IMPACT OF THE 2004 ENLARGEMENT ON THE EU ENERGY SECTOR

CORVINUS UNIVERSITY OF BUDAPEST

REKK REGIONAL CENTRE FOR ENERGY POLICY RESEARCH

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REKK Regional Centre for Energy Policy Research

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E-Bridge Kompetenz in Energie

Directorate-General Energy and Transport

Preface

Dear Reader,

It is a great honour for me to introduce this report, which analyzes the effect of the European Union enlargement on European energy markets. This book represents a very thorough evaluation. This analysis is of high quality, as the study was carried out by the Mercados – Energy Markets International, REKK and E-Bridge at a turning-point, when significant changes regarding the market structure and regulation ensued in the then EU-15 countries and the accessing EU-10 countries. At the time, and even today the EU-15 countries do not form one single energy market, but rather individual national markets. Market issues were and are different in each country. Also, in the accessing EU-10 countries radical regulatory changes, market opening processes and privatisation actions along with regional market building are occurring. The changing regulatory environment, the altering market structure, the continually expanding market processes make it difficult to give one snapshot due to the complexity of the interdependence of processes. The analysing report examines many aspects of the interdependent energy markets, so it contains very useful information for readers on EU energy markets, as well.

The impact of EU enlargement on energy markets has created a two-way effect. On one hand, the national energy markets of new EU counties allows energy companies to more easily expand into a single EU common energy market. On the other hand, the less developed national markets of EU-10 countries will be impacted by the energy market players of EU-15 with regards to capacity balance, energy flows, price and the continuously ongoing regional market building.

Market developments in national and regional energy markets along with perimeter energy markets of the EU-10 countries convey very important messages for energy market players, consumers and legislators. Price signals in some of the energy markets of EU-10 countries, act as very strong warnings which show how the market reacts, if

- “isolated” national markets operate
- there is no healthy capacity-demand balance
- the influence of a dominant player is significant in markets
- the cross border capacities are scarce
- the regulatory environment is immature.

These circumstances are characteristic not only of some markets in the EU-10, but for several national or budding regional markets in the European Union. Overall, they must give signals in order to lower investment risks which can be ensured in a predictable regulatory environment, with a balanced capacity situation in regional markets, with strong cross border capacities and clear market structures. Through this manner, consumers and the economy as a whole will carry a lower risk burden and thus lower energy prices.

When reading the report, it should be noted the incalculable effects that neighbouring countries have on the impact the energy markets, particularly for the new EU-10 countries. This factor highlights the importance of security of supply analyses, which is carried out by the authors especially regarding natural gas markets.

This study, carried out in the area of market opening and competition, calls attention to the market expansion of capital intensive energy companies in EU-15 countries; including market structures as well as the effects on developing competition in the market. Central market processes, the market prices and the evaluation of energy market competition regarding EU-10 counties, in general, meant that by the autumn of 2007 it was too early to be fully evaluated. It is therefore difficult to make conclusions from such an early stage of dynamic market development. The regulated end-user prices give useful information, but not necessarily reflect market conditions. It is worth mentioning that the EU-10 countries cannot introduce common examples from EU-15 regulatory systems, they build different individual models based on their market structure, traditions and circumstances, and EU Directives are only “soft” guidelines in this respect.

Concerning the support of renewable energy sources, the EU-10 countries require the development and more efficient use of the present incentive systems to achieve ambitious new targets in order to not impose an unbearable expense on their energy consumers. The competitiveness of their own economies must be considered in this respect. Unfortunately, best practices were not included in this area either within the European Union (regarding EU-15), since the national support systems include too many individual elements. In respect of co-generation, new member states might draw from the favourable experiences of EU-15 countries as, traditionally, in the continental EU-10 countries, combined heat and power and district heating go back a long way.

The authors of the present report make special emphasis on energy efficiency issues, which underscores the extent of the work new entrants need to do. Energy price signals and the current transmission and generation capacity situation should be acting as appropriate incentives to encourage greater investment into energy efficiency. In addition, the increasing EU emphasis on energy efficiency should serve as encouragement to reduce energy use further.

Regarding regulatory activity – as the report also analyses the legal environment and efficiency of this – I think that the regulators of old and new member states strongly depend on each other to build up regional markets together in order to see the later development of the common Internal Energy Market. The regulators of EU-15 and EU-10 countries can rely on each other’s experiences.

This report makes proposals on each of the examined areas based on the conclusions of the analyses, which prove to be very informative for all stakeholders in the European energy market.

All in all, I wish to congratulate the authors on their useful analytical study, I thank them for the informative data and suggest all European energy market players to become acquainted with the results of the analyses and to consider its proposals.

dr. Gábor Szörényi
Chairman of ERRA
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Introduction

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1 chapter

Dr. Michael LaBelle

1 Introduction

The 2004 enlargement of the European Union with 10 new member states has changed the terms of the security of energy supply within the Union. The expansion brought in countries with a higher public trust in nuclear power, lower energy efficiency and a greater reliance on gas imports from the East. This has also coincided with the restructuring of the Union's energy sector, with the older EU Member States companies expanding into the newer Member States. The focus of this book is on how the EU's security of energy supply has been impacted by the 2004 enlargement. It also considers how the expansion of EU energy policies and regulations further east has impacted at the national and international levels and seen a reshaping of geopolitical relations and foreign energy policy during the same time period.

This book is based on a study funded by the European Commission, Directorate General Energy and Transport (DG-TREN), its intent is to quantify and evaluate the impact of the 2004 enlargement in energy. The broad nature of the study has meant that a wide net has been cast. Specific areas are examined in detail which have significant policy implications and provide important comparative information between the new and old Member States.

There are six broad categories that are examined:

- Disruptions to energy delivery
- Security of supply
- Market opening and competition
- Renewable energy sources
- Energy efficiency
- Regulatory framework and administrative capacity

These categories provide an opening to examine how Member States, both old and new, have been impacted by the Union's significant Eastward enlargement. From the start of the investigation into the impact on Security of Supply it was realized that the date of May 1, 2004 did not usher in a dramatic alteration to energy stability, policy or ways of doing business, rather the years leading up to enlargement and after, demonstrate how progressive the change is. The examination therefore is extends back to these countries' accession talks. In some cases technical changes were introduced from the early 1990s, like the UTCE harmonization and synchronization of electrical codes and grids. This gradual change of policy and standards enabled the accession in 2004 to be a political and social apex of years of technical work. Further efforts in areas of energy efficiency and renewable energy have also been gradually becoming EU compliant.

The new geography of the Union also needs attention. The expansion has brought formerly distant neighbors to its doorstep. Russia and the Ukraine, and in particular gas policies and disputes, are much more relevant and hold the possibility for a larger impact on EU Member States than before. The following chapters go into greater detail in all these issues and seek to reframe EU energy security within this new geography and though new legislative and regulatory structures.

Chapter One sets out to assess whether the 2004 enlargement resulted in disruptions to the European Union's energy grid. For the electricity sector, the joining of new Member States resulted in no disruptions and in fact, may have boosted the security of supply. The additional generation capacity that the Central Eastern European states brought and their abundance of solid fuels helped to boost the availability of generation capacity. However, as the examination of the gas market makes clear, the movement of the EU's border east also brought the EU into the sphere of Russian and Ukrainian gas disputes. As established, these events were occurring for some time, their occurrence post-expansion, along with the increasing reliance on Russian gas has illuminated this running conflict.

In assessing the changes in the European Union's security of supply it is determined that new member states increase the bloc's reliance on imported gas. The reason for this is down to new Member States in the east being more reliant on gas coming from Russia. However, these new states, through their robust transmission system, also increased the security of supply in electricity. Overall, there are on-going efforts through new projects to increase the Union's security of supply. For electricity, there are new interconnectors being built while for gas different pipelines from Russia are being considered as are lines to North Africa.

The privatization of utilities in new member states opened the door for large French, German and Italian companies to move into the region. Chapter Two focuses on these 'foreign' companies expanding into the future new Member States. As explored, they have, through different holding structures, become active in the Czech Republic, Hungary Poland and Slovakia. Also the expansion of CEZ has been notable for its large ability to expand outside the Czech Republic. The geographic spread of investments is notable for the contiguous geographic manner the buying of distribution companies has unfolded. The creation of greater cross-border operation of utilities and increased economies of scale is notable when mapping out their territorial ownership. In addition to the ownership mapping, the financial performance of firms is compared to firms choosing not to expand into the region. The result: firms expanding into the region have seen their share prices rise more than those not.

The security of supply has also risen with the greater use of renewable energy sources. The focus of Chapter Three is on this rising use of renewable energy. As examined, new Member States have been trying to catch up with older states, notably, since 1990 they have increased their share of power production with renewables to 4.5%, double what it was before this time period.

Chapter Four looks to find the role that energy efficiency has played in shoring up the security of supply in new Member States by reducing demand. However, when compared to other efforts like rolling out renewable energy projects or privatization, energy efficiency efforts have not been as successful. For example, the implementation of the Guarantee of Origin scheme is lagging years behind the required implementation. Also, more broadly notable, is that the energy efficiency *acquis* did have some effect in new Member States, but not as extensively as it could have.

The implementation of the energy *acquis communautaire* is considered in its impact on the old and new Member States in Chapter Five. Particular attention is focused on EC Directives 2003/54/EC, 2003/55/EC and Regulations 1228/2003 and 1775/2005. Some areas that are reviewed are third-party access, and the independence of TSOs and DSOs. Further institutional investigation is done to examine the resources of commissions and the independence of national regulators.

The diverse range of issues that impact on the EU's security of energy supply has broadened with the accession of new Member States. The institutional structures in all Member States have been central in ensuring the implementation not only the technical aspects of the energy *acquis communautair,* but the underlining intent that these regulations hold – with the purpose of boosting the EU's security of supply. In order to highlight this purpose, a range of issues are reviewed in this book to establish both the changes within markets and state institutions. The security of the EU's energy supply, as this book makes clear, has been altered gradually over time, but nonetheless in a new direction that future policies and common state actions must recognize. The following chapters provide recommendations for future actions and for future EU enlargements. With the support of the European Commission, Directorate General Energy and Transport it has been possible to provide an in-depth examination of the EU's past, current and future security of its energy supply.

Disruptions and Security of Supply

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2 Disruptions: short term supply security

2.1 Introduction

This section addresses the issue whether the 2004 enlargement has caused any disruption in the functioning of the EU Internal Energy Market (IEM). The effects of and the solutions adopted for any such disruptions are also considered.

The starting point for addressing this issue is the definition of a disruption. For the purpose of this Study we will use the following definition from EURELECTRIC:

> *"A disruption in the functioning of the Internal Energy Market is a situation caused by technical, economic and/or political factors which severely hamper the normal functioning of either the (technical) electricity and gas system or of the electricity and gas market".*

A disruption therefore may result for example from:
- A major outage in the transportation network;
- A major shortage of gas or electricity in a situation where consumers are willing to pay, but supply is unavailable; or
- A situation in which normal market functioning is impacted by political decisions and/or actions.

It is worth noting that this definition can also include situations where the continuity of supply is not affected.

2.2 Electricity Supply Disruptions

2.2.1 Introduction

We have not found any evidence that the 2004 enlargement of the EU has resulted in any major technical disruption of the electricity sector of the Internal Energy Market. No stakeholders reported to us major electricity sector disruptions that could be associated with the enlargement of the Union.

As is discussed below in Section 2.2.2 the UCTE harmonisation process required all the (affected[1]) New Member States' system operators to meet the technical standards of the European electricity system well before the act of political enlargement. This gradual harmonisation process resulted in a smooth technical integration of Old and New Member States' electricity systems.

It should be noted that the most well-known system disruptions of the recent past were the black-out in Italy in 2003, and the system disturbance in UCTE on 4th November 2006, neither of which were related to EU enlargement. Both well known events happened in the western part of Europe (old member states), but they affected the eastern part in both cases, which suffered from an extra high frequency due to the surplus of generation capacity in the "remaining" part of UCTE.

A major lesson from the system disturbance on 4th November 2006 is that the level of coordination of TSOs should be strengthened by setting up an information platform allowing TSOs to observe in real time the actual state of the whole UCTE system, in order to quickly react during large disturbances. The CENTREL TSOs have some experience about central dispatch services for historical reasons and therefore more TSOs in this region have already emphasised the need to establish such a central service provider.

Finally, the analysis of physical electricity flows between the old and new member states, presented in a subsequent Section of this Chapter, also confirms that the enlargement did not disrupt the increasing trend of physical exchanges between these country groups. Rather, central and eastern Europe seems to have become the most 'open' region for electricity exchange within the EU: its electricity with neighbouring regions add up to more than 20% of the region's total consumption[2].

2.2.2. Market Prices – The Event Studies Methodology

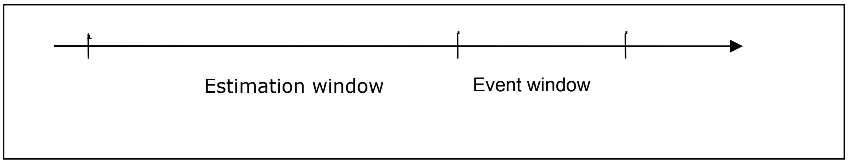
We can also ask whether the enlargement disturbed the European electricity market by shaking up the demand and/or supply side of it, thus causing unexpected price developments in transparent market places. In order to check for such a 'surprise' effect, we have analysed the spot price development of EEX, the most liquid European electricity exchange, around the time of accession by the so called event studies methodology.

The event studies methodology was originally developed to analyse the behaviour of stock returns around certain events. Firstly, we have to define two non-overlapping windows (periods): an estimation window for which we calculate the normal return, and an event window that includes the event we want to analyse.

1 Poland, Czech Republic, Slovakia, Hungary, Slovenia

2 European Commission, Report on the experience gained in the application of the Regulation (EC) No 1228/2003 "Regulation on Cross-Border Exchanges in Electricity", Brussels, May 15 2007, COM (2007) 250, p.3.

Table 2-1: The Estimation and the Event Windows



Source: MacKinley (1997), p. 20.

Let Ř be the normal return, which is the mean of the returns in the estimation window, and let Rt be the return on day t. The difference of these two returns defines the abnormal return:

ARt=Rt- Ř

By definition, the cumulative abnormal return is the mean of the returns in the estimation window. Now consider the cumulative abnormal return for the event window:

$$CAR = \frac{\sum_{t_1}^{t_2} AR^t}{N}$$

where N is the length of the event window (N=t_2-t_1). The null hypothesis is that the event has no impact on the behaviour of returns. We test this hypothesis by t-test. The t-test value is:

$$q = \frac{CAR}{s}, \text{ where}$$

$$s = \sqrt{\frac{\sum_{t_0}^{t_1} AR_t}{T-1}}$$

, where T is the length of the estimation window (T=t_1-t_0).

If t>ca, then we reject the null hypothesis and conclude that the investigated event had indeed an impact on stock prices; otherwise we accept the null hypothesis. (Brown et al., 1980)

2.2.3. Analysis of EEX Forward Prices

To examine whether the event of Enlargement had any immediate impact on market prices, we have to choose the length of the two windows and we have to define the variables to investigate. Following Brown et al. (1985) we chose 50 and 100 days for the estimation window, and 1, 2 and 3 day(s) for the event window. Regarding the variables, we analyse the log of daily EEX forward energy price changes: ln(St/St-1), where St is the price on day t.

There are four main products traded on this platform:

- EEX Baseload Quarter Future (bq);
- EEX Baseload Year Future (by);
- EEX Peakload Quarter Future (pq); and
- EEX Peakload Year Future (py).

The correlations between these derivates are strong, as indicated in the table below.

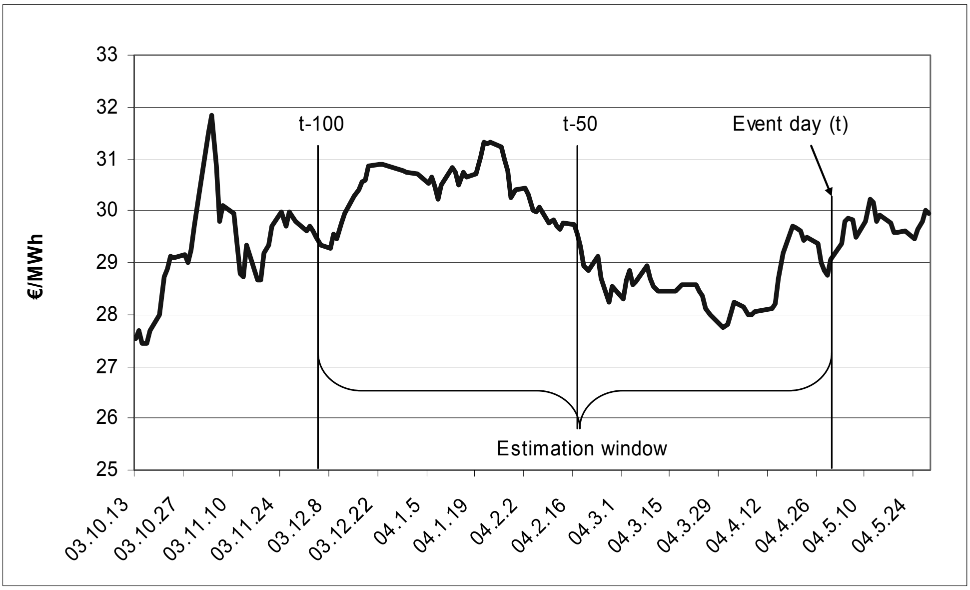
Table 2-2: Correlation Matrix between different Energy Derivates

	bq	by	pq	py
bq	1	0,74	0,73	0,73
by	0,74	1	0,87	0,91
pq	0,73	0,87	1	0,96
py	0,73	0,91	0,96	1

Source: EEX; REKK calculation

Figure 1-1 below illustrates that, for example, the forward baseload price for January 2005 was moving between 27 and 32 €/MWh around the date of Enlargement. The figure also demonstrates our estimation period and the event day (May 1, 2004).

Figure 2-1: Forward Energy Price – Baseload, January 2005



Source: EEX, REKK estimation

By applying the event study methodology for the different products, we get the results included in Figure 1-2

Figure 2-2 Significance Level (p) of the Abnormal Return by different Event and Estimation Window Alternatives

	Estimation window					
	100			50		
	Event window			Event window		
	1	2	3	1	2	3
Baseload - quarter	7,36%	**4,28%**	**4,58%**	9,26%	5,80%	5,80%
Baseload - year	12,17%	14,80%	16,08%	11,39%	13,74%	14,90%
Peakload - quarter	11,03%	9,12%	11,24%	11,41%	8,00%	11,70%
Peakload - year	11,03%	7,71%	9,39%	11,46%	7,08%	9,53%

Source: REKK estimation

In this analysis our null hypothesis was that Enlargement had no significant impact on forward price developments at EEX, in other words that the EU enlargement in itself did not change the future price expectations of market participants. A *p* value lower then 5% means that we can reject the null hypothesis; otherwise we accept it. As can be seen, there are only two cases when the *p* value is lower than (but very close to) 5%, namely when we use the longer estimation period, 2 and 3 day of event window for the quarter baseload derivates. In all the other cases there is no evidence of any abnormal return. We conclude therefore that the event of Enlargement had no significant impact on electricity spot prices at EEX. It seems that the market had already processed all the relevant market information related to the enlargement well before the event itself.

2.2.4. PROTECTIONISM

A specific sort of disruption for normal market functioning is when increasing market integration and import competition leads national legislation or regulation to introduce protectionist measures to impede such developments. The enlargement of the EU electricity market with EU-5 (Czech and Slovak Republics, Hungary, Poland and Slovenia) connected a low generation cost region to the Central European one (Germany and Austria). Relatively inexpensive and abundant electricity, mainly from Poland and the Czech Republic, had already created a competitive pressure for Central European electricity companies, most of all in Austria and Germany, well before the enlargement.

When Austria fully opened its electricity market on 1 October 2000, the Electricity Business and Market Organisation Act (ElWOG) empowered the Austrian regulator (E-Control) to limit third states (that is, non-member states) from which electricity could be imported. Such an import ban could be imposed if the state from which the electricity was to come produced electricity in plants that did not meet state-of-the-art technical requirements, that jeopardised directly or indirectly the life or health of humans, animals or plants in Austria, or that did not dispose of the waste resulting from generation in orderly and adequate ways either in the present nor had any concept of this in the future.[3]

According to the initial intent of E-Control, all the countries east of the eastern border of the EU would have fallen under the ban. This signals the possibility that the original idea behind the provision was a close to full stop to electricity market competition from the east. Because of sharp reactions from accession countries' agencies however, the affected country group was later significantly reduced. This provision of the ElWOG was also later removed in a recent amendment of the Act

.

Despite the happy end of the Austrian story above, protectionism remains an increasingly severe issue for electricity market development in the region, primarily encouraged by the diversity in generation costs and the resulting significant wholesale price differences.

3 Kossuth, K, "Austria case study" in Cameron, P. D (ed), "Legal aspects of EU energy regulation", Oxford University Press, 2005, p.100.

2.3 Gas Supply Disruptions – Introduction

In this section, we provide a description and analysis, in the form of a Case Study, of the gas supply disruptions from Russia. It concentrates on the Ukraine-Russia gas dispute of 1-4 January 2006, which commanded a considerable amount of European and world attention.

The argument is that with the EU enlargement in 2004, relations with Russia have been affected, which has led to Russia reacting in an aggressive way by cutting off gas supplies to its near neighbours, with knock on consequences for the rest of Europe.

This section suggests that that is not the case. Russia has had stormy gas relations with most of its neighbours ever since the break up of the Soviet Union, characterised by gas supply cut offs most winters (in other words a CIS country is more likely to be cut off by Gazprom in the winter than not). There are various reasons for this including:

- Non payment and build up of gas debts;
- Accusations of theft and unauthorised siphoning of gas meant for export.

Into this long history of fraught gas relations, from around 2004 some new factors came into play:

- Turkmen and other Central Asian gas supplies to Ukraine;
- Politics and the emergence of a western leaning Government in Ukraine;
- Steeply rising oil prices and gas prices from 2005;
- EU enlargement.

By bringing the borders of the EU up to Ukraine and Belarus, it is possible that the EU enlargement affected gas relationships within the CIS countries. This does not seem very likely though. What we contend is that there was a long history of gas supply disruptions, further enhanced from around 2005 with sharply increasing international gas prices. The effect of EU enlargement we argue was that countries which were formerly in the Soviet block are now in the EU and their complaints have a wider audience. Russia has not changed its approach but the protestations of its “victims” are now heard more loudly.

2.4 Ukraine 2006

2.4.1 Introduction to January 2006 Ukraine Gas Crisis

Ever since Ukraine gained independence from the Soviet Union, Ukraine had been negotiating with Russia over gas supplies to Ukraine and their payment. Problems came to a head at the end of 2005 and on Sunday 1 January 2006, Gazprom cut off gas supplies to Ukraine.

The effect on western Europe as well as on Ukraine was immediate. Pipeline pressures to western Europe started falling and Gazprom said that Ukraine was diverting transit gas supplies intended for western Europe to the domestic market. European countries reported the following reductions in gas supplies:

- Ukraine: 100% cut in Russian imports;
- Slovakia: Reported transit gas flows reduced 30% by Monday 2 January;
- Hungary: Russian supplies reduced 40%;
- Poland: Immediate 14% supply reduction, later reported 1/3 reduction;
- Austria, Slovakia and Romania: Gas supplies reduced by one third;
- Germany; Reported reductions in gas supplies but did not say by how much;
- France: Reported a 25%-30% reduction in gas supplies;
- Italy: ENI reported a 25% reduction (around 32 million cubic metres) during 1-3 January 2006.4

Crisis meetings took place between Ukraine and Russia and the gas crisis was soon resolved. Gazprom promised to put an extra 95 million cubic metres a day into the pipeline system to compensate for Ukrainian withdrawals. By 3 January, Austrian and Hungarian supplies were back to normal and by 4 January Russian supplies were back to normal for all of Europe.

These reductions in gas supply were reported to have taken place immediately (the same day) upon Ukraine being cut off

Although the situation was restored within four days and there were no disruptions in gas supply to any European customers, the incident nevertheless received major attention throughout Europe with many crisis meetings to try to resolve the situation.

On 4 January 2006, Russian Gazprom and Ukrainian Naftogaz Ukrainy reached agreement for a five year contract (4 January 2006 to 1 January 2011) with the following main terms:

"Agreement on the Settlement of Relations in the Gas Sphere:

1. Gazprom will pay Naftogaz a tariff of $1.60/mcm/100km for transit of gas to Europe.
2. RosUkrEnergo will be the company which delivers gas to Ukraine. From 1 January 2006, Gazprom will not be the supplier of Russian gas to Ukraine, and Naftogaz will not export any gas which it has received from Russia.
3. RosUkrEnergo and Naftogaz will form a joint venture by 1 February 2006 in order to market gas in Ukraine which has been received via the territory of the Russian Federation.
4. RosUkrEnergo's annual gas balance will consist of:

For Purchases:

- 41 bcm of Turkmen gas purchased by Gazexport and Naftogaz Ukrainy;
- Up to 7 bcm of Uzbek gas purchased by Gazexport with the specific aim of swaps with deliveries to South Caucasus countries;
- Up to 8 bcm of Kazakh gas purchased by Gazexport with the specific aim of swaps with deliveries to Caucasus countries;

4 Sources: BBC News Website: http://news.bbc.co.uk/1/hi/world/europe/4575726.stm;
FT, Stand-off cuts gas supplies to Europe, 2 January 2006

- Up to 17 bcm of Russian gas purchased from Gazprom with a price determined by a formula based on the base price of $230/mcm annually.

For Sales:

- In 2006, 34 bcm of gas will be sold by the joint venture (between RosUkrEnergo and Naftogaz by 1 February 2006) at $95/mcm during the first half of 2006 for sale in the domestic Ukrainian market without the right to re-export;
- From 2007, 58 bcm of gas will be sold by the joint venture (between RosUkrEnergo and Naftogaz) to the domestic Ukrainian market without the right to re-export;
- 15 Bcm of gas may be exported in a joint programme with Gazexport.

5. The rate of transit fees and the prices of natural gas, as defined in this Agreement, may be modified only by mutual agreement of the parties."5

The following description gives the background to the gas crisis and the final agreement.

2.4.2 Long History of Non-Payment

The background to the gas crisis of January 2006 goes back a long way, and had been brewing ever since Ukraine's independence on 24 August 1991. Ukraine's economic history in the 1990s was similar to that in almost all of the Former Soviet Union countries. As the old Soviet economic order collapsed the economies in the region collapsed. The early 1990s in Ukraine saw hyperinflation, a rapid and large decline in intra-CIS trade (and little if any increase in trade outside the CIS region), and most of the industrial base of Ukraine ceased. From 1991 to 1997, GDP fell by 68% and GDP per head fell to $2,000 and from 1994 to 1999 the economy contracted at an average -8.4% a year6. Those quoted figures of $2,000 GDP per head overestimate the reality though for most of the population. In a country where Oligarchs were accumulating wealth to themselves, for much of the population, if not the majority, incomes fell to less than $1 a day and with an average of some four months wage arrears across the economy (source: Mercados). That situation remained until the turn of this decade.

The disastrous economic situation combined with strong political forces affecting Ukraine. The country was torn (and very much still is) between the Ukrainian (formerly Polish) western agricultural region and the industrial Russian east. There were and still are also tensions between the industrial groupings around the eastern cities of Donetsk and Dnieprepetrovsk. At the same time the end of the Soviet Union led to conflicts between those politicians who wanted to maintain the old communist order and those "New Ukrainians " who wanted to expropriate as much of the national wealth as possible. The turmoil in Ukraine reflected similar turmoil in many Former Soviet Union countries, including Russia itself. Many political and security analysts predicted that Ukraine would cease to function as a nation and would dissolve. It is an achievement that the country came through the turmoil and remains a single, largely united and an independent country. In such a situation of economic collapse in the 1990s, it was perhaps to be expected that Ukraine would not be able to pay for its gas imports, and it didn't.

5 Source: Pravda News Ukraine website: http://www2.pravda.com.ua/ru/news_print/2006/1/5/36448.htm

6 Simon Pirani: Ukraine's gas sector, Oxford Institute for Energy Studies, June 2007

2.4.3 Strategically Important Gas Transport and Storage Assets in Ukraine

In Soviet times cheap Russian gas had been used to supply Ukraine and Ukraine was very dependent on Russian gas imports. The interdependence was mutual though. Russia supplied 100% of its gas supplies to western Europe through Ukraine. Russian Gazprom managed its downstream supplies to western Europe through some massive gas storage fields in the far west of Ukraine.

Working gas storage in western Ukraine in 1998 was 27 bcm (source: Mercados). This was over half of the total gas storage in western Europe in 1998 (44 bcm, source: IEA). The main gas storage site to note is Bilichevolitske, a depleted gas field in the far west of western Ukraine which was turned into a seasonal gas storage. Bilichevolitske was and is by far the largest gas storage facility in Europe, it was by itself nearly half (40%) of western Europe's entire gas storage. The western Ukrainian gas storage facilities (and especially Bilichevolitske) was and is used as massive market area gas storage for Russian Gazprom to manage its gas supplies to Europe. When the gas production is so far away in western Siberia, having a large gas storage facility close to market has a considerable value to Gazprom.

The importance of Russian gas to western Europe is well understood in Europe, where Russian gas supplies make up such a large proportion of European gas supplies. Through the 1990s all (100%) of that gas passed through Ukraine, and much passed through the western Ukrainian gas storage facilities. The Russian and Ukrainian gas economies are therefore closely tied together. The gas infrastructure was built in Soviet times and was not built with the expectation that the Soviet Union would be broken up. The result was that Russia had to deal with Ukraine, had to transit its gas through Ukraine and had to make use of the Ukrainian based storage facilities. This led to annual negotiations over gas deliveries, prices and payments.

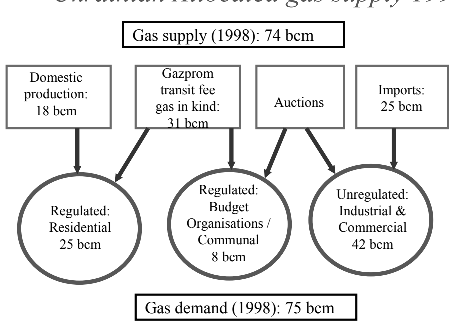
During most of the 1990s Ukraine paid more for its gas than western Europe (reflecting the extra risk of Ukraine). There were two major problems affecting these annual gas negotiations between Russia and Ukraine:

- Use of barter and non cash payments;
- Lack of payment by the Ukrainian side;

2.4.4 Barter Payments

Gas purchases by Ukraine were characterised by Inter-Governmental agreements, barter arrangements and non cash payments. Again this is similar to the arrangements in many other CIS countries. The Czech and Slovak Republics quickly moved away from this by paying for their gas in cash and in receiving cash from Gazprom for gas transit through their countries. The Ukrainian gas industry was also characterised by a policy of allocations of gas from the different sources to different markets. The allocations for 1998 can be shown as follows (source: Mercados):

Ukrainian Allocated gas supply 1998



Gazprom transported large amounts of gas through Ukraine on its way to western markets. As a transit fee payment, Ukraine received gas as payment in kind, and in 1998 Ukraine received 31 bcm as transit payment in kind. In the annual negotiations between Russia and Ukraine, the amount of transit payment was connected to the nominal price Ukraine paid for gas imports from Russia. Although the annual negotiations were protracted and often fraught, through the 1990s the prices finally negotiated remained fairly constant. Although the final agreement and payments were in barter, the calculations were carried out in nominal prices of US$ per thousand cubic metres ($/mcm). Ukraine paid approximately $50/mcm at the Ukraine-Russia border for gas imports and was paid approximately $1.094/mcm/100km for gas transit. The transit fee included the use of the Ukrainian gas storage and in effect Gazprom received the benefit of the storage for free (or at least rolled in). A sample of prices for the late 1990s is shown below.

Table 2-3: Ukraine Border Price and Transit Fee (1997, 1998, 1999)

	1997	1998	1999
Border Price ($/mcm)	80	50	45
Transit Quantity (bcm)	120	120	110
Transit Fee (bcm)	31.5	31.4	32.0
Transit Fee ($/mcm)	21.0	13.1	13.1

Source: Mercados

Although a characteristic of many CIS countries, the use of barter and payment in kind led to many problems. A barter good was traded on average some six times before it was eventually turned into cash (then usually in an offshore or foreign account), barter payments also avoided the payment of taxes. The use of “split barter schemes” by gas traders was a very complicated and very lucrative method by which gas could be turned into cash in a foreign account. It involved the participation of parties from the producers in Russia, Ukrainian gas traders and industrialists in downstream countries (such as Czech or Slovak Republics or Germany).

2.4.5 Ukrainian Gas Debts for Black Sea Fleet

The second major problem was the non payment by Ukraine. We believe that throughout the 1990s, Ukraine never actually paid cash for any gas it received (source: Mercados). In 1991-1994, Ukraine accumulated gas debts to Russia of $4-4.5 billion7. As gas debts built up, the Russian authorities tried various methods to overcome the problem. The first approach during the early to mid 1990s was to try to cancel debt in return for control of all or parts of the Black Sea Fleet, Ukrainian airforce and Ukrainian nuclear warheads. The Russian and Ukrainian Governments agreed to split the Black Sea Fleet 50:50 each, with Russia then buying extra proportions in return for cancellation of Ukrainian debts (gas debts). Russia ended up with 81.7% of the fleet and Ukraine with 18.3% of the fleet. Russia then leased the ports around Sevastapol for 20 years at $97.95 million, the payment again being offset against Ukrainian (gas) debts[8].

7 Simon Pirani: Ukraine’s gas sector, Oxford Institute for Energy Studies, June 2007

8 Jakob Hedenskog and Robert Larsson, “Russian Leverage on the CIS and the Baltic States”, FOI Swedish Defence Research Agency, June 2007

Separate agreements then permitted Russian control over the Ukrainian nuclear warheads. Precise information on these arrangements is hard to come by but the author of this gas section believes that in subsequent gas debt negotiations in the late 1990s, certain parts of the Ukrainian airforce were later handed over in return for forgiveness of some gas debts.

2.4.6 Accusations of "Theft" and Supply Disruptions

Nevertheless, by the end of the 1990s, Russia seemed to be becoming increasingly frustrated with Ukraine and what it saw both as Ukrainian non payment for gas supplies and also for alleged theft of Russian gas. Gazprom estimated that in 1999 Ukrainian gas debts had increased to $1.5 billion, while at the same time Gazprom had lost $720 million from Ukrainian thefts of Russian transit gas[9].

Russia has regularly accused Ukraine of stealing gas destined for western Europe. This has been a complaint from 1991 and was a major contributory factor to the gas crisis of January 2006. Whether gas has in fact been stolen, and if so by how much, are very difficult questions to answer. Points to consider in this are:

1. Gas supply to Ukraine was characterised by allocations but gas molecules do not behave in such a way. The Government could decree that transit fee gas (for example) is sold to the residential market and Budget Organisations, and paid for (or not) gas imports to the unregulated market, but in reality the gas is in a mixed stream and goes wherever the pipeline networks allows it to.
2. On a cold winter day (which it was on 1 January 2006 in Ukraine), customers (residential and industrial) turn on their burners and take more gas. Customers do not consider where the gas comes from and whether they are entitled to take it. In liberalised markets such as the UK or USA, the responsibility lies with the gas supplier. It is the supplier's responsibility to balance gas taken by his customers with gas he buys and puts into the system, and that is managed through a Network Code. Although it had many market participants (many traders and gas suppliers), Ukraine did not have a functioning Network Code and did not have a mechanism for balancing inputs to and outputs from the system.
3. On a peak day therefore, customers take more gas, and if there is less put into the system, then there is less to be passed on downstream. It is a situation that the Ukrainian gas transport company could do little about (short of immediately physically turning off the valves and cutting off supplies to much of Ukraine). We would argue that this was the result of poor commercial arrangements within Ukraine and not the result of deliberate "theft".
4. Another problem lies with metering. The border points and major storage sites have good quality meters with an inaccuracy of less than 1% (world class quality metering). Other meters though were less accurate, and supplies to many industrial customers and Oblgas (distribution companies) are very inaccurate (sometimes up to 30%). An industrial customer would receive a bill from three parties (the producer, transporter and trader) and every month they would agree the amount consumed and sign an "Act" to that effect. The meter reading would then appear later. Another problem which existed for a few years until the late 1990s was that at the Russia-Ukraine border the meter reading was only taken on the Russian side. There was then a Russian village (downstream of the meter) before the border. For all of these reasons, it was and remains very difficult to know actually how much gas has been taken and consumed by Ukrainian customers.

9 Chloë Bruce, "Fraternal Friction or Fraternal Fiction? The Gas Factor in Russian-Belorussian Relations", Oxford Institute for Energy Studies, March 2005

5. At the same time, there is some evidence that there has been real theft of gas in the past within Ukraine. During the 1990s when there were many gas traders (in the late 1990s there were up to 5,000 licensed gas traders), various illegal schemes did take place. Sometimes a trader would sell the same block of gas to several customers, take payment from them and then disappear. At other times a gas flow would be diverted from a legitimate customer (such as a village) for another purpose connected with a split barter scheme arrangement. Different parties would be involved in these illegal activities including parties within and outside Ukraine.
6. In an important build up to the January 2006 gas crisis, in May 2005, Gazprom accused Ukraine of stealing 7.8 bcm of gas it had deposited in Ukrainian storage the previous summer (2004). The gas was not made available during the winter of 2004-2005 despite 40 requests by Gazprom from 14 October 2004 to 22 March 2005. Ukraine could not physically have stolen that precise gas because it was at the far west of the country, downstream of any Ukrainian customers. What would have happened was that the stored gas could have been used to meet Gazprom commitments to western European customers and that gas was not made up with supplies from Russia into Ukraine (presumably because they were diverted to Ukrainian customers). Various explanations were given by the Ukrainian side as to where the stored gas went, but it subsequently transpired that there was sufficient gas in storage to meet Gazprom's requests. Clearly something fishy had gone on. The issue then was how the gas was to be paid for and delivered. Initially Gazprom wanted to subtract the volumes from Ukraine's transit fee gas, to which Ukraine replied that in that case gas in transit to western Europe would be taken and used within Ukraine. Gazprom then suggested that if Ukraine took gas destined for western Europe, then it should pay the European export price (which would have cost over $600 million). The final arrangement was that 2.55 bcm would be repaid from the transit fee and 5.25 bcm would be delivered to the JV Russian-Ukrainian trading company RosUkrEnergo during 2005-2006[10].

In conclusion, we believe that it is harsh for Russia to accuse Ukraine of stealing all the gas that does not transit through to western Europe, but on the other hand there are examples of where theft has taken place within Ukraine. In 2001, the Ukrainian Deputy Prime Minister (Oleg Dubina) acknowledged that 8.7 bcm had been siphoned off from export volumes in 2000.

2.4.7 Regular Gas Supply Disruptions in 1990s

As a result of these accusations of theft, Russia has regularly cut off gas supplies to Ukraine. This happened in **1992**, **1993** and **1994**. In October 1992 there was a serious disruption when for a period of around 10 days, supplies to Germany were 20-50% below contracted levels. Some months previously Turkmen suppliers had cut supplies to Ukraine due to price disputes and Gazprom debts from Ukraine had risen to high levels.

In March 1993 there were allegations of Ukrainian diversions of gas supplies, and in September 1993, Russian gas supplies transiting Ukraine for Bulgaria, Romania and Turkey were reduced substantially.

In February 1994, due to the rising gas debts from Ukraine, Gazprom again reduced its gas supplies to Ukraine, which again led to diversions of Russian gas from the transit pipelines. This affected some 20% of western European gas supplies, with importers in France, Germany and Italy reporting falls in deliveries.
Ukraine and Russia resolved this gas crisis by agreeing in April 1994 that Gazprom would

10 Jonathan Stern: The Russian-Ukrainian gas crisis of January 2006, Oxford Institute for Energy Studies, 16 January 2006

store 10 bcm of gas in Ukrainian storage for deliveries to western European consumers during the winter. However in November 1994, gas supplies to western Europe were again being disrupted. At first the Ukrainian authorities stated that they had not diverted any gas, the problem coming from a reduction in Turkmen gas supplies due to a pipeline accident in Central Asia. By the first week of December 1994 however, Ukraine admitted that it had diverted Russian gas transit volumes after Russia had cut gas deliveries to Ukraine in response to Ukrainian non payment of gas debts. The result was a diversion of around 20% of volumes which should have been delivered to western Europe, to meet Ukrainian gas demand[11].
There have been several other instances of supply disruptions and the author of this gas section personally recalls supply disruptions in **1997** and **1998**. In reality therefore during the 1990s, Russia regularly (almost every year) cut off gas supplies to Ukraine during the winter for up to two weeks.

The conclusion of the analysis of the 1992-1994 disruptions (from Jonathan Stern) was that:

- These disruptions did not involve a complete disruption to western Europe, they were up to a 50% disruption at the very most, the disruptions were only for days, and there were always ample warning of the disruptions;
- These disruptions take place in spring and winter, when Ukraine is shortest of gas and its gas storage is depleted, but no disruptions took place during times of severe winter in western Europe.

It seems therefore that Ukraine was prepared to use gas diversion as a tool in its gas pricing, supplies and gas debts negotiations with Russia but it was aware of the potential affect on Western Europe and did not take any drastic action that would seriously affect gas supplies to western Europe. It was thought in the 1990s that these gas supply disputes between Russia and Ukraine did not constitute a serious risk to security of supply.

2.4.8 Attempts to Acquire Transit Pipelines

From the second half of the 1990s a consortium consisting of Gazprom, Shell and Ruhrgas (now E.ON) has been trying to acquire the Ukrainian gas transit pipeline system. Gaz de France has also indicated an interest in participating in this consortium. This consortium has been trying to either swap control of the transit pipeline for forgiveness of past gas debts, to buy the transit pipeline for cash, or to have the right to build a new transit pipeline. These attempts have been unsuccessful because of the Ukrainian Government's reluctance to hand over control of such an important strategic asset to foreign interests. We believe that although unsuccessful, attempts are still being made to swap gas debts for transit assets.
An EU funded (Inogate) project is currently in the final phase of valuing the gas transit pipeline and advising on ways for restructuring its ownership and operations.

2.4.9 Attempts to Build "Direct Line" Pipelines

In another attempt to deal with the "Ukrainian problem", Gazprom has been keen to build "by-pass" or "direct line" pipelines, bypassing Ukraine. To duplicate a gas transport pipeline network, particularly such a high volume and long one, is a very expensive option and one normally only to be taken as a last resort. Such though are the straits that Gazprom found itself in.

11 Jonathan Stern, "The Russian Gas Bubble: Consequences for European Gas Markets", Chatham House 1995

The first direct line pipeline is the Yamal pipeline through Russia and transiting Belarus to Poland. This is bringing gas supplies from the Yamal field in western Siberia via Russia and Belarus direct to Poland and on to Germany. It is a 24.5 bcm a year capacity pipeline. It is the first pipeline supplying Russian gas to western Europe that completely by-passes Ukraine. Its capacity though is still only a small proportion of the 90 bcm capacity Brotherhood pipeline through Ukraine. The Nord Stream gas pipeline project now under development, taking gas from Russia through the Baltic Sea to Germany will add another 28 bcm of gas transit by-passing Ukraine. The two projects together will reduce Russian reliance on Ukrainian transit from 100% to just over 60% (which will still remain considerable).

Against this the planned 28 bcm Nabucco pipeline which is planning to take Caspian Sea gas (avoiding Russia) is planned to transit through Ukraine.

In conclusion therefore, Russia is attempting to diversify away from complete reliance on Ukrainian transit but Ukraine will remain the dominant transit country, and in energy terms probably the strategically most important transit country in the world.

2.4.10 New Factors from 2000

This then was the status quo at the turn of the century: a strategically very important asset (the transit pipeline and storage), barter payments and low prices, accumulating gas debts and attempts to resolve them, and supply disruptions. Several new factors then came into the scene at the same time which were to destabilise the volatile situation:

- The Putin era in Russia, leading to greater Gazprom control over gas supplies;
- The “Orange Revolution” in Ukraine;
- The rising international oil price, and with it rising international gas prices;
- The EU accession and the EU border now brought to the border with Ukraine.

2.4.11 Trading Companies

Gas supply arrangements between Ukraine and Russia have been characterised by the use of intermediary gas trading companies. While the companies have changed on a frequent (almost an annual) basis, there has remained considerable continuity in the gas trading arrangements. Gas trading was introduced in Ukraine in 1996 when selected gas traders were allocated geographical areas where they had monopoly rights to sell gas. The system was rapidly abused and used for certain gas trading companies to extract wealth. Pavlo Lazarenko was Prime Minister and an executive of the gas trading company “United Energy Systems of Ukraine” (UESU), which was headed by Yulia Timoshenko (named the “Queen of Gas” and who later became for a while Prime Minister under the Orange Revolution). Pavlo Lazarenko was subsequently dismissed as Prime Minister, and arrested and imprisoned in the USA for money laundering. Itera (the Russian trading affiliate of Gazprom) was also a major beneficiary of gas trading.

The system of allocated geographical areas was soon ended and a more open market in gas trading ensued from 1998. A new state holding company was created in 1999, “Nafatogas Ukrainy” to bring together under state control all the various gas interests in the country. Its gas trading arm was “Torgovy Dom” (literally: Trading House). Under the new arrangement, Itera was chosen as the Russian gas supplier.

When President Putin came to power in Russia, various changes were made to the trading arrangements. Itera (registered in Miami) was seen as a Yeltsin era company, and one which had very quickly grown very powerful on the back of Gazprom and its relationships with Gazprom managers. Putin brought the Russian gas business back under the control of Gazprom (a state owned company) and considerably reduced the influence of Itera.
In Ukraine from 2002, Naftogas Ukrainy brought an end to discount schemes operated by other gas traders and considerably reduced the number and influence of the other gas traders (including Itera).

2,4.12. Turkmen Gas Supplies

From 2002, Ukraine started importing gas from Turkenistan and paying Russia for transit through Russia. In 2002, Naftogas Ukrainy bought gas from Turkmen Neftegas at the Turkmen-Russian border, sold it to Itera and then bought it back from Itera at the Ukraine-Russia border. Itera managed transport through Russia.

In January 2003, Itera was replaced as the Central Asian gas trader by a new gas trading company set up in Ukraine to manage Ukrainian gas imports from Turkmenistan: "Euro Trans Gas" (ETG). Cedric Brown (the former CEO of British Gas) was appointed as Chairman but despite this "big name" fronting the company, the ownership and management of Euro Trans Gas remained opaque.

In the summer of 2004, the Russian and Ukrainian Governments, and Gazprom reached agreement for the deliveries of Central Asian gas and the settlement of past gas debts. A Gazprom loan to Naftogas Ukrainy was used to pay off past debts. Agreement was reached for Russian gas transit payments to Ukraine of 21-25 bcm a year from 2005-2009 (based on a notional price of $50/mcm and $1.09375/mcm/100km for transit),12.

From 1 January 2005, Euro Trans Gas was replaced as the trading company by a new company: "RosUkrEnergo" and was contracted to transport 44 bcm in 2005. Whereas Euro Trans Gas was a Ukrainian venture, RosUkrEnergo was a Joint Venture of Gazprom and Ukrainian interests. RosUkrEnergo allows Gazprom to take a more direct role in supplies of gas to Ukraine.

RosUkrEnergo are not only active in the Central Asian to Ukraine gas trades. It is also one of the new entrants trying to enter the Hungarian and Polish gas markets.

Although there seem to be constant changes in trading company and arrangements in fact there was considerable continuity. One group of people (Dmytro Firtash and associates) have been key figures in all of the companies involved in the Central Asian gas supplies13.
Gas supplies from Turkmenistan had the same kind of problems as those Russia had earlier experienced. In early December 2004, Turkmen authorities requested a price increase from $42/mcm to $60/mcm. On 31 December 2004, Turkmen gas flows were then abruptly halted and started again on 3 January 2005 at a new price of $58/mcm (half in cash and half in barter). RosUkrEnergo then took over the trading role.

Following the January 2006 gas crisis, the trading arrangements were changed again. RosUkrEnergo continued as the gas supplier to Ukraine but a new gas trader was established

12 Jonathan Stern: The Russian-Ukrainian gas crisis of January 2006, Oxford Institute for Energy Studies, 16 January 2006
13 Simon Pirani: Ukraine's gas sector, Oxford Institute for Energy Studies, June 2007

for supply within Ukraine: “Ukrgaz-Energo”. Ukrgaz-Energo contracted to buy 34 bcm from RosUkrEnergo in 2006 and 58 bcm from 2007 onwards. This meant that RosUkrEnergo was established as the key Central Asian gas supplier to Ukraine, and also that Naftogas Ukrainy lost its near monopoly in gas trading within Ukraine (which it had held since the demise of Itera in 2003). These changes in effect handed more power to Russia and Gazprom.

To further complicate matters, at the end of 2005, Gazprom announced that it had contracted for 30 bcm of Turkmen gas to be delivered in 2006, at a price of $65/mcm. Gazprom had purchased all available gas and capacity from Turkmenistan for the first part of 2006, leaving none for Ukraine. The existing Ukraine-Turkmenistan contract could not be met.

2.4.13. Orange Revolution

The above description and analysis shows that if nothing else, the gas business is a very political one, with powerful national and international forces at work. The political background changed at the end of 2004 with the “Orange Revolution” and the election of Victor Yushchenko as President of Ukraine. The Presidential elections at the end of 2004 were keenly fought and were very closely followed by the Russian, American and European Governments. Victor Yushchenko was western leaning and American backed and his rival Victor Yanukovich was supported by the previous President (Leonid Kuchma) and the Russian Government. Victor Yanukovich narrowly won but the result was annulled due to allegations of vote rigging. In the rerun Victor Yushchenko won and was elected President in early 2005, with Yulia Timoshenko (the Queen of Gas) as his Prime Minister.

The election of a pro-western Government in Ukraine was a serious concern to President Putin in Russia. The gas supply disruption of January 2006 (just one year later) was a possible consequence of this change in politics. Yulia Timoshenko did not really deliver and in September 2005 she was dismissed as Prime Minister. In the ensuing reshuffles and negotiations, Victor Yanukovich was eventually appointed as the new Prime Minister in August 2006. In Parliamentary elections in March 2006, Victor Yanukovich’s party won the most votes.

It could be argued that the gas crisis was orchestrated by Russia to destabilise Ukraine and help to bring back the Russian leaning Victor Yanukovich. It could be equally argued though that the January 2006 disruption was just one in a long line of almost annual cuts in gas supply to Ukraine.

A new initiative from the Yuschenko Government was in the spring of 2005 when it was suggested that gas transit tariffs should be moved to European levels and paid in cash, in dollars. Gazprom received this enthusiastically as it meant Gazprom could charge European levels for gas sales to Ukraine, it also implied that the summer 2004 agreement was being put aside. In July 2005 the Russian Duma voted that all the western CIS countries (Estonia, Georgia, Latvia, Lithuania Moldova and Ukraine,) should pay European levels for gas.

The new Ukrainian Government also at the same time reopened two other issues of the 2004 gas agreement. Firstly the Government questioned whether the loan for gas debts was not excessive (i.e. that the gas debts were valued too highly). Secondly the Government raised the issue of RosUkrEnergo. In July 2005 the authorities launched a criminal investigation into RosUkrEnergo and its predecessor Euro Trans Gas, alleging that a subsidiary of the Austrian Raffeisen Bank as a 50% shareholder was concealing the criminal activities of certain Ukrainian individuals. RosUkrEnergo denied the allegations.
During the final three months of 2005 negotiations continued between the Ukrainian and

Russian authorities but failed to make progress. Gazprom demanded that from the beginning of 2006, Ukraine should pay “European” prices of $160-230/mcm unless it was handed an equity stake in the transit pipeline network. Ukraine replied that it would pay market prices but it needed time to phase them in and could not pay more than $80/mcm in 2006.

A further complication was when Gazprom purchased all available capacity from Turkmenistan for the first part of 2006, leaving none for Ukraine.

2.4.14. Rising Oil Price

Another very important new factor which affected Ukraine-Russia gas relations, and perhaps the most important one, was the increase in the world price of oil and with it the gas price. The oil price and its relation to the wholesale gas price is considered below in Section 4.4. From the time of Ukrainian independence in 1991 until 2004, European gas prices were fairly constant, at around $110/mcm. They started to rise from 2000 but from 2005 European gas prices started to rise dramatically.

Gazprom sources show a similar picture:

Table 2-4: Russian Gas Export Prices (1998 – 2005, $/mcm)

Year	Average Export Prices to Europe	Average Export Prices to Baltics / CIS	Export Prices to Ukraine	Difference (EU Price less Ukraine Price)
1998	38	28	50	-12
1999	46	34	50	-4
2000	103.2	53.3	50	53.2
2001	120.1	48.3	50	70.1
2002	105.9	53.2	50	55.9
2003	134.1	49.8	50	84.1
2004	139.6	54.2	50	89.6
2005	192.5	60.7	50	142.5

Source: Simon Pirani: Ukraine’s gas sector, Oxford Institute for Energy Studies, June 2007; Gazprom Annual Report; Column 5: Mercados

During the late 1990s Ukraine paid more for its wholesale gas than western Europe but from 2000 received a lower price. Russia could afford for various political reasons to keep a lower gas price to its CIS partners when the difference between CIS prices and European prices (after deducting the transit cost) was not very much, but from 2005 the difference became much larger.

The higher price charged to Ukraine than for European export markets in the 1990s reflects the barter deals Ukraine took. Ukraine paid more for its gas because of the barter and non cash payments. From 2000 though, Ukraine was receiving the advantage of non cash payments but also paying less than export markets. From 2005 the situation became unsustainable.

2.5 Belarus 1990s, 2004 and 2006

2.5.1 Gas Debts and Disruptions in 1990s

Ukraine is not the only country to have had gas supply disruptions from Russia recently. Unlike Ukraine for a while in 2005 (since the Orange Revolution) Belarus has retained very close relations with Russia and can be counted as a close Russian ally. Nevertheless Belarus has also been engaged in bitter gas disputes with Russian Gazprom14.

As with Ukraine, Belarus has long had problems in paying for gas debts and has also had gas supply disruptions from Gazprom. Soon after Belarussian independence, Russia and Belarus signed an agreement whereby Belarus sold its share of former Soviet assets held abroad in return for the cancellation of state debts, mostly owed to Gzprom. By August 2003 however, Belarus gas debts had increased to $100 million and Gazprom cut supplies. Belarus obtained an IMF loan to pay that set of gas debts but there were continuing gas (and also oil) disputes between Belarus and Russia continuing to the present day.

Gazprom was very keen to gain control of the Belarus gas assets (held by the state gas transport company Beltransgaz). In September 1993, Belarus agreed to lease Beltransgaz assets to Gazprom for 99 years and to ensure the "uninhibited transit of Russian gas across its territory for export". In return Russia agreed to increase gas supplies to Belarus: to 21 bcm by 1995, 26 bcm by 2000 and 33 bcm by 2010. Despite the agreement, it was not ratified by the Belarus Parliament and disputes have continued since.

In April 1994, Russia and Belarus agreed a proposed monetary union, in which Belarus agreed to allow for the stationing of Russian troops on Belarus territory without charge, in return for subsidised energy prices from Russia. Again this was not implemented, but both attempts show the efforts Russia made to obtain Belarus gas assets and to link gas with political objectives.

In March 1997, the Russian Government ordered the Chief Executive of Gazprom, Rem Vyakhirev, to pay $1.2 billion in back taxes. Gazprom responded by leaning on those of its CIS neighbours with gas debts. In the case of Belarus, supplies were reduced three times in a year: by 50% in **July 1997**, by 30% in **April 1998** and by 40% in **June 1998.** Belarus paid for just 8% of its gas supplies in cash, the rest in barter of some form. In May 1998, Gazprom reached agreement with Belarus where 26% of gas supplies would be paid for. Despite the agreement this did not happen and Belarus gas debts rose to $270 million. Gazprom then reduced supplies to Belarus in June 1998.

At the end of 1998 another attempt was made to settle Belarus gas debts. This time a creative financing arrangement was put together in which Belarus would borrow $200 million from banks to pay Gazprom, which would transfer the same sum to the Russian Federal Treasury to cover back taxes. The Russian Ministry of Defence would invest this in the army which would in turn buy Belarus goods, which would enable Belarus to repay the bank loans. There still remained $350 million of gas debts, which would be paid through $50 million worth of goods supplied from Belarus to Gazprom, $100 million in cash and the rest in state bonds.
Having more or less normalised commercial relations, Belarus then tried to renegotiate a lower gas price from Gazprom. In early 1999 Belarus asked for Russian domestic gas prices

14 Chloë Bruce, "Fraternal Friction or Fraternal Fiction? The Gas Factor in Russian-Belorussian Relations", Oxford Institute for Energy Studies, March 2005

and Gazprom agreed to lower the price from $40 to $32/mcm. Belarus then negotiated a lower price of $30/mcm. This price was negotiated in direct negotiations with the Russian Government, bypassing Gazprom. Gazprom then reduced gas supplies to Belarus by 12% in **February 1999**.

Gas supplies from Russia to Belarus were next reduced in **April 2000**, by 40%. There were also threats of further gas reductions as Belarus gas debts had increased again, this time to $260 million. In November 2000, Belarus and Gazprom had reached agreement, with Belarus paying a very low price of $30/mcm, and receiving very low transit fees for Russian transiting Belarus (a third lower than Ukrainian transit fees).

2.5.2 Gas Supply Disruptions 2002 and 2004

In April 2002, Belarus and Gazprom reached agreement whereby Belarus would receive cheap gas, in return for a Russian-Belarus joint venture where Gazprom would receive 50% of Beltransgaz. This agreement remained unfulfilled however and relations deteriorated again. Another problem arose over prices. Belarus was only paying Gazprom $19-20/mcm and Gazprom only supplied 10.2 bcm instead of the required 18.5 bcm. The remaining gas was supplied by Itera who charged $28/mcm. Itera then raised its price to $36/mcm. Unwilling to pay the higher price, Belarus then took gas from its Gazprom quota. Gazprom sent a warning to Belarus to halt its unsanctioned gas usage. Gazprom then cut gas supplies by 50% on 1 November 2002 and demanded immediate gas debt repayment. Gazprom also demanded movement on the privatisation of Beltransgaz. After Presidential visits, Belarus agreed to pay higher gas prices to Itera and reduce its gas debt.

In 2003, Gazprom asked for gas prices to be raised to $50/mcm. Gazprom at that time was only supplying 10.2 bcm to Belarus, the rest of its gas needs came from Transnafta (1.5 bcm) and Itera (6.3 bcm) who were demanding higher prices, at $42/mcm. Gazprom and Belarus were unable to reach agreement and on 1 January 2004, Gazprom cut gas supplies to Belarus. Itera and Transnafta were also unable to reach agreement with Belarus and in turn they cut gas supplies in February 2004.

On 18 February 2004, Gazprom then imposed a total suspension of gas supplies to Belarus. Belarus responded by taking gas from the Russian transit supplies destined for central and western Europe. The total supply cut lasted for less than one day but it affected gas supplies to central and western Europe, albeit very slightly (see the affects on Poland discussed below). As with the previous gas crises and disputes between the two countries, a solution was soon reached. During the dispute Belarus was supplied by a subsidiary of Gazprom (Sibur, a petrochemical company) but at higher prices. Throughout 2004 negotiations continued and in July 2004, Russia granted Belarus a $175 million loan to pay for its gas. Gazprom would then resume gas supplies, but at a price of $46.68/mcm, while Belarus transit tariffs were increased from $0.55 to $0.75/mcm/100km.

2.5.3 Price Negotiations and Disruption Threat 2006

In 2006, Russia then announced a renegotiation of its gas supply prices to Belarus. An Inter-Governmental agreement was negotiated during 2006 covering gas transit tariffs, gas prices and oil taxes. Belarus is an important transit country for Russia as some 20% of Russian gas exports (40-44 bcm) transit Belarus en route to Ukraine transit. Belarus imports nearly all its gas needs (20-21 bcm) and 90% of its oil from Russia. As with all the other CIS countries Russia wanted to renegotiate and remove the favourable (low) gas prices Belarus had been receiving up to then.

Russia threatened to cut off gas supplies to Belarus at midnight on **31 December 2006** if agreement was not reached, and agreement was finally reached with two minutes to spare before the deadline expired.

The main points of the new agreement are:

- Gazprom will charge Belarus $100/mcm for gas supplies in 2007 (up from $46/mcm in 2006). The price will then rise in stages to western European levels (less the transport component) by 2011, with Belarus paying:

2008	67%
2009	80%
2010	90%
2011	100%

- The transit fee rises from $0.75 to $1.45/mcm/100km.
- In addition, Gazprom will buy a 50% share in the state owned Belarussian gas transport company, Beltransgaz, for $2.5 billion, paying in cash over five years.

Source: IEA, Natural Gas Markets Review 2007

Through the acquisition of a 50% stake in Beltransgaz, Gazprom has shielded Belarus to an extent from the price increases, but it gains control of the transit pipeline, something that Ukraine has successfully been resisting for many years.

Disputes have continued though. In **January 2007**, Belarus cut the Druzhba oil pipeline transiting Belarus in a dispute over oil taxes (a dispute remaining from the 2006 gas price discussions).

In conclusion, Gazprom is known to have cut gas supplies to Belarus in **1997**, **1998**, **1999**, **2000**, **2002**, **2004** and very nearly did in **2006**.

2.6 Poland 2004

The disruption of Russian gas supplies to Belarus on 18 February 2004 affected gas deliveries further downstream in Poland and Germany through the Yamal pipeline. PGNiG (the Polish gas company) reported receiving one third less gas from Russia for a full day (19 February) but was able to make up the difference from other supply sources (from Ukraine and from storage). PGNiG announced that some supplies to some fertiliser companies were reduced. Germany did not complain but Poland complained about the disruption in gas supplies and asked for compensation from Gazprom. The two fertiliser companies affected claimed $2 million dollars in compensation. The European Commission DG TREN sent a delegation to Poland to discuss the crisis (source: PGNiG).

This was a small disruption, a disruption for one day that was covered from other gas supply sources. It was crucial though because the dispute happened just as Poland was entering the EU (May 2004). Poland may perhaps have made much less of a complaint in earlier years when it was more within the Russian orbit, but as an EU Member State, Poland could command more attention and more notice was paid to the incident in western European circles.

2.7 General Russian Policies

2.7.1. Large CIS History of Gas Supply Disruptions

Ukraine and Belarus are not the only countries that have had gas supply disruptions from Russia. A recent analysis has studied this issue and found that gas supply disruptions from 1990 to 2006 are a very common and even standard feature of Russian gas relations with its CIS neighbours15.
The study concluded that there have been in total 55 gas supply disputes between Russia and its CIS neighbours in the period 1991-2006, of which 38 (70%) were supply cuts. These were broken down as:

Table 2-5: Types of Russian Coercive Energy Policy (1991–2006)

Type of Gas Supply Dispute	Number
Sabotage	4
Threats (without action)	2
Coercive price policy	11
Supply cuts	38
Total	55

Source: Jakob Hedenskog and Robert Larsson, "Russian Leverage on the CIS and the Baltic States", FOI Swedish Defence Research Agency, June 2007

The countries that have been the targets of this Russian coercion are shown below:

Table 2-6: Countries Affected by Russian Energy Policy (1991–2006)

Type of Gas Supply Dispute	Number
Estonia	2
Latvia	2
Lithuania	17
Belarus	8
Ukraine	5
Moldova	3
Georgia	12
Armenia	1
Total	50

Note: Sabotage not included
Source: Jakob Hedenskog and Robert Larsson, "Russian Leverage on the CIS and the Baltic States", FOI Swedish Defence Research Agency, June 2007

15 Jakob Hedenskog and Robert Larsson, "Russian Leverage on the CIS and the Baltic States", FOI Swedish Defence Research Agency, June 2007

Ukraine has been the centre of attention for its gas supply disputes with Russia but the above table shows that (this was during the 1990s), Lithuania was in fact the biggest target of gas disputes with Russia.

The table below shows the number of disputes per year, showing general incidents and supply cuts from Russia to its CIS neighbours.

Table 2-7: Numbers of CIS Gas Disputes per Year (1991–2006)

Year	Number of General Incidents	Number of Supply Cuts
1991	2	1
1992	7	7
1993	1	1
1994	1	0
1995	2	1
1996	1	0
1997	3	3
1998	9	9
1999	1	1
2000	0	0
2001	3	2
2002	2	1
2003	7	6
2004	2	1
2005	7	1
2006	6	3
Total	54	37

Source: Jakob Hedenskog and Robert Larsson, "Russian Leverage on the CIS and the Baltic States", FOI Swedish Defence Research Agency, June 2007

It should be noted that despite the very careful analysis of every single dispute and disruption that this study carried out, some were still missed. The supply reductions to Belarus in 2000 have not been picked up for example. The study also only noted five disputes with Ukraine, whereas the author of this gas section knows of at least six (1992, 1993, 1994, 1997, 1998, 2006). It has to be borne in mind that it is very difficult to gather clear information in the CIS region, where little information is published or put in the public domain.

Nevertheless it can be seen that there have been regular supply disruptions from Russia, in fact, except for just three years Russia has cut gas supplies to at least one CIS neighbour every year since the end of the Soviet Union. A pattern can also be seen. The first period of disruptions occurred during the time of President Yeltsin (1990-1998), with peaks at the start and the end of his Presidency, and the second during President Putin (1999-2006). A comparison of incidents between the two Presidents is shown in the following table.

Table 2-8: Numbers of CIS Gas Disputes per Russian President (1991–2006)

Type of Incident	President Yeltsin	President Putin
General Incidents	26	29
Gas Supply Cuts	22	16
Total	48	45

Source: Jakob Hedenskog and Robert Larsson, "Russian Leverage on the CIS and the Baltic States", FOI Swedish Defence Research Agency, June 2007

There are some points to note from the above analysis. One is that Gazprom is ready to use coercive methods to achieve its aims, whether they are to try to obtain gas assets in transit countries, to protect gas deliveries to western Europe, or to recover past gas debts. The issue of gas debts is clearly a difficult one for Russia with a general strong reluctance for CIS countries to pay their gas debts. The main culprit is Ukraine, as is shown in the following table, which shows outstanding debts to Russia (nearly 50% of the total), most of which are gas debts.

Table 2-9: CIS Debts owed to Russia (2005)

Country	Debt ($ million)	Proportion of Total Debt (%)
Armenia	1,881	0.06%
Belarus	258,881	7.88%
Georgia	158,045	4.81%
Kyrgyzstan	181,815	5.54%
Moldova	140,739	4.28%
Tajikistan	305,730	9.31%
Uzbekistan	654,343	19.92%
Ukraine	1,583,355	48.20%
TOTAL	3,284,789	100.00%

Source: Jakob Hedenskog and Robert Larsson, "Russian Leverage on the CIS and the Baltic States", FOI Swedish Defence Research Agency, June 2007; Analysis (third column), Mercados

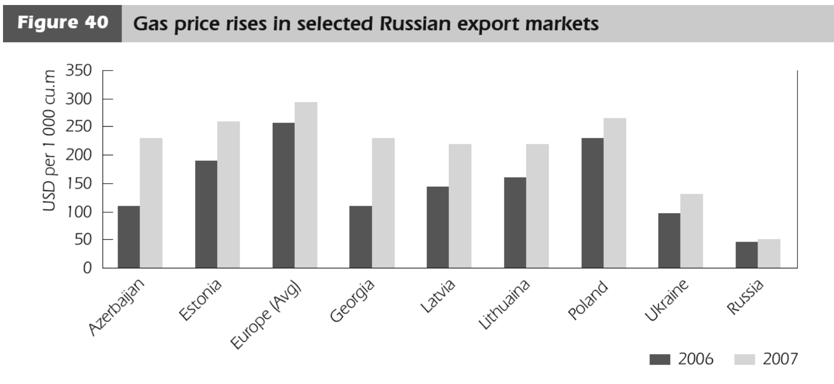
It is clear from the above analysis that gas supply cuts from Gazprom to a neighbouring state are a normal feature of Russian-CIS gas relations. They have not particularly increased since EU enlargement, indeed if anything, there are fewer gas disputes now than in the 1990s. Although there were never any serious disruptions of Russian gas supplies to western Europe, the small disruptions to western Europe that there were had a bigger affect in the 1990s than since 2004.

The recent supply disruptions though (particularly Poland in 2004 and Ukraine in 2006) have led to much more attention in western and central Europe, and that attention may be due to EU enlargement (particularly so with the Polish complaints in 2004, the western interest in the Ukrainian perhaps being due at least partly to the interest in the pro-western Government of Ukrainian President Victor Yuschenko)

2.7.2. *Current Russian Policy of Price Rises.*

Gazprom has not only been increasing gas prices to Ukraine and Belarus. Those two countries are part of a Russian policy of increasing gas prices to all of its CIS neighbours. The following chart shows the price rises in 2006 and 2007 to a selection of countries. Ukraine and Belarus still receive (even now after their price rises) among the lowest prices of Russia's export markets.

Figure 2-3: Gas Price Raises in Selected Russian Export Markets



Source: IEA, Natural Gas Market Review 2007

Russian gas export prices for 2007 to several of its neighbours are shown also in the following table:

Table 2-10: Russian Gas Export Prices 2007 ($/mcm)

Country	Gas Price 2007 ($/mcm)
West European average	293
Azerbaijan	235
Belarus	100
Georgia	235
Estonia	260
Latvia	220
Moldova	170
Ukraine	130

Source: Gas Matters, January 2007

Gazprom has made it clear that these prices for 2006 and 2007 are part of trend to bring all the CIS countries to western European price levels by 2011. For those countries that do not reach an agreement with Gazprom, or who do not agree to sell transit pipeline assets to Gazprom, can expect gas supply disruptions

2.8. Affects of EU Accession

It can be seen from the above description and analysis that gas supply disruptions in January to Ukraine are actually fairly frequent. We know about gas supply cuts of from a few days to up to two weeks in 1992, 1993, 1994, 1997 and 1998 from Russia, again in 2004 from Turkmenistan and finally 2006 from Russia. There have been gas supply disruptions to Ukraine most years since its independence in 1991.

The above analysis shows that there are many reasons for these supply disruptions to Ukraine, including:

- Non payment;
- Accusations of theft or unapproved siphoning of gas destined for exports;
- Actions of gas trading companies;
- Politics;
- Rising oil and gas prices internationally.

The above shows that Gazprom has also fairly frequently cut off supplies to others of its neighbours

.

The question is whether EU enlargement itself played any part in these disruptions. We contend that EU enlargement has not had, per se, any affect on Russian-Ukrainian gas relations (or on Russian relations with any other CIS country), this is a purely Russia-CIS situation which has been going on for a long time. By bringing the EU border right up to the borders of Ukraine and Belarus though, and by bringing many former Soviet Block countries within Europe, the situation has now become much more noticeable.

An important point to note is how little effect these supply disruptions have had on Russian gas supplies to Europe. Throughout the worst days of the Cold War, throughout all the annual problems with Ukraine (including siphoning off of export gas), the disputes with its other CIS neighbours, and despite the latest gas crisis in 2006, Gazprom has continued to supply western Europe, with only minor disruptions to western and central European customers, despite all the apparent problems in getting the gas from Siberian production through Ukraine to western Europe. The reported two Polish fertiliser companies who had supply restrictions for one day are very rare exceptions to a general pattern of continuing Russian gas supplies.

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2.9. Security of Supply in the longer term

2.9.1 Introduction

This chapter aims at providing answers to the following questions:

- To what extent has the 2004 enlargement influenced the security of energy supply of the EU?
- What initiatives are new member states taking to improve their access to external energy sources and what is the role of the different actors (public, private, EU) in such initiatives?

In the following analyses we concentrate on the longer term aspects of supply security. Several issues related to operational security have already been covered in the preceding Section on disruptions.

We rely on two simple (although disputable) assumptions throughout this chapter. Regarding primary energy sources, we assume that, "ceteris paribus", less reliance on imported fuel and more diversity in fuel sourcing will increase supply security. Regarding infrastructure, we associate higher capacity or capacity reserves both in networks and electricity generation with a higher level of supply security. In this study we disregard the cost efficiency aspect of supply security.

It is reasonable to differentiate three sub-groups of 2004 new member states due to technical / operational issues:

- the CENTREL group (Poland, Czech Republic, Slovakia, Hungary) and Slovenia, having strong interconnection to continental western Europe in electricity and gas; sometimes referred to as the EU5 group.
- the Baltic states (Estonia, Latvia, Lithuania), having no direct interconnection to UCTE countries; sometimes referred to as the EU3 group, and
- Cyprus and Malta, being isolated systems; sometimes referred to as the EU2 group.
- EU5 and EU3 together is sometimes referred to as EU8. Old member states are referred to as EU15.

We carry out our consideration of security of supply through analysis of the following:

- Comparison of old and new member states and their primary energy balances, their fuel structure for power generation;
- Measures of fuel and gas import dependency

Electricity

- Generation adequacy;
- The network adequacy of the electricity systems of the new member states;
- A review of the isolated systems which are not UCTE16[16] members – Cyprus and Malta

Gas

- Gas supplies and imports;
- Gas network adequacy

Finally, a review of initiatives to improve security of supply in new member states is provided. We conclude with a summary evaluation on how the enlargement impacted EU wide energy security.

16 Union for the Co-ordination of Production and Transmission of Electricity. The name was changed to Union for the Co-ordination of Transmission of Electricity (UCTE) in 1999, due to the unbundling of TSOs from production.

2.9.2 Access to Primary Energy Sources

2.9.2.1 Introduction

We start with examining the primary energy mix of the different country groups of the EU-25. Five main primary energy sources are considered: solid fuels, oil, natural gas, nuclear and renewable energy sources. The following characteristics are compared for EU-15 (old Member States), EU-5 (Central European members of Czech and Slovak Republics, Hungary, Poland and Slovenia), EU-3 (Baltic States), and EU-2 (isolated systems: Cyprus and Malta):17

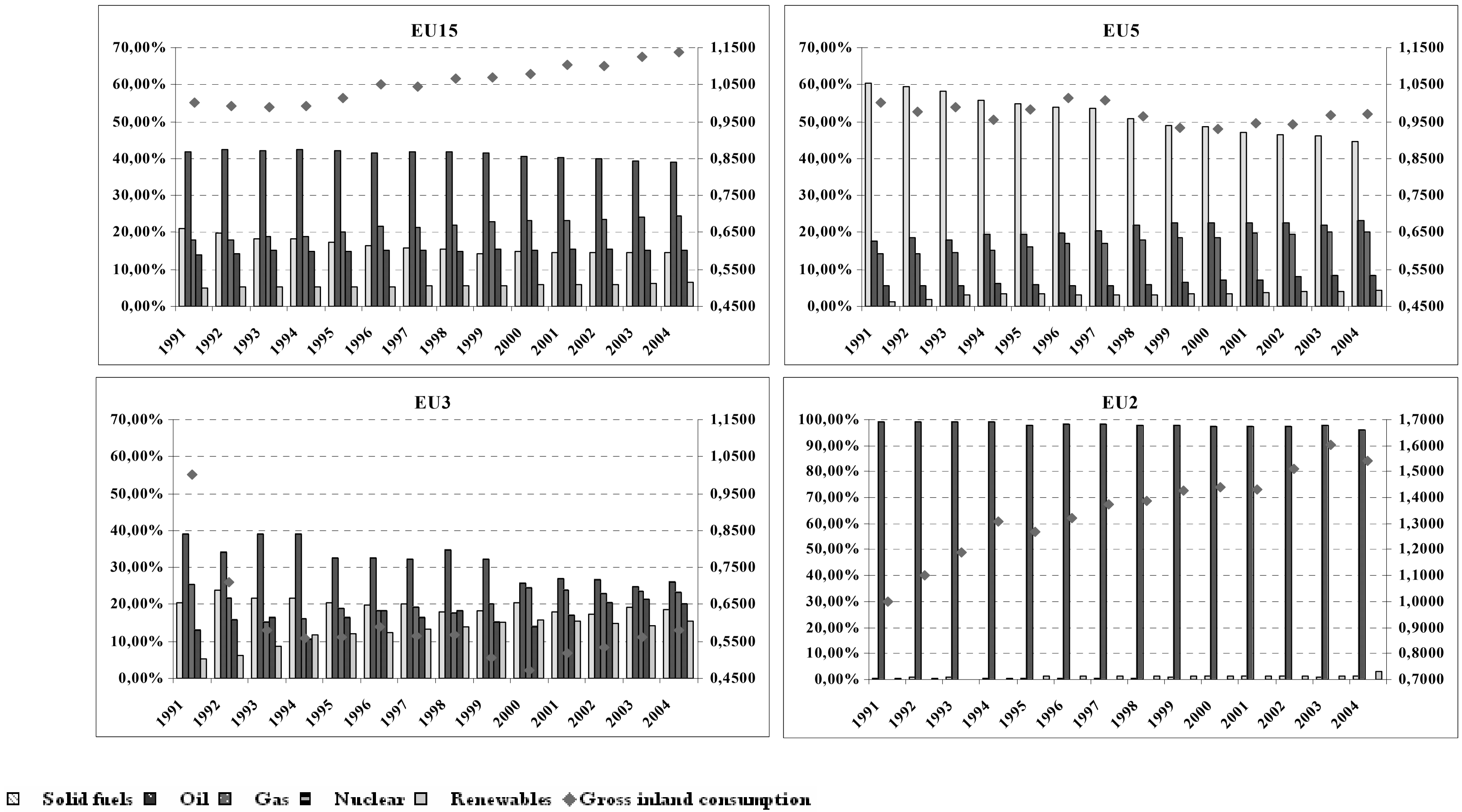
- Gross inland consumption (sometimes used as primary energy supply);
- Domestic energy production;
- Electricity generation; and
- Net imports

2.9.2.2 Gross Consumption of Primary Energy Sources

The left axis of Figure 5-1 below depicts the share of different primary energy sources in gross inland consumption, while the right axis indicates the development of gross inland energy consumption on the basis of 1990 values for the different country groups.

17 The source of the data, unless otherwise stated, is EUROSTAT and the European Commission's Statistical Pocketbook (2006).

Figure 2-4: Gross Inland Energy Consumption



Source: Eurostat; Analysis REKK

The gross inland energy consumption of the old member states as well as of Cyprus and Malta has been steadily increasing. Cyprus and Malta together produced by far the sharpest increase in consumption among the investigated groups: an almost 60% increase in the period under investigation.

Oil is the most important fuel source for these countries, and Cyprus and Malta are almost 100% dependent on imported oil to serve their energy needs. For the EU-15 the share of oil and solid fuels in primary energy consumption has decreased in the last 15 years while the share of natural gas has increased from 17% to about 25%. The popularity of gas for power generation plays the crucial role here.

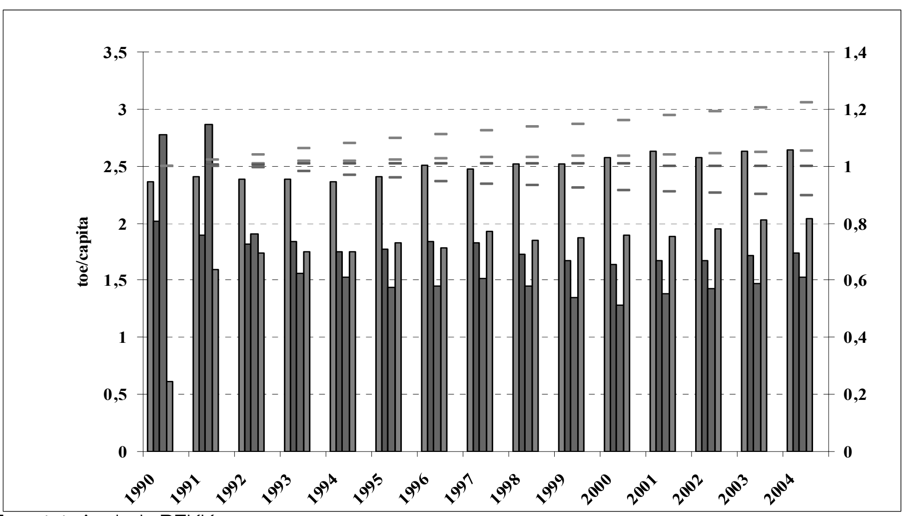
On the contrary, gross inland energy consumption has decreased in both the EU5 and EU3 countries in the last 15 years. While this decrease is modest in the case of EU5, the consumption of the Baltic countries sharply dropped between 1991 and 1992 and continued to decrease until 2000, when gross inland consumption was only 45% of the 1990 consumption. Since then demand has started to recover. The chapter dealing with energy efficiency will further elaborate on the explanation for this dramatic change in fuel consumption.

For the EU-5 the most important primary energy source is solid fuels, that is mostly domestically produced coal and lignite in Poland and the Czech Republic. However, the importance of solid fuels has decreased from 60% in 1990 to approximately 45% recently, while both oil, natural gas and nuclear have increased their share in gross final consumption.

The primary fuel mix of the Baltic States seems to be the most balanced one. It should be noted that the penetration of nuclear energy in the continental new members is at a similar level to that of in EU-15. Also, the importance of gas in the primary fuel mix of EU-15 and EU-8 is almost identical.

It is also important to note the differences in consumption on a per capita basis. Figure 5-2 below summarizes the basic developments in this respect. The left hand axis depicts per capita energy consumption, while the right hand axis measures the change of population on the basis of 1990 values.

Figure 2-5: Per Capita Consumption of Primary Energy



Source: Eurostat; Analysis REKK

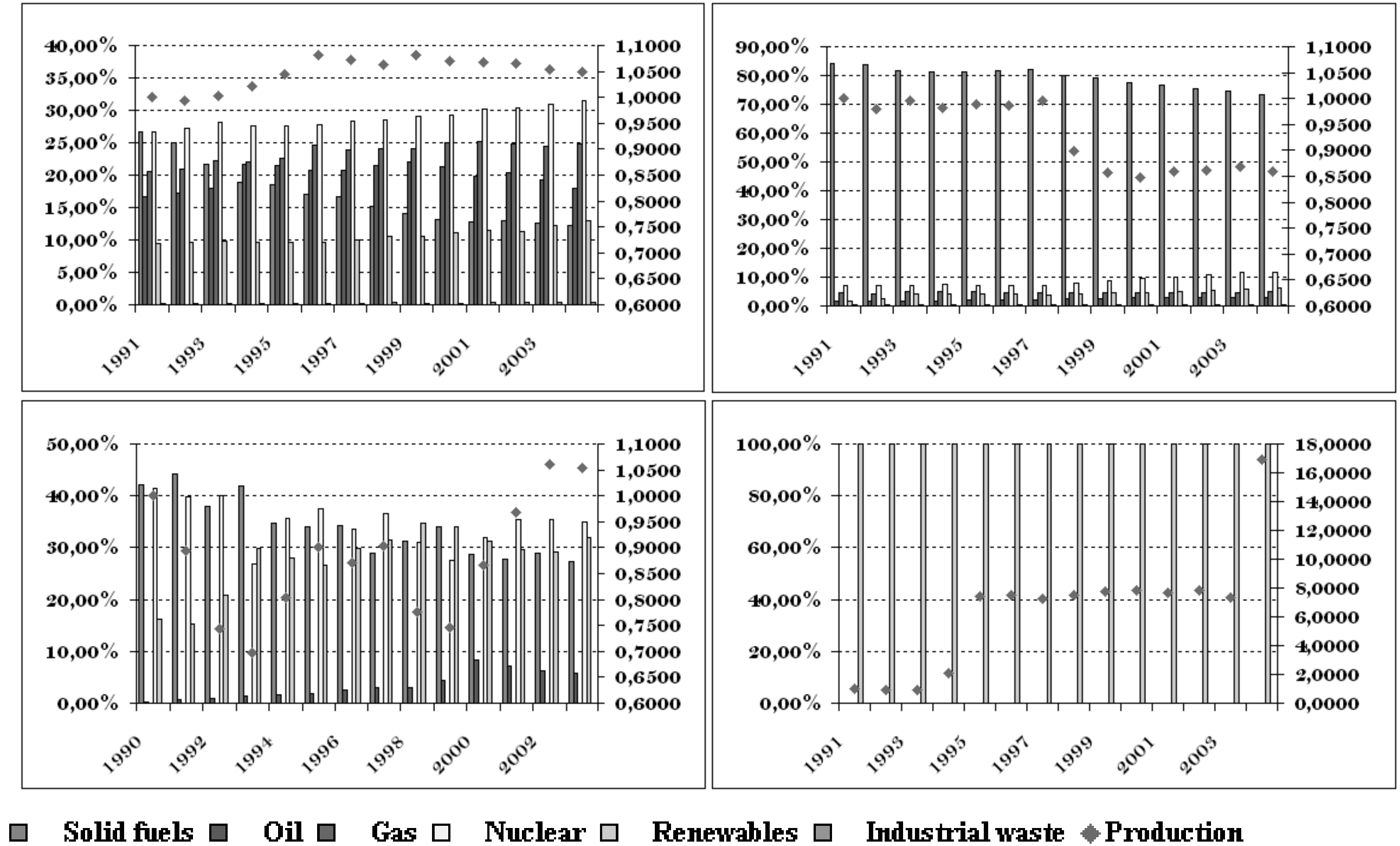
In the case of EU-15 both per capita consumption and the size of population have been increasing. The same trend is typical for Cyprus and Malta, although they started from a much lower per capita consumption level in 1990. On average new member states have a significantly lower per capita energy consumption compared with the old ones. Per capita consumption started to increase from 2000, most probably due to strengthened economic growth, but it is still far away from the old member states' level.

2.9.2.3 Domestic production

Figure 5-3 summarises the trends of primary energy production for the four country groups. The left hand axis depicts the share of the five primary energy sources in the total production, while the right hand axis indicates total production on the basis of 1990 values.

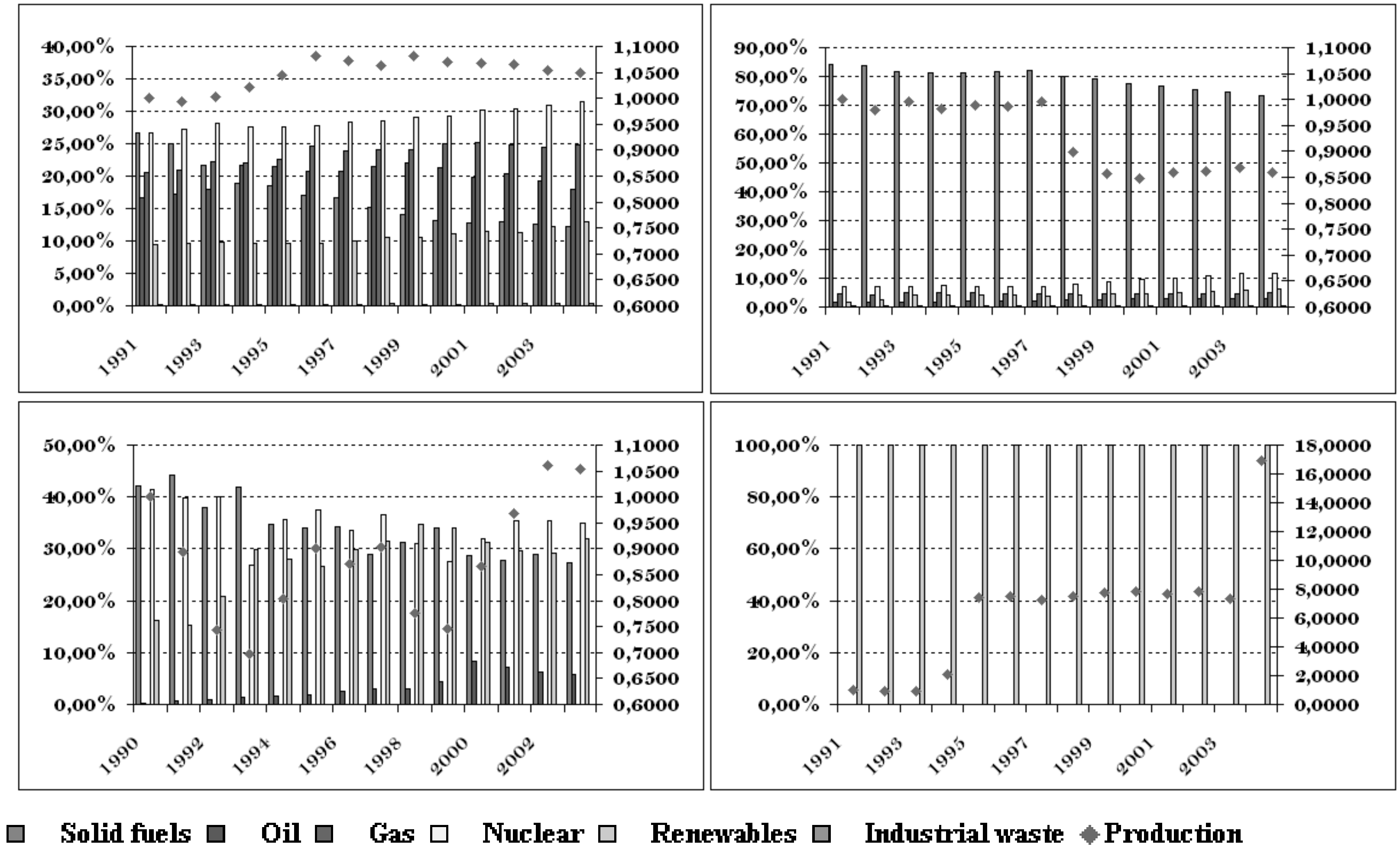
It is apparent at first sight that both the composition of fuels and the trend in production differs greatly among the country groups. The production of EU-15 countries increased by approximately 10% between 1993 and 1996, but decreased moderately since then. The importance of solid fuels decreased in the past decade and has been replaced mostly with nuclear and gas. The share of renewable sources is about 12-13%, with total produced renewable energy showing a remarkable increase of 50% since 1990. (See more details on this in the Chapter on renewable energy in the new member states).

Figure 2-6 Domestic Production of Primary Energy



Source: Eurostat; Analysis REKK

Figure 2-7 Domestic Production of Primary Energy



Source: Eurostat; Analysis REKK

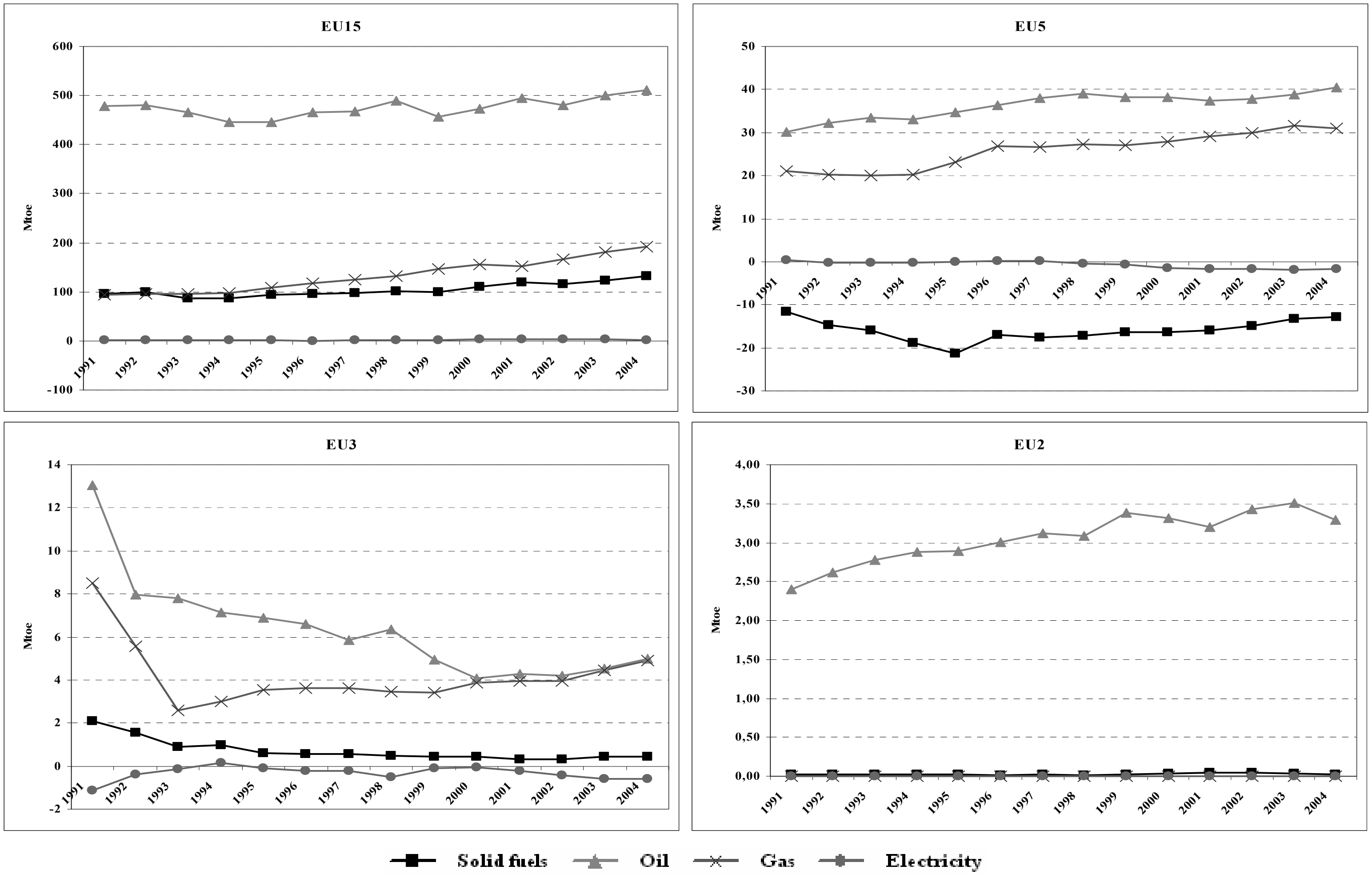
Czech and Polish coal mining dominate the fuel production of the EU-5 countries, while solid (Estonian oil shale) and nuclear is typical for the EU-3. Malta and Cyprus have only renewable local primary energy sources to rely on.

In the Baltic countries we can see significant changes over the period under investigation. There is no gas production in this region. Their solid fuels production decreased, and was replaced mainly from nuclear sources and from renewable sources. The relative importance of renewable sources has increased from 15% to more than 30%.

2.9.2.4 Net Imports

After domestic production, we consider the net import characteristics of the country groups. Figure 5-4 below indicates that for all the country groups except for the Baltic states, oil accounts for the largest amount of net import. Since 1995 natural gas exhibits the largest increase in imports: 100% increase for the EU-15, 50% for EU-5 and 25% increase for the Baltic States.

Figure 2-8: Net Imports of Energy Sources



Source: Eurostat; Analysis REKK

The net import of oil of the Baltic countries shows a sharp (almost 50%) fall in the early 1990s. The same can be said about natural gas net imports, but the latter recovered more quickly. We can say that the recent increased demand for primary fuel imports was mostly supplied by oil and natural gas.

The two islands (Malta and Cyprus) are totally import dependent on oil. Their net import was about 3-3.5 Mtoe in 2004, which is approximately 30% more than in 1991.

2.9.2.5 Fuel Structure of Electricity Generation

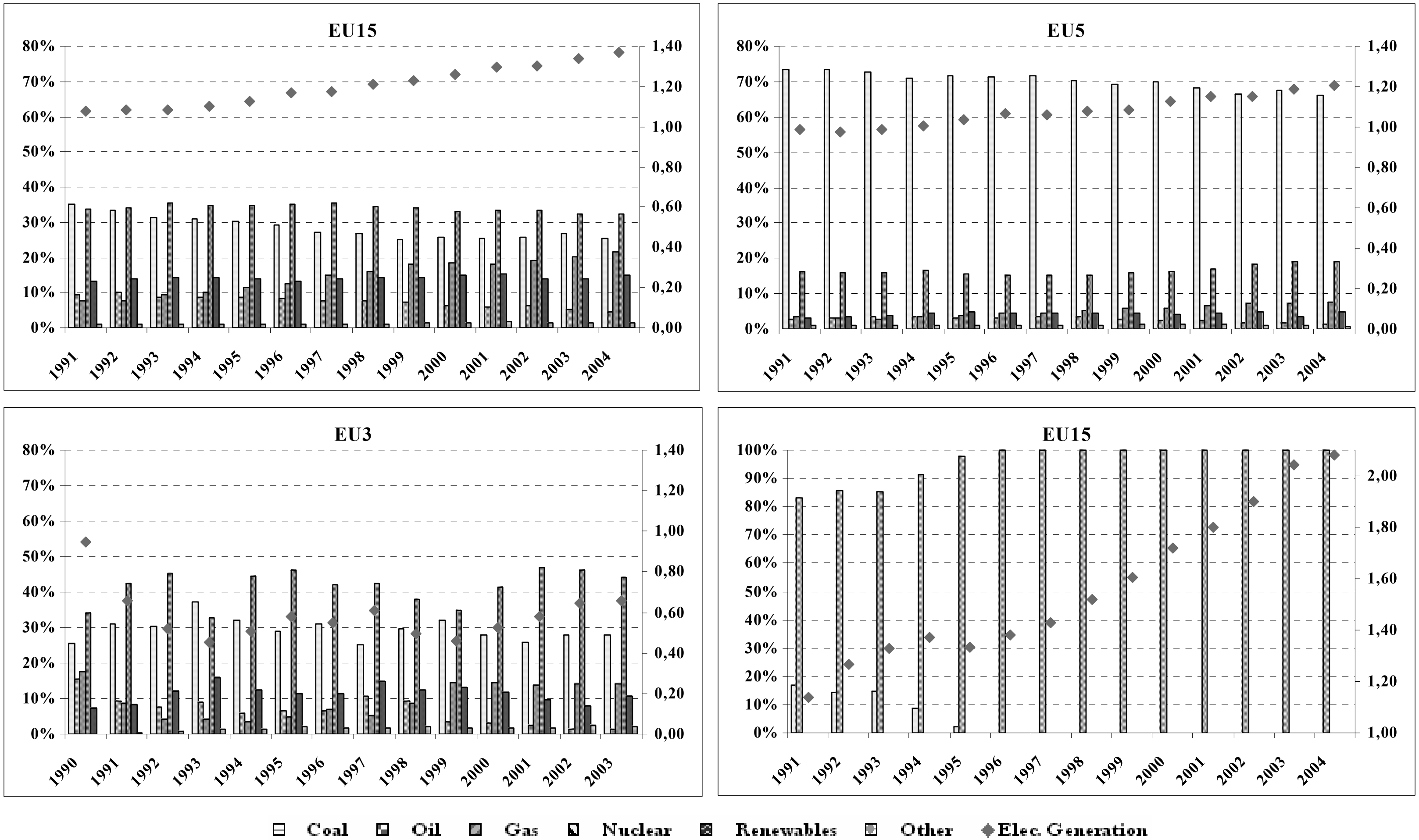
The fuel structure for electricity generation has a special relevance for energy supply security, since the availability and secure sourcing of the different fuels significantly affect the security and cost of generation. With the increasing reliance of Europe on natural gas as a fuel for electricity generation the security issues of the natural gas and electricity industries become highly integrated.

How did enlargement change the European situation in this respect? Before turning to more in-depth analyses on fuel import dependency, let us briefly review the relevant basic statistics for the member states.

Electricity generation has increased substantially for EU-15 (36%), EU-2 (40%) and EU-5 (20%) in the period 1991-2004. Again, we see a similar decrease in generation in the Baltic States (40%).

Regarding the fuel structure of generation, the striking feature of Figure 5-5 below is that while the dominant fuels in the EU-15 and the EU-3 are coal and nuclear, solid fuels play a much more prominent role in Central and Eastern Europe. While decreasing slightly over time, they still provide a basis for almost 70% of generated electricity in the region. Given that the rest of coal is produced locally, the import dependency of EU-5 generation as compared to EU-15 seems less of a problem than at first sight. This picture is further strengthened by the fact that gas based generation in old member states on average is up at 21% while its share in EU5 is only around 8%, and in EU-3 is 14%.

Figure 2-9: Electricity Generation by Fuel Type



Source: Eurostat; Analysis REKK

Dependency on nuclear generation is highest in the Baltic States (or more precisely, in Lithuania). Given that a precondition of EU enlargement was to gradually phase out the only major nuclear plant of the Baltic region (the 1300 MW capacity of the Ignalina nuclear power plant in Lithuania), this issue definitely has a high relevance from a security of electricity supply perspective. We return to this issue later in this chapter. Aggregate measures of diversity in meeting fuel demand

2.9.2.6 Aggregate measures of diversity in meeting fuel demand

We are summing up the previous sections by providing aggregate measures to compare the diversity of meeting fuel demand for the country groups under investigation.
Diversity in meeting the fuel demand of a country or a country group, including imports, is principal element of supply security. Diversity itself comprises at least three subordinate properties.[18]

Variety refers to the number of different sorts of fuels to meet gross fuel demand.

Balance refers to the pattern in the apportionment (spread) of that quantity across the relevant fuel categories.

Disparity refers to the nature and degree to which the categories themselves are different from each other (substitution).

We calculate two versions of the Shannon index to measure the diversity of meeting fuel use for the regions under investigation. The Shannon index is similar to the Hirschman-Herfindahl index, but, as Sterling demonstrates, it is not sensitive to the applied logarithm and it is also more robust, because it holds the additivity property. The general form of the Shannon index is as follows:

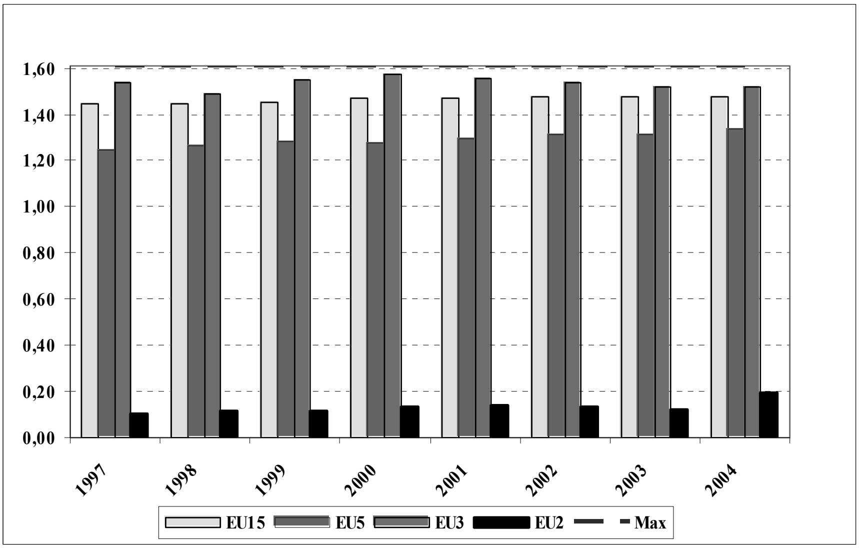
$$SI = -\sum_{i=1}^{n} p_i \ln p_i ,$$

where pi is the share of fuel type i in gross inland fuel consumption and n is the number of different fuels used. Figure 5-5 depicts the Shannon index for the four country groups under investigation. The above dotted (red) line indicates that 1,6 is the maximum value for the index in the case of five different fuel types (solid fuels, oil, gas, nuclear, renewable energy sources).

The higher the value of the Shannon index, the higher the diversification in meeting fuel consumption. Therefore, it can be said, that the diversification is the highest in the EU3 region, which has almost been at the maximum value in the last few years. For the investigated period the value of the index for old member states remained high and stable. Diversification of the EU-5 countries has been steadily improving and in 2004 it almost reached the level typical for the EU-15 group. Naturally, Malta and Cyprus are the least diversified countries with respect to their fuel imports. We can conclude that the general Shannon index indicates no significant difference in the fuel diversity of EU-8 and old members, thus we could conclude that in this respect the 2004 EU enlargement did not significantly change the security of supply of the Union.

18 Sterling (1999)

Figure 2-10 Shannon index



Source: REKK

Beyond diversity, import dependence is also a major determinant of supply security. Apparently, the general form of the Shannon index is unable to account for the extent as well as the diversity in imports to meet local demand. In order to account for those factors, we followed the proposal of Hirschausen and Jansen and calculated an enhanced version of the Shannon index.19 The idea behind this index is that supply security is affected not only by he share of net imports in the final consumption of fuels, but also by the diversification of import sources. Hence, in the case of this index the higher the number of the import sources at a given import rate, the higher the diversification of fuel supply. Formally, the index takes the following form:

$$I = -\sum_{i=1}^{n} c_i p_i \ln p_i \text{ ,}$$

where c_i is a correction factor for each type of primary energy source. The correction factor takes into account the share of net import in the total consumption of a given energy source, and the rate of diversification of the import sources.

For the calculation we assume that the world markets of solid fuels, oil and nuclear fuel are highly competitive since there are a number of alternative sources as well as transportation routes available for customers. On the contrary, trading in gas is strictly limited by the physical infrastructure. In the case of renewable sources, the level of international trading is very low, so we disregard the potential for diversification in this regard.

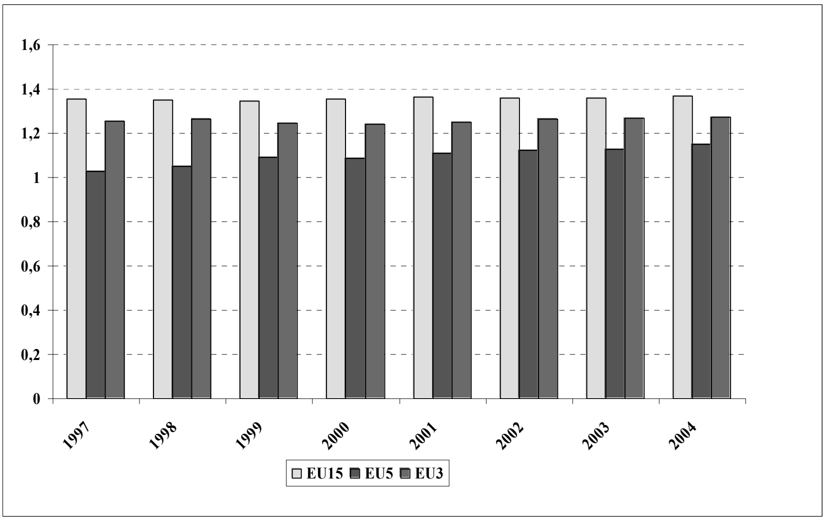
Due to the above explained reasons, the correction factors of solid fuels, oil, nuclear and renewable sources are set equal to 1, and only the correction factor of natural gas is calculated in the following way:

$$c_{gas} = 1 - m_{gas}\left(1 - S_{gas} / S^{\max}\right),$$

19 Hirschausen (2003), Jansen et al. (2004).

where m_{gas} is the share of net import in gas consumption, S_{gas} is the Shannon index of gas import flows, $S^{\max}$ is the maximum of the Shannon index, and $S_{gas} = -\sum_{j=1}^{n} m_{gasj} \,\mathrm{h}\, m_{gasj}$, where m_{gasj} is the share of imports of gas from region j in the total imported gas for the given country group.20 Figure 5-7 contains the results for the period 1997-2004.

Figure 2-11 Import corrected Shannon index



Source: REKK

It seems apparent that the index value for the old member states' is more resistant to the inclusion of the gas import issue into the index calculation. On the other hand EU-3 and EU-5 Shannon index values dropped significantly. This is mainly the result of the fact that the EU-5 member states' gas import diversity is much lower than that of the old member states. They have only five big trading partners, from which the share of the Russian Federation is extremely high. On the other hand, the old member states have significant inland sources of gas. Furthermore, their import mostly comes from three different regions: Norway, the Russian Federation and Algeria. Shipments from these three countries account for approximately 80% of their total net gas import.

The drop in the Shannon index for EU-8 indicates already the problem of very high and unilateral gas import dependence of continental new member states on Russian gas supplies. Since we consider this issue as the single most important supply security risk that the 2004 enlargement of the EU has brought about for the Union, we further analyse it at the country level in the next section.

20 The following exporting countries were considered: Belgium, Denmark, Germany, France, Italy, Netherlands, Slovakia, the United Kingdom, Croatia, Norway, Serbia and Montenegro, the Russian Federation, Ukraine, Algeria, Egypt, Libya, Nigeria, Trinidad and Tobago, Malaysia, United Arab Emirates, Iran, Oman and Qatar.

2.9.3 Measuring import dependency on natural gas

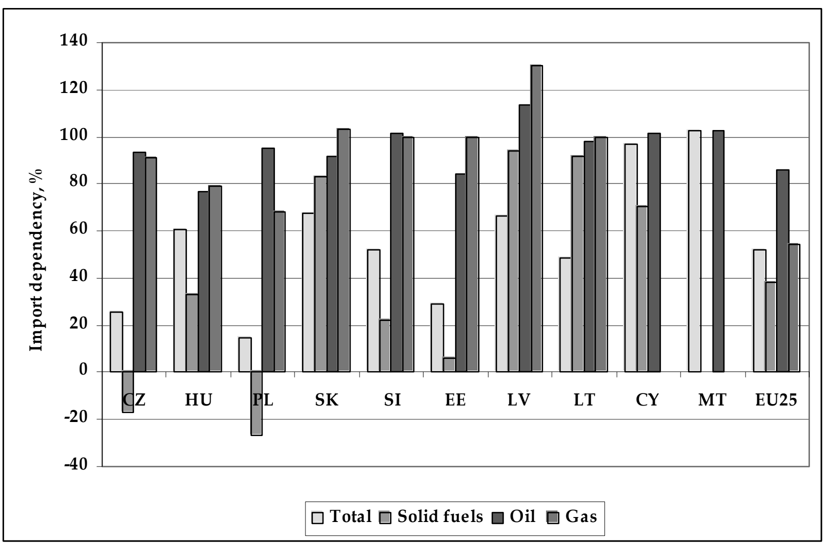
IThe natural gas industry is young on continental Europe. Its history goes back only four decades in time with the development of the major physical infrastructure linking production sites and consumption centers. Infrastructure development has traditionally been based on long term contracts for gas delivery. In this period inland production was significant in EU-15. Also, supply has gradually been diversifying for old member states (Holland, Norway, UK, North Africa, LNG). In sharp contrast to that, for new member states the development of the natural gas industry, including the physical infrastructure was completely based on cooperation with the Soviet Union and within the COMECON block.

In this section, we analyze import dependence on gas as a product. We turn to the detailed discussion of network operation and adequacy in a subsequent section.

Now we turn to a more systematic look at the fuel import dependency of new member states as compared to the old ones. From a security of supply point of view, increased reliance on and decreased diversity in fuel imports poses a higher risk.

Figure 2-12 indicates the status of new member states' fuel import dependency according to its most apparent measure. Import dependency from gas is higher than EU-25 average for all those new members that use natural gas. This is the same for oil with the exception of Hungary and Estonia. Note that the rest of oil and gas imports for EU5 and EU-3 countries is provided by Russia through pipeline systems. Taking all types of fuels into account, it is only Poland, the Czech Republic, Estonia (because of their solid fuel sources) and Lithuania (because of its nuclear energy) that performs better than the EU average.

Figure 2-12 Net imports / total consumption* in new members, 2004



* Definition: Import Dependency = Net Imports / (Bunkers + Gross Inland Consumption. Source: Commission Pocketbook (2006).

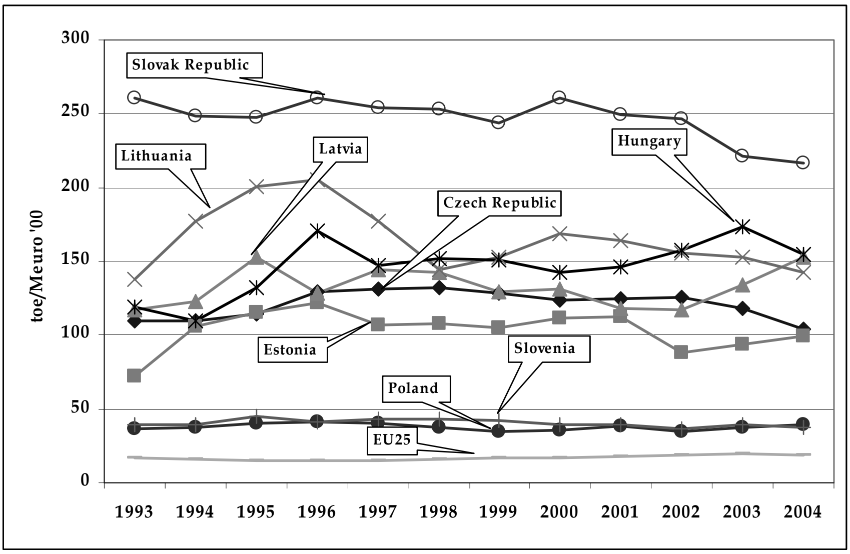
Note: A simplified formula, not taking bunkers into account, is used occasionally. This variant gives higher values for import dependency by overlooking maritime transport. Negative numbers indicate that the country is a net exporter. Values over 100 % are possible due to changes in stocks

Next we apply a measure that is generally used to measure oil dependence of national economies.21 This index is a combined one, and it can be expressed as follows:

(net gas import/total GDP)=(net gas import/total gas used)*(total gas used/total energy consumption)*(total energy consumption/total GDP).

Therefore, it is a combination of import dependency, gas dependency and energy intensity. Figure 2-13 depicts the development of these values for the new member states and compares it to EU 25 average.

Figure 2-13 Natural gas dependency of the economies of new member states*



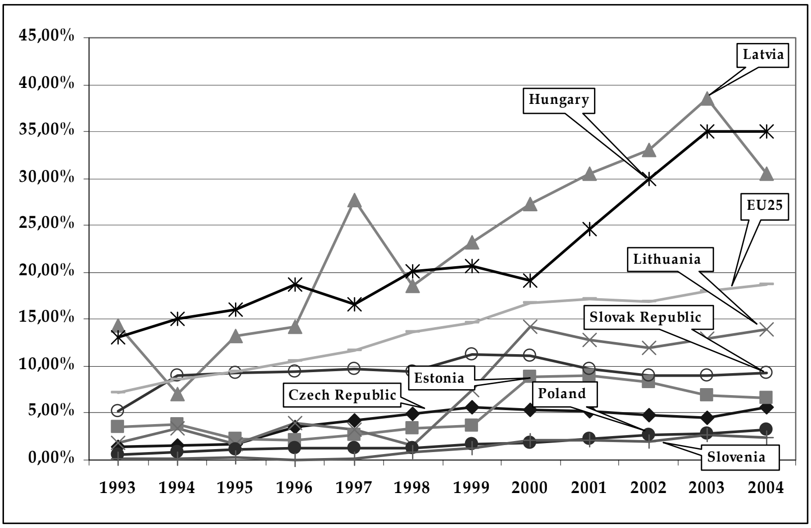
* in year 2000 Euro

The message of the Figure 2-13 is that gas dependency of continental new member states' economies is higher than that of the old members with an order of magnitude. Those are the Slovakian, Hungarian, Latvian and Lithuanian economies that use 15-25 times more gas to produce a unit of GDP than the rest of EU members. On the other end, Poland and Slovenia are the least dependent economies on gas from the continental new members group.

It is also worth having a look on the importance of gas in electricity generation by new member states.

21 Chevalier (2006).

Figure 2-14 The share of gas in electricity generation by new member states



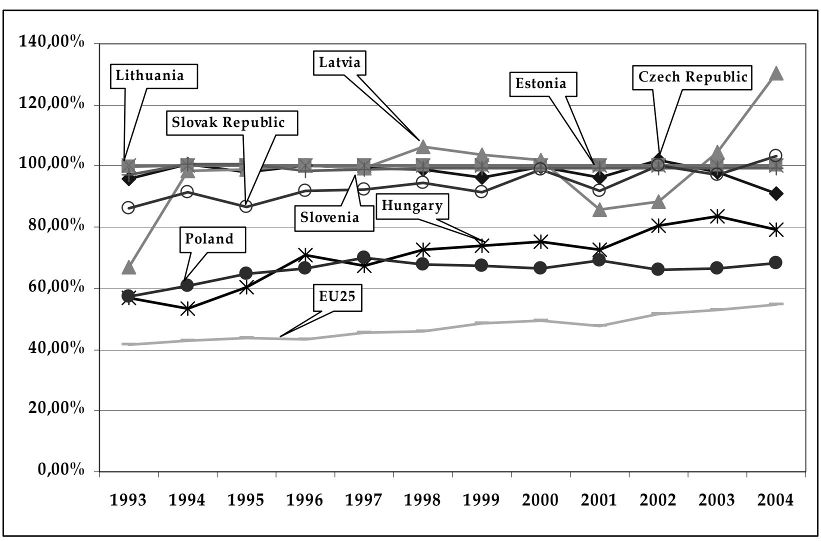
Source: REKK

Figure 2-14 indicates that the combined issue of gas dependency of the economy and of electricity production is the most apparent in the case of Hungary and Latvia. The importance of gas in electricity generation for the rest of new members falls below EU25 average.

Finally, the level of net imports to total gas consumption is depicted on Figure 2-15. Here we can recognize the well over EU-25 import dependency of new member states.

Furthermore, Table 2-15 provides the details on the structure of import sourcing for these countries.

Figure 2-15 Net gas imports to total gas consumption



Note: Values over 100 % are possible due to changes in stocks

Table 2-11 Central and Eastern European new member states' pipeline gas imports 2006 (bcm/%)

Country	PIPELINE GAS IMPORTS 2006 (bcm / year)						
	Algeria	France	Germany	Norway	Russia	Other	Total
C z e c h Republic				2.9 (30%)	6.8 (70%)		9.7 (100%)
Estonia					1 (100%)		1 (100%)
Hungary			0.8 (8%)		7.7 (75%)	1.8 (17%)	10.3 (100%)
Latvia					1.5 (100%)		1.5 (100%)
Lithuania					3.3 (100%)		3.3 (100%)
Poland			0.4 (4%)	0.4 (4%)	5.4 (61%)	2.7 (30%)	8.9 (100%)
Slovakia					6.4 (100%)		6.4 (100%)
Slovenia	0.4 (36%)				0.6 (55%)	0.1 (9%)	1.1 (100%)
EU-10	0.4 (1%)	0 (0%)	1.2 (3%)	3.3 (8%)	32.7 (77%)	4.6 (11%)	42.2 (100%)

Source: IEA, BP, Other

Although in terms of the gas molecules all imported gas supplies to all east and central European countries come from Russia, in commercial terms, some countries have managed to diversify some of their gas imports. For the investigated group gas imports from Russia have reduced from 86% of all their gas imports in 1999 to 77% in 2006. Even though it lies on the route of the Brotherhood Pipeline from Russia via Ukraine, and all gas flows are in an east-west direction, the Czech Republic has nevertheless been able to diversify some of its gas imports. From taking 82% of its gas from Russia in 1999, the Czech Republic in 2006 had reduced that to 70% and took 30% of its gas supply from Norway. Hungary, Poland and Slovenia also diversified some of their gas supplies. The three Baltic Republics of Estonia, Latvia, Lithuania, plus Slovakia (lying right next to Ukraine) in 2006 still took 100% of their gas supplies from Russia. In sum, gas import dependence seems to create the least problem for Poland from the group of 2004 new member states – a country that seems to be the most emotional on the topic. On the other end, Hungary and Latvia seems to be the most fragile economies to gas supply security.

Regarding import fuel dependency, we can conclude that the 2004 enlargement brought the EU-5 region with abundant local solid fuel sources into the Union; in addition it brought two completely import oil dependent nations, Cyprus and Malta into the Union.

With regard to gas dependence, we have seen that Natural gas dependence of the economies of continental 2004 new member states are significantly higher then the EU average. Hungary and Latvia has a combined issue of high gas dependence in electricity generation and high economic dependence on gas.Gas import dependence is significantly higher in new member states than in the old ones.Gas import sourcing is much less diversified for new than for old member states. As a result of the above combination of events, by now unilateral gas import dependence on Russia has became the number one energy security issue for the continental 2004 new member states. We consider the gas supply and gas imports profile for the new member states further below in this chapter, in section I 5.7 Gas Supplies and Imports.

2.9.4 Power Generation Adequacy

2.9.4.1 Introduction

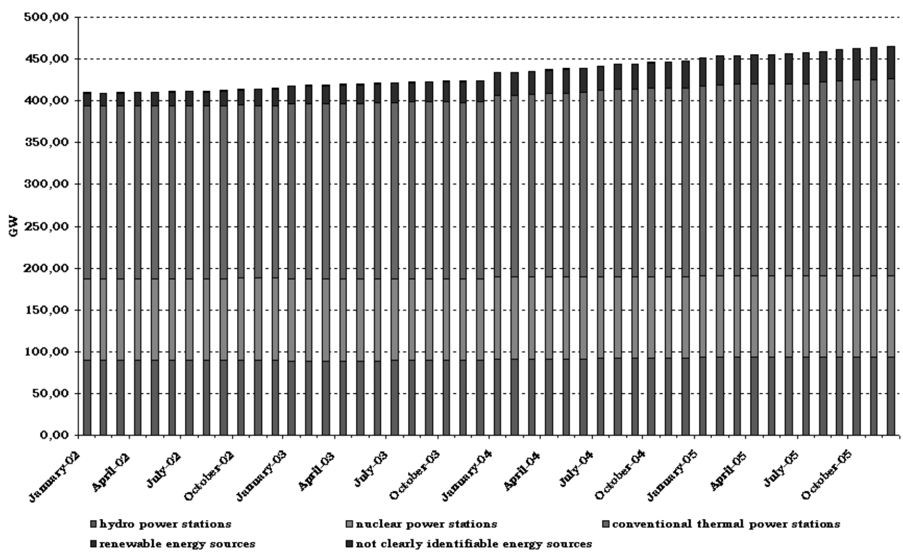
The next element of supply security we investigate is power generation adequacy, that is the extent to which installed and reliably available generation is able to serve the (peak) load for electricity. The question to answer is how enlargement affected the power generation adequacy of the EU.

We look at first the aspect of enlargement in that it brought a new group of UCTE countries into the internal energy market. We compare the generation adequacy of the 10 old UCTE members (EU-15 minus 5 of Finland, Sweden, UK, Ireland and Greece) to that of the new UCTE EU members (the EU-5 group). We then briefly consider generation adequacy in the EU-3 Baltic states that are still part of the Integrated Power System of Russia and other former Soviet Union states. Finally we comment on the generation adequacy of the new member states with isolated electricity systems (Cyprus and Malta).

2.9.4.2 Generation Adequacy within the UCTE Area

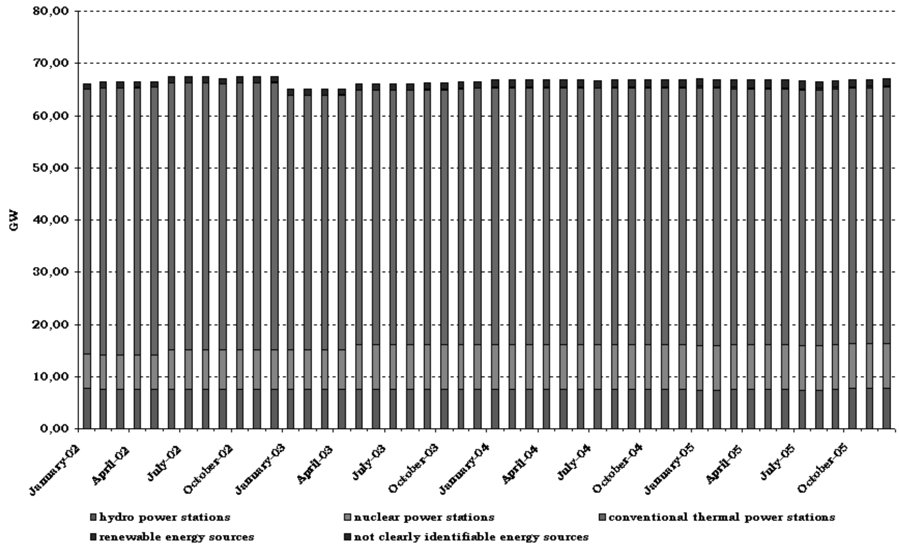
Figure 2-16 and Figure 2-17 below depict the development of net installed power generation capacity in the EU-10 and EU-5 country groups.

Figure 2-16: Net Installed Capacity, UCTE EU-15



Source: UCTE

Figure 2-17: Net Installed Capacity, new EU-5



Source: UCTE

UCTE publishes regular reports on its assessment of generation adequacy within the UCTE area.22 According to the UCTE System Adequacy Forecast for 2006-2015 it states:
"Over the period 2006-2008 the reliability of the UCTE system seems not to be at risk. Substantial developments of the generation capacity are expected... The period 2008-2010 shows a slight decrease of margins... for the 2010-2015 period, the situation is more tightened. Without any additional commissioning program, Remaining Capacity at UCTE level may not respect the Adequacy Reference Margin".

The same study evaluates generation adequacy of the CENTREL group23 as follows:
"This block presents a Remaining Capacity significantly higher then the Adequacy Reference Margin. This situation is stable from 2006 to 2008, and even improves in 2010. It remains sufficient in 2015 without any extra commissioning. CENTREL is the only block that seems to have a long term export-oriented position".

22 UCTE 2001, 2002, 2007.
23 Poland, Czech Republic, Slovakia and Hungary

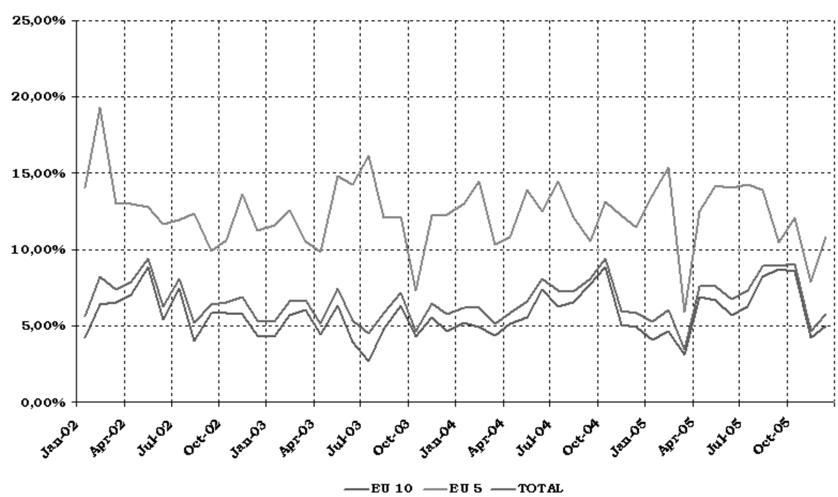
Box: Analysis of generation adequacy by UCTE

"The adequacy analysis is based on the comparison between available generation and load at three given reference time points of the year.
The difference between available generating capacity and load at reference time point is called "Remaining Capacity" (RC) calculated under normal conditions. To assess adequacy, Remaining Capacity is compared to a given "Adequacy Reference Margin" (ARM) accounting for unexpected events affecting load and generation. The ARM is calculated for each country and for overall UCTE in order to cover the increase of load from the reference time point to the peak load (called "margin against peak load"), and demand variations or longer term generation outages not covered by operational reserves.
For the global overview of adequacy at UCTE level, the ARM is calculated as 5% of UCTE total Net Generating Capacity plus the sum of individual margins against peak load.
In this calculation of ARM, two approximations have opposite effects: on one hand, the peak load of all countries are treated as if synchronous, on the other hand the exchange capacities between countries are considered as infinite. The resulting value is considered to be an acceptable margin to ensure a reasonably low risk of shortfall in UCTE.
The comparison used in this report to characterize the reliability of UCTE system is then, for each of the studied time points:

- o Remaining Capacity ≥ Adequacy Reference Margin
- o With ARM = 5% Net Generating Capacity + Margin against the daily peak load"

Figure 2-18 below illustrates this point by comparing remaining capacity in generation for the EU-10 and EU-5 UCTE groups. It is apparent that the level of remaining capacity within the new UCTE EU members is significantly above the level of the old EU-10 UCTE members.

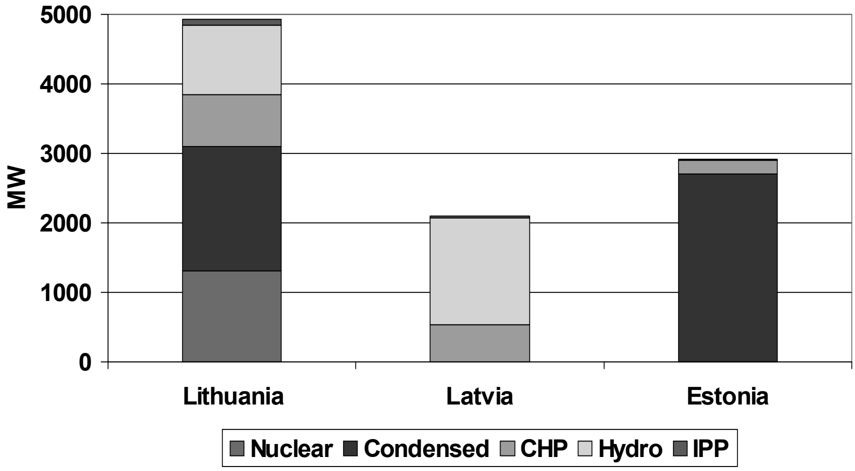
Figure 2-18: Remaining Capacity over Adequacy Reference Margin, %



Source: UCTE

Installed power generation capacity in the Baltic States totalled 9884 MW in 2006.[24]

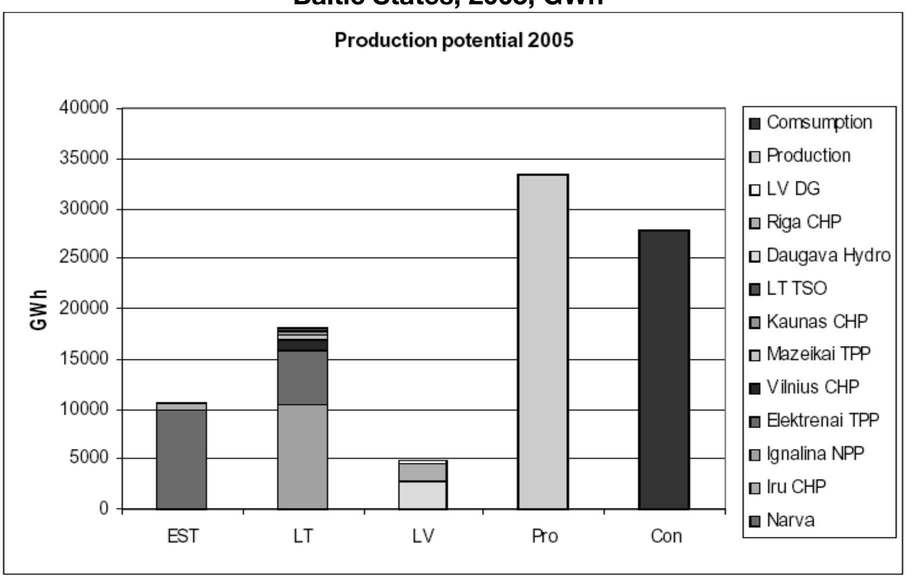
Figure 2-19: Structure of Generating Capacities in the Baltic States, 2005, MW



Source: Jankauskas (2007)

Figure 2-20 below shows that at present the production potential exceeds electricity consumption by about 20% for the three countries. However, with the closure of the nuclear power plant Ignalina in Lithuania, this picture is to be changed substantially, and production potential will decrease by more than 10.000 GWh per year (about one third).

Figure 2-20: Electricity Consumption and Production Potential for the Baltic States, 2005, GWh

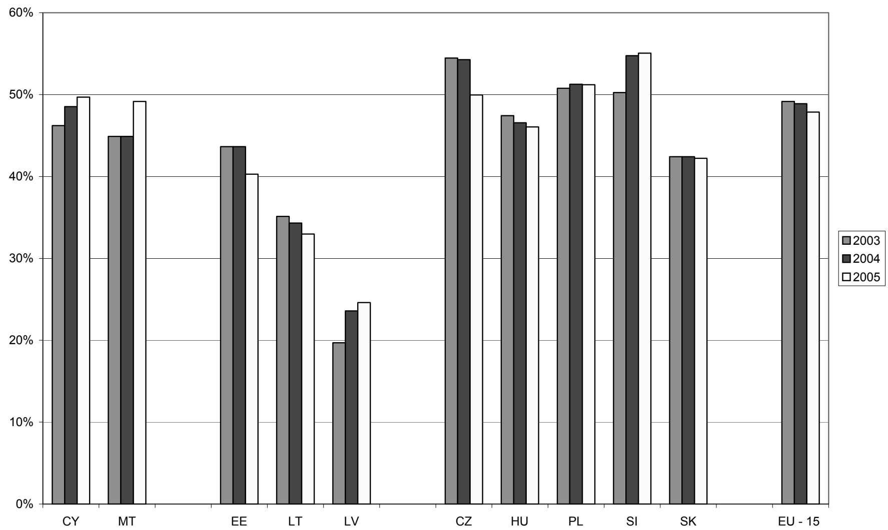


Source: Jankauskas (2007)

24 The lecture of Vidmantas Jankauskas at the Training Programme on Sustainable Energy Markets by the European Energy Institute. Warsaw, 13-16 February 2007.

A UCTE-type in-depth analysis of generation adequacy for the Baltic countries is not available, but through the use of Eurelectric information we can gain an idea on the 'stress' the generation park of these countries operate. Figure 2-20 below compares the average utilisation of new member states' generation parks to that of the average of EU15. Even taking into account the limitations in such a comparison, we can conclude that the Baltic States (especially Latvia and Lithuania) and Slovakia operate generation in the most 'relaxed' way. Average utilisation in the other EU-5 and EU-2 countries is similar to the values for the EU-15.

Figure 2-21: Comparison of Average Utilisation of Maximum Net Generation Capacity* of New Member States with EU-15



* net electricity production / net generation capacity * 8760

Source: Eurelectric; REKK analysis

Finally, Table 2-12 below compares the recent dynamics in capacity commissioning and production for old and new members. In the case of new members the growth rate in net generation capacity has been faster than the growth in production.

Table 2-12: Recent Changes in Net Generation Capacity and Net Electricity Production by Country Groups

	Change in Maximum Net Generating Capacity		Change in Total Net Electricity Production	
Area/ Country	%	%	%	%
	2003/2004	2004/2005	2003/2004	2004/2005
EU – 25	0,2	2,3	1,8	0,2
EU – 15	0,2	2,5	2	0,3
New - 10	0,6	0,6	0,5	-1

Source: Eurelectric statistics

We can conclude that from the point of view of generation adequacy, enlargement brought a balanced new country group into the internal electricity market that contributes to the stabilisation of the power balance of the whole European power system

2.9.5 Network Adequacy and Transport

2.9.5.1 Introduction

For Central Eastern European new member states there is a fundamental difference between how the operation of their electricity as opposed to the gas systems changed as a result of the reorientation process from Russia to the EU. While, as a consequence of UCTE25 harmonisation, the cooperation of the electricity system of the EU-5 with Russia essentially halted, in the case of gas the political changes had in fact no effect on how the gas transmission system has been operated since then (the gas sector is discussed further below).

We claim that this difference has significant security of supply relevance for the whole European Union. While in the case of electricity, network and system integration went hand in hand with market integration (at least for the EU-5 countries), system integration has not yet played a large role during market integration in the gas sector. The result is that the very large gas import dependence on Russia has become the number one energy security issue for the continental new member states.

In this section we turn to the analysis of network adequacy in the electricity sector, and later the gas sector.

In the context of network adequacy we focus mainly on long term aspects, that is the evolution of network capacities. The short term relevance of networks would cover network quality which could be measured by indices like SAIFI, SAIDI, the number of kWhs lost, etc. However such indicators do not exist for all member states and for years before 2000 (CEER, 2005) and so we did not have the opportunity to examine how security of supply has changed over time due to service quality in network operations.

When analysing the evolution of network capacities over time in the context of security of supply we rely strongly on the assumption that ceteris paribus the higher the capacity, the higher is the level of security due to increased trade opportunities. Building on this assumption we focus on how the old member states' level of security of supply was affected by the 2004 EU enlargement. We analyse the evolution of network capacities in those new member states which are connected to the old member states, focusing on the EU-5 of the CENTREL countries (Czech Republic, Hungary, Poland, Slovakia and Slovenia). We also comment on the network adequacy of the island countries (Cyprus and Malta) and the IPS member Baltic countries (the first link built between the Baltic countries and other member states is the HVDC cable between Estonia and Finland, the project was launched in 2005 and put into operation in 2007).

Our analysis starts with an overview of the technical and institutional harmonisation and integration process between UCTE and EU-5 countries. This is followed by analysis of interconnection capacities of the EU-5 countries and the interconnections between the EU-15 and EU-10 (the old and the new EU). Finally we consider the evolution of physical flows over time between the two country groups, closing with a brief discussion of non-UCTE new members.

25 Union for the Co-ordination of Production and Transmission of Electricity. The name was changed to Union for the Co-ordination of Transmission of Electricity (UCTE) in 1999, due to the unbundling of TSOs from production.

The possibility of power exchange between countries greatly depends on which electric power systems they are members of. The continental old EU member countries were historically the members of the UCTE synchronous zone. The Czech Republic, Slovakia, Hungary and Poland were members of the CDU (East European Integrated Power System) but in the mid 1990s joined UCTE. Slovenia as part of Yugoslavia entered UCTE in 1987. The Baltic countries were and are still the members of the Russian Integrated Power System (IPS/UPS).

In this section we discuss in more detail the joining of UCTE by the CENTREL (EU-5) countries since we believe that this step had the greatest influence on the elaboration of the exchanges and power flows between the old and new EU countries since 1990.

2.9.5.2 The Route towards UCTE and ETSO Membership

The technical connection of the electrical system of the EU-15 (except for Sweden, Finland, United Kingdom and Ireland) and the system of CENTREL countries happened on 1 October 1995. This event was the outcome of a long, but very successful cooperation between these countries for the preparation of the integration process.

The power companies of the four accession countries decided to separate from the CDU (East European Integrated Power System) and join UCTE long before 1995. The individual countries each declared their intentions from 1990 to 1991.[26] On 11 October 1992, the electrical systems of Poland, Hungary and what was then the Czech and Slovak Federal Republic formed CENTREL, an association aimed at connecting the electricity grids of its members with the UCTE[27]. From November 1993 the CDU was then technically disintegrated (the formal cooperation of CDU countries continued until year 2006, involving Germany and Russia as well).

The CENTREL countries decided to cooperate in all fields, which was necessary for the integration of their systems to UCTE. To start with they had to comply with the administrative and technical requirements of UCTE. A Technical Committee set up a strict collation of these measures (Catalogue of Measures – Massnahmen Katalog) containing all the procedures and indicators which had to be fulfilled and prepared for the connection. These preconditions were practically the rules detailed now in the Operation Handbook of UCTE.

The CENTREL power systems' cooperation was very successful. They proved their ability in complying to all the UCTE requirements, and after a nearly two years of autonomous operation (together with VEAG – the power system of the former East Germany and a smaller part of western Ukraine), the connection of the two systems was successfully completed.

Parallel to the technical integration, institutional integration and cooperation also began between the countries of the UCTE synchronous zone and the CENTREL countries, and eventually the old and new EU member states.

The power companies of CENTREL became associated members of the UCTE association on 1 January 1999 and gained full membership on 17 May 2001. Slovenia and CENTREL countries also became members of ETSO (the association of European Transmission System Operators) before EU enlargement. The Baltic States and Cyprus gained full membership of ETSO in 2005.[28]

26
27 Swanson (1994)
28 "At the end of 2001 ETSO membership was enlarged to Slovenia and CENTREL countries as full and associate members respectively. The Czech Republic was admitted as full member in June 2003 and Hungary, Poland and Slovakia in 2004." (ETSO, 2007)

The European Union supported the technical integration process of the CENTREL countries in the form of funding feasibility studies and technical assistance programmes. Table 2-13 below gives an example of the projects related to UC(P)TE connection which were financed by EU within the PHARE (pre-accession)[29] programme.

Table 2-13: Pre-accession Support for UCTE Harmonisation for CENTREL Countries

Project code and title	Date	Amount	Output
01C Technical assistance to CENTREL/interconnection with UCPTE	11.09.93	1 m€	feasibility / technical study on the synchronous operation of CENTREL and UCPTE power systems and towards the development of the Trans-European Networks (TEN) Initiative/ cost estimates/training CENTREL load despatching staff
03 02 B Technical assistance to CENTREL interconnection with UCPTE (continuation)	12.95	0.75 m€	establishment of CENTREL/UCPTE contro and accounting centre to improve co-operation and prepare transition to parallel operation of power systems

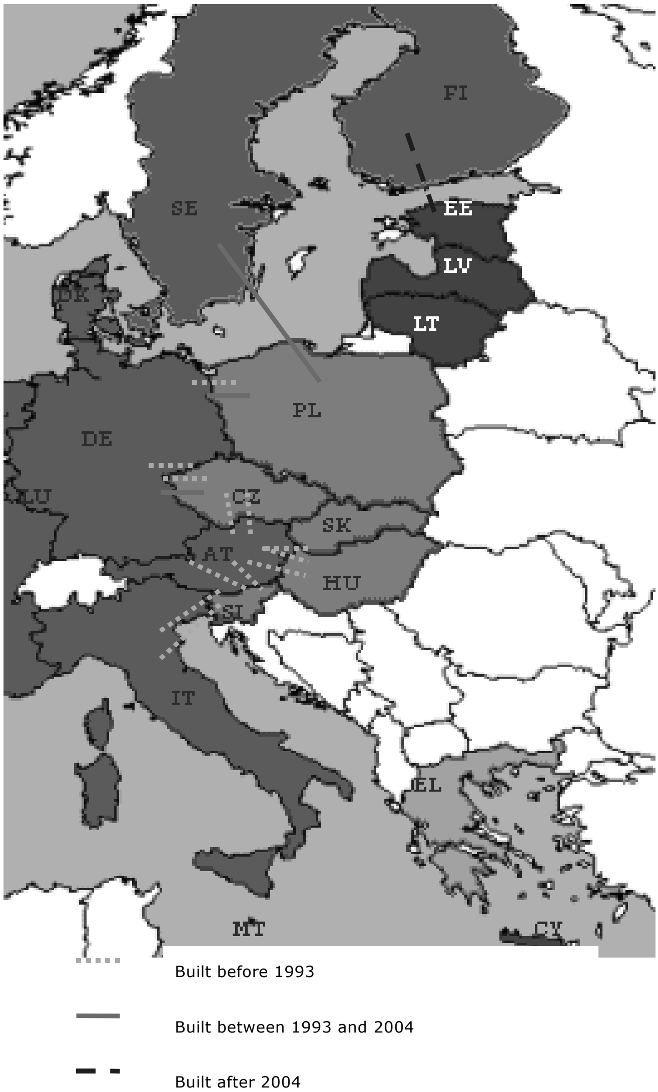
Source: Phare (1999) pp 268, 270

2.9.5.3 The Development of Interconnections between Old and New Member States and within New Member States

Since the joining of CENTREL to UCTE many key network investments were made to strengthen interconnections between the two country groups. Figure 2-22 and Table 2-14 following highlight the most important investment projects since 1993 that aimed at enhancing the interconnection capacities of the CENTREL countries.

29 The Phare programme is one of the three pre-accession instruments financed by EU to assist the preparation for joining the EU of the applicant countries of CEE.

Figure 2-22: Interconnections between Old and New Member States and within New Member States



Source: REKK

Table 2-14: Main Investments in Interconnections of CENTREL Countries

Power systems	Frontier substations	Number of lines	Voltage (kV)	Thermal transmission capacity (MVA at t = 35°C)	Transmission capacity limitation (MVA)	Year of commission
CZ - D	Přeštice - Etzenricht	1	400	1363		1997
CZ-PL	Albrechtice - Dobrzeń'	1	400	1088		2003
H-HR	Siklós - Donji	1	120	134	65 in winter 55	1994
H-HR	Hévíz - Zerjavinec	2	400	2492		1999
H-RO	Sándorfalva - Arad	1	400	1346		1998
PL-D	Mikulowa - Hagenwerder	2	400	2604		1999
PL-S	Słupsk - Karlshamn	1	450	600		2000
PL-SK	Krosno - Lemešany	2	400	2504	1662	1998

Source: CENTREL (2007)

EU subsidies were not prevalent in these projects except for the HVDC cables built between Sweden and Poland, and between Finland and Estonia. Support was given in the framework of the TEN-E project[30] through feasibility and preparatory studies, but direct investment support was also granted (see Table 2-15 below).

Table 2-15: EU Financing of Interconnection Projects (1990–2005)

Date	Country	Company	Descreption	Financing by TEN (€)
1995	Sweden	Vattenfall	SWEDEN - POLAND: Electricity interconnection. Feasibility study.	800 000
1997	Sweden	Vattenfall	Alternative layout for the Sweden-Poland Link (HVDC electricity interconnection). Additional feasibility study including sea-bottom survey.	340 000
1998	Sweden	SwePol Link AB	The SwePol link project : construction of a HVDC cable connection between Sweden and Poland with one converter station in each country. Grant to the investiment.	2 320 000
1999	Finland	Pohjolan Voima Oy	The Estlink HVDC project (Finland - Estonia). Preparatory Studies.	670 000

Source: Trans-European Networks of Energy

By summing up the thermal transmission capacities (and considering the capacity limitations) we can see how the interconnection capacities of the four CENTREL countries had evolved[31]. Poland had almost doubled its capacities between 1993 and 2005, while all four CENTREL countries enlarged their thermal capacities by at least 20% (See Figure 2-23 below).

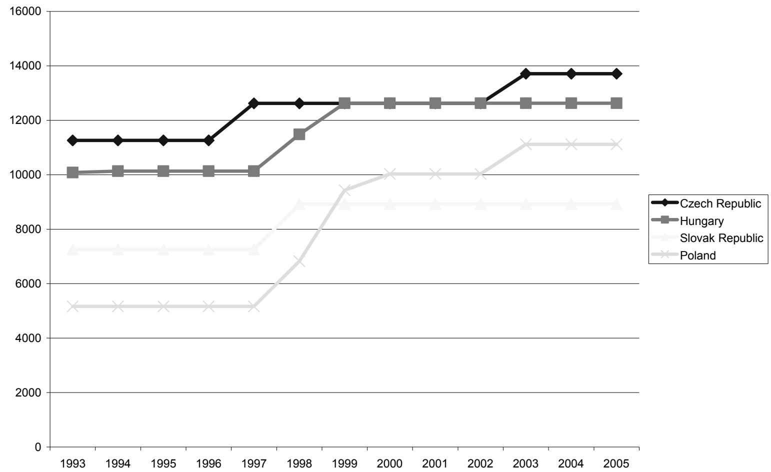
As shows the four new MSs in question had expended their interconnections in both directions, to old MS and to other countries as well. However this extension was greater in the direction of old MSs.[32]

30 Trans-European Networks of Energy

31 Using NTC data instead of thermal transmission capacity data would be much preferred, however NTC data does not exist for the '90s and consistent NTC data for the '00 years was not available during our investigations.

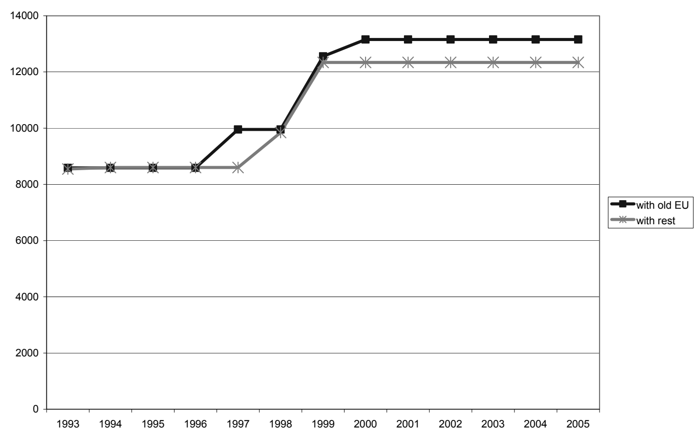
32 Although Slovenia like the CENTREL countries is also an important border country having interconnections with two old MSs (Austria and Italy) we could not yet include it into our analysis due to lack of information about the date of the building of the interconnections and the extent of the thermal capacities.

Figure 2-23: Growth of Thermal Transmission Capacities of CENTREL Countries (MVA at t=35°C)



Source: REKK estimate

Figure 2-24: Growth of Thermal Transmission Capacities between CENTREL countries and Old EU and Other Countries (MVA at t=35°C)



Source: REKK estimate

2.9.5.4 The Development of Interconnection Flows between Old and New Member States

In this section we examine whether the new opportunities given by the synchronization of the UCTE and the CENTREL systems, and the building of new interconnection capacities led to an increased power exchange between these country groups. Our focus is on power flows between old and new EU member states.

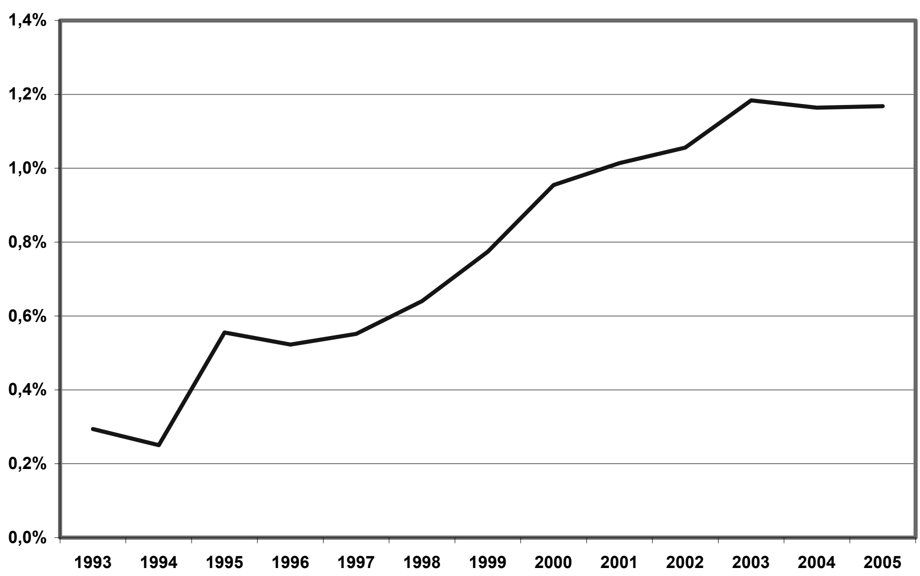
The widening of the UCTE grid gave new "playing fields" for wholesale marketers. In the long run the connections of new power systems to the UCTE grid have enlarged the available cross-border capacities not only between old and new member states, but because of the new "shunt ways of electricity" sometimes among old member states as well. With the connection of the new accession countries, different price areas became closer to each other, so that new trading possibilities were opened up to the electricity markets.

We cannot say however that before the interconnection there was no electrical energy exchange between the two different synchronous area (UCTE and CDU) although there were technical difficulties to these energy exchanges. AC/DC couplers (back-to-back stations which made the realisation of programmed interchange possible in any direction) were installed in international stations on the borders of Germany-Czech Republic, Austria-Czech Republic and Austria-Hungary (Etzenricht, Dürnrohr, Süd-Burgerland).

For our analysis of power flows we have collected data on physical flows between the new and old member states (UCTE, 2007), namely physical flows between (starting from the North) Poland-Sweden, Poland-Germany, Czech Republic-Germany, Czech Republic-Austria, Hungary-Austria, Slovenia-Austria, Slovenia-Italy33.

Figure 2-25 below shows how physical flows relative to electricity generation have increased since 1994 between the two regions. We calculated the total physical flows by summing the physical flows in both directions at each border. By this way we can form a view on how physical flows evolved over time. We then divided the total physical flows by total net electricity generation in the 20 interconnected EU countries (excluding Malta, Cyprus, and the Baltic States as discussed above). Dividing physical flows by net generation gives us an index on physical trade intensity: what percentage of the generated electricity in this region has been traded through the borders between old and new EU. As can be seen physical trade intensity has grown significantly over time.

Figure 2-25: Proportion of Physical Flows to EU-20 Generation (%)

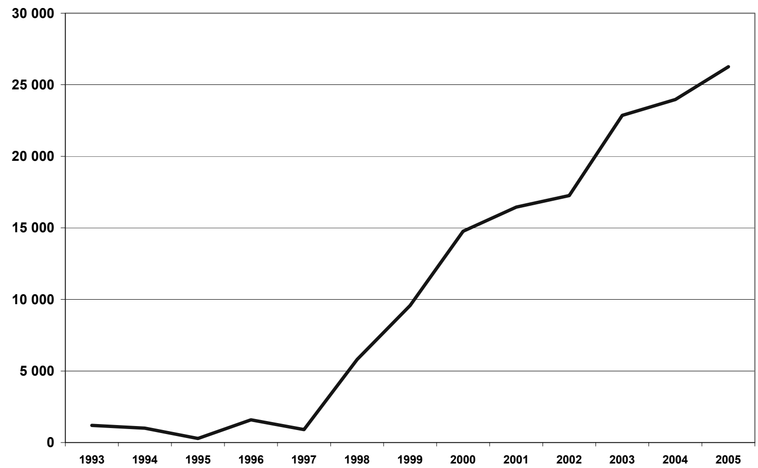


Source: EUROSTAT, UCTE, 2007

33 CENTREL 2007a

The next two figures show that physical flows increased more in the direction of the old EU countries. We calculated the net EU-15 imports by summing the net physical flows on the listed borders. As the graphs show, net imports to EU-15 have increased steadily, especially since 1997 and reaching 25 TWh. We can say that the old EU has increased and used its electricity import possibilities from the new EU from the mid 1990s.

Figure 2-26: Net EU-15 Imports (GWh)



Source: UCTE, 2007

Figure 2-27: Percentage of EU15 import to total physical flow

Source: UCTE, 2007

To summarise how network adequacy has changed over time in the electricity sector, we can state that joining the UCTE had the biggest effect within the new member states. Joining the UCTE was a key part of the reorientation process of the CEE countries from Russia to the west. EU accession could not have been the only driving force for joining UCTE though, as the case of the Baltic States shows. The synchronisation process did receive funding from EU pre-accession funds but was not the main source. Thus we cannot state that the changes in network adequacy were directly due to EU enlargement, we can only state that it was due to the general reorientation process leading to EU accession.

When analysing network adequacy we have concentrated on the evolution of network capacities. We have found that in the CENTREL countries since 1996 many capacity expansion projects were carried out. These expansions were financed by the countries themselves and EU support was given mainly in the form of feasibility and preparatory studies.

The analysis of physical flows shows that after joining UCTE and with the capacity expansions, the physical energy exchange has started to grow massively. We have also shown that the direction of this exchange was from new member states towards the old EU member states. We can therefore say that the CENTREL countries joining UCTE has enhanced security of supply of the old member states, as well by offering greater import possibilities.

Other new member states besides the CEE country group were not effected as greatly. These were the more isolated systems, either due to their island nature (Cyprus and Malta), or the the island like nature of their networks (the Baltic States).

2.9.6 Isolated Systems, Non UCTE New Member States

2.9.6.1 Baltic States

The Baltic States are mutually connected by very strong interconnections with a large overcapacity in their transmission grids (see Figure 2-28 below).

The Baltic grid was designed under the Soviet regime to be operated as an interconnected system with Russia, and therefore interconnection capacity between the Baltic States is high. Furthermore, the Lithuanian electricity transmission network is fairly well-integrated with Belarus and Kaliningrad Region. At the time of EU accession in 2004 Lithuania, Latvia and Estonia, the power systems of the Baltic States did not have any links to the power grids of other EU countries (most notably: an interconnector between the Baltic States and Poland is missing). The Baltic power systems were therefore isolated from the EU market.

The Baltic TSOs used to have a co-owned company (DC Baltija) for various coordination tasks of the network operation. This company though has now been dismantled and the tasks were transferred to BALTSO, a newly founded Baltic TSO association.

In a later section we come back to plans on how strong existing and planned new interconnections can increase the security of supply of the Baltic States.

Figure 2-28: Map of Electricity Transmission System in the Baltic States

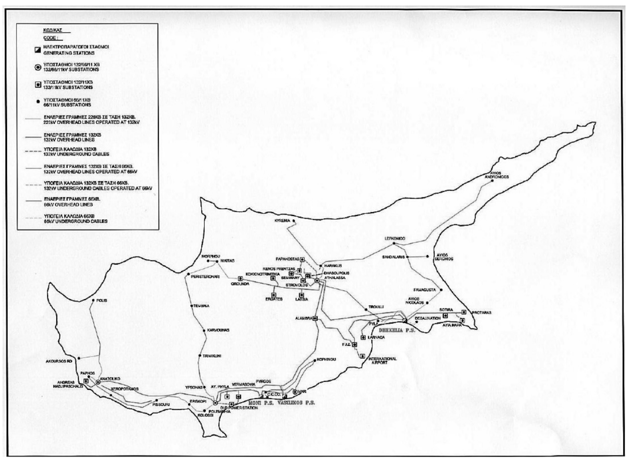
Source: V. Jankauskas, NCC

2.9.6.2 Cyprus

Cyprus is an isolated, island country with no physical energy links to other EU Member States.

The dominant utility on Cyprus is the vertically integrated, majority state-owned Electricity Authority of Cyprus (EAC). EAC generates and supplies 100% of the electricity in Cyprus. Additionally, EAC owns the transmission network, and owns and operates the distribution network and supply. EAC operates three power stations: Dekelia Power Station, Moni Power Station and Vasilikos Power Station, with a total installed capacity of approximately 1100 MW.

Figure 2-29: Map of the Electricity System of Cyprus



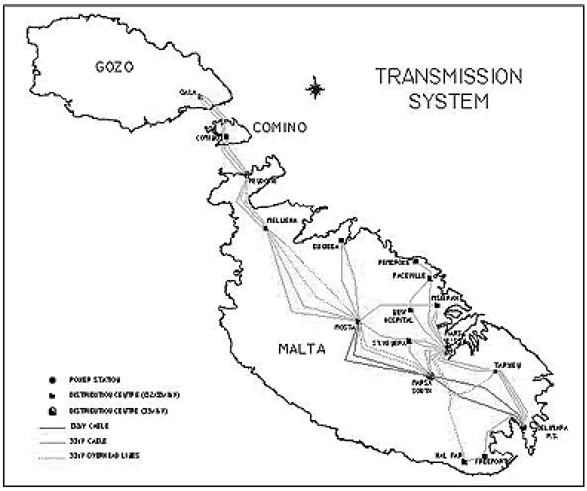
Source: EAC

2.9.6.3 Malta

The Maltese national electricity grid is isolated and is not connected to any other electrical network. Therefore, all the electrical energy required is generated in Malta. This is carried out by Enemalta Corporation.

At present Enemalta Corporation operates two Power Stations, which supply all the Electrical power needs of the Islands of Malta and Gozo. These stations have a total combined nominal installed capacity of 571 MW, and they are interconnected together through the existing grid. Malta has no indigenous primary energy resources and therefore Enemalta Corporation relies entirely on imported fuels, mainly heavy fuel oil and light distillate. The possibility of an undersea electricity interconnection with Sicily is currently under investigation.

Figure 2-30: Map of the Electricity System of Malta



Source: Enemalta Corporation

2.9.7 Gas Supplies and Imports

2.9.7.1 Introduction

In this section a detailed analysis is made of the gas supplies to the ten new EU Member States. It considers gas supplies to the original EU-15, to the new EU-10 (the EU-10 in this section are the EU-5 and EU-3 as Cyprus and Malta do not have any gas industries) and the combined EU-25 Member States, as groups and as individual countries.

The conclusion of the analysis is that the EU is becoming increasingly reliant on imported gas supplies and most of those imports are coming from Russia. This is for the following reasons:

- Indigenous gas reserves and gas production from within the EU (most from the Netherlands and UK, but which includes all EU gas producers) are declining. This affects all EU gas producers;
- Consumption at the same time is continuing to increase;
- The new Member States have increased this reliance on imported gas as they are all (the east European countries) very reliant on imported Russian gas supplies.

Despite the increasing reliance on imported gas supplies, there is some evidence that as a proportion of total imports, the Russian position is being eroded slightly. Some EU-10 Member States (Czech Republic in particular) have been able to increase the proportion of gas imports from Norway in place of Russia. Others (such as Poland and to a lesser extent Hungary) have for a long time been able to diversify slightly from their reliance on Russian gas supplies. The Baltic States, Slovakia and Finland remain 100% reliant on imported Russian gas supplies though for all of their gas needs

.

The gas supplies section concludes with a set of maps showing in a clear way the gas flows throughout Europe for each year since EU enlargement.

2.9.7.2 Natural Gas Reserves in EU Countries

Natural gas reserves for EU Member States are shown in the following table.

Table 2-16: Natural Gas Reserves in EU Countries, bcm (1990-2005)

COUNTRY (bcm)	1990	2000	2001	2004	2005
Austria	18	26	24	20	21
Belgium					
Cyprus					
Czech Republic	4			3	3
Denmark	167	144	141	132	122
Estonia					
Finland					
France	35	8	10	7	7
Germany	244	264	254	201	187
Greece	9	1	1	1	1
Hungary	114	32	34	23	23
Ireland	46	34	34	34	34
Italy	350	199	191	125	117
Latvia					
Lithuania					
Luxembourg					
Malta					
Netherlands	1950	1655	1616	1449	1387
Poland	126	152	152	110	109
Portugal					
Slovak Republic	9	15	15	14	14
Slovenia					
Spain	20				
Sweden					
United Kingdom	540	1197	1111	826	800
EU-15	3,379	3,528	3,382	2,795	2,676
EU-25				2,945	2,825

Source: IEA (from Cedigaz)

The above table shows that the main natural gas reserves within the EU are held within the Netherlands and the UK (around 1,000 bcm or more), with lesser gas reserves lying in Denmark, Germany, Italy and Poland (100-200 bcm). Tiny amounts lie in another seven EU Member States. Gas production from each country reflects the level of reserves.

A key point to note is that gas reserves (and gas production) are declining throughout the EU. Even with the addition of ten new Member States in 2004, the trend of declining reserves is continuing. The decline in the North Sea reserves has the largest effect, which affects the UK, Netherlands and Denmark. This decline in reserves is a general trend that is taking place in all EU countries with gas reserves.

As gas reserves, and production, continue to decline in the EU, and as gas consumption continues to rise, the EU will become increasingly dependent on gas imports. This is already becoming noticeable and the trend will become increasingly so.

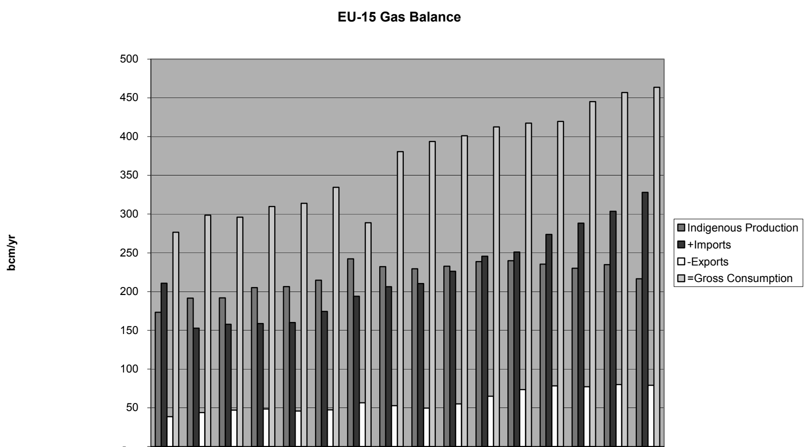
2.9.7.3 Natural Gas Balance for the EU

Natural gas balance across the EU is shown in the following figures. They show the trend since 1990, which was approximately when the East European members of the 10 new Member States started their progress towards EU membership.

Just considering the original EU-15 Member States, it can be seen in

Figure 2-31 below that indigenous production reached its highest point in 2001 (at 240 bcm) and has been declining since then. Consumption has been steadily rising throughout the period (to 464 bcm in 2005) and imports have also been steadily rising to fill the gap (328 bcm in 2005).

Figure 2-31: EU-15 Gas Balance (1990-2006)

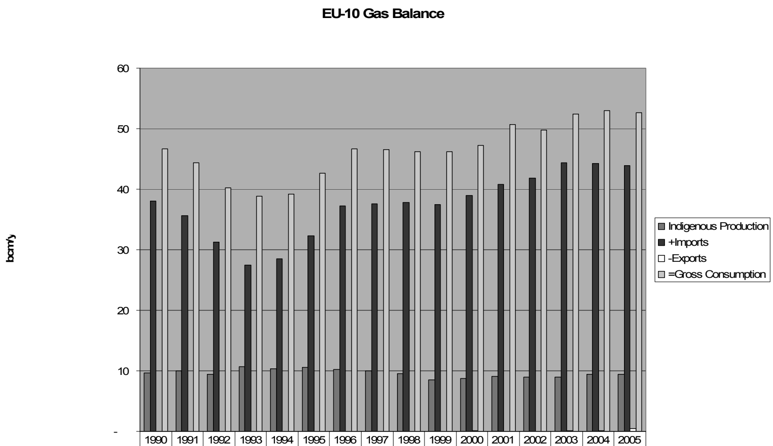


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Indigenous Production	173	192	192	205	207	215	242	232	229	233	239	240	235	230	235	217
+Imports	211	153	158	159	160	174	194	206	210	226	246	251	274	288	304	328
-Exports	39	44	47	48	46	47	57	53	50	55	65	73	78	77	80	79
=Gross Consumption	277	299	296	310	314	335	289	381	394	401	413	417	420	445	457	464

Source: IEA; analysis Mercados

Figure 2-32 below now shows the pattern of the EU-10 (that is EU-5 + EU-3) in terms of their gas balance.

Figure 2-32: EU-10 Gas Balance (1990-2006)



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Indigenous Production	10	10	9	11	10	11	10	10	9	9	9	9	9	9	9	9
+Imports	38	36	31	27	29	32	37	38	38	37	39	41	42	44	44	44
-Exports	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
=Gross Consumption	47	44	40	39	39	43	47	47	46	46	47	51	50	52	53	53

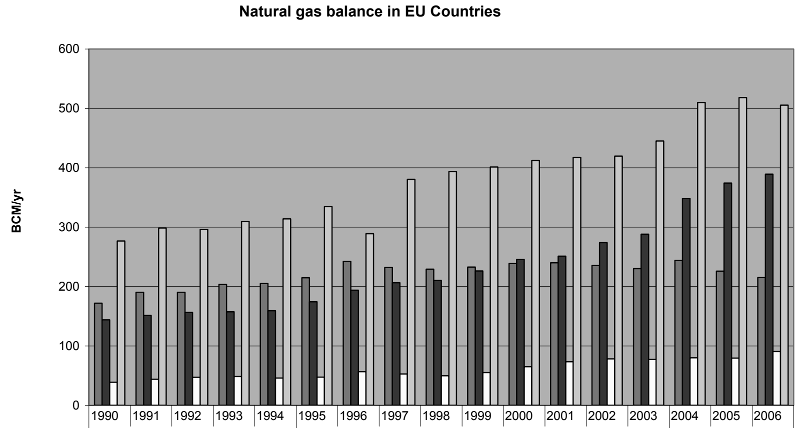
Source: IEA; analysis Mercados

Production among the EU-10 countries has always been very small, around 10 bcm a year. The gas supply needed to meet total consumption (53 bcm in 2005) has largely been met from imports (44 bcm in 2005). Exports have been marginal.

The following chart shows the gas balance for the EU as a whole, for the 12 Member States from 1990 to 1994, for the 15 Members from 1995 to 2003 and for the 25 Members from 2004 to 2006.

Total gross consumption of all the EU Member States shows a steadily rising trend (except for a blip in 1996) as new Member States were added. Production from within the EU has remained relatively constant over the period (the main EU gas producers being the UK and Netherlands, with lesser gas production from Denmark, Germany, France and Italy). As the EU gas producers are all old Member States from before 1990, the total EU production has not increased with new Members. There has been a small amount of EU exports (from these old Member States) and exports have increased slightly over the period. Imports have increased though, and significantly so, with the entry of new Member States though.

Figure 2-33: Total EU Natural Gas Balance (1990-2006)



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	EU-12					EU-15									EU-25		
Indigenous Production	172	190	190	204	205	215	242	232	229	233	239	240	235	230	244	226	215
+Imports	144	151	156	157	159	174	194	206	210	226	246	251	274	288	348	374	389
-Exports	39	44	47	48	46	47	57	53	50	55	65	73	78	77	80	80	90
=Gross Consumption	277	299	296	310	314	335	289	381	394	401	413	417	420	445	510	518	505

Source: IEA (1990-2005); IEA, BP, other (2006); analysis Mercados

In 1994 (the last year of the EU-12), indigenous production at 205 bcm accounted for 65% of EU gross consumption (at 314 bcm), and 36% by net imports (imports less exports, 113 bcm). On average over the period 1990-1994, 64% of consumption was met by indigenous production and 36% by net imports.

The EU became a net importer (where imports exceeded EU gas production) from 1999 and the EU has become increasingly import dependent since then. EU gas production has been falling since 2002, reflecting the fact that the UKCS is now in decline. From being a gas exporter since the construction of the UK-Belgium Interconnector, the UK is now a net gas importer.

In 2003 (the last year of the EU-15), indigenous production at 230 bcm had fallen to 52% of gross consumption and net imports of 211 bcm had risen to 47% of gross consumption. On average over the period 1995-2004, 61% of consumption was met by indigenous production and 43% by net imports.

By the end of 2006 (with the EU-25), indigenous production at 215 bcm had fallen to 43% of gross consumption, and net imports at 299 bcm had increased to 59%. On average over the period 2004-2006, just 45% of consumption is met by indigenous production and 56% by imports. The effect of the new Member States (with high gas import reliance) on a situation where EU gas production was already falling is shown in the following charts.

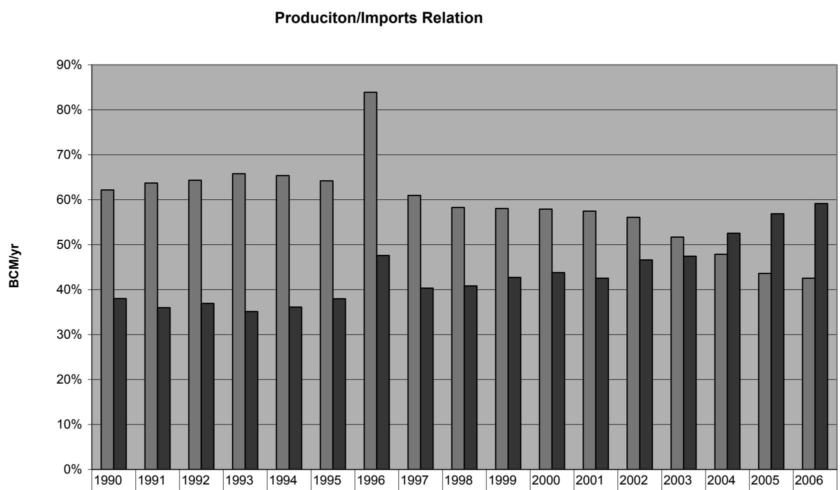
2.9.7.4 Natural Gas Balance for EU Countries

The issue regarding gas imports (and the effect of EU enlargement on this) is not the level of gas imports to EU Member States, but where that gas is coming from. Of the old EU-15 Member States, much of their gas imports came from other EU Member States (mainly from the Netherlands), from Norway (an EFTA member), plus from Algeria, Russia and from LNG imports. With the increase in the EU to EU-25, the new Member States take their imported gas largely from Russia. This issue of gas imports is further analysed in the next section.

2.9.7.5 EU Gas Imports Summary

Figure 2 34 below shows more clearly the relationship between indigenous production and imports for the EU, and the proportions of gross EU consumption met by indigenous production and by net imports.

Figure 2-34: EU Gas Production and Imports (1990-2006)



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	EU-12					EU-15									EU-25		
Indigenous Production	62%	64%	64%	66%	65%	64%	84%	61%	58%	58%	58%	57%	56%	52%	48%	44%	43%
Net imports	38%	36%	37%	35%	36%	38%	48%	40%	41%	43%	44%	43%	47%	47%	53%	57%	59%

Source: IEA (1990-2005); IEA, BP, other (2006); analysis Mercados

The EU has become steadily more reliant on net imports rather than its own gas production to meet total consumption from 2004, the same time as the entry of the new EU-10. The entry of the new Member States aggravated a situation where indigenous production was already falling.

EU gas imports have been increasing each year from the entry of Austria, Finland and Sweden in 1995, and much more so since the entry of the ten new Member States in 2004. With the exception of Sweden (importing gas from Denmark), all of the increase in gas imports to new Member States has been from Russia and other CIS suppliers moving gas through Russian pipelines.

In terms of import dependency, the EU in 1999 could be said to be reasonably diversified in terms of dependency of pipeline gas imports on any one country. Only Austria, Finland, Ireland and Portugal could be said to be dependent on any one source of pipeline gas supply.

Ireland took all its imported gas needs from the UK (another EU Member State) and as Irish indigenous production declines that dependency of Ireland on the UK for gas imports will increase (although Ireland can in theory import from any other country and simply transit the UK).

Portugal took all its pipeline gas imports from Algeria, transited through Spain.

Austria and Finland were entirely dependent on Russia for all of their gas imports. Of old EU-15 Member States Finland had for long been reliant on Russian gas imports for 100% of its gas needs. Greece began building a gas industry in the 1990s and again took all its gas supplies from Russia (transited via Ukraine and Bulgaria).

With the entrance of the new Member States, the reliance on Russian gas supplies increases. Estonia, Latvia, Lithuania and Slovakia rely on Russian gas supplies for 100% of their gas imports.

Three countries from the former Soviet block though managed to diversify some of their gas supplies (Hungary, Czech Republic and Poland). These are countries that are all on or off transit routes for Russian gas to western Europe and normally would expect to take 100% of their gas supplies from Russia. They have managed to diversify some of their gas supplies from other countries. These will be commercial diversifications only though, the gas molecules are still likely to come from Russia, and the commercial flow is "back haul", in other words the movement of the gas according to the commercial contract is against the physical flow of the gas.

These diversifications of supply mean though that there are other parties dealing with the Gazprom over gas deliveries, not only the Czech, Hungarian and Polish buyers but also German, French and Norwegian suppliers.

In the Appendix of the full study details of the amount of gas imports to the EU Members is considered in more detail. There are a number of tables showing imports by source for each Member State and for the EU-10 new Member States.

2.9.7.6 Analysis of Gas Imports from Russia

As has been shown above, the EU is very dependent on gas imports from outside the EU and is becoming increasingly so. As well as being the largest gas supplier to the EU, Russia is also crucially important for gas supply to the east European Member States of the EU-10. By joining the EU, the new EU-10 have increased EU reliance on Russian gas supplies.

Russia is the largest gas exporter to the EU, followed by Norway, Algeria and the Netherlands. The Netherlands and Norway are EU or EFTA members so the main non western European gas suppliers are Russia and Algeria (this is pipeline gas suppliers, LNG suppliers are not included). As the largest gas supplier to the EU and the main supplier to Eastern Europe, this section analyses gas supplies from Russia for each of the EU-25 countries is considered in this section. In the following table are shown imports from Russia to EU countries, for the EU-15 for 1999 and the EU-25 for 2004-2006.

Table 2-17: EU Imports from Russia

Country	Total Imports (bcm)				Imports from Russia (bcm)				Imports from Russia (%)			
	1999	2004	2005	2006	1999	2004	2005	2006	1999	2004	2005	2006
Austria	6.1	8.4	9.5	8.8	5.2	6.6	6.8	6.9	85%	79%	72%	78%
Belgium	15.8	17	18	15	-	0.4	-	0.3	-	2%	-	2%
Cyprus		0	0	0	-	-	-	0	-	-	-	-
Czech Rep		8.8	9.3	9.7	-	6.5	7.1	6.8	-	74%	76%	70%
Denmark	0	0	0	0	-	-	-	0	-	-	-	-
Estonia		1	1	1	-	1	1	1	-	100%	100%	100%
Finland	4.1	4.9	4.4	4.8	4.1	4.9	4.4	4.8	100%	100%	100%	100%
France	40.6	45.3	34.7	45.8	12.1	9.6	9.2	8.7	30%	21%	27%	19%
Germany	76.7	89.3	93	88	34.4	39.1	38	33.1	45%	44%	41%	38%
Greece	1.5	2.6	2.8	3.3	1.5	2.2	2.4	2.8	100%	85%	86%	85%
Hungary		11.5	12	10.3	-	9.3	8.8	7.7	-	81%	73%	75%
Ireland	2.2	3.4	3.5	3.4	-	-	-	0	-	-	-	-
Italy	49.54	68.3	73.3	77.5	19.1	23.6	23.3	22.5	39%	35%	32%	29%
Latvia		2.2	1.8	1.5	-	2.2	1.8	1.5	-	100%	100%	100%
Lithuania		2.9	2.9	3.3	-	2.9	2.9	3.3	-	100%	100%	100%
Luxembourg	0.7	1.4	1.4	1.4	-	-	-	0	-	-	-	-
Malta		0	0	0	-	-	-	0	-	-	-	-
Netherlands	10.8	19.7	25.1	24.7	-	1.3	-	2.5	-	7%	-	10%
Poland		9.9	10.5	8.9	-	6.2	6.9	5.4	-	63%	66%	61%
Portugal	2.3	3.8	4.5	4.1	-	-	-	0	-	-	-	-
Slovakia		6.9	6.7	6.4	-	6.9	6.7	6.4	-	100%	100%	100%
Slovenia		1.1	1.1	1.1	-	0.7	0.7	0.6	-	64%	64%	55%
Spain	15.18	26.9	33.6	33.2	-	-	-	0	-	-	-	-
Sweden	0.9	1	1	1.2	-	-	-	0	-	-	-	-
UK	1.2	12.2	15.7	22	-	-	-	0	-	-	-	-
EU-15	228				76.4				34%			
EU-25		349	366	375		123	120	114		35%	33%	30%

Source: IEA (1999-2005); IEA, BP, Other (2006); analysis Mercados

A key point to notice is that although the EU-25 and the EU-10 are very dependent on Russian gas supplies, the dependency has reduced slightly in recent years. Although in terms of the gas molecules all imported gas supplies to all east and central European countries come from Russia, in commercial terms, some countries have managed to diversify some of their gas imports, as is shown in the following section. EU-10 gas imports from Russia have reduced from 86% of all their gas imports in 1999 to 77% in 2006.

For example in the case of the Czech Republic, it lies on the route of the Brotherhood Pipeline from Russia via Ukraine, and all gas flows are in an east-west direction, it has nevertheless been able to diversify some of its gas imports. From taking 82% of its gas from Russia in 1999, the Czech Republic in 2006 had reduced that to 70% and took 30% of its gas supply from Norway. Hungary, Poland and Slovenia have also diversified some of their gas supplies (although to a less extent than the Czech Republic).

Of the EU-10, the three Baltic Republics of Estonia, Latvia, Lithuania (EU-3), plus Slovakia (lying right next to Ukraine) in 2006 still took 100% of their gas supplies from Russia.

2.9.8 Maps of European Gas Supplies

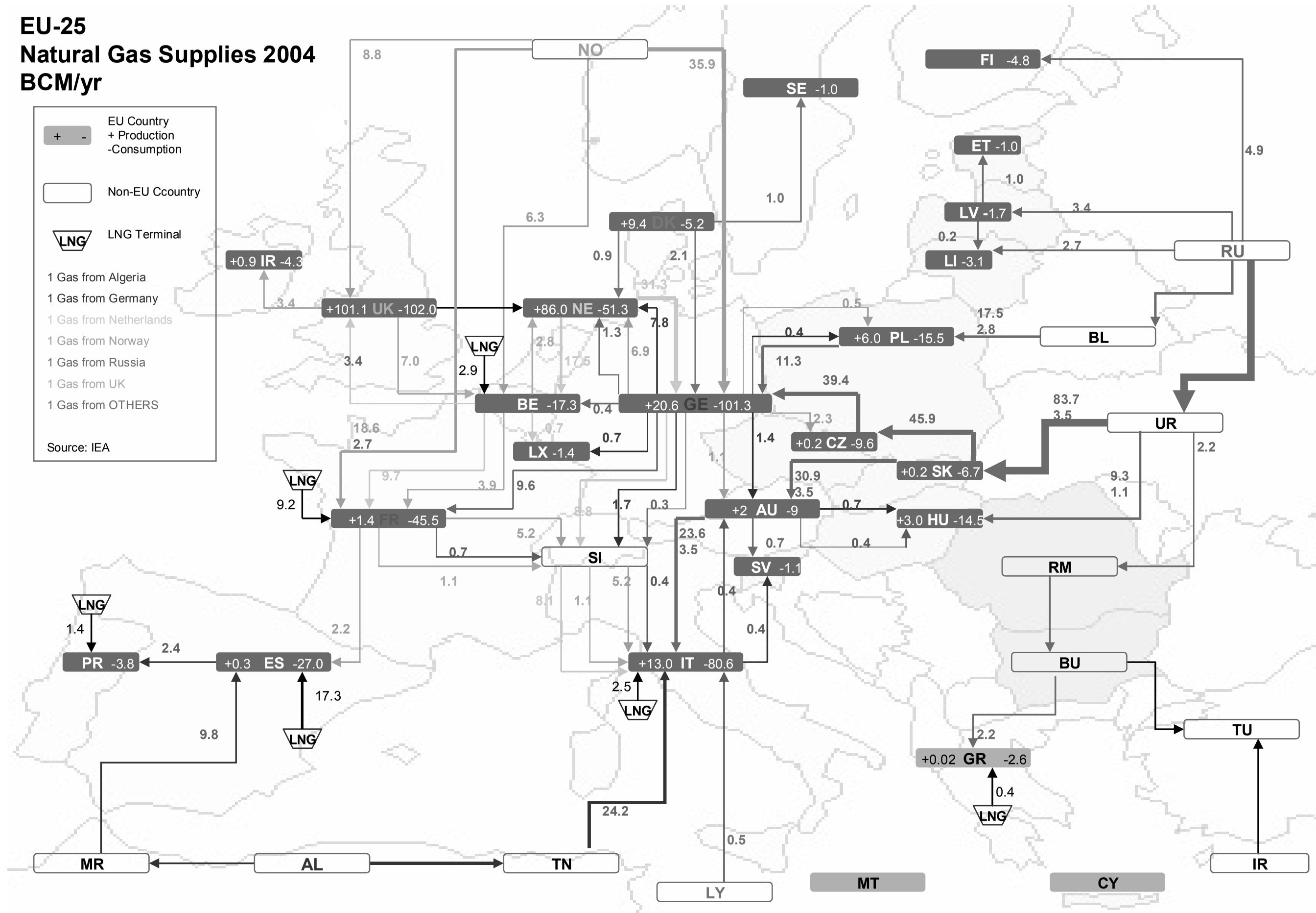
2.9.8.1 Introduction

In this section, there follow maps of gas supplies to all the EU countries. These maps show in a single sheet, for each year since the EU enlargement, how gas flows around Europe. For each supply country, the maps show in a colour coded way, where gas supplies flow to. They also show the indigenous production and consumption in each country. Each country is considered as a single node, showing gas imports, exports, domestic production and consumption.

They show the huge impact of Russian gas supplies, both in terms of volumes, in terms of their complete dominance of gas supplies in eastern Europe, and also in terms of the reach, of Russian gas reaching markets far to the west in western Europe.

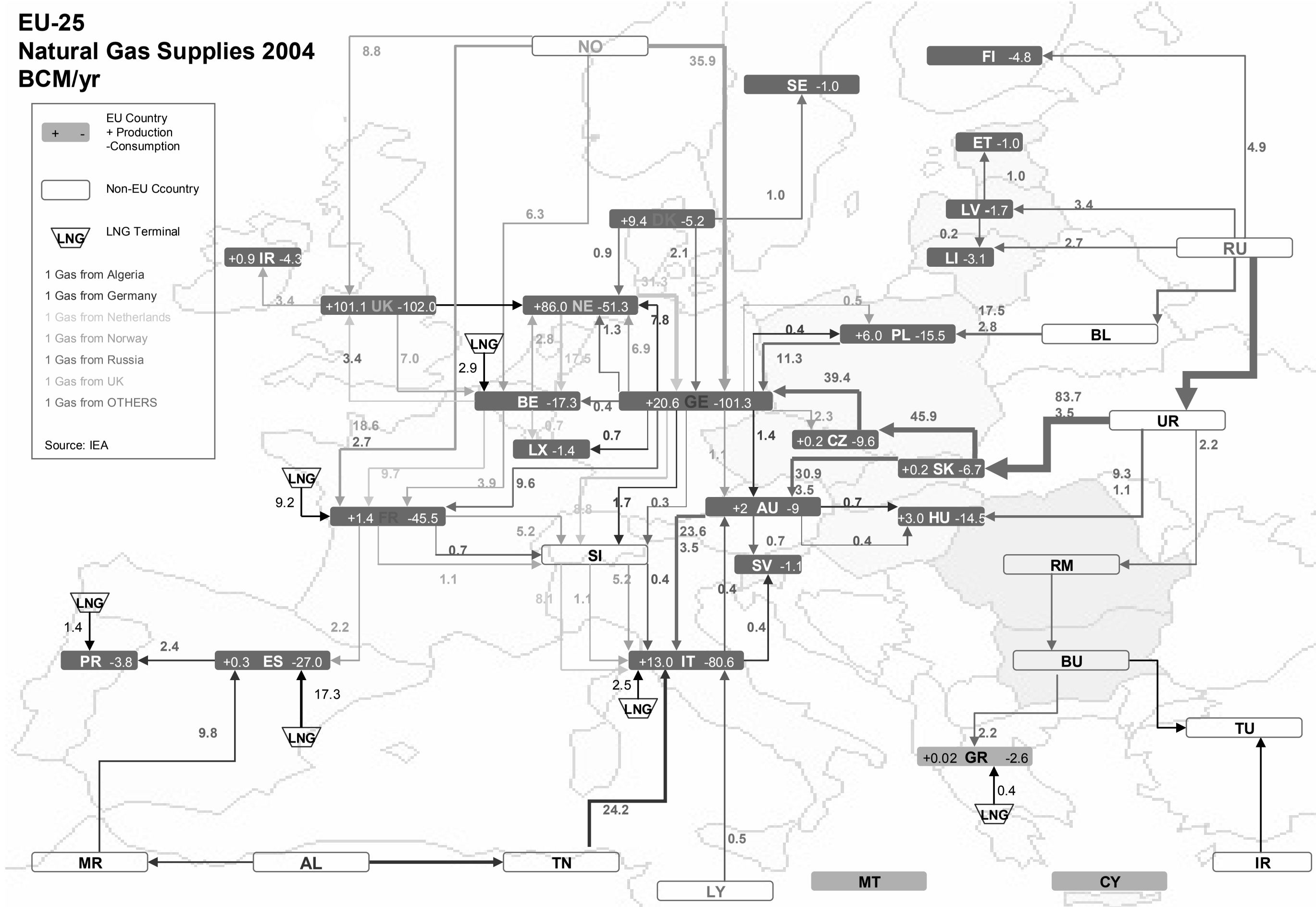
The maps also show that although Russia plays a very significant role in European gas supplies, it is far from dominant. Gas supplies from Norway and from Algeria are also very significant. There are also large amounts of LNG imports (Spain is the world's third largest LNG importer, after Japan and South Korea). In fact, Europe is blessed in that it receives competing gas supplies from all points. In terms of gas supplies, Europe can be considered the most competitive set of gas markets in the world. If for example a similar set of maps were produced for North America, they would be very simple. The USA receives gas from its own production (mostly in the Gulf of Mexico) and imports from Canada and Mexico, plus LNG imports. In terms of gas supply, Europe is much more diversified than North America.

Figure 2-35 Map of European Gas Supplies 2004



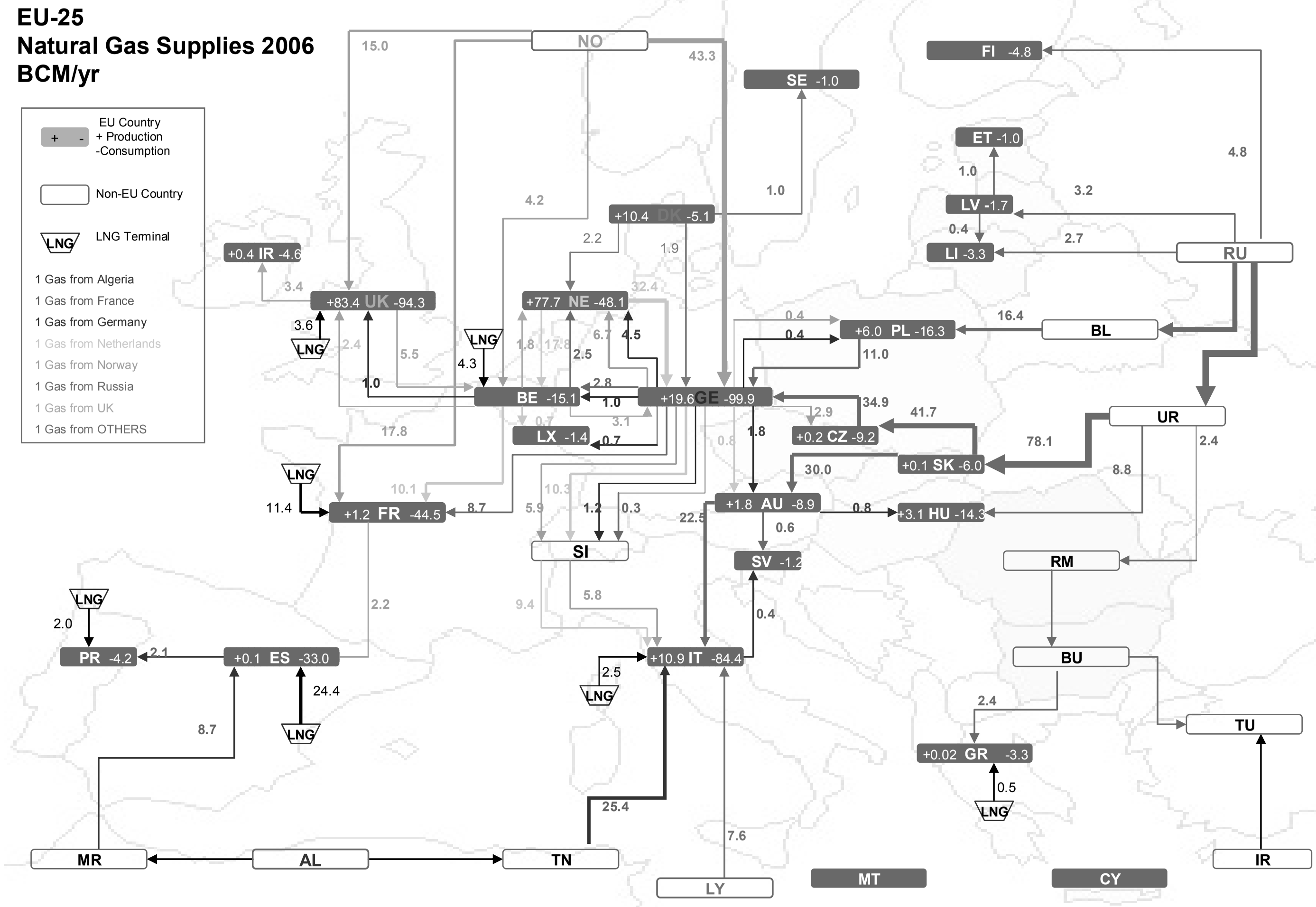
Source: Mercados

Figure 2-36 Map of European Gas Supplies 2005



Source: Mercados

Figure 2-37 Map of European Gas Supplies 2006



Source: Mercados

2.9.9 Gas Network Adequacy

2.9.9.1 Gas Transport Capacity at the End of 2005

Gas networks in continental new member states (EU-5 and EU-3) reflect the east-west gas transmission routes connecting major Russian gas fields to markets in central and western Europe (Germany, Italy and points further west). North-south connections and consequent cooperation across new member states (Poland on the Yamal pipeline with Czech and Slovak Republics and Hungary fed from the Brotherhood pipeline) are essentially missing. The current gas infrastructure in the new member states does not allow for much diversity of sources of gas supply.

One of the arguments in favour of liberalised and competitive energy markets is that they promote diversification of energy supplies, through sourcing gas from different suppliers, and also from improving physical connections and building new connections. The process of EU enlargement could also be expected to lead to increased physical interconnections between EU-10 Member States and between EU-10 and EU-15 Member States over the period of EU enlargement.

The capacities for the main international gas pipelines at the border points are shown in the following table.

Table 2-18: Capacities at EU-10 Cross Border Nodes (End 2005)

Pipeline	Location	From	To	Max Flow rate	
				mcm/hour	bcm/year
Gasum Oy	Imatra	Russia	Finland	0.80	7.0
LV-LT	Kiemenai	Latvia	Lithuania	0.22	1.9
Bel-Lit	Kotlovka	Belarus	Lithuania	1.20	10.5
Yamal	Kondratki	Belarus	Poland	3.72	32.6
EuRoPol	Mallnow	Poland	Germany	3.00	26.3
Brotherhood	Velke Kapusany	Ukraine	Slovakia	12.75	111.7
Brotherhood	Drozdowicze	Ukraine	Poland	0.70	6.1
Brotherhood	Beregdaroc	Ukraine	Hungary	1.72	15.1
Stegal	Lanzhot	Slovakia	Czech	6.50	56.9
Stegal	Hora Svate Kateriny	Czech	Germany	1.83	16.0
Megal	Waidhaus	Czech	Germany	3.97	34.8
TAG, HAG	Baumgarten	Slovakia	Austria	6.00	52.6
HAG	Mosonmagyarovar	Austria	Hungary	0.50	4.4
SOL	Murfeld	Austria	Slovenia	0.42	3.7
SOL	Rogatec	Slovenia	Hungary	0.20	1.8
TAG	Gorizia	Slovenia	Italy	0.19	1.7

Source: Mercados

These various pipeline systems are the main transit pipelines to western Europe, Brotherhood from Russia through Ukraine to the Slovak Republic and its various offshoots (STEGAL and MEGAL through the Slovak and Czech Republics, TAG and WAG through Slovak Republic to Austria, HAG from Austria to Hungary) and Yamal from Russia via Poland to Germany. There are some direct pipeline routes to Finland and to Baltic countries.

These pipeline routes were established in Soviet times and the main Brotherhood and offshoot pipelines date from the mid 1980s. The pipeline system is therefore approximately 20 years old now. More recent developments have been the Yamal pipeline but Yamal II is now in doubt because of the forthcoming Baltic sea pipeline route connecting Russia directly with Germany.

In terms of network adequacy, the Brotherhood pipeline operated in 2005 at about 70% load factor. With a capacity of 111.7 bcm a year and gas flows of 81.3 bcm on the Brotherhood pipeline at the Ukraine – Slovak Republic border, there was an average load factor in 2005 of 73%. This is a well used pipeline but there is sufficient spare capacity now to cope with any demand spikes.

EU-25 demand for natural gas is increasing strongly however and new gas supplies and pipeline capacity is needed, hence there is a lot of activity now in developing new pipeline projects, as described below.

2.9.9.2 Gas Storage

An important way of balancing gas supplies and also in reducing reliance on a single source of piped natural gas is through using gas storage. The following table shows working gas capacity for the EU-15 and EU-10 countries for three spot years. They show that while the EU-10 countries have been increasing their gas storage, it has been more or less in line with EU-15 storage increases and in line with the growth in domestic demand.

Table 2-19: European Gas Storage

Country	Working Capacity (mmcm) 1998	Working Capacity (mmcm) 2002	Working Capacity (mmcm) 2005
Austria	2,630	3,020	2,820
Belgium	854	636	655
Denmark	770	700	810
France	10,490	10,800	10,800
Germany	15,450	18,830	18,934
Italy	9,110	12,747	12,792
Netherlands	72	2,478	2,478
Spain	1,274	1,414	2,366
UK	3,114	3,645	3,759
Total EU-15	43,764	54,270	55,414
Czech Republic	1,700	2,059	2,285
Slovak Republic	1,700	2,740	2,740
Hungary	3,200	3,340	3,400
Poland	1,100	1,460	1,795
Total EU-10	7,700	9,599	10,220

The conclusion is that EU-10 Member States have not specifically increased gas storage capacity as a response to the EU enlargement process, or for any other reason except as a balancing tool to manage domestic demand.

Uniquely in the region, Slovakia has already separated gas storage from the transportation assets. SPP holds 35% of Pozagas as malacky, which is a joint venture with Nafta Gleby and Gaz de France (it has these three as shareholders). Nafta Gleby is a private company and is the oil and gas exploration and production company in Slovakia. It is also responsible for the storage assets. SPP buys all its domestic gas and all its storage capacity from Nafta Gbely.

The gas storage capacity in the EU-10 countries, and indeed in the whole EU-25, is dwarfed by that of Ukraine. Against the approximately 50 bcm of working gas capacity in the EU-25 in 1998, Ukraine alone had 36 bcm, and half of that in one storage field.

2.9.9.3 LNG

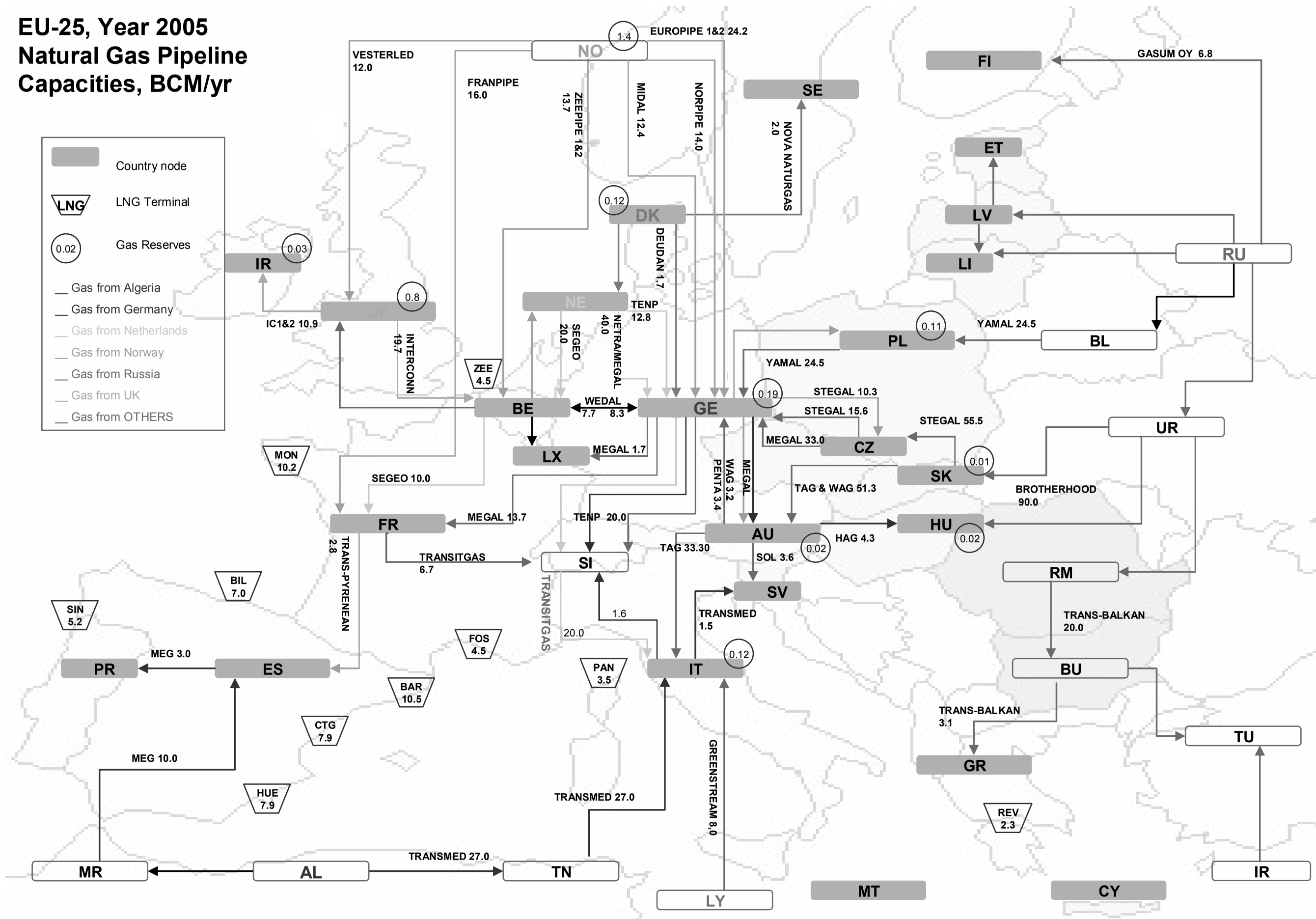
None of the EU-10 countries currently have any LNG import terminals. LNG terminals for the central European members of the EU-10 have to be on the Baltic coast (so only Poland and the three Baltic Republics could be LNG importers). The problem that all of these countries face is that LNG cargoes will have to pass through the Skagerrak channel (the straits between Denmark and Sweden). These straits are very narrow and congested. They also pass by very populated areas (Copenhagen, the capital of Denmark, and Malmö, a major city in Sweden), and at the narrowest point (some four km) they pass by the towns of Helsingor and Helsingborg. As well as congestion through the straits the Danish Government in particular wants to keep the transport of dangerous highly inflammable liquids (oil and LNG) to a minimum.

Nevertheless, Poland is planning an import terminal at Gdansk, to import 4 bcm a year from 2011. The Polish national gas company PGNiG under a subsidiary Polske LNG (PLNG) is developing the project. Germany is also planning a terminal at Willhelmshaffen, also to import 4 bcm a year from 2010.

LNG will help to reduce Polish dependency on Russian gas but in the circumstances, LNG can not be relied upon to make anything more than a minor diversification of gas supplies to the region.

There have also been discussions about starting a natural gas industry in Cyprus based on either LNG imports or a seabed gas pipeline from Syria. We understand that this project is currently on hold with no imminent plans to take it forward.

Figure 2-38 Map of European Gas Capacities 2005



Source: Mercados

2.9.10 Initiatives to Increase Security of Supply in New Member States

2.9.10.1 Introduction

The final section of this chapter discusses those major initiatives that new member states have been taking to improve their access to external energy sources and thus to improve their supply security. We have identified some prominent security of supply issues for new member states, namely:

Substantial, and in some cases total, gas import dependence on Russian gas supplies (dependence referring both to import transportation routes and also to sources of supply);

The closure of Ignalina nuclear plant in Lithuania and the missing network integration of the Baltic States into the European electricity grid;

The full oil dependence of the Cyprus and Malta energy sectors.

2.9.10.2 Diversification of Gas Sources

Diversifying gas supply sources is one way of increasing security of supply, and of increasing access to primary energy.

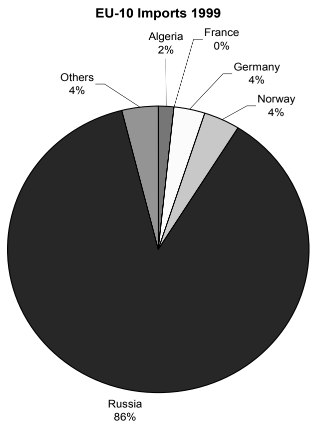
Although in terms of the gas molecules all imported gas supplies to all east and central European countries come from Russia, in commercial terms, as has been seen in Sections 5.7.6 and 5.7.7 above some new member states have managed to diversify some of their gas imports. EU-5 gas imports from Russia have reduced from 86% of all their gas imports in 1999 to 74% in 2006 and for the EU-10, from 87% in 1999 to 77% in 2006 (see Table 2-20, plus Figure 2-39 and Figure 2-40 below).

Table 2-20: Some Diversification of EU-5 Imports from Russia

Country	Total Imports (bcm)				Imports from Russia (bcm)				Imports from Russia (%)			
	1999	2004	2005	2006	1999	2004	2t005	2006	1999	2004	2005	2006
Czech Rep	9.1	8.8	9.3	9.7	7.5	6.5	7.1	6.8	82%	74%	76%	70%
Hungary	8.5	11.5	12	10.3	7.7	9.3	8.8	7.7	91%	81%	73%	75%
Poland	7.7	9.9	10.5	8.9	6.0	6.2	6.9	5.4	78%	63%	66%	61%
Slovakia	6.5	6.9	6.7	6.4	6.5	6.9	6.7	6.4	100%	100%	100%	100%
Slovenia	1.0	1.1	1.1	1.1	0.4	0.7	0.7	0.6	40%	64%	64%	55%
EU-5	32.8	38.2	39.6	36.4	28.1	29.6	30.2	26.9	86%	77%	76%	74%
Estonia	0.7	1	1	1	0.7	1	1	1	100%	100%	100%	100%
Latvia	1.3	2.2	1.8	1.5	1.3	2.2	1.8	1.5	100%	100%	100%	100%
Lithuania	2.3	2.9	2.9	3.3	2.3	2.9	2.9	3.3	100%	100%	100%	100%
EU-3	4.3	6.1	5.7	5.8	4.3	6.1	5.7	5.8	100%	100%	100%	100%
EU-5+EU-3	37.1	44.3	45.3	42.2	32.4	35.7	35.9	32.7	87%	81%	79%	77%

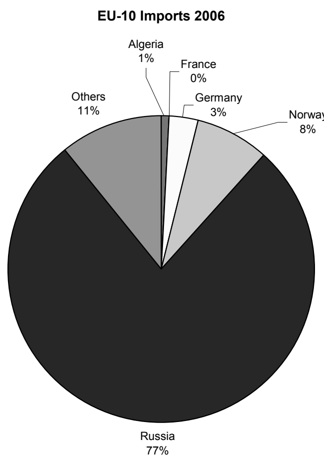
Source: IEA (1999-2005); IEA, BP, Other (2006); analysis Mercados

Figure 2-39: EU-10 Pipeline Gas Imports 1999



Source: IEA; analysis Mercados

Figure 2-40: EU-10 Pipeline Gas Imports 2006



Source: IEA, BP, Other; analysis Mercados

The process of EU enlargement (including the long build up to it) can be argued to have improved the security of supply situation for the eastern European members of the ten new Member States by allowing them to diversify their supply sources, at least slightly.

It is argued that liberalisation and market opening lead to diversification of supply sources, and also to increased diversity in physical supply links. Changes therefore in the gas profile in EU-10 countries could be directly due to the EU enlargement process, but could also be due to other related processes, such as the adoption of the two Gas Directives, also the energy company privatisations that have taken place and other market opening measures that the EU-10 countries have adopted by themselves as they have moved away from communist to market economic structures.

2.9.10.3 Gas Future Investment Projects

Another way of increasing security of supply is through increasing capacity, which can be transportation (especially cross-border links), gas storage, and LNG import facilities.

There are various major new interconnection projects now under development across the EU-25 and neighbouring countries (those under project development and those in construction). As can be seen there are many projects under development to bring pipeline natural gas to western Europe from Russia, the Caspian Sea region and North Africa.

Regarding gas from Russia, there are two major pipeline routes. For a number of years now it has been increasingly realised that there is room for a North European Baltic Sea pipeline route of some form. Of the various projects under consideration, the NEGP has won out and is now the project under development.

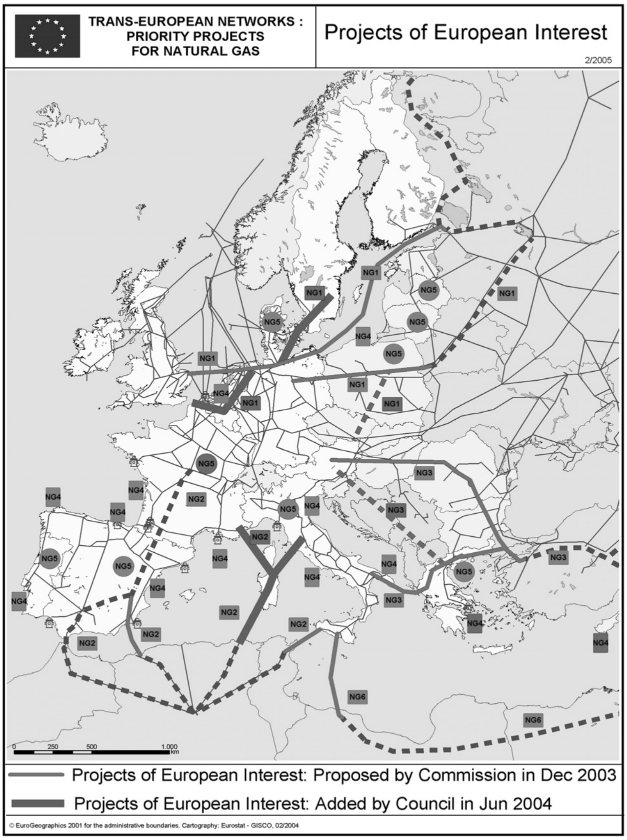
The other North European supply route was pioneered by Yamal I, from the Yamal field in western Siberia in Russia through Poland to Germany. Yamal I is in operation and Yamal II can now be developed. Because of the NEGP Baltic Sear project, Yamal II is now on hold.

Regarding Caspian Sea projects, the Nabucco project is the most interesting and is under project development. This will take Caspian Sea gas through Turkey, Bulgaria, Romania and then to Hungary and Austria. This is a very large pipeline project that will to a certain extent go against the trend of east-west pipelines. As it will run south east to north west, it will be the first north south gas pipeline project for central and eastern Europe.

Of the various North African projects it is possible that there could be an offtake leading to Malta to develop a gas industry there. We have not however heard of any such projects in mind.

A map of EU priority gas projects is shown below in Figure 2-41, followed by a brief description of the projects in the following

Figure 2-41: Trans-European Networks Priority Projects for Natural Gas



Source: TEN-E

Table 2-21: European Gas Pipeline Projects Under Development

Project Name	Countries	Capacity	Comments
From Russia:			
NEGP North European Gas Pipeline	Russia, Germany, Sweden, Benelux, France		Under development
Northern Trans-European	Russia, Germany, Sweden, Netherlands, UK	27.5 bcm in 2010	
Baltic gas Interconnector	Sweden, Germany, Denmark	3 bcm in 2010	Under review
Yamal II	Russia, Belarus, Poland, Germany	43 bcm in 2013	
From Caspian:			
Nabuco	Central Asia, Turkey, Bulgaria, Romania, Hungary, Austria	30 bcm Turkey 16 bcm Austria In 2012	
North European	Turkey, Greece, Italy		Under construction
TGI Turkey-Greece Interconnector	Turkey, Greece, Italy	12 bcm in 2008	Imports from Caspian basin and Iran, from Komotini to Karacabey, 300km.
IGI Italy-Greece Interconector	Greece, Italy	8 bcm in 2010	Greece will transit gas to Italy from Caspian basin. Stavrolimenas in Western Greece to Otranto in Italy
TAP Trans Atlantic Pipeline	Turkey, Greece, Albania, Italy		
South Caucusus Pipeline (SCP)	Azerbaijan, Georgia, Turkey, Greece	124 bcf/yr 2007 and then 406 bcf/y	will transport Azeribaijani natural gas between Karacabey, Turkey and Komotini, Greece
From North Africa:			
GALSI	Algeria, Italy (Sardinia & Toscani), France (Corsica)	8bcm in 2012	Facing delays
Transmed II	Algeria, Tunisia, Italy (Sicily)	6bcm in 2008	Under construction
Green Stream	Libya, Italy (Sicily)		Completed
Medgaz	Algeria, Spain, France	8 bcm in 2009	
Other:			
BBL Balgzand-Bacton	Netherlands, UK	16 bcm in 2007?	Under construction

Source: Mercados

Source: Mercados

There certainly are a large number of gas pipeline infrastructure projects in development, and the number of projects has accelerated in recent years. This can not be said to be a result of the 2004 EU enlargement, as there are pipeline projects from all directions (plus other LNG projects). The various developments within the EU energy market clearly have had an impact though.

There are though two small gas pipeline projects under consideration which could be attributed to EU accession:

Balticonnector: a 2 bcm a year pipeline to link Finland and Estonia; and

Amber: a 1 bcm a year pipeline linking Poland and Lithuania.

Some key new gas route diversification projects affecting the new member states are described further below.

a) Nabucco Gas Pipeline

The most ambitious gas infrastructure project which will have a major impact on the new member states' gas infrastructure diversity and their security of supply is the well-known EU top priority NABUCCO gas pipeline project. If accomplished, this pipeline could bring an additional 30 bcm a year of natural gas to the European market at Baumgarten in Austria.
This project could serve several EU-level policy goals at the same time. It could provide Europe with direct physical access to Middle East, Central Asian and Caucasian gas resources; it could increase the possibility of gas-to-gas competition in new member states' gas markets; it and could contribute to increased cooperation of the EU with the supplying countries. The Nabucco pipeline is planned to transit through Ukraine though which could potentially lead to the type of problems that Russia has had with transiting gas through Ukraine.

b) Adria LNG

The idea of building an LNG re-gasification terminal at Krk island close to the Adriatic coast of Croatia and supply this gas to the Croatian, Italian, Austrian and Hungarian markets has a history of 10 years. The project was mothballed but due to gas market developments the project development company Adria LNG has been re-vitalized recently. If this project is completed, the project could bring 8-14 bcm a year of additional gas to the region by 2011.
The Adria LNG Study Company is a joint venture by OMV, Total, RWE Transgas, and INA for the setting up of an LNG terminal in Croatia. Adria LNG signed an alliance agreement with EoN Ruhrgas in 2006. Due to the prevailing state ownership in INA and OMV, government support from Austria, Croatia and also from Hungary seems vital for accomplishing this project. Recently the Croatian and Hungarian governments have expressed their support for the project several times. Despite recent renewed interest in the project, it is still in its very early stages and it is still doubtful whether this project will go ahead.

c) LNG in Poland[34]

The Polish oil and gas company PGNiG (Polskie Górnictwo Naftowe i Gazownictwo) and a consulting consortium are working on a detailed technical and economic feasibility study for a project to import LNG to Poland. One of the key elements of the study is to verify the profitability of an LNG terminal construction on the Polish Coast. The expected throughput

34 Source: PGNiG homepage: http://www.en.pgnig.pl/firma/1865.htm. Downloaded: August 11, 2007

capacity of the terminal is 3 to 5 bcm with an option for further expansion. At the beginning of 2006 PGNiG signed letters of intent with the ports in Gdansk and Swinoujscie with a view to cooperation in location studies.

d) Polish-Norwegian-Danish Gas Cooperation[35]

In June 2007 Polish and Norwegian authorities are reported to have agreed on the financial terms for a pipeline to channel natural gas from Norway's offshore fields to Poland, via Denmark, in order to reduce Polish reliance on Russian energy. The commercial terms of the proposed plan is still to be agreed on.
In May 2007 the Polish gas company PGNiG reached a deal on the pipeline with Denmark's Energinet.dk. In March, as part of the project, PGNiG also agreed with ExxonMobil to purchase a 15% stake in three Norwegian offshore gas exploration and production licences.

e) Security Gas Storage Development in Hungary

In order to provide extra security of supply, especially in winter peak load periods, the Hungarian Parliament has passed legislation that requires the Hungarian Hydrocarbon Storage Association to build a security gas storage facility with a minimum of 1.2 bcm annual working gas capacity and a daily 20 Mcm off-take capacity. The estimated project cost is €400 million. Mol, the major Hungarian oil and gas company, has won the investment tender and the storage facility should be operational by 2010. Conditions and pricing of access to this specific storage facility will be regulated by the Minister for economy and transport.

2.9.10.4 Electricity Future Investment Projects

There are also several electricity interconnection and capacity projects among the new member states under development.

a) Baltic electricity 1. - Proposed new nuclear plant

As a precondition for EU membership, Lithuania agreed to close down its Ignalina 1 and 2 nuclear units. These units are of RBMK 1500 Mwe type, built with the same technology as Chernobyl. The units were commissioned in 1983 and 1987 respectively and until recently they provided 70% of Lithuania's and 30% of the whole Baltic countries' electricity supply. With the loss of nuclear generation the dependence of the Baltic countries on Russian oil and gas supplies is expected to increase significantly. In order to reduce this increased dependence on Russia, public and private players from the Baltic countries and Poland have teamed up to launch a new proposal to build an entirely new Ignalina 3 nuclear power plant.

The proposal is to have a "commercial" plant, driven originally by a three country agreement: Lithuania, Latvia and Estonia with Poland joining later. The project is to be based on a new bill submitted to the Lithuanian parliament, since this country would host the project and also the three biggest Lithuanian energy companies are to be the leading investors in this project.

35 Source: http://www.polandbusinessnetwork.pl/news/index.php?contentid=143568. Downloaded: August 11, 2007

The Lithuanian state is expected to have a 51% share in the project. Lithuania's plant is planned to be connected through a power bridge to Sweden and Poland, which it is hoped will increase the commercial attractiveness of Ignalina 3.36

b) Baltic Electricity 2 – Interconnection Development and Integration

In order to ensure security of electricity supply after the early closure of the Ignalina nuclear power plant, interconnections between the Baltic grids and Poland and the Nordic countries are needed. An HVDC link between Estonia and Finland has recently been commissioned which connects the Baltic States to Nordel (the Scandinavian electricity market) and connections to Sweden and Poland are currently being planned (see Figure 2-42 below).

Figure 2-42: Map of Planned Interconnections between Baltic States & EU

Source: BALTSO

a) ESTLINK connecting Estonia and Finland

In 2005 the implementation of ESTLINK project was started. It is a joint project of the power companies of Lithuania, Latvia, Estonia and Finland with a goal of constructing a 350 MW submarine cable between Estonia and Finland. The project was completed in early December 2006. ESTLINK consists of an undersea DC cable with a voltage of 150 kV and a length of 105 km. The transfer capacity amounts to 350 MW. The total investment was about €110 million.[37]

b) SWINDLIT connecting Lithuania and Sweden

SWINDLIT is a joint project of the Lithuanian and Swedish grids to assess the feasibility of constructing a 1000 MW DC submarine cable across the Baltic Sea connecting the grids of Sweden and Lithuania. In February 2007 Lietuvos Energija and Svenska Kraftnät commissioned

36 The presentation of William J. Nuttall 'Prospects for new nuclear power capacity in the EU' on June 1, 2007 at the Berlin CESSA conference.

37 Source: BALTSO, http://www.baltso.eu/index.php?id=493.

a third party to carry out the feasibility study for this project. The cable is planned to become operational in 2012. Total investments are estimated at €400 million. A pre-feasibility study has already been completed and the feasibility study is now under preparation.[38]

c) Interconnector between Lithuania and Poland

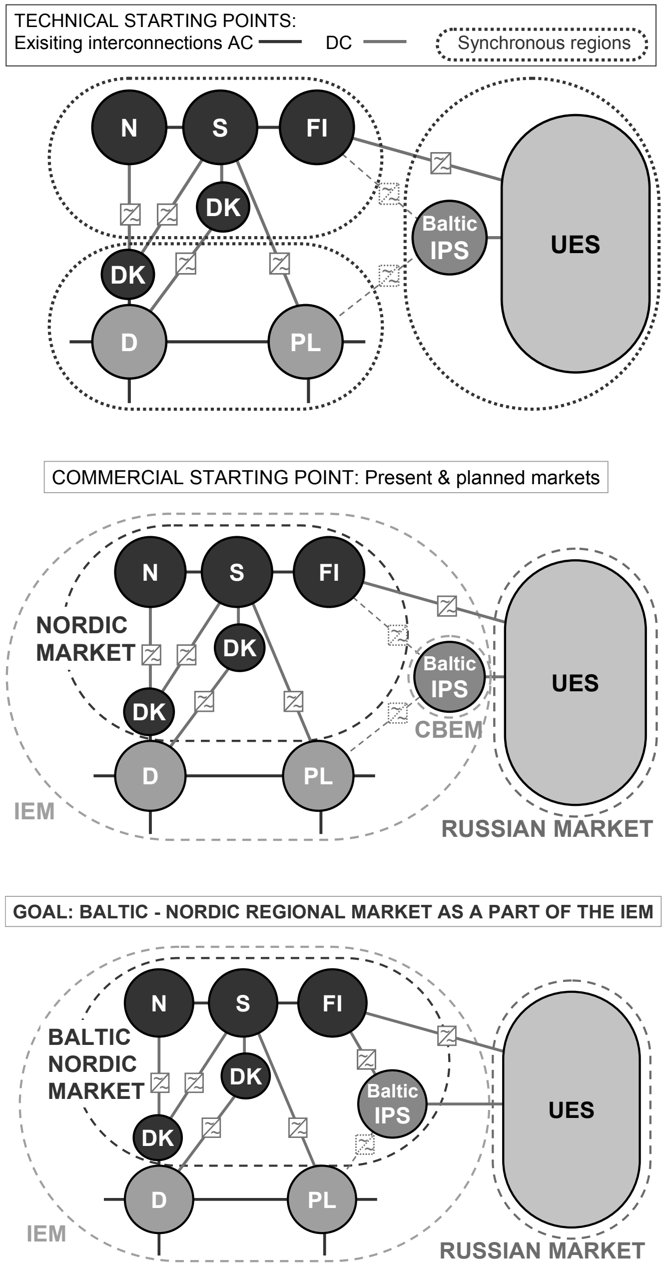
In June 2005, based on a decision of the European Parliament, the interconnection project of the Lithuanian and Polish power grids was included in the list of priority projects in Europe. In September 2005, the transmission system operators from Lithuania and Poland (Lietuvos Energija and Polskie Sieci Elektroenergetyczne), plus the Ministries of Economy of Lithuania and Poland signed a joint Communiqué. Lietuvos Energija and Polskie Sieci Elektroenergetyczne are continuing their negotiations and studies on the interconnection of the grids of Poland and Lithuania. The link may become operational in 2010. The proposed interconnection between Lithuania and Poland will consist of two circuit 400 kV AC overhead lines with back-to-back converter. The transfer capacity will amount to 1000 MW and will need an investment of about €304 million. The interconnection project is listed in the European Commission “Quick start” projects list and in the updated TEN Guidelines.[39]

All these projects will contribute to the formation of a ‘Baltic Ring’, which is one of the Commission’s priority axes within the context of the Trans-European Networks for Energy programme. Through these interconnections, the Baltic States will be able to genuinely benefit from the integrated European electricity market.

A next step is to decouple the Baltic electricity system from the Russian system and gradually move it into the European system, and possibly to become a part of the Nordic market (see Figure 2-43 below). A feasibility study is currently being carried out on this issue.[40] Figure 2-43 envisions the gradual development of the electricity system in the Baltic states from integration with the Russian system (top) to integration with the European system (middle) and possibly full integration with the Nordic power system (bottom).

38 Source: BALTSO, http://www.baltso.eu/index.php?id=494.
39 Source: BALTSO, http://www.baltso.eu/index.php?id=495.
40 See for an update: UCTE, IPS/UPS, Feasibility Study: Synchronous Interconnection of the Power Systems of IPS/UPS with UCTE, Summary of Project Status, December 2006, http://www.ucte-ipsups.org/Pdf/Download/englisch/CR_Summary_of_Project_Status_19.12.2006.pdf.

Figure 2-43: Planned Development of the Baltic Electricity System Russian Integration (top) to EU Integration (middle) and possibly Full Nordic Integration (bottom)



Source: V. Jankauskas, NCC

2.9.11 Conclusions And Recommendations

Conclusion: Early Technical Integration

The gradual UCTE harmonisation process resulted in a smooth technical and institutional integration of some old and new Member States' electricity systems. The same process was missing in the case of the Baltic states and the gas sector.

Recommendation: Early Technical Integration

The Commission should promote Accession countries' electricity and gas system operators to harmonise their technical rules and operations with European partners and promote their membership in European associations at an early stage of their accession process.

Conclusion: Unilateral Gas Import Dependence

The very high and unilateral gas import dependence of continental new Member States on Russian gas supplies is the single most important supply security risk that the 2004 enlargement of the EU has brought about for the Union.

Recommendation: Unilateral Gas Import Dependence

The Commission should facilitate the diversification of gas sources away from high dependence from single-source suppliers, where network assets are owned by the single-source supplier. Sufficient diversification of entry routes, as a technical pre-condition to competition, should be in place before price liberalisation is fully implemented and price regulation is removed. In the meanwhile, regulation should promote cost-reflective prices in order to encourage new entrants to these markets. Our findings give support to the Commission's proposal calling for the ownership unbundling of network operations, including gas storage.

Conclusion: Information Transparency

Publicly available and accessible market and regulatory information in 2004 new member states is not sufficient to promote market development. Information provision and transparency problems are outstanding in the gas sector.

Recommendation: Information Transparency

The Commission should require the full implementation of those information transparency requirements from accession countries that are prevailing within the Community. In order to promote an easy accessibility of regulatory and market information, the publication of principal rules and regulations in English should be promoted.

Conclusion: Interconnection Development Support

The development of critical interconnections with the rest of the EU increases the security of supply of the whole community as well as the new accession country. At the same time the existence of sufficient physical interconnection is key for energy market integration.

Recommendation: Interconnection Development Support

The Commission should pay an outstanding attention to the analysis and understanding of the existing and potential physical interconnections of new accession countries. Community support of all kind to rehabilitate, upgrade and develop the sufficient physical infrastructure of prospective accession countries should enjoy a higher priority than it had in the course of the 2004 enlargement.

Market opening and competition

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3 Market opening and competition

The 2004 expansion of the European Union to 10 new countries has altered both the energy markets and participating companies in these new Member States. Discussed in this chapter is how the 2004 EU enlargement has impacted both countries and companies in the EU. A dual approach is taken that examines both the gas and electricity companies affected by the enlargement. The focus is mainly on the impact that enlargement has had on new Member States.

This chapter will show that there are energy pricing and demand differentials between the EU-15 and EU-10. The price of gas has gone through a period of dramatic price rises in all current EU Member States. Markedly, since 2000 the price of gas for customers in Hungary, the Czech Republic and Slovakia has risen significantly as these countries make the transition to more market orientated pricing structures. In terms of supply, delivery and distribution E.ON Ruhrgas, Gazprom and to an extent RWE, have emerged as significant owners in all new Member States excluding Cyprus, Malta and Poland. E.On, RWE and EDF have also been active in the field of electricity generation and distribution in the Czech Republic, Hungary and Slovakia.

The expansion of the EU can be directly linked, through case studies, as a reason EU-15 Member State companies' are now participating in the EU-10 markets. In addition, the financial performance of firms from the EU-15, that actively acquired companies in the EU-10, indicates that these companies are performing better than companies not active in new Member States. Overall, the reasons for expansion and the resulting strategic activities of firms now established in new EU Member States, is exemplified through case studies. These demonstrate the significant involvement of Russian and German energy companies and how governments have through privatization and other projects moved their energy companies to the open marketplace.

3.1 Gas Pricing

3.1.1. Introduction

This section looks at the trends in gas pricing over the period since 1990, when the new Member States started their progress towards EU membership. There are two major impacts on gas prices over this period:

1. The drive over time for the EU-10 to increase prices in-line with western European levels;
2. The impact of the rise in oil prices and Gazprom gas prices since 2000.

This analysis will show gas prices in the EU (EU-15 and EU-10) have changed for:

- Wholesale prices;
- Power generation prices;
- Industrial prices;
- Household prices.

3.1.2. Gas Wholesale Prices

Gas prices closely follow oil prices, albeit with a time lag, and traditionally have done since the oil and gas industries started. There are several reasons for this:
Traditionally the oil producers, and the major utilities who bought from them, priced their gas products according to an indexation formula, of which oil was a major component;
Gazprom contracts continues to price gas in relation to the oil price, and as Gazprom is such a major gas supplier in Europe, the Russian gas price is a major influence on the gas price throughout Europe;

Power generators and large industrial customers, both of whom usually have dual firing capacity (meaning they can choose whether to burn oil or gas depending on the price), are able to switch between the oil and gas price quickly. This means that the gas price can never move far out of line from the oil price.

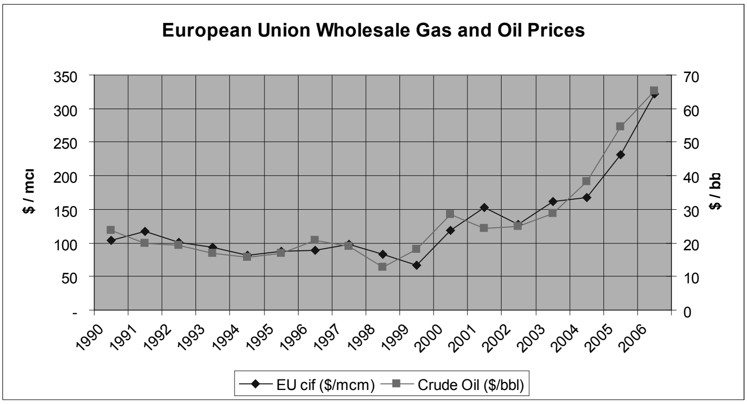
In the 1980s and 1990s the USA and UK opened up their gas markets and gas on gas competition emerged. This meant that the gas wholesale price was set in relation to the supply of and demand for gas, without reference to the oil price. The experience of these two very liberalised markets initially suggested that the gas price could really be decoupled from the oil price. The experience since 2000 has disproved that, for two reasons:

The ability of power generators and large industrial customers to switch between oil and gas meant that as the oil price rose the wholesale gas price eventually rose as well. This is what happened in the USA.In the UK the same probably would have happened as well but for another stronger effect.

From privatisation in 1986 there was price regulation, which kept gas prices low, and from 1997 there was a full deregulated market. Over the whole period prices fell in real terms, and in 1992-93 they also fell in nominal terms. From 1998 though the UK-Belgium gas interconnector (Interconnector UK) started operations. As gas prices were substantially below continental

European levels the Interconnector was mostly filled with exports from the UK. This drove prices up in the UK. The UK is a price follower and the (liberalised) market price in the UK is set by continental European contracts (of which the main component is the oil related Gazprom gas contracts). Figure 3-1 shows the movement in gas and oil prices since 1990. Gazprom export prices reflect the same situation, where export prices started rising from 2000 and dramatically so from 2005.

Figure 3-1 EU Oil and Gas Prices (1990 – 2006)



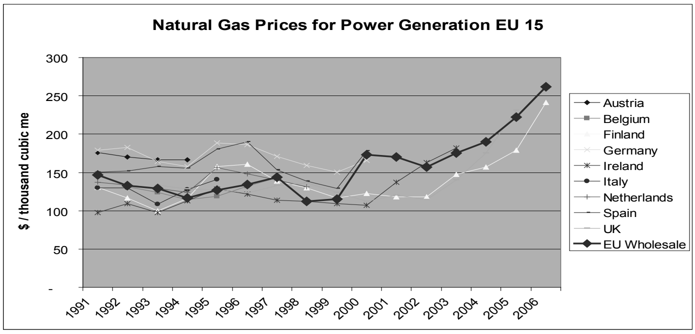
Source: data from BP Annual Statistical Review 2007

In conclusion, European gas import prices, and Gazprom export prices, ultimately are all related to the rise in the crude oil price, which started rising from 2000 and rose dramatically from 2005. This dramatic rise in European gas prices since 2005 is most likely to be related to the rise in crude oil prices rather than the 2004 EU enlargement (and any effect that that had on Gazprom price setting policy).

3.1.3. Gas Prices for Power Generation

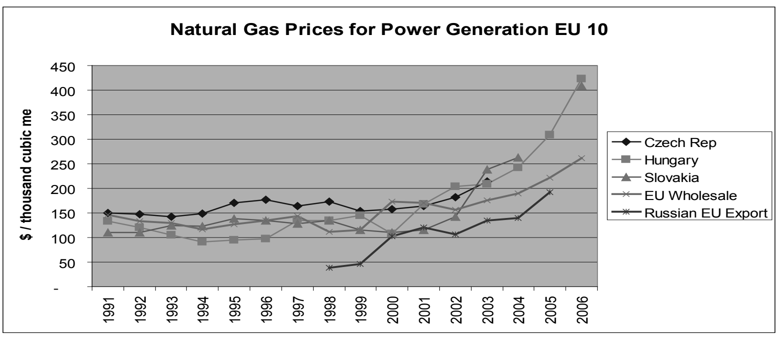
This and the following two sections consider retail gas price in three main sectors (gas for power generation, industry and households).
The following charts (Figure 3-2 and Figure 3-3) shows the movement of gas prices to power generation plants in the EU-15 and EU-10 from 1991.

Figure 3-2 Natural Gas prices for Power Generation (EU-15, 1991 – 2006)



Source: IEA; EU wholesale price BP; Conversions Mercados

Figure 3-3: Natural Gas prices for Power Generation (EU-10, 1991 – 2006)



Source: IEA; EU wholesale price, BP; Russian Export, Oxford Institute for Energy Studies; Conversions, Mercados

Looking at the gas price for power generation customers in the old Member States (EU-15) a close correlation can be seen between the price and the average wholesale EU gas price (Figure 1-2). This is to be expected as power generation customers (and large industrial customers) are able to buy their gas at wholesale prices. This is reflected in the recorded prices they pay. With a few exceptions, prices across the EU-15 countries were in a relatively close band around the average EU wholesale price. The few exceptions are:

Ireland – in the early 1990s Ireland took gas from its own gas field off south east Ireland, and it was not connected to continental European gas supplies. As indigenous Irish supplies ran down, from the late 1990s Ireland started importing gas from the UK, which itself was also then becoming connected to continental Europe via the UK-Belgium Interconnector. From the late 1990s therefore Ireland became connected to European gas supplies and prices, and from 2002 Irish wholesale gas prices have very closely followed average European wholesale gas prices.

Germany – During the 1990s, gas prices to German large users (large industry and power generation customers) were very high. These high prices were for reasons connected with the internal structure of the German gas industry. As the EU wholesale gas price rose though, the price came into line with German large user gas prices and from 2000 the two moved very closely together.

Austria – Austrian large user gas prices can be seen to follow those in Germany, with the same pattern.
The few exceptions can be seen therefore to be connected with the dynamics of their internal gas markets. Where gas markets are exposed to wider European gas supplies, the price for power generation customers can be seen to very closely follow the average EU wholesale price (because power generation customers tend to buy wholesale at the wholesale price). The average price was around 150 $/mcm through the 1990s, then rising to 250 $/mcm in 2006 (Figure 1-3).

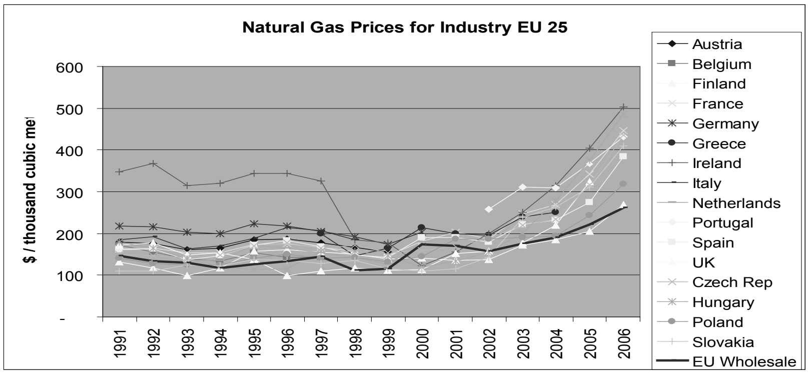
For the new Member States (EU-10), the gas price to power generation customers is also closely correlated with the wholesale price, but not as closely as with the EU-10 Member States. Figure 1-3 has the average Russian export price to EU Members on the chart as well. Until around 2000, there can be seen to be a close correlation between the price to power generation customers in the EU-10 Member States but from 2000, the gas price paid by Hungarian, Czech and Slovak customers began to rise much more (data is not available for gas prices to power generation customers in other EU-10 Member States). Through the 1990s these three countries (Hungary, Czech and Slovak Republics) paid around 150 $/mcm (so around the same price as EU-15 Member States and the average EU wholesale price). From around 2000 the domestic prices started rising though, and well above the EU wholesale price, until in 2006, 400 $/mcm was being paid. The rate of price rise seems to be related to the increase in the Gazprom export price. It is possible therefore that gas brokers selling to power generation customers in these three EU-10 Member States have increased prices in line with the increase in their import price from Russia, and kept their previous margin.

In conclusion there is some evidence to suggest that the gas price to power generation customers in Hungary, and the Czech and Slovak Republics follows the Russian import price to those countries (but with a large margin over the import price).

3.1.4. Gas Prices for Industry

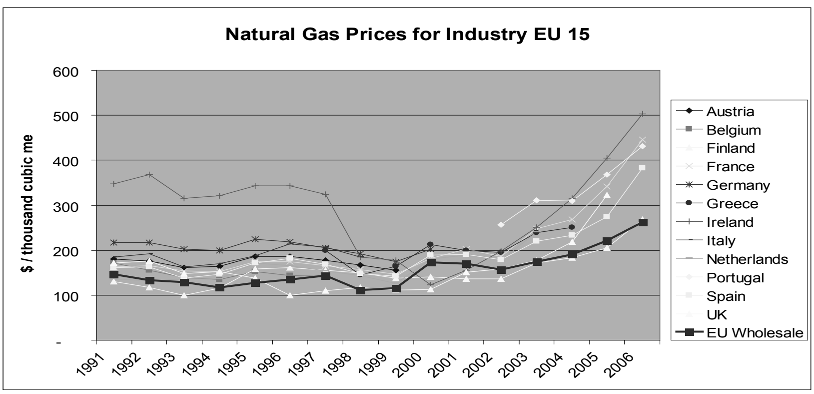
The following table and charts (Figure 3-4 and Figure 3-5) show the movement of gas prices to industrial customers in the EU (EU-15 and EU-10) from 1991.

Figure 3-4 Natural Gas Prices for Industry (EU-25, 1991 – 2006)



Source: IEA; EU wholesale price, BP; Conversions, Mercados

Figure 3-5 Natural Gas Prices for Industry (EU-15, 1991 – 2006)

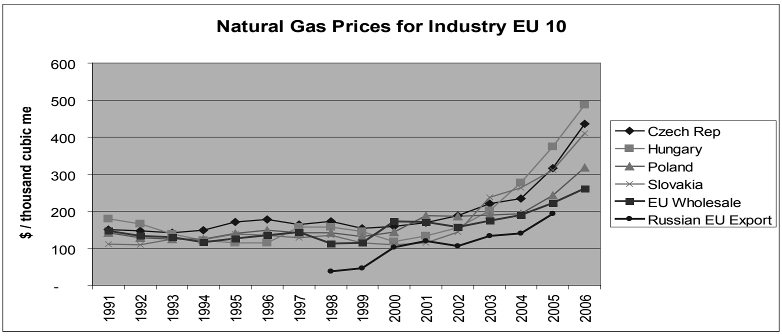


Source: IEA; EU wholesale price, BP; Conversions, Mercados

As with the power generation market, the industrial gas price in the EU-15 Members closely tracks the average EU gas wholesale price, but with a larger range between the highest and lowest price (with a range of approximately \$110/mcm to \$220/mcm) (Figure 3-5). During the 1990s the UK and Finland boasted among the lowest industrial gas prices and Germany the highest except for Ireland. Ireland had the highest industrial price (in sharp contrast to the power generation market where it had the lowest price in the EU-15), but as Ireland started importing from the UK from the late 1990s, Irish industrial buyers were able to buy from competitive suppliers and the price fell dramatically to normal levels. From 2000 though all prices started rising, and dramatically so from 2005, and the price rises exceeded the rise in the wholesale price.

For the EU-10 Member States, as with the power generation market, during the 1990s the industrial gas price closely tracked the EU wholesale price, with a range of \$100/mcm to \$200/mcm but from 2000, the industrial gas price rose dramatically (Figure 3-6).

Figure 3-6 Natural Gas Prices for Industry (EU-10, 1991 – 2006)



Source: IEA; EU wholesale price, BP; Conversions, Mercados

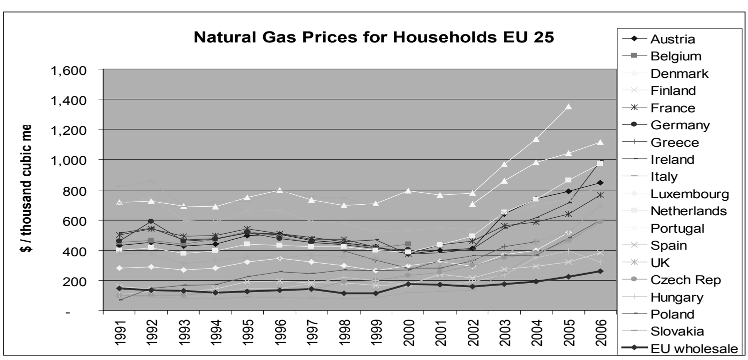
Prices moved out of line with the EU wholesale price but have seemed to move in line with the Gazprom export price, although at a much higher level. The four countries tracked (Hungary, Czech and Slovak Republics, Poland) have all seen large industrial price rises in recent years, but Poland less so than the others. As a matter of policy, Poland may have decided not to pass on as much price rises as the other three countries, or it may be that some Polish industrial buyers may have been able to benefit from some small amounts of cheaper priced gas being exported from Ukraine (it is difficult to know the amount of gas exports from Ukraine to Poland, if indeed there are any at all).

3.1.5. Gas Prices for Households

The following table and charts show the movement of gas prices to household customers in the EU (EU-15 and EU-10) from 1991 (Figure 3-7, Figure 3-8 and Figure 3-9).

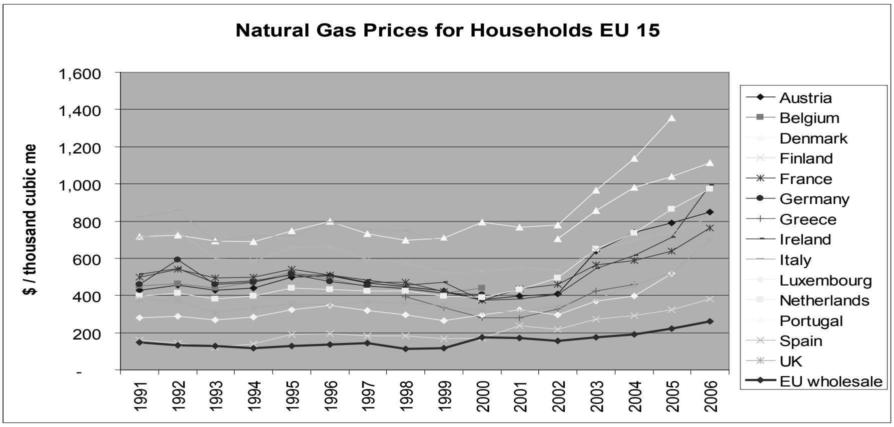
More data are available for household customer prices than for power generation and industrial customers but among the EU-10 data are only available for Hungary, Czech and Slovak Republics, and Poland.

Figure 3-7 Natural Gas Prices for Households (EU-25, 1991 – 2006)



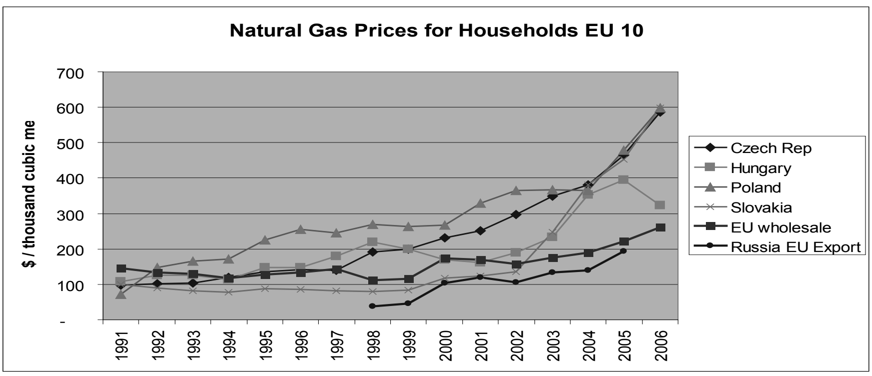
Source: IEA; EU wholesale price, BP; Conversions, Mercados

Figure 3-8 Natural Gas Prices for Households (EU-15, 1991 – 2006)



Source: IEA; EU wholesale price, BP; Conversions, Mercados

Figure 3-9: Natural Gas Prices for Households (EU-10, 1991 – 2006)



Source: IEA; EU wholesale price, BP; Conversions, Mercados

While for the power generation and industrial markets, the analysis tested how much the gas price reflected input prices (the average EU wholesale price or the Gazprom export price), for the household markets other factors are also at play.

In 1990, the central European Members of the EU-10 inherited a system of very low household prices. It was a feature of the Soviet energy pricing system (and which is still found in many CIS countries), where cross-subsidies existed (and in many cases still exist) where the industrial price was higher than the household price. Gas sales to household customers (and also Government organisations, called "budget consumer") were often at a loss, subsidised by sales to industrial customers (whether private or Government owned).

The issue for EU-10 Member States then was how to reverse the situation so that EU-10 household gas prices reflected the prices paid by EU-15 Member States, in other words EU-10 household gas prices had to rise significantly. This could be an area where EU membership was a key contributory factor. In CIS countries there was not the drive of EU membership to drive up household gas prices and in most CIS countries this has not happened. The drive or incentive of EU membership though would be a very important driver towards EU-10 Member States increasing gas prices over a period of time. That then is the contention. The analysis below shows to what extent this supposition is true.

We have seen from the analysis of power generation and industrial gas prices that through the 1990s and after 2000, EU-10 Member States paid equivalent prices to EU-15 Member States. It could be said therefore that they paid international market prices (the 'market price' being defined as the average EU wholesale gas price).

The same is not true for the household market however (Figure 1-7 and Figure 1-8). In 1991 there could be said to be two groups in terms of household gas prices. EU-15 Member States paid in a range from around $380/mcm (UK) to $520/mcm (Ireland) with some outliers (Denmark, Italy and Spain) paying much more. Of the outliers Italian household gas prices were higher because of a higher VAT element included in the gas price than in other countries and for Spain the price may have reflected the higher import costs of LNG (although this did not affect the Spanish power generation and industrial gas prices). Luxembourg household gas prices were also much lower than the EU-15 range (at $280/mcm in 1991).

In 1991, the EU-10 Member States (that is Hungary, Czech and Slovak Republics, and Poland) formed a second group, with much lower household gas prices. Although and EU-15 country, Finland also fell into this group. Household gas prices were in a range of $70/mcm to $110/mcm. All countries in this group paid less for their household gas than the average EU gas wholesale price (at $147/mcm in 1991). It can be seen from this that household consumers in the eastern block of countries did indeed pay much lower gas prices than their western neighbours, and much lower gas prices than industrial consumers. There was indeed evidence of cross-subsidisation of gas prices from industrial to household consumers.
The second question is to what extent did EU-10 Member States increase household gas prices over the period from 1991 until EU enlargement in 2004, and after. Again there seem to be two groups. From 1991 to 1998 three countries (Czech Republic, Hungary and Poland) raised household gas prices regularly each year, such that by 1998 household gas prices had virtually doubled.

In the Czech Republic, the Ministry of Finance produced guidelines for gas pricing up to 1999, which consisted of a 10% increase in household gas prices in June 1995 and a 10-15% increase each subsequent year until 1999. On 1 January 1998, VAT was also raised from 5% to 22%. The Czech Republic kept to these guidelines.

The second group consisted of the Slovak Republic through the 1990s, where there was no increase in household gas prices at all, in fact a small price fall from 1991 to 1998. From 1998 the momentum seems to have stalled in Hungary and household gas prices actually fell from 1998 to 2001. From 1998, Hungary joined the second group with the Slovak Republic.

Throughout the 1990s in fact, Hungary had trouble in implementing household gas price rises. The Hungarian Government had agreed a programme of steady price rises with the World Bank. The first of the price rises was introduced in January 1995. Prices increases which were to go into effect in October 1996 though were abruptly delayed until 1 January 1997 (when gas prices were increased by 18.8% and electricity prices by 24.9%). Full market related pricing was supposed to be in place by 1 January 1997. The delay in price increases and the failure to put a long term tariff and regulatory framework in place though caused concern (and losses) for the foreign investors and for MOL in the newly privatised distribution sector and many of the new investors began to reconsider their position. The new distribution companies were faced with the situation of gas supplied being sold on the Hungarian domestic market at prices below the purchase price. MOL made a loss in 1993-94, purely it said because of the loss-making gas operations.

In the first group of the Czech Republic and Poland, household gas prices continued their steady annual increase, until they were around $600/mcm in 2006, within the range of EU-15 Member States (albeit at the lower end). Although the increase in gas prices must have been painful for Czech and Polish household consumers, the pain was lessened through having annual increases over the entire 15 year period.

In the second group of the Slovak Republic and (now) Hungary, the eventual pain was much worse because the necessary price rises were delayed. The price rises when they came (from 2001 for Hungary and for the Slovak Republic from 2002) were much steeper. Gas prices increased almost six fold from 2002 to 2006 for household consumers in the Slovak Republic.

At the end of the period the Slovak Republic had joined the Czech Republic and Poland in having achieved “international” (that is within the range of EU-15, although at the low end) household gas prices. Again Hungary seems to have lost momentum and household gas prices actually fell from 2005 to 2006. Hungary was the only member of the EU (EU-25) to have had household gas price falls from 2005 to 2006 (to $322/mcm) when there was the very large jump in the wholesale gas price (and the Russian export price), leading to the lowest gas prices in the EU. Although an EU-15 Member State, Finland also kept low household gas prices, and in 2006 Finnish prices were only slightly above those of Hungary (at $381/mcm).

In conclusion, it can be said that there was a move to increase household gas prices to western European levels from 1991 to 2006, whether this was done steadily over the period or in spurts. The prospect and the fact of EU enlargement can be said to be a major contributory factor to this, because household gas prices in CIS countries (which started off in 1991 in the same position as the EU-10 countries, but which did not have the drive or incentive of EU membership) have not risen in the same way over the period.

3.2. Significant Privatisations and Mergers & Acquisitions

3.2.1. Gas Sector : Introduction

Since 1990, when the EU-10 New Member States began their progress towards EU membership, most of them have privatised or transferred ownership of their main gas assets. Of the EU-10 only Poland and Slovenia have not fully or partly privatised their main gas companies (Slovenia has a very small gas company, and Malta and Cyprus of course do not have natural gas industries). In this section, the main privatisations are discussed and in the following section their impact on the current gas industry in the region is considered.

Poland has kept a closed policy on selling the transmission system and is the only country not to have sold its gas infrastructure assets. Slovakia has sold 49% of its interest in its wholesale gas transmission business, SPP. The Czech Republic has sold 100 percent of its transmission and distribution network to TWE. Hungary has transferred its gas pipeline network to the 'national champion' MOL, while selling its gas storage and international trading activities to E.ON. Described briefly below are descriptions of the privatisations process in some key EU-10 countries.

a) Hungary

The movement of the Hungarian wholesale gas storage and trading into the publicly listed hands of E.ON Ruhrgas International AG begins in the 1990s when the Hungarian State's gas division went through a period of restructuring. After this restructuring, in 2004, transmission, storage and trading was taken over by MOL, the Hungarian national oil and gas producer (active in oil and gas). In an attempt to refocus its business on core assets and markets, MOL sold both the gas trading division which dealt with Russian supplies and its gas storage division to E.ON Ruhrgas International in 2006. At the same time, E.ON bought MOL's 50% shareholding in Panrusgaz (Panrusgaz is a jointly owned company, with E.ON and Gazexport (a subsidiary of Russian Gazprom) each holding 50%). Panrusgaz is used to purchase gas from Gazprom.

Due to concerns about market concentration that the purchase of the different gas divisions by E.ON could cause, the EU Commission launched an investigation. As a result of the European Commission investigation, E.ON made some modifications to its offer to allow some opening up of the business, full ownership unbundling, bringing in third-party traders, having an annual gas release programme (a gas auction), and allowing storage by third parties.[41] Regardless of the modifications, E.ON clearly gained a significant strategic asset in the Hungarian gas sector to compliment its other gas assets in Slovakia and Romania.

At the time of the transfer of the gas assets, the Chairman of E.ON Ruhrgas made a promise to Hungary's Economics Minister, not to sell a majority stake to Gazprom, who had been interested in buying the MOL gas division. Instead, an agreement was reached in the spring of 2006 between Gazprom and E.ON Ruhrgas to conduct an asset swap. Under this asset swap, E.ON would transfer to Gazprom 25% of E.ON's electricity and gas distribution businesses in Hungary, together with 50% minus 1 share in E.ON Foldgaz Trade, plus 25% of E.ON Foldgaz Storage. In exchange E.ON would receive interest in a Siberian gas field. However, as of the winter of 2008 this deal appears to have encountered problems, with a possible initial overvaluation of E.ON's Hungarian assets.

41 European Commission, 2005 "Mergers: Commission approves acquisition by E.ON of MOL's gas business, subject to conditions" MEMO/05/492.

The main gas distribution companies were privatised in 1997. The shareholdings and the initial owners at privatisation are shown in the following chart (Table 3-1). The new owners included: E.On Ruhrgas, Verbundnetzgas, Bayernwerk, Italgas, Gaz de France, Gazprom and local municipalities.

Table 3-1 Shareholdings of Gas Distribution Companies in Hungary (1 July 1997)

Distribution Company	Owners	Shareholding
Fõgáz (Fövárosi Gázmüvek, or Budapest Gas Works)	Municipalities Ruhrgas (later E.ON) VEW AG Employees	50.0% +1 15.7% 31.3% 3.0%
Tigáz (Trans Tisza Gas Distribution Gas Company)	Italgas / SNAM OTP Municipalities APV Rt Employees	50.% + 1 25% 6.5% 15.0% 3.5%
Dégás (Southern Lowlands Gas Distribution Company)	Gaz de France Milford Internat. (Gazprom) APV Rt Municipalities Employees	65.1% 19.9% 9.3% 5.0% 0.7%
Kögáz (Középdunántúli Gázszolgáltató Részvénytársaság, or Mid Trans Danubian Gas Distribution Company	Bayernwerk – EWN APV Rt Municipalities Employees	50.0% + 1 40.0% 6.3% 3.7%
DDgáz (Déldunántúli Gázszolgáltató Részvénytársaság, or South Trans Danubian Gas Distribution Company)	Ruhrgas (later E.ON) APV Rt Municipalities Employees	89.0% 7.5% 2.5% 1.0%
Egáz (North Trans Danubian Gas Distribution Company)	Gaz de France Undall Holding (Gazprom) APV Rt Municipalities Employees	57.7% 12.9% 19.4% 8.9% 1.1%

Source: 5th Annual Central / East European gas conference, Bucharest, May 1998

a) The Czech Republic

Transgas, the Czech Republic's gas network company, was sold in 2001 to RWE which bought 100% of the company. Transgas is responsible for the international (transit) and national transport of gas and also for gas storage in the Czech Republic. RWE also owns, or has a strong shareholder interest in six gas distribution companies in the country.

b) Slovak Republic

The partial privatization of Slovakia's main gas wholesaler, Slovenský Plynárenský Priemysel a.s., (SPP), began in 2001 and was completed in 2002. A consortium of Ruhrgas (later E.ON Ruhrgas), Gaz de France and Gazprom won the tender for a 49% stake in the company. E.ON and GDF each have a 24.5% stake, with an option to sell to Gazprom. This option has not yet been exercised. E.ON also holds a 49% stake in ZSE, one of three Slovakian gas distribution companies.

c) Estonia

The dominant gas transporter and supplier in Estonia is Eesti Gaas. The company was privatized in 1995. Ruhrgas was the first private partner with the former state owned company. Later the percentage of shares outside state hands would increase to the present holding of 37 percent with OAO Gazprom, 34% with Ruhrgas AG, Fortum OY 18% (another division of Eesti Gaas), while the remaining shares are held by Itera Latvija 10 and private individuals 2 percent.[42]

d) Latvia

Latvijas Gâze, is the gas distribution, storage and supply company for all of Latvia. The company was privatized in 1995. The current shareholding of the company is E.ON Ruhrgas AG, 47%, OAO Gazprom 34%, SIA Itera-Latvija 16% and other shareholders at 3%.[43] It is a vertically integrated company with a number of subsidiaries which are in charge of the different gas business sectors.

e) Lithuania

Lietuvos Dujos is the national privatized gas company. It was privatized in 2001 and its current shareholders and percentage of holdings are: The Lithuanian state 53%, a consortium of E.ON Ruhrgas AG 35.7%, and 5.94% held by other shareholders. The company deals with import, transport, storage and distribution of gas through a variety of subsidiaries.[44]

3.2.2. Analysis of Gas Company or Country Dominance

In this section is a summary and a consideration of the current ownership and gas industry structure in the New Member States. Following that are summaries of the gas industry structures in each of the EU-10 Member States.

In 1990, in the former Soviet system, the central and east European region could be described as being dominated by national single vertically integrated gas companies, all of which were under a strong degree of control by a dominant Soviet Gazprom. During the 1990s and right up to date (2007), the region has seen a wide transfer of ownerships of these previous national companies. Where previously there was dominance of the industry by single national companies and Gazprom, the question is to what extent this pattern has changed after 15 years of activity. Table 3-2 shows in a summary form the main players and owners in the gas industries of each of the EU-10 New Member States.

42 Eesti Gaas, Company History, http://www.gaas.ee/index.php?page=146&
43 Latvijas Gaze homepage, http://www.lg.lv/pub/default.php?lapa=1&oid=57
44 Lietuvos Dujos 2006 Prospectus Report –Corrected, p 4

Table 3-2 Summary of EU-10 Gas Industry Structure (2006)

Country	National Gas Company	Ownership	Amount of Unbundling	New Entrants	Gas Supply 2006
Estonia	Eesti Gaas	Gazprom (37%) E.ON (33%) Fortum (17%) Others (13%)	Vörguteenus (TSO and DSO) 24 smaller DSOs (DSO, supply)	None	Russia-100%
Latvia	Latvijas Gaze	E.ON (47%) Gazprom (34%)	None	None	Russia-100%
Lithuania	Lietuvos Dujos AB Dujotekana UAB	State Property Fund (53%) Gazprom/E.ON (36 %)	Lietuvos Dujos AB (TSO, DSO, supply) Dujotekana UAB (supply) 6 local DSOs	None	Russia-100%
Czech Republic	RWE Transgas Net	RWE (100%)	RWE Transgas Net (TSO) 8 DSOs (6 RWE, 2 E.ON) 105 small DSOs	Wingas (one consumer)	Russia-70% Norway-30%
Slovak Republic	Slovensky Plynarensky Priemysel (SPP)	State (51%) E.ON (24.5%) GdF (24.5%) Option to Gazprom	None	None	Russia-100%
Hungary	MOL Földgáz-szállító Rt	MOL (100%)	Földgáz storage (75% E.ON) (storage, supply) 6 regional DSOs (Budapest Municipality, Italgas, Gaz de France x 2, Bayernwerk, E.ON) 5 small DSOs 14 other suppliers	Panrusgaz (E.ON 50%, Gazprom 50%) EMFASZ (Hungarian, Russian, Ukrainian) 14 licensed suppliers	Russia-75% Germany-8% Others-17%
Poland	PGNiG	PGNiG (Polish State)	None	None	Russia-61% Germany-4% Norway-4% Others-30%
Slovenia	Geoplin	Geoplin (Slovenian)	None	None	Algeria-36% Russia-55% Others-9%

Source: Mercados

Note: TSO = Transmission System Operator, DSO = Distribution System Operator

It can be seen that the gas companies of the New Member States are dominated by E.ON Ruhrgas and Gazprom in joint ventures, and other German companies (RWE, Wingas and Bayernwerk). There is also a small influence by Gaz de France and Italgas in the region. Of the whole region, every country that has allowed in foreign participation (which is every country except for Poland and Slovenia) has resulted in an E.ON Ruhrgas ownership of the assets.

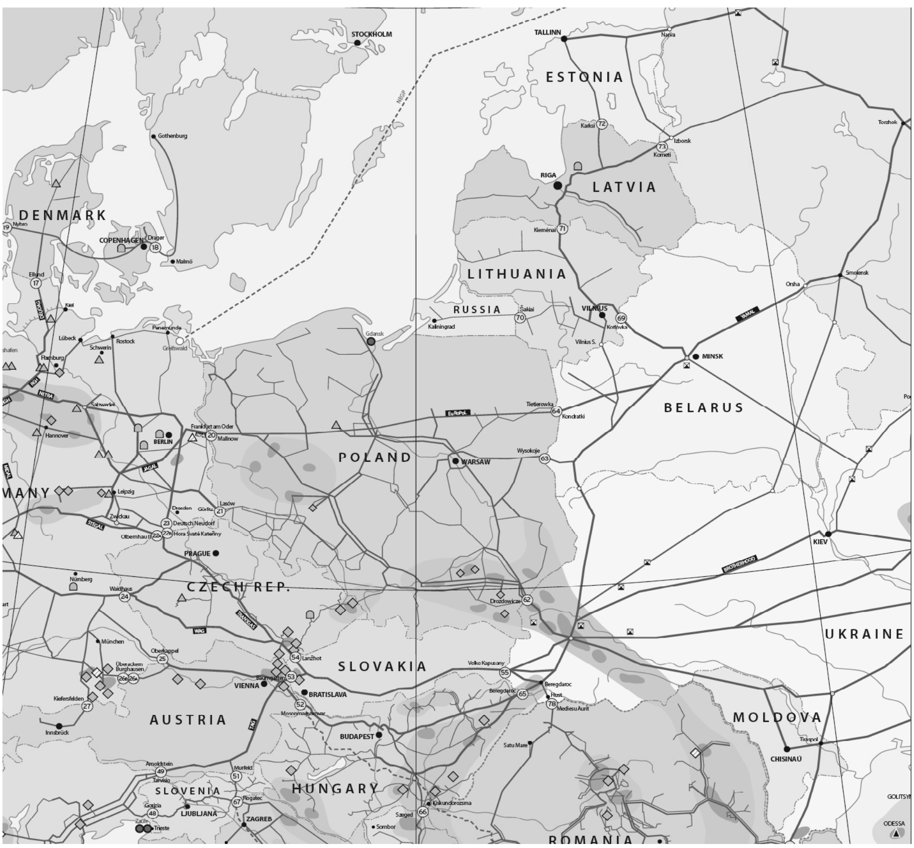
Of these countries E.ON Ruhrgas made acquisitions in partnership with Gazprom in every country except for the Czech Republic (where another German company, RWE, has a 100% ownership of the gas transport company and six of the eight distribution companies, the other two being owned by E.ON). It could be said that the region has exchanged Soviet dominance for German and Russian dominance of their gas industry.

Meanwhile very little competition has been introduced. German companies have engaged in asset swaps among themselves and with Gazprom to acquire regional monopoly positions in the different EU-10 countries (discussed below). Wholesale trading has been very slow to develop (and retail competition is virtually non existent). The few new entrants in the gas wholesale trading market are the German Wingas (with one customer), Panrusgaz (a joint venture of E.ON and Gazprom) and EMFASZ (a joint venture of Hungarian, Russian and Ukrainian interests).

Without strong efforts to introduce effective competition, an area where European Commission regulation could be very important, the dominance of the region by German and Russian companies (that is to say, by joint ventures of E.ON and Gazprom) is likely to continue.

3.2.3. Analysis of Control over Main Transit Pipelines

Figure 3-10 Map of Central and East European Gas Pipelines (2007)



Source: from GTE

a) Brotherhood

The Brotherhood and Transgas pipelines are the main transit pipelines from Russia. They run from Russia through Ukraine and Slovakia. Brotherhood then splits in western Slovakia into the Transgas and the TAG pipelines. The Transgas pipeline then runs through the Czech Republic to Germany, and TAG runs to Austria and on to Italy. There is also a branch connection from Brotherhood in Ukraine to Hungary. Construction began in 1971 and gas started flowing in June 1973. The transit pipelines flowing through the Czech and Slovak Republics now consist of four lines of 48" diameter pipeline.

The Brotherhood is a critically important gas pipeline, it is indeed the strategically most important gas pipeline in the world. Until the Yamal pipeline was built Brotherhood took 100% of Russian gas supplies to Western Europe, and even now it still carries the vast majority of Russian gas exports to western and central Europe.

During Soviet times, Gazprom kept a very firm control over the operations of and gas supplies running through the Brotherhood pipeline. Because of the fact that 100% of the gas supplies running through Brotherhood were Russian, Gazprom kept a strong influence over gas supplies running through the pipeline through the 1990s. An important difference from the situation in Ukraine though (which has seen much stronger Russian influence than in the Slovak Republic) was that the Slovak Republic from an early stage started paying for gas supplies in currency and receiving currency payments for transit fees.

With the partial privatisation of SPP in 2002, the Russian influence can be seen to continue, as Gazprom is a possible future partner in the E.ON / Gaz de France consortium which bought 49% of SPP.

b) Yamal

The Yamal pipeline brings gas supplies from the Yamal gas field in western Siberia in Russia through Poland to Germany. Although Gazprom is a major partner in the pipeline, the Polish Government and PGNiG have been tough negotiators. The negotiations over the Yamal pipeline between Russia and Poland are discussed below. Phase 1 is in operation and carrying gas through Poland. Gazprom influence over the Polish section of Yamal seems to be less than Gazprom influence over the Slovak section of Brotherhood. Gazprom is now not proceeding with Phase 2 of the Yamal pipeline and instead progressing the Baltic gas pipeline. There are good economic reasons for pursuing the Baltic pipeline which have nothing to do with the status of the Yamal pipeline (many economic studies have shown the benefits of a northern pipeline route to Germany which can pick up Scandinavian gas markets en route).

3.3. Electricity Sector

3.3.1. The Eastward Flow of Energy Investment

The opening of the energy markets in the former Communist countries in Eastern Europe prompted an expansionist strategy from the established, but newly restructured, energy companies from the EU-15. The privatizations of key electricity and gas distribution companies along with generation companies became key investment targets from the mid-1990s to the early 2000s. The result has been a fundamental restructuring of companies that were privatized and extensively transformed; including the still largely state owned 'national champions'. In addition, the marketplace itself, because of the dramatic alteration in company ownership and their strategies have extensively altered the markets in what are now the 2004 New Member States. This section looks at the 2004 enlargement process by assessing three issues:

The extent to which energy companies (producers, suppliers, energy service companies, et) in both old and new Member States have been affected by and responded to new opportunities offered by the single electricity and gas markets

Whether there is a tendency for energy companies to internationalize their business (mergers, opening of subsidiaries, investments etc..)

Whether factors for success or failure of energy companies on the extended EU market can be identified

The impact of the EU-10 joining the EU in the 2004 indicates that it affected the internationalization process of the EU-15 companies. It also indicates that the financial performance of the active energy firms has been impacted by whether they participated in this eastward expansion.
"The breakdown of the wall and the liberalization [of the economies] in these former communist countries, and their wish to get into the European Union had quite a significant impact on what the companies in Germany, Italy and France did" 45

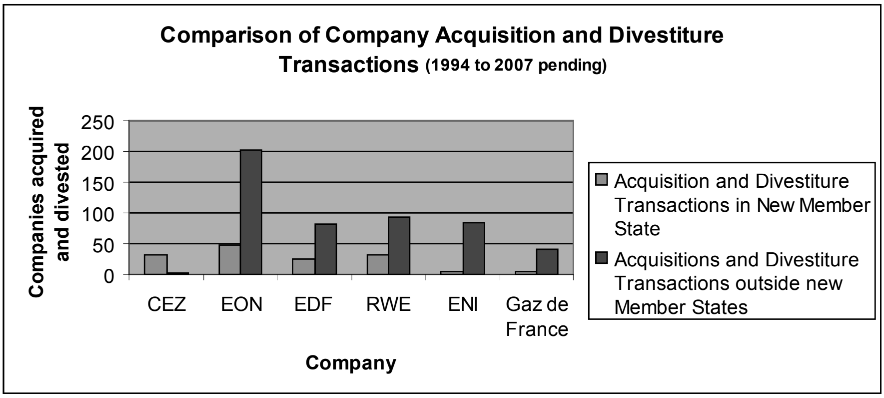
As described above by this energy company CEO, the EU enlargement and the process leading up to it, impacted both old and new member states. It influenced not only how potential member states to the 2004 enlargement would operate their electricity markets, but also influenced how companies from the EU-15 were organized and conducted business. The opportunities present in the soon-to-be new Member States offered growth potential for companies which were not available in their own home markets46. In the case of German firms, the liberalization of the German energy market affected the future domestic growth potential, prompting companies like E.ON and RWE to internationalize their businesses.47
The expansion of energy companies from the EU-15 into what would become the EU-10, and in particular, the EU-5, had started almost a decade before the 2004 EU enlargement. The response by these companies was to pursue international opportunities in their core business of energy and to participate in the privatization process occurring markedly in the Czech Republic, Hungary, Slovakia, and to a limited extent in Poland.

This refocusing of the old Member State businesses on the new Member States can be seen in the financial activities of acquisitions and divestitures occurring between 1994 and 2007.

45 Schultz, Interview, Company A, June 2007
46 Schultz, Interview, Company A, June 2007
47 Schultz, Interview, Company A, June 2007

Figure 3-11 demonstrates this diversification of attention into the new Member States, and mainly the EU-5 and EU-3, including the relation to company financial activities outside of the old Member State region.

Figure 3-11 Company Acquisition and Divestiture Transactions



Source: Reuters Knowledge v2.7 and Company Reports, REKK analysis

The three most active energy companies in the NMS, E.ON, EdF and RWE, participate the most in NMS electricity and gas markets, underscoring their important investment role in the region. For example in Hungary by 2003 the combined Foreign Direct Investment by the 25 largest companies includes 5 energy companies invested a total of $210 billion into the country. With E.ON and RWE the top energy companies investing around $760 million each by 2003. The heavy participation of these companies demonstrates the concerted strategic effort in acquiring a large percentage of companies in the EU-10. For example, drawing on the data from Figure 1-11 the acquisition and divestiture activity of E.ON in the new Member States accounts for 19 percent of its overall company activity, for EdF this stands at 24 percent, while for RWE this is 25 percent.

It is important to put the financial data of acquisitions and divestitures in perspective in relation to activities in OMS and NMS. Company acquisitions, for these three top companies, are mainly within the EU-5 while divestitures are heavier within the traditional market of the EU-15. For example, RWE only divested companies from OMS. Between 2000 and 2006 it divested 18 companies from its core business [48] compared to none before 2006 in the NMS. While for E.ON, it pursued a strategy of divestiture of its non-core energy business to fuel its expansion further into the both the OMS and NMS energy sector.[49]

It is important to establish if companies within NMS are taking similar actions in seeking to increase their sales within OMS. However, just as OMS energy companies cite limited growth opportunities within their home markets; it is also difficult to find a NMS company that has followed an equivalent strategy moving westward.

A possible example is CEZ, which is an active company following a similar strategy of growth. It is also active in distribution and generation, similar to the three big OMS energy companies.

48 RWE, "RWE AG Facts and Figures 2007."
49 E.ON, "E.ON Annual Report 2001."

For example, CEZ, like E.ON or RWE, derives a percentage of its income from OMS. For CEZ this accounts for 15% of its overall business sales (Table 3-3) however, this takes place within its trading companies in Austria, Germany and the Netherlands. E.ON and RWE on the other hand, derive an equal percentage of their business in NMS from trading but also investments in distribution and generation. Trading for CEZ may represent a significant volume of sales, but a lower contribution to the firm's profits, compared to its generation portfolio and stable income from its distribution companies.

Table 3-3 Comparison of Approximate Business Sales in NMS and OMS[50]

Company	Apx.% of Business sales in NMS	Apx. % of business sales in OMS	**Apx. Sales in NMS** (displayed in million Euros)	**Apx. Sales in OMS** (displayed in million Euros)	NMS countries of key operations and assets (distribution and/or generation)
E.ON	11%	87%	€3,469	€23,256	Czech Republic, Hungary, Slovakia, Poland, Romania, Bulgaria
RWE	14%	86%	€4,300	€16,100	Czech Republic, Hungary, Slovakia, Poland,
EdF	8.4%	88%	€215 (electricity only-EBITDA)	Not available	Poland, Hungary, Slovakia
CEZ	85%	15%	€4,792	Not available	Czech Republic, Poland, (numbers include trading arms in Netherlands and Germany) heavily active in Southeast Europe

Sources: (E.ON Annual Report 2006, p30, RWE Strategy, Structure and Corporate Governance 2007 p 17, EDF Annual Report 2006, p130, CEZ Annual Report 2006, p 7)

All four companies have taken the opportunities available in the privatization process in the EU-5 (excluding Slovenia) to buy electricity and gas distribution companies along with generation and CHP companies; this same opportunity has not been possible for NMS companies to do this in OMS. However, CEZ appears to be following a similar strategy in its eastward expansion into newer member states like Bulgaria and Romania and the Southeast of Europe.[51]

The initial reasons for expanding eastward into the 2004 NMS and how these countries attracted the investments by OMS energy companies, provides a fuller picture of the fuel that drove company acquisitions and the (partial) privatization of a nations energy companies. Understanding these mutually reinforcing actions can highlight aspects of the role that the 2004 EU enlargement played in the thinking of energy companies.

50 The amount of sales and percent are approximate values, many companies do not report their full results by separating old and new Member States.

51 Niles, "CEZ: expanding into southeastern Europe - ."

3.3.2. Privatization of Energy Assets in New Member States

The initial privatization phase of NMS state energy assets and the subsequent flow of capital from West to East began in 1995 with the large scale privatization process occurring in Hungary. Generation and electricity and gas distribution were all privatized. In later years, the Czech Republic, Poland (to a limited extent) and Slovakia would follow suit by privatizing portions of their state run energy companies.

Each country approached the privatization process differently and how much controlling interest would be sold to foreign investors. Slovakia for example, would not concede more than a 49 percent ownership rights in the electricity and gas businesses, making the new owners only minority shareholders. Hungary on the other hand had given almost full ownership in its businesses to the foreign investors. Poland only privatized two electricity distribution companies before altering its policy of retaining domestic ownership over distribution companies but still allowing foreign investment into generation.

These national examples underscore the localized nature of the privatization deals. Limits can be placed on the amount of shares owned in a company or allowing the selection of companies to be privatized and which to retain in state hands. As will be seen (below) in the neighbouring countries of the Czech Republic, Hungary and Slovakia electricity and gas distribution companies were allowed to have significant ownership by OMS energy companies, thereby offering a view of congruent energy policy within the region.

The ownership of energy companies in NMS by OMS companies should not be seen in isolation. There were other factors happening at the same time that influenced the expansion of these companies. The perceived need for some energy companies to expand in order to increase profits, the wider global liberalization of the energy industry which underpinned this need for greater performance by utilities; and the support by the EU Commission to promote an Internal Energy Market. These factors came together at the same time as privatization was also taken off in the former Communist countries. As one CEO of a German firm stated, "We have three developments, first the privatization in the enlargement countries… privatisation on one side means growth potential on the other. Second…we have privatization falling together with liberalization procedure, and [third this is] promoted by the market opening by the [EU] Commission."[52]

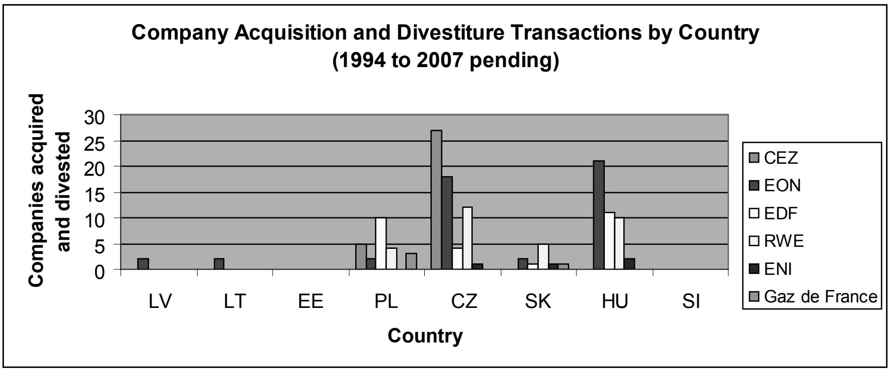
The unfolding of privatization, liberalization and competition, laid out by the German CEO, conformed to a newly formed company vision. They became committed to make a German "regional company into an international company".[53] This vision could be fulfilled with the new opportunities available in Eastern Europe. Further evidence of this shift in strategy can be seen in their initial movement into the region and later through their reorganization of the different companies they had accumulated in the privatization phase.

Importantly, as established in interviews, both E.ON and RWE took a tentative step first into Hungary where they initially tried out this foundation of this new international corporate vision.[54] Later, the same companies that participated in Hungary would become involved in the privatization processes in Poland, the Czech Republic and Slovakia. Overall, as shown in Figure 3-12, the acquisitions and later some divestitures by OMS companies would become substantial in four of the 2004 NMS. The acquisitions and divestiture of the largest OMS

52 Schultz, Interview, Company A, June 2007
53 Schultz, Interview, Company A, June 2007
54 Brenner, Interview, Company B, April 2007; Breuer, Interview, Company B, May 2007; Schultz, Interview, Company A, June 2007

energy companies, within the four countries between 1994 and 2007 would see the Czech Republic and Hungary having the most activity. These two countries also allowed a majority of share ownership in energy companies to be controlled by owners from OMS. Electricity and gas distribution companies in all the countries were the main investment targets by E.ON, EdF, RWE and CEZ.

Figure 3-12 Acquisition and Divestitures by Country



Source: Reuters Knowledge v2.7 and Company Reports, REKK analysis

The three processes, privatization, liberalization and market opening, as discussed by the German CEO, created significant impact on the industry at different stages of market development. However, there exist during this time period, and between countries, different levels of privatization, liberalization and market opening. To date full market opening has not yet come to each country or region. As examined next these time periods show companies reacting to the investment and regulatory environment around them resulting in a more recent reorganization of business assets and structure in order to reposition themselves in a more integrated regional marketplace.

3.3.3. Strategy and Asset Management

The initial privatization of state energy assets resulted in a period of acquisitions by large OMS energy companies. This mainly occurred from 1994 to 2003, when large shareholdings or whole companies were bought in NMS. The period since 2004 is marked by ownership consolidation and the strengthening of companies' shareholdings and market positions. This is occurring in the four geographically interconnected states of the Czech Republic, Hungary, Poland and Slovakia. In addition, there is also a perceivable movement towards regional coordination of company assets in the CEE region.

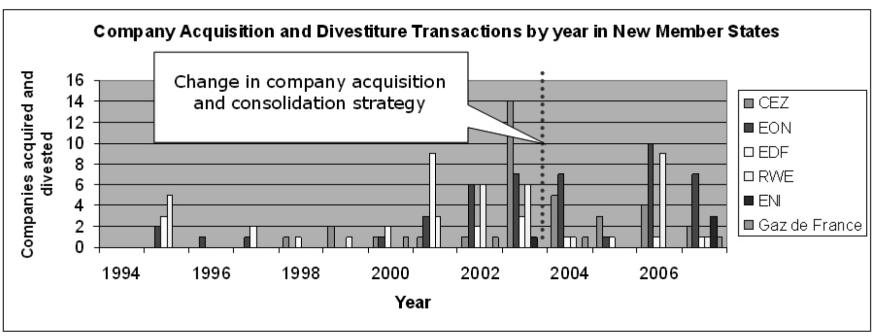
The common legal framework brought about EU membership is now influencing the strategic thinking and asset management of both E.ON and RWE. Due to these companies' large holdings across the four central countries in the CEE region, their overall strategic moves can significantly represent changes within the gas and electricity distribution and generation companies. Importantly, it is now their strategic movements, which may be reflecting the affects of EU enlargement. Their current strategy is to reform their operations of the different national energy companies into more closely coordinated regional entities. This closer coordination is a result of a common legal framework and secondly the emergence of a more integrated energy market. “Fortunately, every company in these countries is in the European Union, with all its common legal framework….Because the legal system is getting harmonized, the [market] environment is getting harmonized.”[55]

This repositioning of companies reflects the thinking among industry executives. “If you think more deeply and about the past 3 years… in the strategic thinking of the people in the companies, we have some operations in enlargement countries, how do we connect these operations into a European model?”[56] Thus the adoption of a common legal framework and the emergence of a more coordinated market place offers greater opportunities to coordinate energy assets for some of the larger energy companies active in NMS.

This change in strategic thinking underscores the two separate time periods of market evolution in NMS. The first time period can be identified as the first round of privatization carried out in the late 1990s and early 2000s. This is now giving way to the reorganization of the shareholding interests of OMS companies accumulated in the first round of privatizations. This has occurred from approximately 2004 to the active deals proposed in 2007.

Figure 3-13 shows the two separate time periods, one of low and gradually increasing acquisition activity, starting in 1995 and peaking in 2003 (a year before EU accession). The year of the 2004 EU expansion marks the start of a period of reshuffling of assets. Importantly, the analysis of the Reuters Knowledge v2.7 database shows the acquisitions and divestitures, in the last time period, came from transactions with other companies, not from the participation in privatization processes. This reduction in participation in the privatization process should not be seen as unwillingness to participate, but rather limited opportunities of companies being privatized reflecting a change in government policies.

Figure 3-13 Acquisition and Divestiture by Year



Source: Reuters Knowledge v2.7and Individual Company Reports, REKK analysis

The acquisition and divestiture activity of E.ON and RWE demonstrate two distinct periods. For E.ON these are the periods 1995 to 1997 and from 2001 to 2003, thereby following the different countries privatization processes. RWE holds a similar profile with 1995 a key year and later 2001 to 2003 being active privatization years. For both companies, the later period, from 2004 and on, shows a consolidation period on the part of the energy companies. This is dominated by acquisitions and divestitures of previously owned companies in an attempt to consolidate ownership in companies. For example, E.ON created E.ON Generation in Hungary

55 Schultz, Interview, Company A, June 2007
56 Schultz, Interview, Company A, June 2007

by consolidating its different generators into a single company, a process that included increasing over time its shareholding in some generation companies. This time period also included share swaps in NMS companies.

The largest example of this realignment in company ownership is the share swap carried out by E.ON and RWE in the Czech Republic and Hungary in 2006. Initially after the privatization period they were both key shareholders in seven gas distribution companies in the Czech Republic and two gas distribution companies in Hungary. As each company developed further its regional strategy based on their holdings and as the national and regional market matured, along with the benefits of a common legal framework afforded by EU membership restructuring some of the assets took on strategic importance. RWE and E.ON, for example, sought to “clarify business management … in both companies and [for RWE] reinforce the strategic focus of natural gas distributors.”[57]

The result was changing the share ownership in eight gas distribution companies in the Czech Republic and Hungary. Figure 3-14 shows in yellow the subsidiary companies affected by this share swap and how through this coordination both companies consolidated their ownership in a regional manner within two new Member States. The significance of this share swap is two fold. First the investment risk, which had energy companies paring up to spread the initial investment risk (and expertise), has severely diminished from the first round of privatization. “For [our company] in the Central and Eastern European region it is now a core region, like Germany. For example, we have no higher risk ratio for these companies. If we invest in Poland, Slovakia, the Czech Republic or Hungary it is like Germany”.[58]

57 RWE Transgas, Press Releases “Swap of shares in the Czech Republic and Hungary is to clarify the ownershipstructure of gas distribution companies”, February 22, 2006

58 Brenner, Interview, Company B, May 2007

Figure 3-14 Large Energy Share Holdings in CEE New Member States

Local Company	Country	EDF	E.ON	RWE	CEZ	Activity	Year acquired
BERt	HU	95.50%				Generation	2000
Démász	HU	100%				Elcty Distribution	1995
SSE	SK	49%				Elcty Distribution	2002
EC Wybrzeze	PL	77.51%				CHP	2000
El Rybnik	PL	51.20%				Generation	2001
Kogeneracja	PL	50%				CHP	2001
EC Krakow	PL	66.96%				CHP	1997
STOEN S.A	PL			85%		Elcty Distribution	2002
VSE	SK			49%		Elcty Distribution	2003
Prazska energetika	CZ			minority		Elcty Distribution	
Transgas	CZ			100.00%		Network and Distribution	2002
Severomoravská plynárenská	CZ		RWE/EON swap	67.7%		Gas Distribution	2002
Středočeská plynárenská	CZ		RWE/EON swap	96.4%		Gas Distribution	2002
Severočeská. Plynárenská	CZ			50.24%		Gas Distribution	2002
Západočeská plynárenská	CZ		RWE/EON swap	97.97%		Gas Distribution	2002
Jihomoravská plynárenská	CZ		43.73%	50.11%		Gas Distribution	2002
Východočeská plynárenská	CZ		RWE/EON swap	66.6%		Gas Distribution	2002
Pražská plynárenská	CZ			49.18%		Gas Distribution	2002
Jihočeská plynárenská	CZ			46.66%		Gas Distribution	2002
ELMU	HU			55.25%		Elcty Distribution	1995
EMASZ	HU			54.26%		Elcty Distribution	1995
Fővárosi Gázművek Rt.	HU		RWE/EON swap	49.8%		Gas Distribution	1995
Tiszántúli Gázszolgáltató Rt.	HU			44.00%		Gas Distribution	1995
Mátrai Erőmű Rt.	HU			50.92%		Generation	1995
E.ON Generation	HU		100.00%			CHP	2006
Dél-dunántúli Áramszolgáltató Vállalat	HU		100.00%			Elcty Distribution	2004
Észak-dunántúli Áramszolgáltató Vállalat	HU		100.00%			Elcty Distribution	1997
Tiszántúli Áramszolgáltató Vállalat	HU		100.00%			Elcty Distribution	1995
Dél-dunántúli Gázszolgáltató	HU		99.94%	RWE/EON swap		Gas Distribution	1996
E.ON Közép-dunántúli Gázszolgáltató	HU		99.94%			Gas Distribution	1995
ZSE a.s	SK		49%			Elcty Distribution	2002
Jihomoravská energetika	CZ		43.73%			Elcty Distribution	2003
Jihočeská energetika	CZ		N/A			Elcty Distribution	2003
Jihočeská plynárenská	CZ		100%	RWE/EON swap		Gas Distribution	2006
Pražská plynárenská	CZ		49.35%	RWE swap		Gas Distribution	2006
Stredoceska energeticka	CZ				100%	Elcty Distribution	2003
Zapadoceska energetika	CZ				100%	Elcty Distribution	2003
Severoceska energetika	CZ				100%	Elcty Distribution	2003
Vychodoceska energetika	CZ				100%	Elcty Distribution	2003
Severomoravska energetika	CZ				100%	Elcty Distribution	2003
Elektrociepłownia Chorzów "ELCHO" Sp. z o.o.	PL				75.20%	Generation	2006
Elektrownia Skawina S.A.	PL				74.82%	Generation	2006
EON/RWE asset swap in 2006							

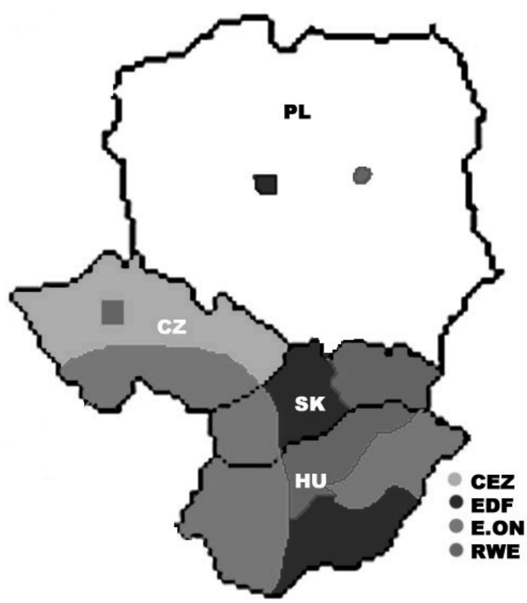
Source: REKK Analysis

Reflecting back on the different levels of privatization within countries, the average amount of ownership interests of companies can also be compared in Figure 1-14. For example, Hungary has a higher percentage of majority shareholding by private investors per company than Slovakia. In addition, it also indicates where some companies have been able to gain more control in companies than others. For example EdF, of all the EU-15 companies has an average share ownership of 70 percent, while E.ON in NMS is shown to be aggressive in its share ownership, controlling an average of 84 percent. On the other hand, CEZ can be seen as benefiting by its incumbent position in the Czech Republic by controlling an average of 93 percent shareholding in its assets.

Creating a fuller picture of the investment strategies can be done by understanding the geographic structures that the OMS energy companies have constructed throughout the territories of NMS. Increasing not only the shareholding concentration but the geographic holdings can better enable the regions key energy companies to coordinate their companies on a regional scale, thereby matching their new strategic focus in Central and Eastern Europe. Figure 3-15 and

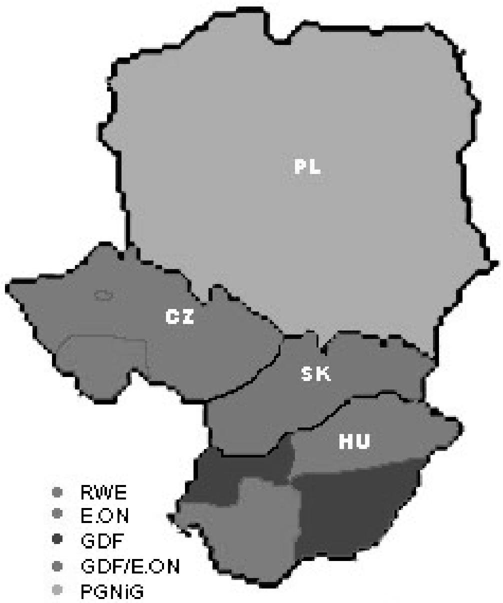
Figure 3-16 show the geographically coherent organization of the different national electricity and gas distribution companies owned by EDF, E.ON and RWE. Overall, it is apparent that there exist, particularly for RWE and E.ON a geographic organization that is territorially contiguous. Their participation in the privatization processes in these countries demonstrates their efforts at creating a geographically coherent structure among its distribution companies. Further consolidation of their ownership interests could extend more their control over these companies.

Figure 3-15 Ownership/Key Shareholder Electricity Distribution Companies



Source: REKK

Figure 3-16 Ownership/Key Shareholder Gas Distribution Companies



Source: REKK

The three countries with the most privatization occurring also demonstrate how the energy companies have interlinked their electricity and gas distribution businesses. While different national laws and regulations (along with the level of shareholding), restrict how much coordination occurs between the different distribution companies of a single company like E.ON, significant cooperation can be seen to existing now and when a more coherent regional or European energy market develops. The companies appear ready for an increased regional marketplace where greater asset coordination can occur.

Examined in the next section is how companies with interests in NMS, including national champions, have performed financially. This includes a financial comparison between companies which have and have not expanded into NMS. Extending the analysis to the financial performance of firms will illuminate the monetary impact of the strategy of firms which have participated in NMS privatizations and organic growth compared to those that chose a different strategy and either stayed within their domestic market or internationalized into other regions of the world.

3.4. Company Financial Performance

The expansion of the EU-15 countries' firms into the EU-10 countries has been measured in terms of their geographic scope and level of financial interests. What has not been determined is if these investments have positively or negatively impacted the companies now active in NMS. Assessing the financial performance of these companies can help assess the economic impact on companies that choose to internationalize their business. This section sets out to assess individually and then compare those companies that have expanded into NMS and those that have not. It is acknowledged that other factors affect the financial performance of firms, besides expansion into NMS, however assessing a number of companies, with similar strategies, provides an overview of the influence of eastward expansion. This financial assessment is then extended to a selected group of 'national champions' and how they have performed in the same markets and investment climate as the assessed publicly traded companies.

3.4.1. Financial Background of Acquisitions and Share Price Developments

To understand the financial part of this analysis it is important to shed some light on the theories underlining mergers and acquisitions, financial valuation of companies and value creation (see appendix C in original study). In the case of acquisition of another company, if the value of an acquisition is the real value of the target company, the share price of the acquirer should not change. The question is what is the real value? In principle it is the discounted value of the future cash flow of the target company. The future cash flows are exposed to change in the advance of time if the main fundamentals are amending (growth rate, rate of return, profitability, re-investment rate, macro environment).

According to general trends the share value of acquirer companies, decreases in the short term, in the long term it may increase if the management is able to realize or go beyond a strategy mirroring the acquisition value. The market value of a company listed on the stock exchange is the sum of the market capitalization (share price multiplied by the number of outstanding shares) and the external debt minus the cash owned by the company. Share price can change for infinite reasons for instance: deteriorating profit margins, declining market share, or changes in the tax rate. Acquisitions can also significantly move the prices up or down, as mentioned before.

Financial indicators in Table 3-4 will be used to analyze acquire and non-acquire companies' financial performances:

Table 3-4 Definition of Financial Performance Indicators

Financial performance indicators	Explanation
EBITDA	Compare profitability between companies and industries because it eliminates the effects of financing and accounting decisions. EBITDA = Revenue – Expenses (excluding interest, tax, depreciation and amortization.
EBITDA margin	A measurement of what proportion of a company's revenue is left over after paying for variable costs of production such as wages, raw materials, etc.[59] EBITDA margin = EBITDA/Revenue.
Revenue/1000 employee	The amount of revenue produced by 1000 employees.
Sales	The amount of money that a company actually receives during a specific period, including discounts and deductions for returned merchandise.
Net income	A company's total earnings (or profit).
CAGR[60]	The year-over-year growth rate over a specified period of time. $\text{CAGR} = \left(\frac{\text{Ending Value}}{\text{Beginning Value}}\right)^{\left(\frac{1}{\#\text{ of years}}\right)} - 1$

3.4.2. Financial Analysis

The objective of this section is to answer the following questions: Is there a tendency for energy companies to internationalize their businesses through mergers, acquisitions, opening of subsidiaries and making investments? Have the share prices (value) of those companies which have been actively taking part in acquisitions in the new member states developed more than those who have? Is there any correlation between profitability improvement and acquisition strategy of a company?

In order to answer the above questions two separate groups were created. Seven European energy companies which have acquired companies in the new member states - before and after accession - were selected and put in one group labelled Acquirers. In contrast four companies not active in NMS were chosen to form the second group, titled, Non-Acquirers. The methodology61 for selection and profiles of the companies are available in Table 3-5

59 http://www.investopedia.com/search/results.aspx?q=ebitda
60 http://www.investopedia.com/terms/c/cagr.asp
61 Selection of companies is based on ranking within Platts Top 250 Global Energy Company Ranking, European Region, 2006; in addition subjective analysis of portfolio mix, investments in EU-10 and EU-15 and global investments were taken into consideration.

Table 3-5 List of non-acquire and acquire companies in NMS

Non-Acquires (not active in NMS)	Acquires in NMS
EDP	CEZ
Suez	E.ON
Endesa	EDF
Verbund	ENI
	Gaz de France
	Vattenfall
	RWE

Source: REKK

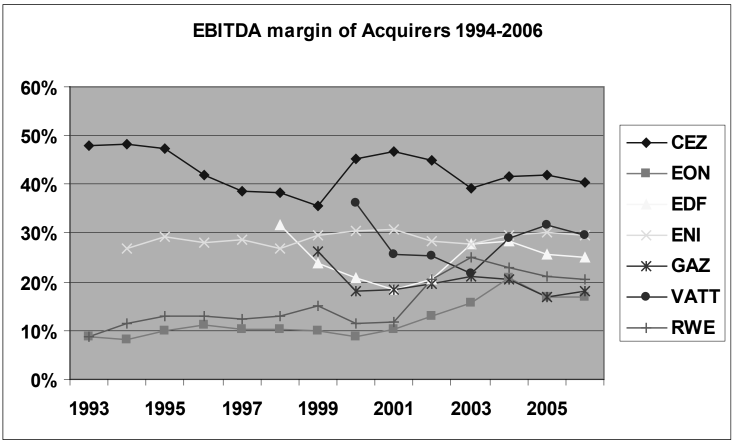
The methodology used to compare the companies and the groups is based on the change in the sales, EBITDA, net income performance, profitability and efficiency figures and share price (see in the original study Appendix D for definitions). The next section analyzes the difference between those companies that have activity expanded in NMS and those that have expanded outside NMS or have remained within their own old MS.

3.4.3. Profitability and Efficency Change

The Acquire and Non-Acquire companies have significant differences in their business operations and business segmentation. As far as profitability is concerned the business segmentation aspect is crucial. The margins in electricity and gas generation, distribution and trading are substantially different. Electricity and gas generation belong to the most profitable segments of the energy business while electricity and gas trading generates relatively smaller profit. CEZ for instance historically reached higher EBITDA margins, as its electricity generation segment weighs significantly in its business portfolio, at the same time E.ON. which is more involved in electricity trading and distribution, generates less EBITDA on its revenues. In both Figure 3-17 and Figure 3-18 it can be seen how the group members vary in terms of profitability and efficiency.

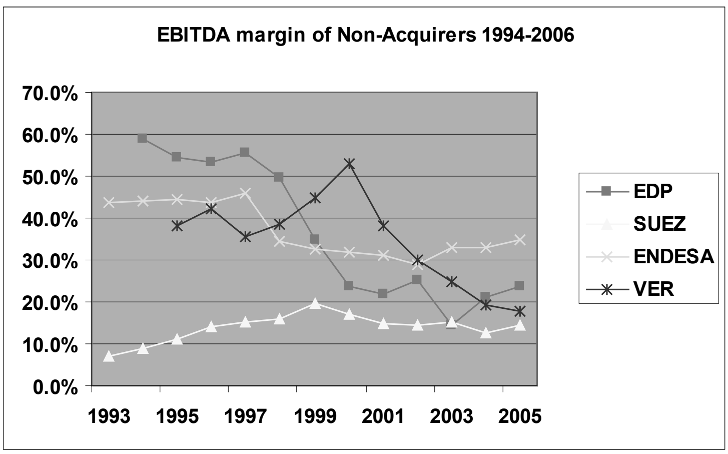
Analyzing the correlation between the merger and acquisition activity and profitability, the Acquirers contrast sharply with the Non-Acquirers. The yearly absolute difference in EBITDA margin change is 1,5% in favour of those who acquired. Those companies that have entered into the Central Eastern European markets improved their EBITDA margin 0,3% per year on average, whilst the Non-Acquirers booking 1,2% yearly EBITDA margin deterioration.

Figure 3-17 EBITDA Margin of Acquirers 1994 to 2006



Source: REKK

Figure 3-18 EBITDA margin of Non-Acquirers 1994 to 2006



Source: REKK

On the other hand the efficiency level from the aspect of revenue generation per employee shows a different picture. The efficiency development of the Non-Acquirers based on the revenue per 1000 employee ratio succeeded the Acquirers by 1% annually. This is a noteworthy and interesting difference, but we should bear in mind that it shows only a small part of the efficiency gain and EBITDA margin is the most reliable ratio depicting the profitability change.

3.4.4. Sales Performance

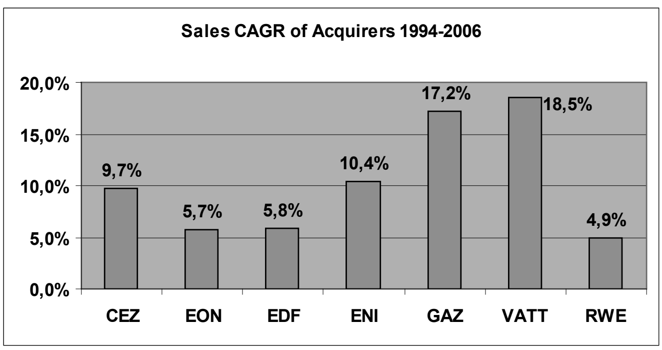
Examining the sales performance growth of the Acquirers and Non-Acquirers is also meaningful. It would be expected that the Acquirers would perform much better on sales level. This assumption is based on the principal that they have not only grown organically but with the help of acquisitions. It came out of the analysis that the average yearly revenue growth of the Acquirers (10,3%) exceeded the yearly sales expansion of the Non-Acquirers (9,9%) which matches our expectations, but the difference is surprisingly slight (0,4%) (Table 3-6).

Looking at the two groups of Acquires and Non-Acquires more closely the sales growth of the individual companies in both groups is broad. Among those who acquired, Vattenfall and Gaz de France reached substantially above average yearly revenue gain while E.ON and RWE lagged behind (Figure 3-19). The situation between those who stayed away from the accession countries is almost the same, although the standard deviation of the range is not as wide. Endesa topped the group reaching approximately 12% turnover growth, whilst Verbund proved to be the worst performer obtaining 6,2% development (Figure 3-20). The conclusion, then is, between 1994 and 2006 the sales growth of the Acquirers surpassed the Non-Acquirers by 0,4% per an year.

Table 3-6 CAGR difference between Acquires and Non-Acquires

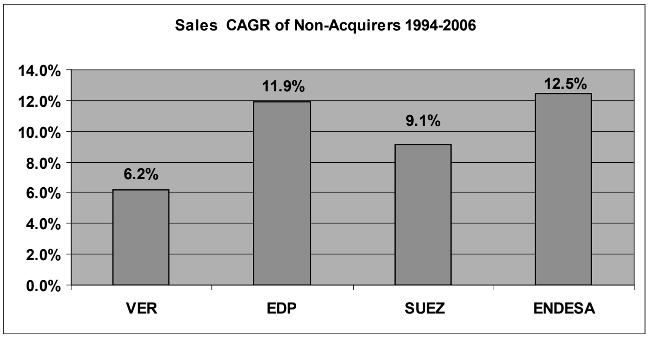
CAGR (1994-2006)	Acquirers	Non-Acquirers
Sales	10,3%	9,9%

Figure 3-19 Sales CAGR of Acquires 1994 to 2006



Source: REKK

Figure 3-20 Sales CAGR of Non-Acquires 1994 to 2006

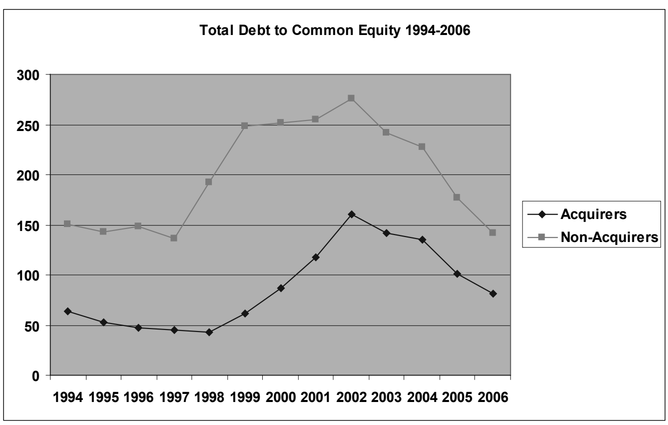


Source: REKK

3.4.5. Financial Leverage

It would be reasonable to expect that companies, which acquired more in the new member states would need more credit to finance their acquisitions. This would have resulted in higher total debt to common equity ratio (Figure 3-21). At first glance the numbers are contradictory. The total debt to common equity ratio of the Non-Acquirers is well above the level of the Acquirers. However upon further analysis, two more important conclusions can be drawn from the graph. First, the total debt to common equity level of the two groups' correlates, second the gap between the two is continuously decreasing.

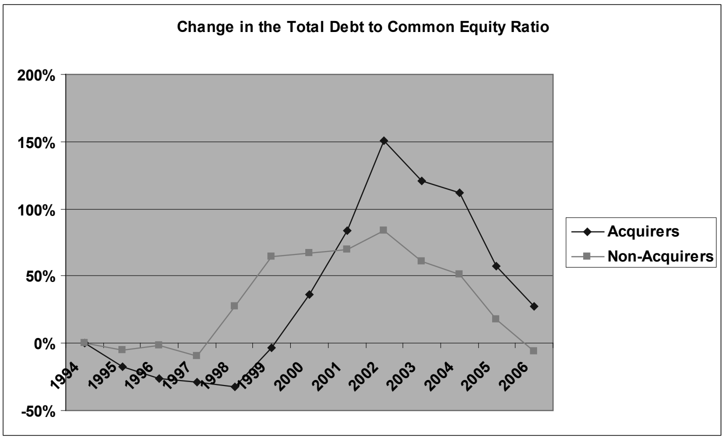
Figure 3-21 Total Debt to Common Equity 1994 to 2006



Source: REKK

Examining the relative change in the ratio, we can see that our hypothesis is not yet true. Figure 3-22 shows that between 1998 and 2003 the Acquirers raised their debt level two times higher, as they required more external financing to finance the mergers and acquisitions.

Figure 3-22 Change in Total Debt to Common Equity Ratio



Source: REKK

3.4.6. Acquires and Non-Acquires Conclusion

Based on the result of the comparative financial analysis we found that those companies which have internationalized their operations towards the new member states of the European Union increased their value more significantly than those who followed a different strategy. The average annual share price development of the Acquirers reached 23,2% between 1994 and 2006 exceeding the group of Non-Acquirers (8,7%) by 14,5%. (Table 3-7) This means that the strategy focusing on the geographical diversification of the operations towards Eastern Europe proved fruitful and managed to create significant value. Because of the share price development, it can be inferred that the acquisition price paid, was fair or less than the company's value based on the cash flow and strategy.

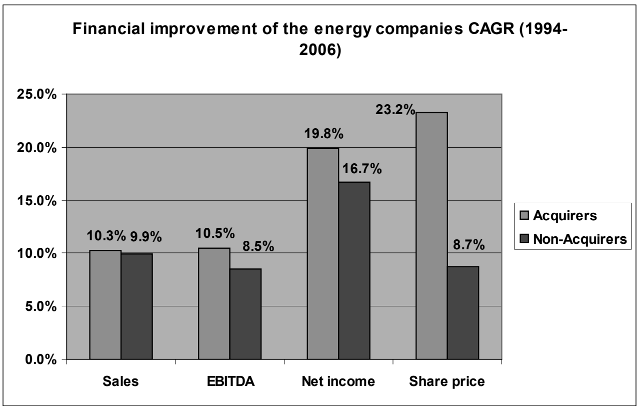
Table 3-7 CAGR of Acquires and Non-Acquires

CAGR (1994-2006)	Acquirers	Non-Ac.
Sales	10,3%	9.9%
EBITDA	10,5%	8.5%
Net income	19,8%	16.7%
Share price	23,2%	8.7%
Revenue/1000 employee	8,5%	9.5%
EBITDA margin	0,3%	-1.2%

Source: REKK

The significant difference in the share price growth of the two groups is much higher than the difference in the sales, EBITDA and net income growth. Although it is noticeable that the Acquirers managed to increase their revenue more than the Non-Acquirers, the difference is not as extensive. The revenue of the Acquirers in the examined period rose 10,3% per year on average, whilst the Non-Acquirers reached 9,9% annual increase (Figure 3-23). Moving downward on the income statement the difference in the yearly average growth becomes wider: EBITDA rose 10,5%, net income improved 19,8% among active acquirers. For Non-Acquires EBITA rose only 8,5% while net income rose 16,7%. The higher share price development of some companies compared to profit development can be explained by the fact that the stock market and investors value those companies higher, which may indicate they have a higher prospect for future earnings growth.[62] Those companies which are partly operating in countries of the Central-Eastern European region are expected to have better growth potential as the GDP growth is higher in those countries.

Figure 3-23 Financial Company Improvements 1994 to 2006



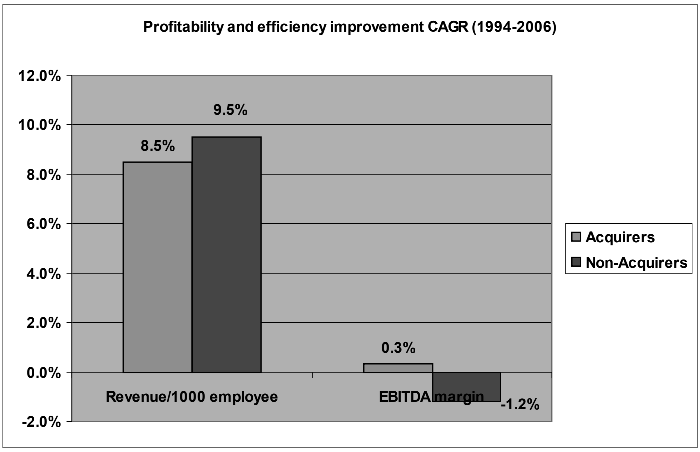
Source: REKK

The growth in profitability and efficiency improvements are not substantially clear. The yearly average EBITDA margin change reached 0,3% among Acquirers and -1,2% among Non-Acquirers (Figure 1-23). The numbers indicate a slow and slight profitability enhancement in the first group and a slight deterioration in the second group. The profitability on net level (net margin) of Acquirers increased more significantly, however the real comparison should be made between the EBITDA scores, in order to exclude the effect of different country specific tax systems, diverse financial structure and asset portfolio.(See Table 1-7).

The analysis draws our attention to the fact that the efficiency of the companies measured by revenue per 1000 employee is noteworthy. From this point of view Non-Acquirers reached a “higher score” with an average yearly 9,5%, compared to Acquirers (8,5%) (Figure 3-24).

62 (In general the companies with higher growth have higher Price to Earnings ratio, P/E. P/E shows how many times a company worth its yearly earning. The higher P/E has the company, the more it is valued by the investors.)

Figure 3-24 Profitability and Efficiency Improvement CAGR 1994 to 2006



Source: REKK

The comparison of the financial performance of companies that did and did not become active in NMS, provides a partial picture of the influence of NMS on the financial integrity of some companies. This analysis does not account for wider economic and political influences which at times may play a strong role in financial decisions and the financial results of companies. However, it does provide a snapshot of the financial impact that expanding into NMS has on OMS companies. Extending this financial analysis to the 'national champions', discussed next, can provide a picture of the domestic companies which dominate their domestic energy markets.

3.4.7. National Champions

The definition of 'national champions' is based on the strategic value to the state, of a large energy company. NMS have on one hand opened their door to Foreign Direct Investment by OMS energy companies, while on the other hand have structured their markets to favour a specific domestic companies. These companies can be considered as 'national champions' for the protection they are given by each state. This support has generally slowed the transition towards a more competitive marketplace. Examined here, is the financial performance of national champions in selected companies in NMS.

A key problem with assessing the financial performance of national champions is they are not always publicly listed companies, therefore it is difficult to count share price developments. Moreover, analysis of the financial statements shows the performance of net income levels were often highly volatile; they experienced huge losses and profits year-to-year. Taking these factors into account the percent of sales, EBITDA and profitability improvement of the "national champions" (Table 3-8). Overall, the financial performance of each firm is varied and does not correspond either with the GDP growth or other economic factors in each country.

Table 3-8 CAGR of National Champions

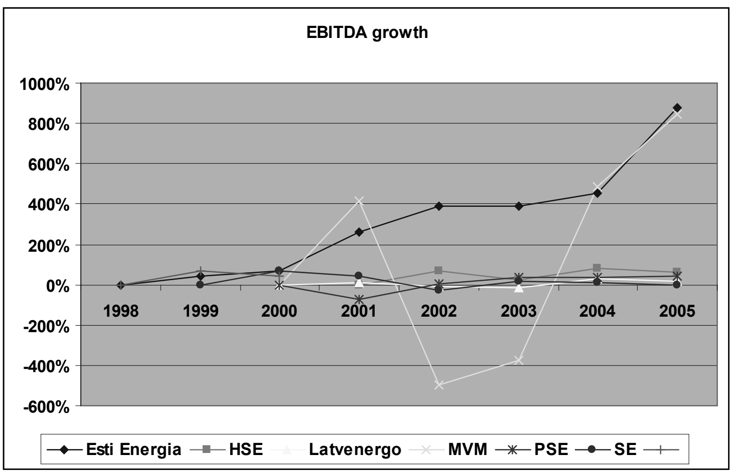
CAGR	Esti Energia	HSE	Latvenergo	MVM	PSE	SE
Sales	9.4%	25.2%	7.4%	3.6%	-0.5%	6.1%
EBITDA	38.5%	12.4%	3.7%	56.8%	7.2%	-0.7%
Period	1998-2005	2001-2005	2000-2005	2000-2005	2000-2005	1999-2005

Source: REKK

Table 1-8 demonstrates the significant differences among the financial performance of the "national champions". Esti Energia and HSE outperformed the other companies demonstrating strong sales and EBITDA growth and improved margins. On the other hand, sales of PSE or the earnings of SE decreased during the examined period. The relatively poor performance compared to Esti Energia or HSE or the earlier analysed Acquirers and Non-Acquirers could be the result of state influence. Most of these 'champions' are controlled by governments, either directly or indirectly, and may not be profit-orientated. Appendix D in the original study provides an overview of each national champion's ownership and key activities.

Esti Energia is the only company on the list, in Table 1-9 which can show a healthy EBITDA growth between 1998-2005. The aggregated growth exceeded 800%. On the other hand HSE, PSE, and SE were not able to increase their earnings, and remain at the late 1990's level, lagging well behind the earning growth of their countries and competitive and profitable competitors.

Table 3-9 EBITDA Growth of National Champions



Source: REKK

There is limited explanation to the financial performance of national champions. As told by the financial figures of the 'national champions' there is little explanation for the increased sales growth of these firms and financial stagnation in terms of EBITA growth. The limited publicly traded status of the companies, combined with state ownership, limits the openness and consistency in explaining the dramatic alterations in company performance.

3.5. Case Studies

3.5.1. The Eastward Expansion of OMS Energy Companies

The heavy investment of OMS energy companies into NMS set the stage for a dramatic reorganization of the energy market in Central Eastern Europe. Four key OMS energy companies have seized on opportunities and emerged as the largest and most active in the four countries out of the 10 NMS of the 2004 enlargement. Participation in the privatization of state energy companies and the later restructuring in the shareholding of companies, have allowed them to respond to current market conditions and to prepare for a future where a more competitive environment may exist. These companies have built themselves extensive regional holdings which are broad in geographic scale. They are also deep in terms of vertical integration of generation and supply, in both electricity and gas, markedly with extensive national and regional networks. These companies demonstrate the extent that OMS companies have responded to the opportunities in NMS and how they are preparing for increased competition in the enlarged Internal Energy Market.

The vision of expansion that EDF, E.ON and RWE first developed and later implemented in NMS, particularly in Hungary, can be understood by case studies of how their expansion occurred. A more in depth examination of their strategies can shed more light on the formation of the current market and geographic positions examined above. Discussed next is how these companies have moved into the NMS, their subsequent consolidation of their holdings and their most recent focus following limited opportunities available in further privatization of NMS energy companies.

3.5.2. Direct and Indirect Company Expansion: EDF

The entrance of EDF into NMS during the 1990s relied on a diversification strategy, concentrating on generation, distribution and CHP operations. EDF entered into the region by forming partnerships with existing OMS energy companies and would later, as the market developed, in Poland and Hungary, seek to create subsidiaries which would possess the necessary expertise to better manage the companies.

EDF is one of the major European energy companies. Like other companies, during the last decade EDF has looked for growth opportunities in Eastern Europe. The following quotation describes the current focus of EDF with respect to Eastern Europe:

In the context of the progressive building up of the European energy market and convergence of electricity prices, the Group is contemplating growth opportunities on different European markets close to France. The Group is planning to rationalize its current positions in central and Eastern Europe countries around a core constituting a basis for development and participating in expected privatization programs and in the renewal of/growth in generation fleets. [63]

During the wave of privatizations of the late 1990s and early 2000s, EDF acquired majority stakes in several Polish companies, thus positioning itself on the entire value chain of the Polish electricity market. As part of its pan-European strategy, the EDF Group aimed to assist in modernizing the energy infrastructure in Central and Eastern Europe by investing in independent power producers' sites. In this respect, the EDF Group consolidated in Poland

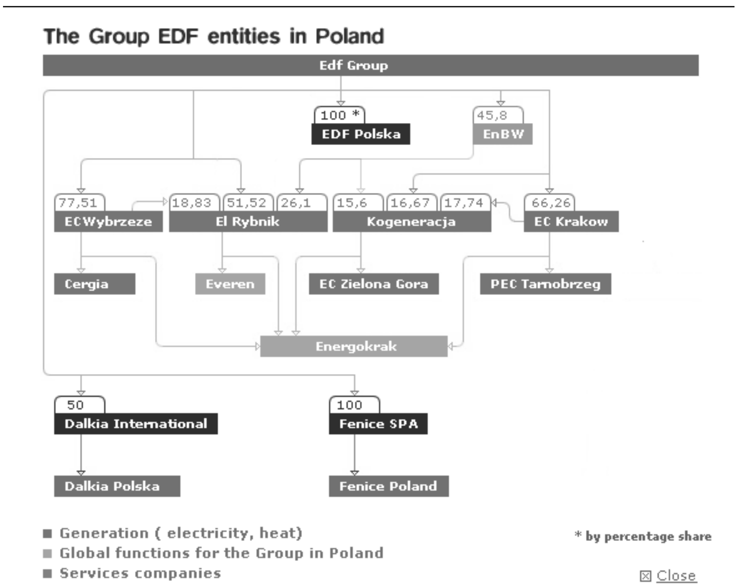
63 EDF, 2006 Document de Référence ('Reference Document 2006'), p.33.

and Hungary in 2001 by forming a consortium with EnBW, Energie Baden-Würtenberg. EDF is seen as contributing its industrial strength to EnBW, particularly in the development of its generation facilities, whereas OEW, the German, Bade-Wurtemberg's local authority consortium, brings its knowledge of regional operations.[64]

Through this joint holding structure it became more active in the Polish market, by acquiring a majority stake in Elektrownia Rybnik S.A. The deal made the EDF Group the leading foreign electricity producer in Poland. Further cooperation between EDF and EnBW created a joint shareholding arrangement in Kogeneracja, located in the Wroclaw-Czechnica region.

Furthermore, during EDF's consolidation in the early 2000's in order to make optimal use of its generation assets, the EDF Group and EnBW joined forces in July 2001 to create EDF-EnBW-Polska, a joint venture 51%-owned by the EDF Group which supplies electricity and related services to large industrial customers in Poland (Figure 3-25 labeled EDF Polska).[65] In 2004, the EDF Group created Everen, an energy supply and trading company, by bringing together EDF EnBW Polska, which serves the eligible customer market, and the sales department of the Rybnik power plant, a trader on the wholesale market. Everen is a fully-owned affiliate of the Rybnik power plant. Everen handles the sale of the Rybnik's production on the wholesale market and represents the plant on the power exchange.[66]

Figure 3-25 EDF Group Entities in Poland



Source: http://www.edf.pl/edfgroupa.html

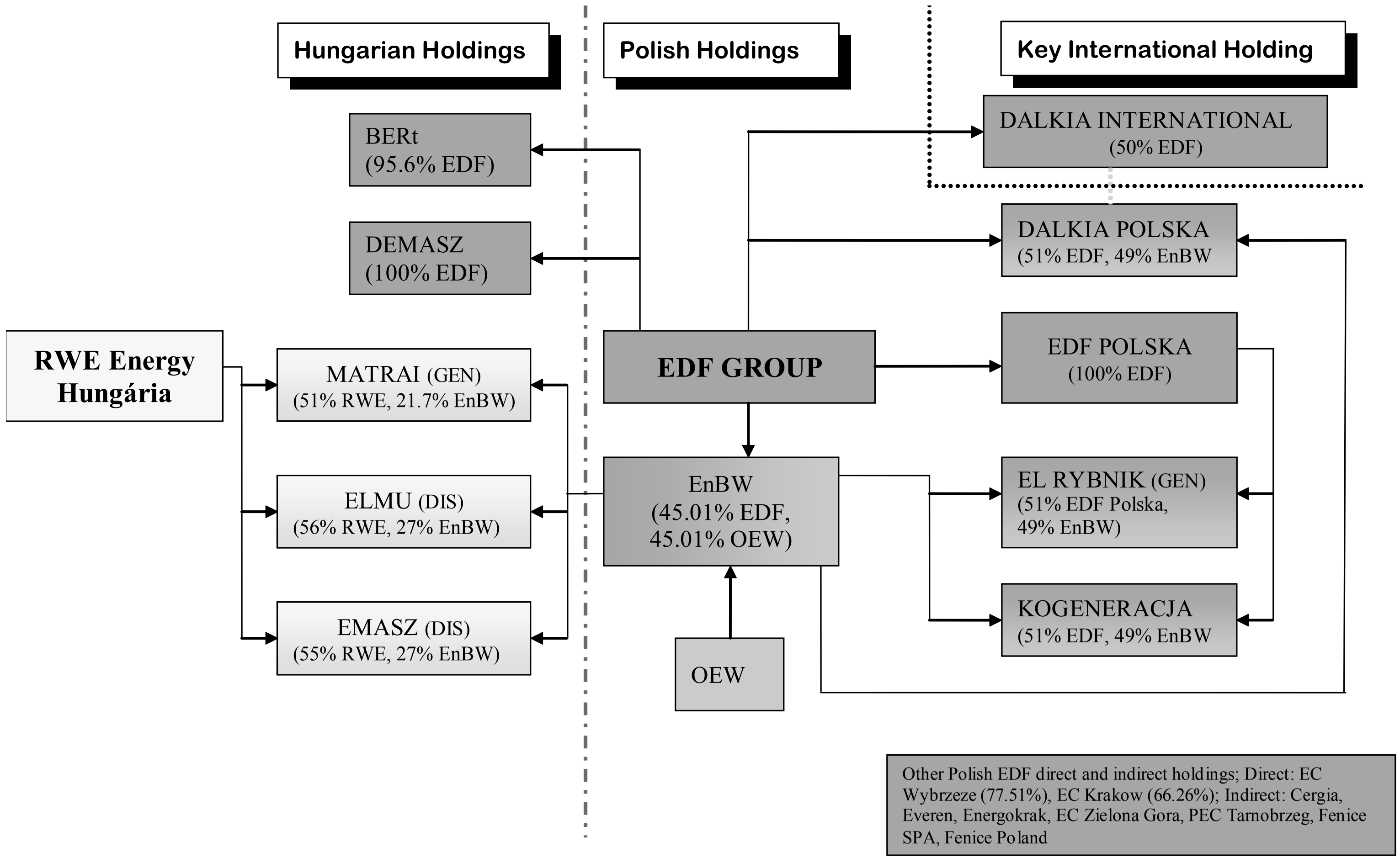
Downstream, Everen is responsible for marketing the electricity generated by these plants. Synergies are being developed between these different companies: now that coal purchases have been pooled through Energokrak and electricity sales centralized through Everen, the Group continues to streamline its industrial activities in the country.[67]

64 EDF, Annual Report 2005, p.32.
65 EDF, Annual Report 2001, p.24.
66 EDF, Annual Report 2004, p.36f.
67 EDF, Annual Report 2006, p.84.

This cross-shareholding in EnBW, also served its interests in Hungary, by allowing indirect shareholding in the generation company Matrai Eromu and the distribution companies ELMU and EMASZ, which are all co-owned with RWE Energy Hungaria. (Figure 3-26) Also in Hungary in 2000, EDF directly bought controlling shares in the cogeneration plant, BERt in Budapest, later this share would be boosted to 95.6 percent. BERt supplies two-thirds of the heating needs of the city. In addition EDF invested 123 million euros in the new cogeneration power plant in Ujpest and agreed to invest a further 123 million euros in a project of BERt's Kispest plant.[68] EDF's presence in Hungary began in 1995 with the purchase of DEMASZ a distribution and supply company in the south of Hungary. The subsidiary D-Energia markets electricity to eligible customers that have opted for the free market.

68 enerCEE – Hungary, 2006 Austrian Energy Agency

Figure 3-26 EDF Group Holdings in Hungary and Poland



Source: REKK

The collective amount of investments in Poland by the EDF Group and its direct and indirect subsidiaries' are substantial when compared against the amount of other energy companies' total investments. EDF ranked as the second highest foreign investor in Poland. If its 50 percent owned subsidiaries of Dalkia and EnBW are added, an extra $245 million are added to EDF's amount of $600 million. In addition, EnBW invested $200 million in Hungary by the end of 2003.[69] Vattenfall A.B. was first with $1 billion and RWE Plus AG was third with $400 million.[70]

The expansion of EDF, and in particular, its involvement in Poland and Hungary, highlights the strategy of how an OMS energy company may enter directly or indirectly into NMS's energy markets. In some areas EDF has chosen to invest directly while in other areas it has sought specialized partnerships either through companies it owns directly or through partial shareholder ownership. It has not been able to gain the larger territorial strength of E.ON or RWE in NMS, as displayed in electricity and gas distribution companies throughout the region. EDF can be seen to be developing its generation business through EnBW in Poland and directly through EDF in Hungary. The limited privatization opportunities in Poland and the limited ability to extend its shareholding in Slovakia's SEE, past 49 percent, constrains its ownership and territorial reach.

3.5.3. Internationalization of German Energy Companies

The interplay between the internationalization of energy companies and the privatization opportunities offered by governments in the 2004 NMS, demonstrates a symbiotic investment relationship. The expansion of E.ON and RWE in the Hungarian energy sector can be used as a case study to expose the strategic decision making of these two companies and the influence that future EU membership played in investment decisions. In addition, the Hungarian example can, by accounts from both companies, represent a successful role-out of each companies preferred portfolio mix which served as models for their further expansion into other NMS

Hungary turned out to be a springboard for later investments into NMS for both E.ON and RWE. For both companies, this was their first international experience as two CEOs reflect:

"This is the first time we had a foreign company in our portfolio, Hungary was the first time, and Hungary is the oldest foreign company in the portfolio of E.ON. [71]
"Hungary was the first investment not only in the CEE region, but for the RWE group… It was the driver for the strategy to say let's invest more money in Central and Eastern Europe".[72]

The experience, and later through the long-term operations, in the Hungarian units provided enough experience outside the home market of Germany to enable the companies to expand into other countries and to play a role in influencing business and organizational decisions.[73] The initial strategy of operating in both the electricity and gas sectors in Hungary appears to be a common strategy for the companies. This can be put down as the pursuit of producing a "critical mass that is supporting your economies of scale".[74] That is the ability to use the synergies between the different companies and at a large enough scale to extract extra value. For E.ON, this holds true for its key electricity and gas divisions, which are now becoming better coordinated at a regional level. While for RWE, they are involved in electricity, gas and water.

69 US Department of State 2007
70 Polish Information and Foreign Investment Agency 7
71 Schultz, Interview, Company A, June 2007
72 Brenner, Interview, Company B, April 2007
73 Brenner, Interview, Company B, April 2007; Schultz, Interview, Company A, June 2007
74 Schultz, Interview, Company A, June 2007

At the end of the day we want to have, in all these countries, appropriate stakes in gas and electricity, like in Hungary, if we have balanced portfolios in these countries, then we can generate, with open borders, we can generate portfolio effects at a higher level of security of supply. This means we are linked to this privatization process and on the other side the opening of the borders in electricity and gas.[75]

Achieving a critical mass in Hungary and to have a 'balanced portfolio' means having a substantial territorial presence. Out of seven electricity distribution companies in Hungary, E.ON owns three, while RWE holds controlling interests in two. In the six Hungarian gas distribution companies, both E.ON and RWE each control two companies; in addition, E.ON owns Hungary's key gas storage facilities[76] (Figure 1-15 andFigure 1-16). RWE AG, is also involved in the water distribution business, and it holds a stake in Budapest's water utility. This mixture of assets in Hungary is viewed by each company as a robust portfolio and optimal use of each company's management expertise which has reached a 'critical mass' of assets.

This multiple holding strategy is seen by RWE as offering greater returns in a business which is marked by long investment cycles and limited growth potential. "…anyone who can offer more than one product in one region has both cost and competitive advantages"[77] This strategy of multiple holdings within Hungary and the CEE region (as displayed in Figure 1-15 and Figure 1-16), underscores both the initial strategy that these companies held when entering the market in 1995 and how it is still influencing their operations.

The Hungarian experience was the cornerstone of our strategy which we built up for the Central Eastern European market. If you look at the market shares the balance between gas and electricity this would be really our vision, in all these markets, but it depends on privatization chances.[78]

The activities of RWE and E.ON are heaviest in Hungary, Slovakia and the Czech Republic, with both companies entering to a limited extent into Poland. The impetus to expand into these markets was not only fuelled by the privatization process, but as the interviewees and company reports demonstrate, strategic decision making to be in NMS with higher growth potential than OMS.[79] The coming EU membership of these countries helped to shape the investment strategies of companies. "In taking part in privatization, everybody knows we will be part of the EU, be integrated into the European energy system, that was one of the main reasons to go to Hungary".[80]

The acquisitions within Hungary and the coming of EU membership should also consider Hungary's neighbours in order to account for the interconnected nature of the energy business. While the EU promotes its internal market, and membership means joining this market, most business operations are still centred in national markets. Despite the assets of RWE and E.ON being territorially contiguous throughout the CEE region and in the NMS of the Czech Republic, Slovakia and Hungary, national laws still separate the joint operations of these assets (Figure 1-15).

"As you know we have investments in Poland, the Czech Republic, Slovakia and here

75 Brenner, Interview, Company B, April 2007
76 E.ON either owns or has majority control over electricity distributors Észak-Dunántúli, Tiszántúli and Dél-Dunántúli; gas distributors, DDGaz and Kőgaz; while RWE controls the electricity distributors Budapest Erőmű and Émász, along with gas distributors Főgaz and Tigaz, including the Budapest Water Works
77 RWE AG, Annual Report 2004, p.20.
78 Brenner, Interview, Company B, April 2007
79 "RWE AG, Annual Report 2004," 20.
80 Breuer, Interview, Company B, May 2007

in Hungary, definitely the EU enlargement is helpful for this we have the same European regulations, but due to the fact that the main impact of the business that the business is sticking to the national regulations, that is the biggest hurdle we have to overcome."[81]

Operating within a common EU legal environment, with the Commission pushing for a common internal energy market was cited by all interviewees as a definite advantage when having to contend with separate national laws. In fact, the perspective of the EU Commission and its desire to foster a common European Internal Energy Market was cited as an important influence even within the planning of national laws. "The EU Commission is supporting us in opening up the market and coming up with market orientated solutions. This means as an investor, you can use this argument if you are threatened with some new national regulation and issues you cannot solve" it is possible to cite the support of the EU as to why a law should not be implemented.[82]

3.5.4. Refocusing Strategies of Big Three

The limited privatization opportunities in NMS, since approximately 2004, means companies from OMS need a new strategy if they want to continue expanding in the region. A new strategy for EDF, E.ON and RWE appears to be reliant on creating greater coordination among different national units, while also expanding in the area of generation and trading. Both of these areas are open to greater levels of competition and do not require the privatization of existing state run entities. Nonetheless, it is expected that they will remain open to participating in privatization opportunities which may occur. Or as the EDF 2006 Annual Report stated:

"Its [EDF] subsidiaries and affiliates in Central and Eastern Europe are performing better than ever, and synergies are being created between them. These countries have significant generation needs and will offer industrial investors like EDF numerous opportunities as energy companies continue to be privatized and environmental constraints tightened."[83]

The previous participation in the privatization of formerly state-owned energy assets has enabled both RWE and E.ON to establish a comprehensive presence in Hungary and the Czech Republic while providing a more limited footprint in Poland and Slovakia. A similar assessment can be made of EDF, but noting their more extensive coverage of the overall energy sector in Poland. Going forward it is apparent that further privatization of energy assets will occur slowly or hold high premiums. Therefore, developing a strategy that meets the requirements of operating in a common European energy market, or a regional CEE market, sees EDF, E.ON and RWE shifting their focus instead from distribution to generation and trading.

This new strategy can be seen in the first international base for E.ON and RWE – Hungary. Both companies have announced plans to build significant amounts of generation. E.ON plans to build a gas fired power plant with a capacity of 400 MW, while RWE and EnBW (partial subsidiary of EDF) are adding to their Matrai power plant a 440 MW lignite fired power plant costing EUR 750 million.

Looking further eastward, it is now apparent that for E.ON, EDF and RWE, their expansion into Eastern Europe's NMS may have been an intermediate stage in their overall corporate growth.

81 Breuer, Interview, Company B, May 2007
82 Brenner, Interview, Company B, April 2007
83 EDF Annual report 2006 p.82

These companies are now conducting business in the NMS of 2007 and in the Southeast of Europe. In addition, and importantly, E.ON and EDF are involved in projects in Russia; E.ON in the area of gas and EDF in the area of nuclear power.[84]

3.5.5. Concluding the Eastward Expansion

The international expansion of EDF, E.ON and RWE and other energy companies from OMS has been progressing for more than 10 years. The gradual increase of acquisition and divestitures of companies has resulted in a new geographic order that emphasizes geographic contiguity and regional coordination among companies' subsidiaries. Among the top three companies in the region, emphasis has been placed on buying state owned companies to reach a 'critical mass'. Their 'success' in the region can be seen to stem partially from this geographic and sector reach.

Analyzed here is how OMS energy companies have been affected and responded to the opportunities within NMS. Also considered was how the opportunities presented in the opening of NMS energy sector has contributed to success or failure of OMS companies. This largely one-way movement of investment has reorganized share ownership and national markets while offering the central eastern European region opportunities for greater integration of national markets: thereby contributing to a single European electricity and gas market.

Perceiving success and failure for the most active energy companies in the NMS, revolves around their ability to participate and reach a certain level of economies of scale. These can generate both profits for the business and synergies along the value chain of each sector and across sectors. For example, in the electricity sector, there is a need to be both involved in generation, distribution and trade along with the interlinked industry of gas. The privatization of the Hungarian electricity, gas and water sectors has offered these companies the opportunity to be involved in a range of businesses niches in their core sector. However, the limited opportunities to have financial interests or full ownership in Polish companies have limited the extent that these energy companies can reach a higher level of operational coordination – matching the perceived success of scale in Hungary.

The failure, as perceived from OMS energy companies, can be seen in the terms of limited market opening or larger shareholding in Poland and Slovakia. Reaching the 'critical mass' which all three companies have in Hungary has not been possible in others due to limited privatization opportunities, particularly since enlargement, within the NMS. However, there is a need to further extend this analysis and consider the beneficiaries of this lack of privatization: the NMS 'national champions'.

84 Energy Business Online April 2007

3.6. Impact of Enlargement on Third Country Relations: the Case of Russia

The survey of impacts of the 2004 enlargement on the Commission and third countries relations in the field of energy contains brief analyses on Russia, European and Central-Asian CIS countries, the US, South-East Europe, Cyprus and Turkey. The analysis below will focus on the relations of the European Union and Russia for several reasons. First, the new EU member countries receive most of their energy import from Russia. Slovakia's domestic natural gas consumption is covered 100% from Russia. The ratio of Russian natural gas in the domestic consumption of other Central European countries is also high, in case of the Czech Republic 84%, Hungary 62% and Poland 47%.[85] Moreover, Russia is the sole supplier of natural gas to most of the Central European and Baltic countries and there is every reason to assume that it will continue to do so. As a result, most of the new member states are and will continue to be in contact with the Russian Federation as third country when it comes to the field of energy supply.

The second reason to focus on Russia, is a result of the high reliance of the new EU member states on Russian crude oil and natural gas import, the ratio of Russian imports in the overall EU domestic energy consumption grew after the 2004 enlargement. This growth makes Russia an even more important third country supplier than before, as after the enlargement the EU receives 50% of its crude oil and 30% of its natural gas import from Russia.[86] Several past studies illustrated very well that relying extensively on one source of energy, creates dependency. This part of the current study does not intend to repeat what was argued very well by several experts before. It will focus on another issue – that of Russian energy corporate expansion in the new EU countries before and after their accession - which makes Russia an even more influential third country when it comes to the field of energy.

Before 2004 Russian energy companies tried to get a foothold in all the Central and Eastern European countries' domestic oil and gas markets by attempting to acquire the most important players in these markets. In almost all these attempts, the Russian state assisted its companies at a level way beyond that which is acceptable by international standards.

Additionally, more and more studies prove that Moscow is using these companies as a tool of its foreign policy. Most of these studies concentrate on Russia's relations with the countries of the former Soviet Union. However, there is every reason to believe that the Kremlin follows the same behavior in its relations with countries beyond the post-Soviet sphere, i.e. new member countries of the European Union. In February 1997, the influential Council on Foreign and Defense Policy published a document entitled "East Central Europe and the Interests of Russia," which examined thoroughly Russia's interest in Central Europe.[87] The report acknowledged that the military, political and economic integration of the region into Western institutions was not preventable and it would happen in the foreseeable future.

The report, on "East Central Europe and the Interests of Russia" differentiated between two types of countries in the broadly defined East Central European region. The first were those countries that were less developed, like Bulgaria and Romania, and as a result, leaned more towards cooperating with Russia and would enter the EU later. In the second group were the more developed countries, like Poland and Hungary, which were less eager to work with

85 Energy Information Administration, www.eia.doe.gov/emeu/cabs/Russia/NaturalGas.html

86 Ahto Lobjakas, "Russia: EU Maintains Codependent Energy Relationship," RFE/RL, May 11, 2006

87 „Tsentralnaia i vostochnaia Evropa i interesi Rossii," Strategiia dlia Rossii: 10 let SVOP (SVOP, Moscow, 2002), pp. 154-171.

Russia and would become members of the European Union sooner. The dilemma for Russia was to decide where to strengthen its position. The document unambiguously supported an increase in Russian influence in the second group of countries. The report was taken seriously by the Yeltsin administration and considered as a guide in its foreign policy toward Central Europe in the years to come.

Russian corporate expansion before 2004 eyed at Central Europe because of the projected accession of countries of this region to the European Union. Poland, Slovakia, Lithuania and other countries were of interest for Russian energy companies because they offered a spring board to the EU. It became a declared goal of Russian foreign policy to gain back some of its lost influence by Russian energy companies acquiring essential assets in soon-to-be member countries of the European Union.

3.6.1. Fibre Optic Cable Scandal in Poland

In November 2000, the so called fibre optic cable scandal broke in Poland. According to the original contract made between Gazprom and PGNiG, the Polish gas monopoly, Gazprom was allowed to lay a fibre optic cable along the Polish part of the Yamal pipeline. An accompanying cable is an established practice in the gas industry for monitoring the gas flow and checking any problems which may occur. However, in November 2000, Warsaw recognized that the cable, which was laid by Gazprom along the Yamal pipeline had far too much bandwidth to be used solely for the purposes of monitoring the pipeline's activity.

According to Polish Communications Minister Tomasz Szyszko, the high-capacity data transfer cable could pose a threat to Poland's national security.[88] According to the most extreme opinions, the cable's bandwidth is enough to transfer data equivalent to eavesdropping on the entire phone conversations conducted in Poland; moreover, it may be enough to transfer data from all European phone conversations.[89] Polish Communications Minister Tomasz Szyszko said that „the lack of a decisive reaction from state authorities in the face of Gazprom's activities in question may in consequence lead to the loss by Poland of a part of its sovereignty over its territory in the high-tech sector."[90] On the other end of the spectrum are those who claim that the technical parameters of the cable would not make it capable for transferring so much data.

Whether it did pose a national security threat to Poland or not, the outbreak of the scandal illustrated at least three things. First, it revealed one aspect of Gazprom's way of conducting business. The investigation into the fibre optic cable issue found that the language of the inter-company contract of 1996[91] signed by PGNiG and Gazprom was not specific enough. Even though Gazprom did not breach the word of the contract, it violated its spirit. Even if its language was not specific enough, it allowed for a cable only for technical/monitoring purposes and not commercial ones. Nobody after the scandal had broken, questioned that the bandwidth of the cable laid by Gazprom is way beyond monitoring purposes but allows to be used for commercial ones. Gazprom has never apologized or given an explanation for its conduct. Moreover, it did not prove to be cooperative in trying to correct the problem.

88 „Companies and Privatisation," ISI BOSS Business News Poland, December 4, 2000

89 Originally in Gazeta Wyborcza, August 27, 2001, cited in „New Law Gives Government Control over Yamal Fibre Optic Cable," by PNB, August 27, 2001

90 „Yamal Data Cable Controversy: Who Gets the Profits?" PNB – Weekend Supplement, December 7, 2000

91 This contract was the company level equivalent of the inter-state treaty made between Poland in Russia in 1993 about long-term natural delivers and the Yamal pipeline system. The inter-state treaty was delegated to the level of companies. The result of that is the 1996 contract between PGNiG and Gazprom.

Second, the scandal brought to surface the fact that Europol Gas had lost its control over the fibre optic cable and more importantly over the Yamal pipeline. Europol Gas was created in 1993 as a Russian-Polish joint venture for importing Russian gas and building the Yamal pipeline.[92] The Yamal pipeline would have been owned and operated by Europol Gas. The investigation into the scandal made it clear that Europol Gas, the Russian-Polish joint venture lost its control over the Yamal pipeline and thus caused serious national security threat to Poland.

Third, the investigation of the scandal inspired other investigations about Poland's energy security. These investigations showed that Poland's dependency on Russian gas was even greater than previously thought. The fibre optic cable issue made Polish Justice Minister Lech Kaczynski launch an investigation into Poland's dependency on Russian gas. The investigation „concluded that Poland's dependence on one single supplier grows deeper, since the Polish side did not seek other sources of acquiring natural gas, and did not construct an underground gas storage base, so no reserves can be saved in case of emergency."[93]

The cable scandal was solved in August 2001 with the Sejm passing an amendment to the Telecoms Law that restored the Polish government's control over the fibre optic cable. In the future, foreign operators of networks on Polish territory have to apply for approval from the state specifying that their activity does not harm the Polish national interest.[94]

The fibre optic cable scandal of Poland illustrated the covert way of conducting business by Gazprom. Additionally, it demonstrated that lack of control may cause national security threat to the country. The scandal also brought to surface the level of Polish dependency on Russian natural gas.

3.6.2. The Cases of the Baltic and Inter-System Connect Pipelines

In early 1999, Gazprom first hinted the idea of the possibility of withdrawing from building the Yamal 2 pipeline. According to a 1993 bilateral agreement between Russia and Poland, the Yamal system should consist two pipes. The construction of the first was finished in 1999. According to the contract, the construction of the second pipeline should have started as soon as the first was fully operational in 2001.95 In February 1999, Gazprom management board member Yuri Komarov first hinted that Gazprom would withdraw from the idea of constructing the second Yamal pipeline. His explanation was that demand for gas in Western Europe was not growing as fast as expected which means that the construction of the second pipe is not feasible in economic terms.[96]

However, there is reason to believe that Gazprom's explanation was rather an excuse than the real justification for the withdrawal from the construction of the second pipe. At the time of this announcement, it became also known that Gazprom was considering building a gas pipeline under the Baltic sea from Russia to Germany in order to avoid Poland as a transit country.[97] If Gazprom entertained the idea of the Baltic pipeline, then the low Western

92 Ownership structure of Europol Gas:

93 Originally reported by Rzeczpospolita, December 21, 2000. Cited in „When Nobody Knows What's Going on, Then It's About Money and Power," by PNB – Weekend Supplement, December 28, 2000

94 Originally in Gazeta Wyborcza, August 27, 2001, cited in „New Law Gives Government Control over Yamal Fibre Optic Cable," by PNB, August 27, 2001

95 Originally reported in Gazeta Wyborcza, May 29, 2001. Cited in „In the Steely Embrace of the Pipeline," by PNB, May 31, 2001

96 PNB, February 2, 1999

97 PNB, Febr. 2, 1999

European gas demand could not be the real reason for the cancellation of the second Yamal pipe. Additionally, the Baltic pipe would cost much more than Yamal 2. The Baltic pipe's projected costs of construction were $2.5-3 billion as opposed to the second Yamal pipe's projected costs of $1-1.5 billion.[98]

There are two plausible explanations for the "Baltic instead of Yamal" idea. First, to rely much less on Poland as a transit country thus avoiding mutual dependency.[99] Second, to prevent the building of a gas pipeline which would connect Norway with Poland thus depriving Poland of an alternative source of natural gas. According to international law, pipelines are not allowed to cross each other underwater to minimize the risk of an underwater accident. "The President and the government of the Russian Federation support the monopoly's [Gazprom's] campaign to build a trans-Baltic gas pipeline to transport Russian gas directly to Germany, Great Britain, the Netherlands and Scandinavia. The construction of such a major gas pipeline would put an end to all other projects to build gas pipelines across the Baltic Sea."[100] The Baltic pipeline which would connect Russia with Germany would run East-West direction, as a result, its construction would rule out the option of building any North-South pipeline under the Baltic Sea connecting either Norway or Denmark with Poland. Additionally, if the Baltic pipeline is built, then most likely Yamal 2 wouldn't be constructed. Western European gas demand forecasts do not justify building two East-West pipelines in the Northern part of Europe. As a result, if the Baltic pipe is built, Yamal 2's construction will most likely be postponed into the indefinite future.

Gazprom's February 1999 announcement about potential withdrawal from building Yamal 2 and at the same time entertaining constructing the Baltic pipeline, started a chain of talks about whether the second pipeline of Yamal would be built and what were its alternatives. Gazprom used Yamal 2 as a stick and/or carrot in its negotiations with Poland and made the construction of the second pipeline also a political question. Rem Vyakhirev, then head of Gazprom, answered Polish anxieties about Yamal 2 by saying that "if Poles don't like Russian gas, they can always go back to burning wood in stoves."[101] Furthermore, two months later Gazprom started to float the idea of yet another pipeline running from Belarus to Poland and through Southern Poland to Slovakia where it would connect into the old Brotherhood pipeline.[102] This pipeline would connect the Yamal pipes with the Brotherhood system, as a result, they started to refer to it as the inter-system connect pipeline.

In May 2000, Gazprom made it clear that it would like to withdraw from the construction of Yamal 2 and build the inter-system connect pipeline instead. The inter-system connect pipeline meant more gas transmitting through Slovakia. The increased gas transit would result in increased revenues from transit fees for the country. It would also make Slovakia a more important partner of Russia as a significant portion of gas transit to Western Europe would go through Slovakian territory. In case the new track was built, the biggest loser would be Ukraine. The new track would circumvent Ukraine and connect into the old Brotherhood pipeline.

The decision whether to agree to the building of the inter-system connect pipeline became a political issue in Warsaw. On 20 May, 2000, Polish Economy Minister Janusz Steinhoff said that when deciding about the new track, Poland's economic interests, Poland's foreign policy

98 „Gazprom Looking for Alternative Pipeline Routes to Europe," Poland AM, January 26, 2001 and http://www.europolgaz.com.pl/english/finanse_naklady.htm

99 In case both pipes of Yamal were built, they would deliver 67.4 bn cubic meters gas annually.

100 Ewa Paszyc, „Chapter 2: The Russian Energy Policy," in The Resource Wealth Burden – Oil and Gas Sectors in the Former USSR (Centre for Eastern Studies, Warsaw, December 2003) p. 21.

101 „Heard in Passing," Warsaw Voice, October 24, 1999

102 „Gazprom Points the Finger at Ukraine," EIG – Energy Compass, December 10, 1999

interests and Ukrainian interests will be taken into account as well.[103] Steinhoff's statement was reinforced by President Alexander Kwasniewski, who told in an interview that the political task of the Polish government was „to avoid acting counter to Ukraine's interests."[104] At the same time Rem Vyakhirev announced that Gazprom would speed up the construction of the inter-system connection pipeline bypassing Ukraine.[105]

The Russian state also put its weight behind Gazprom's plan. During Kwasniewski's visit to Moscow in July 2000, President Putin renewed Gazprom's proposal about the inter-system connect pipeline.[106] A few weeks later, Russia's Deputy Prime Minister Viktor Khristenko sent a letter to Polish Prime Minister Jerzy Buzek to ask Poland to cooperate in the construction of the inter-system connect pipeline.[107]

In November 2000, Russian President Putin asked Warsaw to agree to the construction of the inter-system connect pipeline for which he promised a revenue of $1 bn in transit fees for Poland.[108]

The Polish rethoric changed soon after. Both a representative of the Foreign Ministry and Economics Minister Janusz Steinhoff softened their criticism and said that in theory Poland could agree to building the inter-system connect pipe in case Ukraine's interests are not hurt.[109] On November 22, Russian Foreign Minister Igor Ivanov visited Poland. He was dissatisfied with Warsaw making its decision about the pipeline based not only on economic but also on political considerations. Ivanov said that there is too much „political noise" around the inter-system connect pipeline. He encouraged the Poles that the whole issue „should not arouse such a great deal of emotion, should not be dramatized," rather „only the economic side should play a main role."[110] „If, however, political considerations prevent the decision, „Russian gas will bypass Poland.""[111] The Russian foreign minister delivered in effect a threat in the name of Gazprom.

To back Ivanov's threat, in January 2001, Gazprom announced that it was about to sign a letter of intent with the Finnish Fortum Oy and two German companies for the construction of a gas pipeline under the Baltic Sea. The Baltic pipeline would be an alternative to the existing stretch of Yamal running through Poland.[112] In other words Gazprom demonstrated that it was ready to make good on Ivanov's threat.

103 Interestingly enough, just before this announcement press reports were speculating about the recent resignation of Deputy Economy Minister Jan Szlazak. According to press speculations, Szlazak's resignation had to do with his letter from February, in which he says that Poland „supports in principle" Gazprom's proposal about the new track. Even though it is unclear why he had to resign, on May 20th, 2000, Economy Minister Janusz Steinhoff called Szlazak's letter a mistake. Originally in PAP News Agency, May 21, 2000, cited in „Poland to Table Yamal Gas Pipeline Stance in Talks with Gazprom – Minister," by BBC Monitoring, May 21, 2000

104 Originally in Gazeta Wyborcza, July 8, 2000, cited in „Ukraine's Failure to React to Polish Goodwill Gestures on Gas Transit Analyzed," BBC Monitoring, July 22, 2000

105 „Ukraine: High-Stakes Game," ElGOMI, June 16, 2000

106 „Poland Opposes Russian Gas Pipeline That Bypasses Ukraine: Minister," Agence France Presse, July 21, 2000

107 Originally in PAP News Agency, August 9, 2000, cited in „Russia Sends Letter to Polish Premier on Gas Pipeline Issue," BBC Monitoring, August 9, 2000

108 Originally in Gazeta Wyborcza, November 6, 2000 cited in „Yamal Natural Gas Project May Threaten Poland's Energy Diversification Plans," by PNB, November 10, 2000

109 „Pipe Schemes," Warsaw Voice, November 12, 2000

110 Originally reported by PAP News Agency, November 22, 2000. Cited in „Poland: Russian Foreign Minister Says Pipeline Proposals Economically Justified," BBC Monitoring, November 22, 2000

111 Originally reported by ITAR-TASS News Agency, November 30, 2000. Cited in „Russian Gas to Bypass Poland if Politics Interfere – Foreign Minister," BBC Monitoring, November 30, 2000

112 „Gazprom Looking for Alternative Pipeline Routes to Europe," Poland AM, January 26, 2001

3.6.3. Privatization of the Slovak Gas Monopoly

In May 2000, the Slovak government decided to sell 49% of the shares of Slovensky Plynarensky Priemysel (SPP). SPP was the natural gas importer, transmitter, distributor and merchant monopoly in the Slovak Republic. SPP had the exclusive rights to import gas from abroad and to distribute it in the wholesale market. Additionally, it was the owner of the pipeline system that transported natural gas through the territory of Slovakia in an East-West direction. In the 1990s, about 50% of SPP's revenues came from transmitting gas through the five lines and stretches which ran all the way through Slovakia.[113]

A few days after announcing the intent to privatize, Slovak Economy Minister Lubomir Harach said that Gazprom expressed interest in participating in the privatization through the Russian ambassador to Bratislava. [114] Even though the minister did not endorse Gazprom's interest openly, the context of his talk then and later suggested an implicit endorsement. Slovakia seemed to have no concern over Gazprom and probably actively supported its participation in SPP's privatization. Slovak Economy Minister noted that it can not be stated categorically that the dependence of Slovakia on Russian energy will increase if a Russian company buys into SPP. According to him, it depends on the size of the stake the Russian investor would buy.[115]

At the same time, the Slovak government was involved in negotiations with the Poles about an alternative pipeline going from Norway through Poland southwards delivering Norwegian natural gas. In May 2000, the Slovak government expressed its interest in the construction of the Norway-Poland gas pipeline with an interest in buying from the Norwegian gas. It also said that Bratislava is considering an alternative gas pipeline via the Czech Republic. Moreover, the month after, Slovak Economy Minister Lubomir Harach said that „we are interested in good cooperation not only with Gazprom and Russia, but also with other countries of the former Soviet Union because a certain diversification in eastern natural sources for the supplies of Slovakia is needed."[116] Additionally, Harach reinforced the government's decision to consider an alternative route via the Czech Republic. In June 2000, Gazprom's senior official responsible for the company's export policy, Jurij Komarov, threatened Bratislava with the option either „constructively cooperate in implementing the planned project [inter-system connect pipeline] with Russian gas officials or to lose the transit."

However, as the likelihood of the Norway-Poland pipeline waned, Slovakia returned to its original strong support of the inter-system connect pipeline. During his January 31, 2001 visit to Bratislava, Russian Foreign Minister Igor Ivanov said that he welcomed Slovakia's interest in participating in the construction of the pipeline. However, an entire year passed without any official steps taken in the matter of SPP privatization. Finally, the tender was announced in August 2001.

Gazprom confirmed officially its interest in participating in the privatization of SPP on June 18, 2001, two months before the tender was officially released. In mid-November, Gazprom's chief executive, Alexei Miller, said that „Gazprom's participation in SPP's privatization is strategically important for both countries and will guarantee stable gas supplies to Slovakia as well as to other European countries in the future."[117] His statement coincided with the Slovak president's

113 „Company Operations," Slavia Capital – Company Highlights, February 7, 2001
114 „Slovakia: Sell-Off Beckons for Oil and Gas Companies," EIGOMI, May 11, 2000
115 „Minister Harach Does Not Rule Out Gazprom's Entry into SPP," SITA – Economy and Business, June 16, 2000
116 „Minister Harach Does Not Rule Out Gazprom's Entry into SPP," SITA – Economy and Business, June 16, 2000
117 „Russian Gazprom Ready to Make a Final Bid for Slovak Gas Monopoly SPP," IntelliNews – Slovakia Today, November 14, 2001

visit to Moscow. It is hard not to see the thinly veiled threat in Miller's words, which link a stable gas supply to the issue of privatization. This implicit threat was a frequently used tool of Gazprom's.

Discussions between Gazprom and the Slovak state started in mid-November 2001 right after the Slovak president Rudolf Schuster paid an official visit to Moscow where he met President Putin. According to the company's press release, the issue of Gazprom's participation in the privatization of SPP, received special attention at the high-level bilateral meeting.[118] In February 2002, a consortium of companies consisting Gazprom, Ruhrgas and Gaz de France submitted its bid for 49% stake in SPP, which it eventually won.

3.6.4. Mazeikiai Refinery in Lithuania

In 1997, Lukoil's President Vagit Alekperov, announced that Lukoil intended to take over Lithuania's oil infrastructure without paying in return. In exchange Lukoil would have offered guarantees to supplying crude oil to Mazeikiai Refinery. Mazeikiai is the only refinery in the three Baltic states and the only non-Russian one in the Eastern Baltic region. However, this offer was against the very intent of the Lithuanian government that is to ease the country's energy dependency on Russia. Vilnius started to look for a Western investor for Mazeikiai and it started negotiations with the American Williams Company. After these negotiations started, Russia turned off oil supply to Lithuania nine times in 1998-99 claiming technical reasons. Lukoil also successfully prevented a Kazakh company from supplying Mazeikiai during this period thus forcing the Kazakh company to breach its contract with the refinery.

In 1999, Moscow sent a former KGB officer, who used to be the liaison officer with Lukoil to Vilnius as Russian ambassador. According to Keith Smith, the Russian ambassador's goal was to prevent Williams from taking over the refinery. At the same time Moscow warned through unofficial channels of the damage a deal with the American company would cause to bilateral Russian-Lithuanian relations.[119] Eventually Vilnius sold the majority of the shares as well as the operating rights of Mazeikiai to Williams in 1999.

However, Lukoil did not refrain from using its monopoly as the sole Russian crude oil supplier to Lithuania awarded by the Russian government to reduce crude oil supplies substantially and make Mazeikei less than profitable (close to bankruptcy). This move made Williams to decide to sell the refinery. Lukoil's intention was to take over, however, Vilnius stepped in and Williams' share got finally sold to a subsidiary of the Russian company Yukos.[120] However, the destruction of Yukos which started in 2003 with the imprisonment of its head Mikhail Khodorkovski reached Mazeikiai and thus made the fate of the sole oil refinery in the eastern Baltic basin again rather questionable.

In March 2006, "Russian authorities are now targeting oil assets on EU territory in Lithuania for takeover by a Kremlin-approved company." According to Russian energy expert Vladimir Socor, "Moscow seems to plan a seizure of Yukos' majority stake in the Mazeikiai complex as part of settling the Yukos "tax arrears" to the Russian state."[121] Beforehand the Moscow

118 „Corrected: Summary of Last Week's Major Economic Happenings," SITA – Economy and Business, November 18, 2001

119 Speech delivered by Mr. Keith Smith, former Ambassador of USA to Vilnius, currently a senior associate at the Washington-based CSIS in Vilnius on June 21, 2004

120 Vladimir Socor, "Lithuania Braces for Russian Move on Mazeikiai Oil Complex," Eurasia Daily Monitor, The Jamestown Foundation, vol. 2., January 20, 2005, www.jamestown.org, accessed on July 2, 2007

121 Vladimir Socor, "Lithuania May Nationalize Mazeikiai Oil Complex," Eurasia Daily Monitor, The Jamestown Foundation, vol. 3., April 3, 2006, www.jamestown.org, accessed on July 2, 2007

Arbitration Court ruled in favour of the bankruptcy of Yukos. The decision forbade any sale-and-purchase in Yukos property even if it was in a third country. This ruling came at the time when Vilnius was in several negotiations with Yukos and international investors in trying to sell Yukos' share to non-Russian companies and somehow secure the survival of the refinery. The Russian administration's aim was to stop this process and make a Russian company to take over the Mazeikiai oil complex.[122] The Russian court appointed Eduard Rebgun as a temporary administrator to deal with Yukos assets. He announced on April 3, 2006 that he would nullify sale of any assets of Yukos in Lithuania to any party. He claimed to operate on behalf of Yukos' creditors, among them the Russian state. The Russian move "looks, rather, like a state-ordered attempt to derail the negotiations between Yukos and Lithuania as they have reached the end-game phase. It equally aims to derail Lithuania's ongoing negotiations with non-Russian oil companies that are interested in re-purchasing the Yukos assets from Lithuania, in the planned second stage of the transaction."[123]

In case of the Mazeikiai refinery Moscow did not refrain from using all means possible to prevent its repeated sale to non-Kremlin controlled investors.

3.6.5. Russian Case Study Conclusions

Since the 2004 enlargement Russian energy companies are trying to make inroads into the new EU member countries by acquiring stakes in their energy industries (refineries, pipelines, wholesale). Russian energy companies continue to be interested in investing in Central Europe. The above examples provide vivid illustrations about Russian energy corporations' conduct: Russian companies may use covert means to reach their goal (fibre optic cable) Russian companies may use non-independent state institutions to reach their goals (Mazeikiai Moscow court decision and follow-up) Russian conduct may scare off Western investors from buying into the strategic industries of Central Europe which do depend on Russian supply (Mazeikiai case with Williams) At the same time, several examples illustrated that Russian energy companies are supported by the Russian state in their endeavors. Moreover, they are not only supported but also used to further the aims of Russian foreign policy. In the past few years, Moscow did not refrain from using Russian energy companies when foreign policy came into consideration. The Kremlin used energy companies to:

Put pressure on other countries in their privatization and foreign policy decisions (cases of the Baltic pipe and inter-system connect regarding Belarus, Ukraine and Poland) Place significant pressure on countries to reach favorable decisions (SPP privatization in Slovakia) Illustrate that it believes that leverage can be and should be exercised over member countries of the European Union (Poland, Slovakia and Lithuania)

The more inroads Russian energy companies make into the new EU member states the more they may threaten the sovereignty of these countries. Russian energy companies' expansion in EU territory involves more than business rationale. Past examples illustrate company activities in the EU-10 countries may be motivated by more than profits. Russian energy corporate expansion should be assessed from the point of view of national security. If the national security of an EU country is endangered, it affects the whole community.

122 Ibid.

123 Vladimir Socor, "National Security a Necessary Factor in Negotiations on Mazeikiai," Eurasia Daily Monitor, The Jamestown Foundation, vol. 3., April 5, 2006, www.jamestown.org, accessed on July 2, 2007

3.7. Conclusion: market opening in electricity and gas sectors

There is a close correlation between oil and gas wholesale prices in the EU. From 1990 until 2004, European gas prices were fairly constant, at around $110/mcm, in fact falling slightly. Until around 2000, there can be seen to be a close correlation between the price to power generation customers in the EU-10 Member States but from 2000, the gas price paid by Hungarian, Czech and Slovak customers began to rise.

In 1990, the Central Eastern European Members of the EU-10 inherited a system of very low household prices. The issue for EU-10 Member States then was how to reverse the situation so that EU-10 household gas prices reflected the prices paid by EU-15 Member States, in other words EU-10 household gas prices had to rise significantly. This could be an area where EU membership was a key contributory factor. In CIS countries there was not the drive of EU membership to drive up household gas prices and in most CIS countries this has not happened.

Since 1990, when the EU-10 New Member States began their progress towards EU membership, most of them have privatised or transferred ownership of their main gas assets. Of the EU-10 only Poland and Slovenia have not fully or partly privatised their main gas companies. It can be seen, through analysis and a case study that the gas companies of the New Member States are mainly dominated by E.ON Ruhrgas and Gazprom in joint ventures. Of these countries E.ON Ruhrgas made acquisitions in partnership with Gazprom in every country except for the Czech Republic

The impact of the 2004 EU enlargement on energy companies from OMS and NMS has resulted in a diverse marketplace with a range of public and private actors. As described in the questionnaire responses, the 2004 enlargement has, to varying degrees, impacted the way energy companies conduct business. Through acquisitions, divestitures and strategic readjustments in company holdings, OMS companies are now established, to varying extents, in four NMS markets in Central and Eastern Europe. The key OMS companies of EDF, E.ON and RWE have been the most active in opening up both the electricity and gas markets to foreign investments.

The financial performance, due to the expansion into NMS has resulted in higher share prices of those companies who decided to enter the region. Those companies which decided to stay out, or invest in other regions, have grown financially and have become efficient operations; however, their share prices have not been as favoured as those companies that expanded into NMS. The condition of national champions has been more mixed, or at least less clear in how they have adopted or benefited from the changing energy market. It is suspected that the financial figures of the companies do not track as closely their financial performance as the publicly listed companies. Due to this, assessing the performance of national champions based on financial figures shows sever limitations while at the same time highlighting the special role that national champions may be playing in their strategic positions in national economies and politics.

3.8. Conclusions and recommendations

Conclusion: Market Barriers

Major barriers to further electricity market development and integration exist in the form of regulated end-customer tariffs which have remained in place after full market opening, insufficient unbundling of many network companies, unreasonably high access charges which prevent the contestability of certain market segments even under circumstances when third party access regimes are pro forma in place, and restricted access to and distorted allocation of cross border transmission capacities in some new member states.

Recommendation: Market Barriers

It is recommended to proceed with the process of regional integration of electricity markets in order to transform some of the small, segmented and distorted local markets into competitive ones. This includes full market opening up to the level of household electricity and gas supply while abolishing all remaining regulated end-customer tariffs. Furthermore, all network tariffs should be fully cost-reflective network access charges, which will increase the contestability of certain market segments. Finally, transparent and open access to cross border transmission capacity and implementation of market-based congestion management mechanisms where congestion occurs.

Conclusion: Energy Prices

Over the past years, energy prices have gone upwards, at least partly due to significant oil price increases. Energy prices reached new record levels in the first half of 2006. The average spot price for electricity in Europe rose by an average of 70% in early 2006 compared with the same period a year earlier.

Recommendation: Energy Prices

The ability for non-incumbent suppliers to enter the local markets should be safeguarded which, essentially, can be done by guaranteeing non-discriminatory TPA to the networks and transparency of information on the market. In order to assist all market parties to be able to balance their portfolio, short-term markets and an efficient balancing market should be installed. The further introduction of power exchanges would also contribute to more transparent pricing schemes.

Conclusion: Economies of Scale

The level of economies of scale for EDF, E.ON and RWE are substantial in three neighbouring countries. The three countries with the most privatization occurring demonstrate how the energy companies have integrated these separate divisions to reach a ‘critical mass.’ These companies appear ready for an increased regional marketplace. Vertical re-integration of the assets is a clear strategic objective for active acquirers in the region. There is also a danger of muted competition due to cross-holdings among these three energy companies.

Recommendation: Economies of Scale

Economies of scale, particularly on the regional scale offer opportunities for both companies and consumers. Effective regulatory oversight must be in place at the regional scale that accounts for regional actions by these companies. Further EU expansion can envision similar investment strategies and cross-share holdings. To ensure effective competition at both the national and regional level regulatory oversight and coordination amongst regulators in future new Member States needs to take place.
In addition:

- Harmonisation of licensing rules and procedures and, possibly, European licensing regime for non-asset based activities
- To create regional markets where individual jurisdictions are too small for an effective competitive market to develop at the national level

Conclusion: Investment Opportunities

Opportunities presented in the opening of the EU-5 energy sector has contributed to the success of some EU-15 energy companies. This largely one-way movement of investment has reorganized share ownership and national markets while offering the central eastern European region opportunities for greater integration of national markets: thereby contributing to a single European electricity and gas market.

This one way movement demonstrates that with the possibility of EU membership, energy companies have a greater perception of stability and will invest heavily into a countries energy infrastructure. This increases both the country's security of supply and the regions. In addition, due to the geographic and systemic organizational structure of these multinational energy companies, market integration on a regional scale can be facilitated when combined with actions of EU and national institutions.

Recommendations: Investment Opportunities

The need for investment into a potential new Member State can be facilitated by its status as a future EU Member State. Opening a country's energy assets to foreign investment and ownership, even at differing levels of share ownership, can result in efficiency improvements and significant investment into the energy infrastructure – under proper regulatory regimes. EU institutions need to help with professional trainings, development of effective regulatory oversight, and offer regional and European considerations to infrastructure projects.
In addition:

- Development of critical cross-border interconnections
- Improve cross-border access to market
- There should exist cost-reflective prices which promote entry into the market

Conclusion: Improving Firm Financial Performance

Based on the result of the comparative financial analysis we found that those companies which have internationalized their operations towards the new Member States of the European Union increased their value more significantly than those who followed a different strategy. The average annual share price development of the Acquirers reached 23,2% between 1994 and

2006 exceeding the group of Non-Acquirers (8,7%) by 14,5%. (Table 1-10) This means that the strategy focusing on the geographical diversification of the operations towards Eastern Europe proved fruitful and managed to create significant value. Because of the share price development, it can be inferred that the acquisition price paid, was fair or less than the company's value based on the cash flow and strategy.

Recommendation: Improving Firm Financial Performance

The financial gain for energy companies investing in States joining the European Union are positive over the long-term. In terms of benefiting the companies themselves, significant gains in share price, and more modest gains in operational profits can be seen. It is recommended that lowering the 'risk premium' that companies may seek to gain in entering soon to be new Member States, be lower as participating in privatizations or other investments will provide the needed returns and increase shareholder value in the investing companies.

Conclusion: Energy Prices

The transition for the EU-3 and EU-5 required a dramatic rise of energy prices to market levels. There were two approaches to this:

Rise prices steadily (10%-15% a year) over 15 years

Delay price rises and then raise them hugely at the end of the period

The price shocks, due to the rise of Russian and world gas prices, since 2002 forced all countries to raise household prices, which in many cases meant substantial price rises.

Recommendation: Energy Prices

Lessons from past experiences show new Member States should be encouraged and agree to a programme of steady above inflation household price rises over a long period of time (10 years or more). External pressure is particular important as price increases may span several election cycles.

Conclusion: Gas Dominance

The central European region of EU-10 has exchanged Soviet Gazprom dominance for dominance by joint ventures of German E.ON and Russian Gazprom. There is little evidence of effective competition being introduced into the region.

A major stake in the present fight over the control of existing and future strategic gas assets in the region is whether Russia (with the support of its strategic partner E.On Ruhrgas) can manage the stabilisation of unilateral gas import dependence of the EU-3 and EU-5. Russian success in this respect could have serious negative effects on these member states as well as perhaps on the future of EU supply security.

Recommendation: Gas Domiance

Without strong efforts to introduce effective competition, an area where European Commission regulation could be very important, the dominance of the region by Russian and German companies (that is to say, by joint ventures of E.ON and Gazprom) is likely to continue. These solutions could include ownership unbundling of gas TSOs, to arrive at agreement with Russia and transit countries to provide regulated third party access to their gas transmission grid, a more apparent support for principal infrastructure diversification projects like Nabucco. Finally, the national governments of the affected new Member States, most prominently Hungary and Lithuania, should also implement policies to reduce their significant 'addiction to gas'.

Network ownership is not important provided there is sufficient competition. The EU-10 region should introduce effective competition into the region, through ownership unbundling and introducing effective supply competition (first examples for ownership unbundling of the TSO are Slovakia and Hungary). Supply competition (perhaps through gas auctions held at the border) is difficult to introduce because of the dominance of Russian supplies but various measures can still be done.

Potential Member States need to implement similar regulations that will restrict unfettered monopolistic practices from dominating their gas market.
In addition:

- Facilitate the diversification of gas sources away from high dependence from single-source suppliers, where network assets are owned by the single-source supplier
- Reduce dependence from a single source and developing an effective market supporting wholesale and retail competition set as policy objectives
- Ownership unbundling of network operation, including gas storage
- Sufficient diversification of entry routes, as a technical pre-condition to competition, should be in place before price regulation is removed. In the meanwhile, regulation should promote cost-reflective prices
- There should exist cost-reflective prices which promote entry into the market

Transparency of information

Renewable energy sources

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4 chapter

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4. Renewable energy sources

4.1. introduction

This chapter aims at providing answers to the following questions:

- To what extent are the new Member States complying with their obligations in the field of renewable energy sources?
- Has the 2004 enlargement led to an increase in (public and private) investment in renewable energy sources?
- Have the new regulatory framework and investments resulted in an increased share of renewable energy sources in the energy balance?

An additional question was originally offered in our original research proposal: "Which has been the impact of the increased use of renewable energy sources on the functioning of the national and European electricity markets?" We have attempted to survey TSOs for opinions, but there were not enough valuable answers received. Thus we regard the question as not appropriate for the time being. However, as more renewable electricity would be supplied and more cross-border capacities installed, the question should be further investigated.

In the first section, we first assess how new Member States comply with their renewable energy targets and other obligations mandated by their commitments to the EU. Then we survey to detail the two segments of the renewable energy sector that are targeted by explicit EU policies: electricity and motor fuels. In the second section, we review renewable electricity investment support policies in EU-10 and provide a quantitative evaluation of investment activity in this segment. Then we study the design of policy instruments set up in the new member states in order to enhance renewable electricity generation and analyse the most important statistical observations we made about renewable electricity generation. The third section is about biofuels support measures and consumption statistics. A detailed inventory and chronology of renewable energy policy measures are provided country-wise in the original study's Appendix. We demonstrate that a considerable increase is found in the utilisation of renewable energy sources and that this process has been fundamentally driven by direct EU policies.

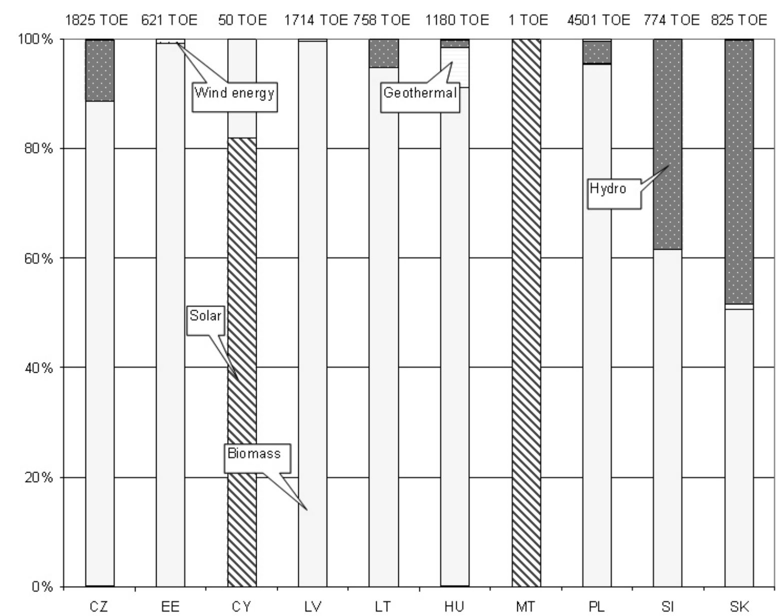
Nevertheless, providing a definite assessment of the drivers behind any increase in renewable energy production goes beyond analysing the effect of renewable energy policy. Any increase observable in investments in renewable energy sources and in the share of renewable energy is the combined effect of direct renewable energy support policy and indirect policy measures in the field of non-renewable energy. Thus, besides a strong focus on the direct effects of the EU renewable energy policy on the new Member States, the last section of this chapter takes a look at the most important indirect drivers that could have influenced the penetration rate of renewable energy sources. We demonstrate that the EU environmental policy has strong indirect impacts. Additionally, we provide clues about the favourable impacts of technology advances in the renewable energy industry. The indirect but effective role of EU energy policy and competition policy is discussed as well.

4.1.1. Renewable Primary Energy Consumption Target

EU-15 has committed itself to a voluntary 12% share of renewable energy sources in the mix of primary energy use by the year 2010.[124] This Community target has not been broken down to member state level implying a flat rate increase requirement for all member states. The 2004 enlargement formally did not change this target, and no country specific breakdown was introduced either. So it is fair to conclude that the 12% renewable target applies to the new member states as well. As this target is not legally binding, it was not an issue of the accession negotiations, and consequently, not included in the 2004 Accession Treaties.

At the end of 2006, the Commission proposed considerable changes to the renewable target of primary energy consumption after concluding that it would not be realised by 2010.[125] The new and mandatory target under discussion would be 20% by 2020. Moreover, current negotiations are aimed at allocating the overall target among Member States, suggesting explicitly the consideration of natural endowments in the burden-sharing process.[126] Figure 4-1 suggests that different domestic resources (and, probably to a lesser extent, support policies) have resulted in vastly different shares of renewable sources in the primary energy consumption in the 10 new Member States.

Figure 4-1: Breakdown of Total Primary RES Consumption by Energy Sources in 2005 in New Member States

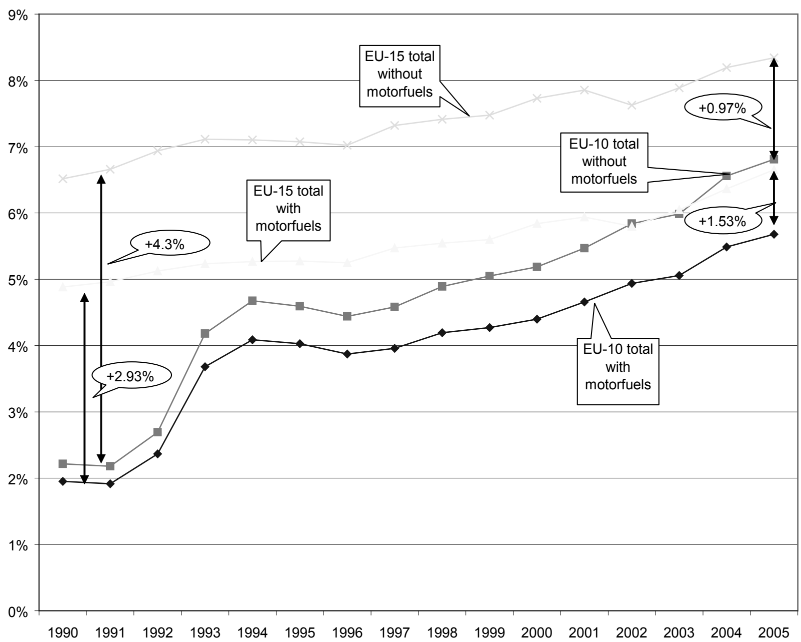


Source: EUROSTAT

124 COM(1997) 599.
125 COM(2006) 848 final
126 "The contribution of each Member State to achieving the Union's target will need to take into account different national circumstances." - COM(2006) 848 final

The EU-10 as a group seems to show distinctive patterns in the share of renewables within the total primary consumption compared to EU-15 as shown in Figure 4-2.

Figure 4-2: Share of Production from Renewable Energy as % of Total Primary Energy Consumption With and Without Motor Fuels



Source: EUROSTAT

The share of renewable energy in total primary energy consumption has increased over time in both groups. In EU-15, the share of RES in total primary energy consumption exceeds considerably that in EU-10 but the gap has decreased since 1990.

There was a quick growth in the share of RES in new Member States between 1991-1994. This apparent jump does not imply real growth in RES but a dramatic drop in the total primary energy consumption. This was the period of heavy industry collapsing in most ex-COMECON countries, resulting in an 11% drop in total primary energy consumption. In the meantime, renewables stayed more or less constant, with primary biomass combustion for heat being the most important factor and with hydro power and waste-to-energy following suit and staying constant. By the end of this period, the share of RES was more than two times greater than earlier (2% -> 4,5%) in EU-10.

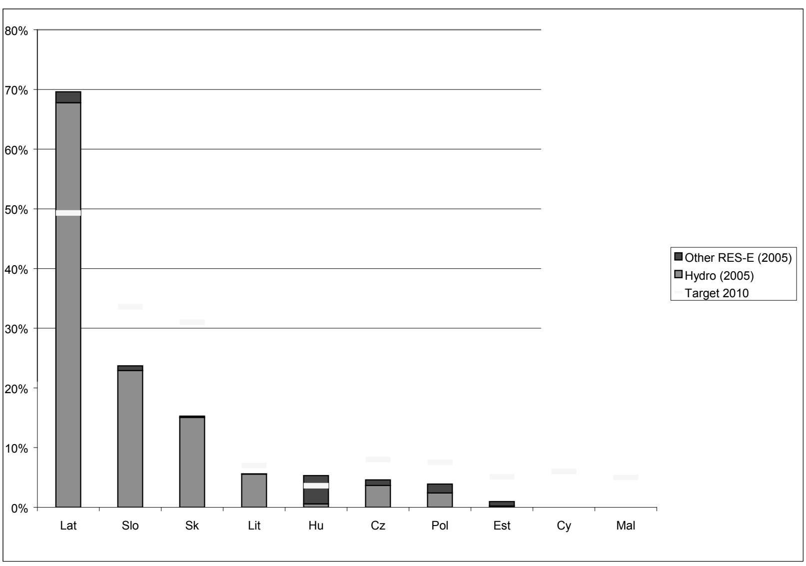
We discuss later (in Section 1.4.) that the EU-10 to EU-15 gap observable between per cent share of RES-E in total electricity generation looks very stable (see Figure 1-18 further below). Figure 1-4 above demonstrates however, that the gap is decreasing in terms of % share of RES in total primary energy, regardless of the robust gap in terms of electricity. Looking for an explanation, we made an effort to find the segment of energy use where the gap is closing. If motor fuels are deducted from primary energy then the gap is closing faster that with motor fuels. That leaves only one plausible explanation: the share of heat production from renewable energy sources has increased more as % of total primary energy used for heat production in EU-10 than in EU-15. The share of RES heat as % of total heat increased especially between 1991-1994 with households and some district heating to provide a strong and stable consumption of renewable energy sources. This is an important lesson for RES support policy makers: direct heat use of renewable energy sources is of lesser policy focus than its weight should justify.

Besides primary energy consumption, there are two segments of energy consumption (electricity and motor-fuels) that the Community of EU member states has agreed to set targets for in order to enhance the share of renewable energy sources. Note that having mandatory renewable targets in primary energy, electricity and motor-fuel consumption imply a heat target as well.

4.1.2. Renewable Electricity Consumption Target

The overall mandatory target for EU-25 regarding renewable electricity consumption is 21% by 2010. Directive 2001/77/EC sets national indicative targets for the 15 Member States concerning the share of electricity produced from renewable energy sources (RES-E) in gross electricity consumption in 2010. The new Member States, acceding in 2004, had to transpose this piece of legislation and agreed to their own RES-E targets in their accession treaties and the Directive was amended accordingly.

Figure 4-3: Electricity from Hydro and Other Renewable Energy Sources in New Member States in 2005 and 2010 targets (% of Gross Electricity Consumption)

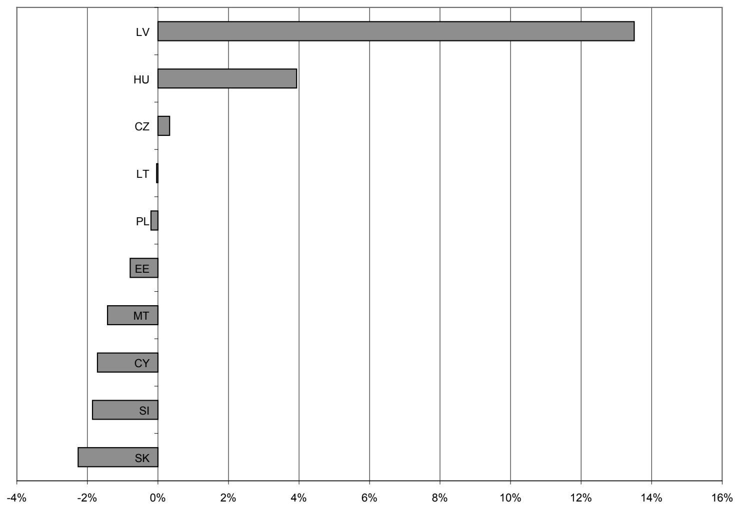


Source: EUROSTAT and Accession Treaties

Figure 4-3 shows that Hungary and Latvia have already fulfilled their obligation regarding renewable based electricity generation. In Hungary it is due to the (partial) conversion of conventional power plants to biomass, in Latvia to the large share of hydropower.

A further question and the next step in the analysis is whether the rest of the EU-10 countries are likely to reach their targets by 2010. The distance-to-target indicator (DTI) we present below (Figure 4-4) is a measure for the deviation of actual production in 2005 from the (hypothetical) linear path between 2003 and 2010 if targets are to be met. This analysis gives an indication on progress towards the RES-E goals on a country level. For example, the DTI value of -1.86% for Slovenia (SI) is the deviation of the actual share of RES-E from the hypothetical target path in 2005. The figure shows that there are seven countries in the negative range that will have to enhance their efforts to reach their own 2010 target levels. Apart from Hungary and Latvia, the Czech Republic looks like fulfilling its obligation if RES-E grows at the current rate, the rest do not.

Figure 4-4: Distance-to-Target Indicators for RES-E in EU-10 countries, 2005



Source: EUROSTAT

4.1.3. Obligation to Introduce Guarantees of Origin for Renewable Electricity

Article 5 of Directive 2001/77/EC requires Member States to implement a Guarantee of Origin system (hereafter GO system) by 27 October 2003 for EU-15. For the 10 new Member States, the deadline for implementing such a system was, in accordance with the Treaty of Accession of 2003, 1 May 2004. The main objectives of such a system are to facilitate trade in electricity from renewable energy sources and to increase consumer transparency by distinguishing between electricity from renewable and non-renewable energy sources. The following table (Table 4-1) summarises the status of implementation with regard to setting up the required legislation, appointment of an issuing body, and setting up the needed operational system for issuing guarantee of origins (as of September 2005).

Table 4-1: Status of Implementing Guarantee of Origin Systems in EU-10

	Legislation	Issuing body	Status of GO
Cyprus	In process	Not appointed	In process
Czech Republic	Passed	Government organisation	In process
Estonia	Passed	Not appointed	Not started
Hungary	In process	Not appointed	Not started
Latvia	Not started	Not appointed	Not started
Lithuania	In process	TSO	In process
Malta	Passed	Regulator	In process
Poland	Passed	Regulator	In process
Slovakia	Passed	Regulator	In process
Slovenia	In process	Regulator	In process

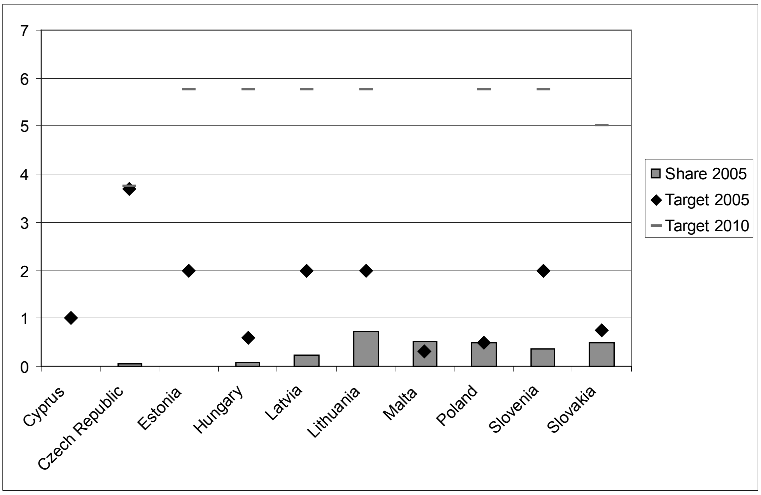
Source: Support of electricity from renewable energy sources (COM(2005) 62) pp 48-49.

At present, none of the new Member States has an operational system issuing GOs. Estonia, Hungary and Latvia have not even started to set up such system. Regarding the legislative aspect, only the Czech Republic, Estonia, Malta, Poland and Slovakia have passed the required rules. The rest, except for Latvia, are in the process of preparing or have proposed it already. The new member states seem to favour the national regulator as the issuing body of GOs.

4.1.4. Renewable Motor-Fuels Consumption Target

Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport intends to “promote the use of biofuels… in each Member State, with a view to contributing to objectives such as meeting climate change commitments, environmentally friendly security of supply and promoting renewable energy sources”. Contrary to the Union’s renewable electricity target set for 2010 alone, the Biofuels Directive includes not only a target for 2010 (5.75% share of the market for petrol and diesel in transport) but also an interim target for 2005 (2%). It requires that Member States set indicative targets for 2005, taking this reference value into account. These national indicative targets are not mandatory, albeit they constitute a moral commitment. The 2006 Biofuels Progress Report by the EU Commission concluded that the Member States are lagging behind their targets and as a consequence the Biofuels Directive’s target for 2010 is not likely to be achieved.

Figure 4-5: Biofuels Targets and Consumption in 2005 and the 2010 targets (% of Energy Content of Total Domestic Consumption of Motor Fuels)



Source: EUROSTAT, Biofuels Progress Report (COM(2006) 845 final)

It is quite evident from Figure 4-5 that all countries are lagging behind their targets. Within the group, Cyprus and Malta have not yet set biofuels targets for 2010, Slovenia's target is very close to the default value of 5.75% and only the Czech Republic has a distinctive lower target value as of 3.75%.

4.2. Electricity from renewable energy sources

4.2.1. Introduction

The section is dedicated to the detailed analysis of how the 2004 EU enlargement influenced the renewable electricity sector in new Member States. First we focus on investments and provide statistical coverage of the major changes to note. Then we describe RES-E production support schemes found in new Member States and show by statistics the impacts induced.

4.2.2. RES-E Investment Support Policies

In order to draw a conclusion on whether enlargement has led to an increase in renewable energy investment, we should clarify in what ways enlargement could affect investment activity. We suggest two types of effects. First, EU renewable energy policy has a direct effect on domestic support schemes for RES-E. Second, EU pollution reduction commitments in conventional power production imply additional costs for electricity generators that operate on fossil fuels. In this section, we focus on the former relation and discuss the latter one in Section 1.6.

The direct policy influence means that the new Member States are requested to set their own targets during the enlargement process in order to provide formal incentives for their governments to enhance their current RES utilisation. New Member States, therefore, create support schemes partly based on EU funds opening up concurrently to improve chances of success. Grants for investment reduce the large initial investment expenses thus the net present value of many RES projects increase. Supporting production has the same effect by incrementing the yearly cash flows of the investment projects. The increase in NPV of the investment projects make these projects more profitable and more investors decide to invest in them.

The questions to be answered are: Has support really increased and has it happened because of EU support and the pressure represented by the targets? Was there any increase in investment in generation from renewable energy sources? If yes, was it due to the increased support?

Investigating the investment support schemes for RES-E, we have found that in the majority of the new Member States (Cyprus, Estonia, Hungary, Malta, Slovakia, Slovenia, Poland) these support schemes had been introduced or updated around or after 2000.[127]

Although detailed country specific information is not available on government grants for RES investments by sources, we suggest that the various foreign (bilateral) and international financial sources to promote the production and consumption of renewable energy have been crowded-out and overwhelmed by EU sources. Multilateral donor organisations (e.g. Global Environmental Facility, World Bank) have been pulling out from the region recently, as the CEE countries do not qualify any more to the mandate of these developmental funds. The National Developmental Programmes (and its various sub-programmes), funded by the cohesion fund and supplemented by domestic co-financing and private capital, are becoming the prime

127 See Appendix in original study for comprehensive reference and more details.

source of national policies to support the use of renewable energy sources. See for example the following table (Table 4-2) on changes in Hungarian subsidies.

Table 4-2: Grants by Sources Allocated for Energy Conservation and for Use of Renewable Energy (Hungary, 2001-2005, million Euro, nominal)

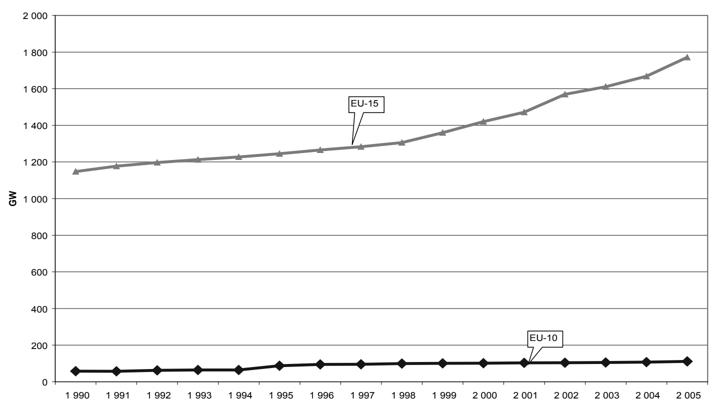
	Domestic grant payment	Amount from EU co-financing (grants with EU-share of 75% or more)
2001	11.69	
2002	18.52	
2003	13.40	
2004	6.52	6.87
2005	2.11	6.97

Source: HU renewable electricity report (2006) pp. 23.

4.2.3. RES-E Investment Statistics

The installed capacity for electricity generation from renewable energy sources has increased between 1990 and 2005 in both EU-15 and EU-10. (see Figure 4-6, Figure 4-7, Figure 1-10s).

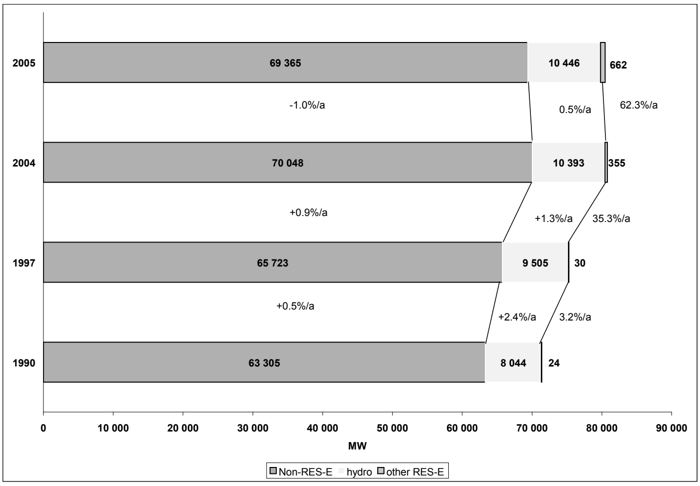
Figure 4-6: Total Net Installed RES-E Capacity in EU-10 and EU-15



Source: EUROSTAT

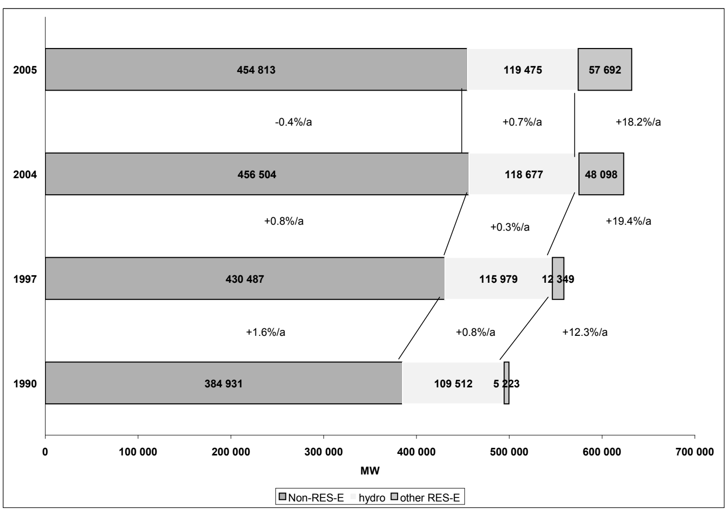
The following two figures (Figure 4-7 and Figure 4-8) show how this growth breaks down into hydro and non-hydro plant capacity, as well as how the observed RES-E capacity growth rate relates to the growth of non-renewable power plant capacities.

Figure 4-7: Composition and Growth of Installed Electricity Capacity in EU-10 (MW, growth/year)



Source: EUROSTAT

Figure 4-8: Composition and Growth of Installed Electricity Capacity in EU-15 (MW, growth/year)

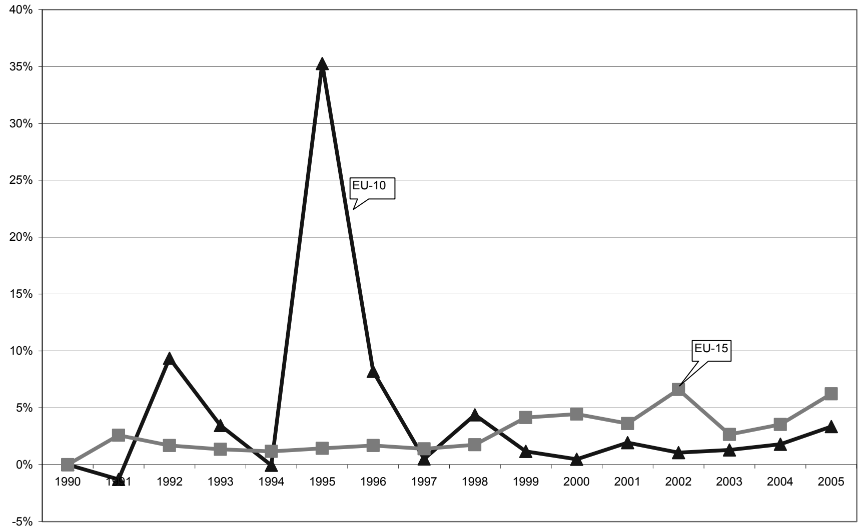


Source: EUROSTAT

The following figures (Figure 4-9 and Figure 4-10) present the growth dynamics of RES-E installed capacities with and without hydro plants, respectively. The apparent difference between the two figures demonstrates that there are relatively more investments made into non-hydro than to hydro generation in both old and new EU Member States. This could be explained by hydro generation already being a mature and well-known technology before the 1990s, while other RES-E technologies had then just started to develop.

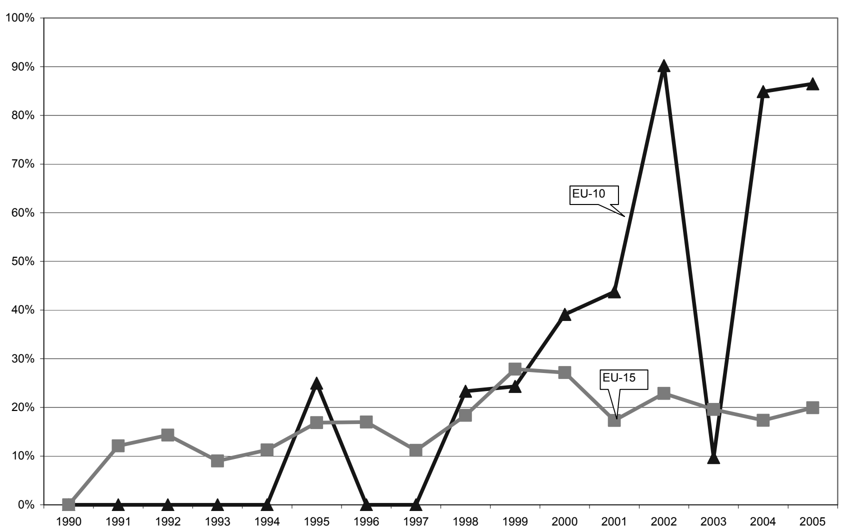
Also, while in the 1990s the growth rate of hydro investments was larger in EU-10, this relation changed around 1999 and the growth rate of hydro installed capacity became lower than in EU-15.

Figure 4-9: Growth Rate of Total Net Installed Capacity of RES-E including Hydro (% of Previous Year)



Source: EUROSTAT

Figure 4-10: Growth rate of Total Net Installed Capacity of RES-E excluding Hydro (% of Previous Year)

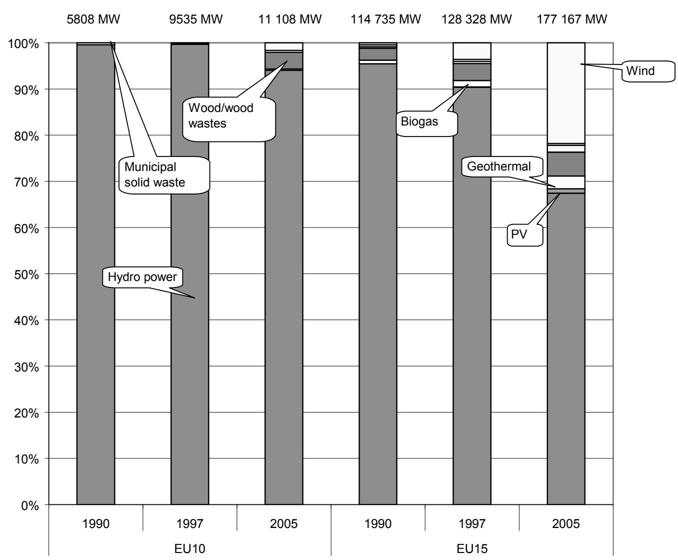


Source: EUROSTAT

More insight can be obtained on the nature of the capacity investments if relative capacity changes are investigated by sources of renewable energy. The next chart (Figure 4-11) provides strong evidence that hydro power was the only measurable source of renewable electricity in new Member States throughout the 1990s, while the EU-15 group shows a less biased development but still with an overwhelming hydro dominance. Hydro capacities must be stripped off the rest of RES-E if any other patterns are to be discovered (see Figure 4-12). In EU-10 municipal solid waste was the only non-hydro renewable source in the 1990s, wood and wind-turbines only took over in 2005. The tendency is different in EU-15: while wood was dominating in the 1990s, its share gradually decreased and wind energy took over.

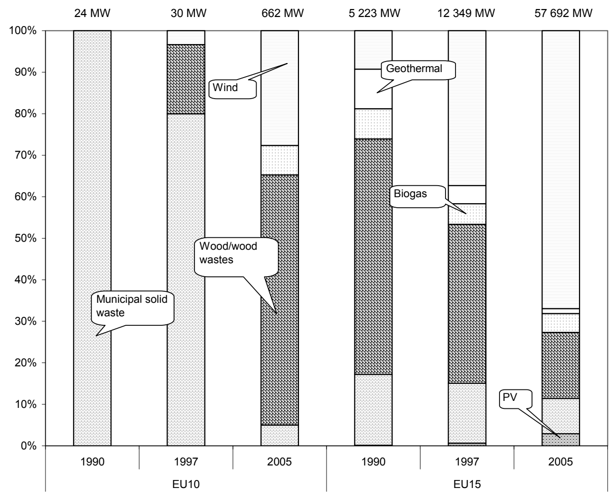
Note that EU-15 have always had a more diverse non-hydro renewable portfolio, however, the diversity of non-hydro renewables has increased considerably in EU-10 over time.

Figure 4-11: Breakdown of Total Installed RES-E Capacity by Energy Sources in 1990, 1997, 2005 in EU-10 and EU-15



Source: EUROSTAT

Figure 4-12: Breakdown of Total Installed RES-E Capacity without Hydro in 1990, 1997, 2005 in EU-10 and EU-15



Source: EUROSTAT

By investigating the investment support schemes and investment statistics in this section, we can conclude that both have been increasing in the period under consideration. However, we cannot state that this 'correlation' means that the growth in installed capacity was (only) induced by EU driven investment funds and incentives. As we have noted before, we think that there are other factors that could also have a major effect on the level of installed capacity, such as EU environmental regulations and the reduction of technological costs for RES-E generation. See Section 1.5.4 below on indirect drivers.

4.2.4. RES-E Production Support Policies

Renewable electricity capacity instalments are heavily influenced by perspectives of selling the product, as in other sectors of the economy. The major difference is that, in the case of RES-E, the producers are mostly selling their products to governments either directly when state funds are explicitly involved in the purchase of RES-E or indirectly when the government enforces electricity consumers to purchase a given GWhs of or spend a certain amount of money for RES-E. So in this section we map the ways EU-10 governments arrange for buying RES-E and analyse the support schemes run in order to enhance production of renewable electricity. Then, in the section to follow, we present our statistical observation about RES-E production changes induced in EU-10.

The amount of electricity production is greatly dependent on the installed capacity and the willingness of the owner to produce. Support schemes that provide price subsidy on production directly enhance the willingness of the owner to produce, and by promising higher cash flows, it indirectly effects investment decisions and thus the level of installed capacity. Therefore, production subsidies for generation from renewable energy sources have a major effect on the overall level of production from these sources. Investigating the production support schemes in the new EU Member States, we have concluded that:

* The dominant form of support is general purchase obligation with an authority feed-in tariff.
* The majority of new Member States have introduced feed in tariff schemes or have updated them around or after 2002.

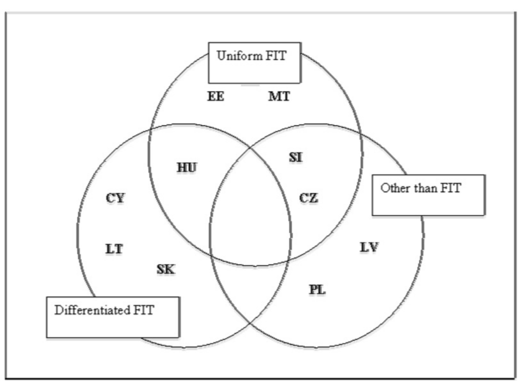
In eight out of the 10 new Member States, a feed-in tariff system is in operation and each of the EU-10 has (or used to have) a feed-in tariff support system for the production of renewable electricity. Some Member States (such as Slovenia, Hungary and Estonia) introduced this system long before 2000 but, in order for the system to be more adaptive and more effective, these forerunners also updated their feed-in regimes around 2002-2004. Other Member States (such as Cyprus, Lithuania and Malta) only introduced purchase obligation with feed-in tariffs between 2002-2005 with the explicit motive of reaching their EU targets. In the case of Latvia and Poland, the feed-in tariff system was cancelled in 2005 and 2000, respectively. In Latvia, the feed-in tariff system was followed by a renewable quota obligation on suppliers just as in Poland, where the feed-in regime was also replaced by a green certificate system in 2005.[128]

Out of the eight countries where feed-in tariff schemes were in operation in 2005, two (Estonia and Malta) applied uniform tariff regimes regardless of RES-type, technology or the time of the day. In the other six new Member States the feed-in tariff differs by the type of renewable source or technology.

The Hungarian system is somewhere between a uniform and a differentiated tariff regime. Those who produce electricity from renewable sources that depend on weather conditions (e.g. wind) receive a flat rate uniform tariff around the clock, while other types of renewable electricity are purchased by a tariff scheme that is differentiated by the time of the day with the average price equal to the flat rate tariff.

The Czech Republic and Slovenia provide another supported selling option for renewable electricity producers besides the feed-in tariff system. In both countries, RES-E producers (instead of selling at flat rate feed-in tariffs) may choose to sell their electricity at the market independently and apply for a uniform and fixed annual premium (Slovenia) or green bonus (Czech Republic). The following chart (Figure 4-13) summarises the status of RES-E support schemes of EU-10 as of 2005-2006.

Figure 4-13: RES-E Support Schemes in Countries of EU-10, 2005-2006



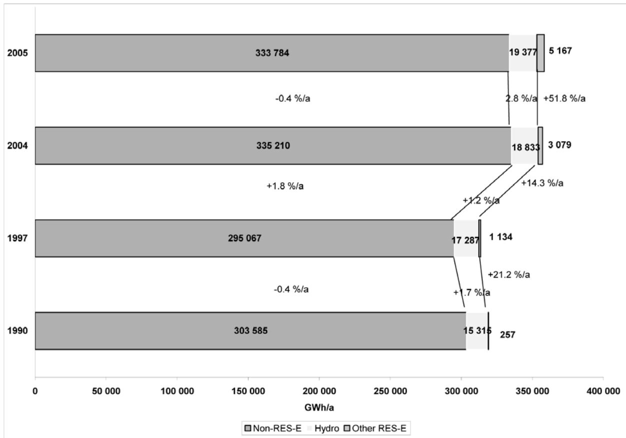
Source: REKK

128 See Appendix in original study for more details.

4.2.5. RES-E Production Statistics

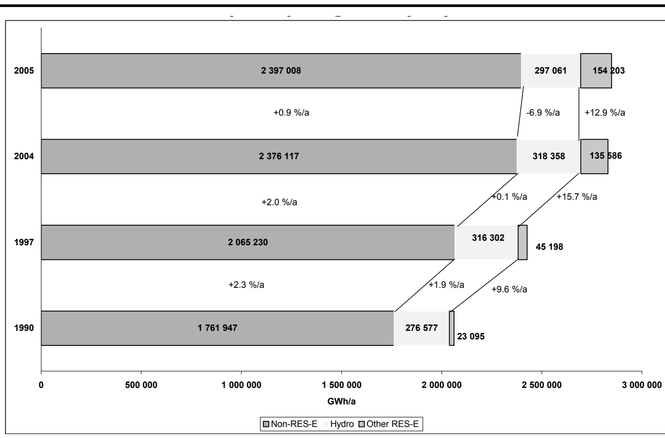
Electricity production has been continuously growing both in EU-10 and EU-15 from renewable and non-renewable energy sources alike (see Figure 4-14 and Figure 4-15).

Figure 4-14: Composition and Growth of Electricity Generation in EU-10 (GWh/year, growth/year)



Source: EUROSTAT

Figure 4-15: Composition and Growth of Electricity Generation in EU-15 (GWh/year, growth/year)

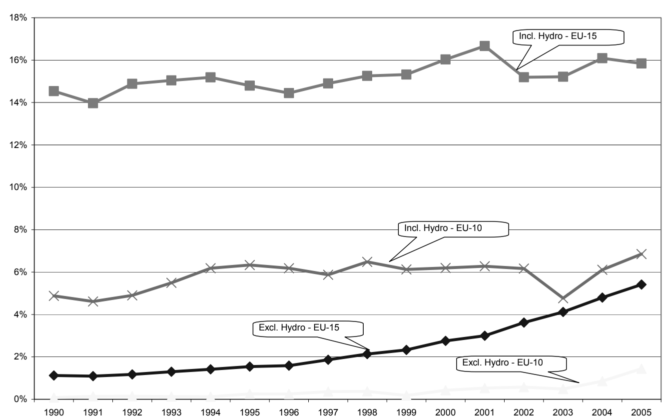


Source: EUROSTAT

There seems to emerge a tendency of RES-E taking some share of non renewable electricity, indicated by RES-E annual growth rates being much higher than those of non-RES electricity in both EU-10 and EU-15. However, the figure to follow (Figure 1-16) shows EU-15 hydro-included RES-E production increasing over time, although its share in total electricity generation remains constant with some fluctuations. Almost the same pattern reveals regarding the share of hydro-included RES-E in EU-10. Nevertheless, a deeper look discovers further features.

As discussed above, the amount of electricity production generally depends on two factors: installed capacity and the willingness of the operator to produce. However, in the case of weather dependent renewable energy sources, such as hydro and wind, a third factor, the weather condition does also has a role. Weather conditions substantially determine the actual production of electricity from hydro-plants. Although the installed capacity of hydro plants was continuously growing over time, hydro generation did not follow this tendency due to the fluctuating precipitation patterns. Since generation of renewable energy sources is dominated by hydro generation, weather conditions greatly affect the total amount of RES-E. Consequently, hydro-excluded RES-E can be then considered a useful proxy of how total RES-E generation develops if controlling for weather conditions.

Figure 4-16: Share of Production from Renewable Energy in Total Electricity Generation

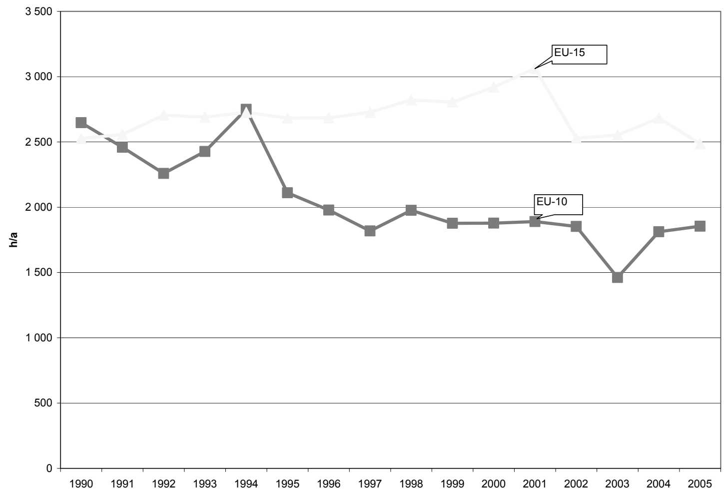


Source: EUROSTAT

Renewable electricity excluding hydro power has been continuously growing in EU-15 and, at a slightly slower pace, in EU-10 as well. This pattern is only revealed if the non-growing hydro power is excluded. So, non-hydro renewable electricity has started to increase its share, faster in EU-15, slower in EU-10, but clearly being the growing segment of renewable electricity generation.

It is interesting to compare load factors of hydro power in EU-10 with that of EU-15. Dividing the annual hydro electricity production (GWh/year) by the total installed hydro capacity (MW) gives us an estimate of the average load factor of hydro power plants. The following graph (Figure 4-17) shows how hydro load factors have changed in EU-10 and EU-15.

Figure 4-17: Estimated Average Load Factor of Hydro Power in EU-10 and EU-15 (hours/year)

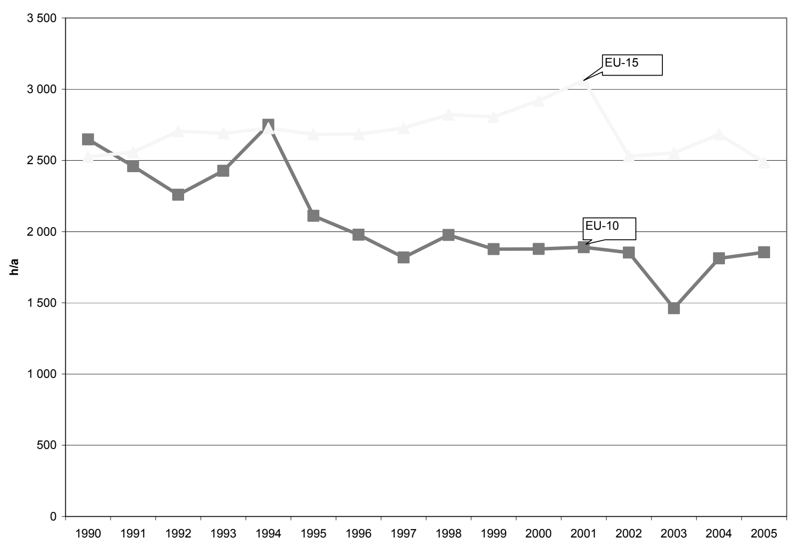


Source: EUROSTAT

The estimated average hydro load factor in EU-15 is much higher than in EU-10. Moreover, there seems to be an upward trend in EU-15 hydro load factors (especially if corrected by precipitation data) while there appears a solid downward trend in EU-10 hydro load factors.

The following table (Table 4-3) shows some descriptive statistics of the estimated load factors for hydro power.

Table 4-3: Statistics of Estimated Hydro Load Factors in EU-10 and EU-15



Source: EUROSTAT

The estimated average load factor of hydro energy in EU-10 (2066 hours/year) is much lower than that in the EU-15 (2698 hours/year). Standard deviation of the estimated hydro power load factor is more than twice as big in EU-10 than in EU-15. The lowest load factor in EU-10 (1462 hours/year) was recorded in 2003, which is much lower than the lowest record in the EU-15 (2487 hours/year) as of 2005. Comparing the standard deviation of the hydro load factors to the total gross electricity generation and to the total non-hydro RES-E generation, note that the sheer size of the hydro load factor standard deviation gives more than 1% of the total electricity production and more than 70% of the total non-hydro renewable electricity generation in EU-10. Both of these figures are much lower in EU-15 (0,65 % and 12 %, respectively).

As a conclusion, we note that RES-E production is still mostly hydro power in the EU-10. Nevertheless, a non-hydro RES-E generation has started to emerge with high growth rates. The non-hydro RES-E sector is still less important than that in the EU-15, looking like an infant sector. So it seems accurate that all of the EU-10 governments started out with universal RES-E purchase obligations and authority feed-in tariffs. Two of them have replaced their universal feed-in systems with renewable quota obligation schemes and another two have provided optional support for the 'renewable' attributes if the electricity is sold in the electricity markets. If the RES-E production sector is mature enough to provide enough supply for a quota base support system still needs to be seen.

4.3. Biofuels

4.3.1. Introduction

The other major renewable energy sector with explicit support policy instruments is biofuels. Unlike electricity, where domestic renewable generation is mostly consumed domestically (with very limited "renewable" attributes to be imported on a voluntary basis via international certification systems) in the case of biogenic motor-fuels, domestic production and consumption is considerably decoupled by heavy international trading. Therefore, unlike in the case of electricity, it makes a difference if targets are set production-wise or consumption-wise. With explicit consumption targets on scene, in this section we will focus mainly on biofuels consumption. First we summarise consumption enhancing measures and then provide statistics of biofuels consumption observed in the EU-10.

4.3.2. Biofuels Suppor t Measures

Regarding the support policies that new Member States have applied in their domestic markets, promoting measures were only introduced in six out of the ten new Member States in 2004 or later. The main type of support that exists in all the ten countries is tax support for consumption, i.e. a partial or total exemption from excise tax. (See Table 4-4 below)

Table 4-4: Tax Exemptions for Biofuels in New Member States (2005)

Country	Petroleum tax for unleaded petrol (EUR/1000 liters)[1]	Tax exemption on the biomass content	Limits and categories
Cyprus	299.08	no tax exemption only since October 2006	-
Czech Republic	339.9	Reduced rate, and in the biodiesel containing 31vol% RME exemption proportional to the share of biofuel added	-
Estonia	337.45	Exemption proportional to the share of biofuel added	-
Hungary	407.56 - 459.57 depending on petrol specification	Exemption proportional to the share of biofuel added, but there is a limit depending on total sales	bioethanol up to 15%, biodiesel up to 5%
Latvia	287.65	Reduced rate, and in case of a 100% biofuel, full tax exemption	-
Lithuania	287.04	Exemption proportional to the share of biofuel added	-
Malta	310.1	Exemption proportional to the share of biofuel added	
Poland	320.28	Different excise duty reliefs, where the system makes higher blends more attractive	2-5%, 5-10%, 10% and up, 100%
Slovakia	375.53	Reduced rate changed to exemption proportional to the share of biofuel added in 2006	for esters up to 5%, for ETBE up to 15%
Slovenia	361.89	Exemption proportional to the share of biofuel added but there is a 25% ceiling, however in case of 100% biofuel, there is full exemption	

Source for tax data: Klink – Langniss, 2006, pp: 10-11

Source for tax exemption data: see Appendix in original study, status as of spring 2005.

Besides this type of support, there are also other instruments for promoting consumption in use e.g. reduced VAT (until 2002 in Latvia), exemption from pollution tax (Lithuania), quota obligation (Slovenia) and tax relieves for electrical vehicles (Cyprus and Malta).

Besides consumption subsidies, financial aid for producers by means of investment grants, price rebates for oil rape, or support for energy crop production also exists in the Czech Republic, Estonia, Latvia, Lithuania, Poland and Cyprus. In Malta and Cyprus the government supports producers by being one of the main consumers.

A recent communication by the EU Commission suggests that only one of the EU-10 countries has realised the merits of the alternative support instrument: biofuels obligations.[129] The Czech Republic has already announced to introduce a mandatory biofuels rate as a percentage of total marketed motor fuels. This type of instrument is successfully used whenever the cost-safety exit fee is set high enough to stimulate cost-efficient biofuels purchasing by fuel retailers. The rest of EU-10 has not yet appreciated the economic value of such a policy design: car owners and transport sector paying for the total cost of the biofuels sector without a cent needed to be drawn from the taxpayers' fiscal budget. Therefore, excise tax breaks seem to stay in EU-10.

4.3.3. Biofuels Consumption Statistics

Except for Poland, the Czech Republic, and Slovakia biofuels consumption was virtually zero before 2004, and in two countries (Cyprus and Estonia) it was still zero in 2005. In three other countries (Hungary, Latvia, and Slovenia) 2005 was the first year when biofuels consumption commenced on the domestic fuel market. Biofuels consumption in the 1990s was mainly driven by agricultural production surpluses. (See Poland in Appendix A of original study).

As for the quantity of biofuels consumption, consumption in 2005 was lower than 1% (measured by energy content) of the total motor fuel sold for transport purposes in every new Member State. In the majority of the new Member States who have positive domestic consumption only biodiesel is produced and consumed. In Hungary, however, bioethanol is the only type of biofuels consumed.

Table 4-5: Biofuels consumption statistics for the new Member States

Member State	Type of biofuels	Consumption since	2005 value (kilotonnes)	2005 % share in total fuel consumption for transport (energy content)
Cyprus	-	-	0	0
Czech Republic	both, but mainly biodiesel	1997	3	0.046
Estonia	-	-	0	0
Hungary	bioethanol	2005	4.47	0.07
Latvia	biodiesel	2005	2.89	0.24
Lithuania	both	2004	4.1	0.72
Malta	biodiesel	2004	0.78	0.51
Poland	both, but biodiesel only since 2005	1994	62.49	0.48
Slovenia	biodiesel	2005	5.61	0.35
Slovakia	biodiesel	2001	11	0.49

Source: EUROSTAT and MS reports (see appendix in original study for detailed reference)

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Comparing the support schemes and consumption statistics regarding biofuels in the new MSs, we can state that in the majority of the countries both have started around or after 2004. In the case of biofuels the relation between supporting measures and consumption looks more straightforward than in the case of RES-E however it still cannot be proved.

4.3.4. Indirect Drivers

We have demonstrated so far that new Member States have run designated renewable energy support policies and, also, that significant increase can be observed in their utilisation of renewable energy sources. However, we have reserved some marginal effort to challenge the effectiveness of renewable energy support policy instruments by questioning an exclusive cause-and-effect connection. We would consider some other significant forces that could have had an indirect effect on the penetration of renewable energy sources along the EU enlargement process. Some of these indirect effects can be very positive and very important at the same time. In the section to follow, we are discussing some of these most influential indirect forces with the support of quantitative observations.

4.4. Environmental policy for non-renewableenergy producers

4.4.1. *Introduction*

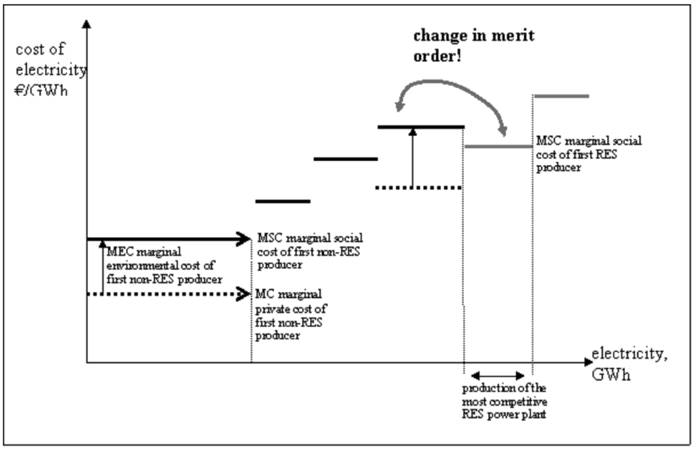
First of the effective indirect drivers from outside of the domain of renewable energy policy is environmental policy regarding non-renewable energy sources. Based on the economic theory on externalities, the environmental damages of non-renewable energy are to be reduced in the first place by policy instruments that make producers of such energy incur the costs related to these damages. This policy results in a cost increase of non-renewable energy and markets would experience increasing prices and decreasing volumes. Thus renewable energy enjoys a competitive edge over non-renewables to the extent it is less environmentally costly. If all environmental costs are included in the price of each energy product and service then there is no need to support renewable energy any further, because markets would deliver an optimal amount of renewable versus non-renewable energy.

Let us use an example from electricity production markets. Assume that various power plants, in the short run, compete in the electricity markets on the basis of their private marginal cost of production. As soon as the environmental authority enforces a new environmental instrument (e.g. pollution tax) in order to control adverse environmental effects of their harmful emissions power plants incur a new production cost amongst their private cost.[130] Thus the supply curve of electricity shifts upwards and, moreover, various segments of the supply curve shift to various extents, and the whole merit order may reshuffle. As is demonstrated in

Figure 1-18 below, renewable and non-renewable power plants might change around in the post-regulation merit order, therefore some renewable electricity producers who were too costly relative to non-renewables before environmental regulation might now enjoy a competitive edge over the most polluting non-renewables in certain demand periods when market price is sufficiently high.

130 The resulting new private marginal cost would be equal to the marginal social cost of production if the environmental instrument causes the producer to incur the marginal environmental cost that corresponds to the socially optimal level of pollution.

Figure 4-18: Effect of First-Best Regulation on Relative Competitiveness of Renewable and Non-Renewable Electricity Producers



Source: REKK

Based on this argument, it is only in a second-best world that renewable energy needs some kind of administrative support from the government, whenever non-renewables are subsidised by external cost allowance or other direct and indirect transfers from society. Even though we all live in second-best worlds, and the first-best regulation is a text-book concept, it is fair to argue that any tightening in environmental regulation improves the chances of non-polluting renewables to increase their market share. So this section is dedicated to a systematic survey of recent environmental policy effects on EU-10 non-renewable power production.

4.4.2. Implementation of EU Environmental Policy

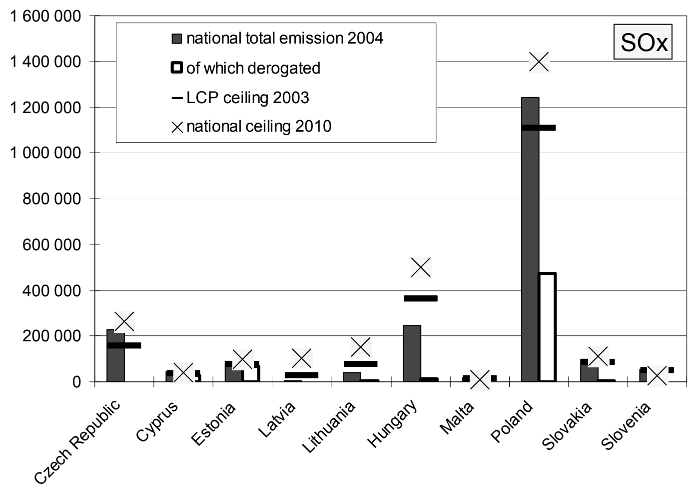
The environmental policy of the European Union has heavily affected non-renewable power production. Arguably the most influence has been made by the Large Combustion Plant Directive (LCP) as of 2001/80/EC. However, in many cases national environmental policies had been initiated by the preceding directive on limitation of air pollution by large combustion plants as of 88/609/EEC (Nov. 1988). Still, many claims for derogation allowances were submitted by EU-10 administrations during the accession talks, and many of their existing large combustion plants were given grace periods as long as 8-10 years before European emission limit values are imposed.

This section is dedicated to the air pollution derogation allowances of large combustion plants in EU-10 in order to find out the magnitude of these derogations and speculate their slowing effect on the catch-up of environmental policy.

Sulphur, the major cause of acidification, has been a critical issue for the power sector in many new Member States. Firstly, because much of the local coal reserves have high sulphur content (often as high as 2-4%) and the simple pulverized coal combustion technology is not capable of keeping sulphur within the combustion residues. Secondly, the use of heavy fuel oils was to blame, because most refineries of EU-10 countries produced fuels oils from high-sulphur Russian crude. The second issue has been solved by the motor fuel desulphurisation policy of the EU, which terminated high-sulphur fuel oil production and left low quantities of low-sulphur, high-cost gas-turbine oil at the market, what has been one of the main causes for the recent dash for gas.

Still, the first issue of high-sulphur local coal reserves is not resolved completely, because combustion techniques are not easily upgradeable in economic terms, (fluidised bed or supercritical combustion mostly ruled out for prohibitively high switching costs) leaving closure, fuel switch or flue-gas desulphurisation as the three possible options to choose – none of them very easy if it applies for most of a country's power generation. Each new Member State has been hit by this process to various extents. The following figure summarises the most important facts regarding SO2 policy in EU-10.

Figure 4-19: SOx Emissions, Emission Ceilings and Derogation Allowances by New Member States and their large combustion plants (tonnes, SO2 equivalent)



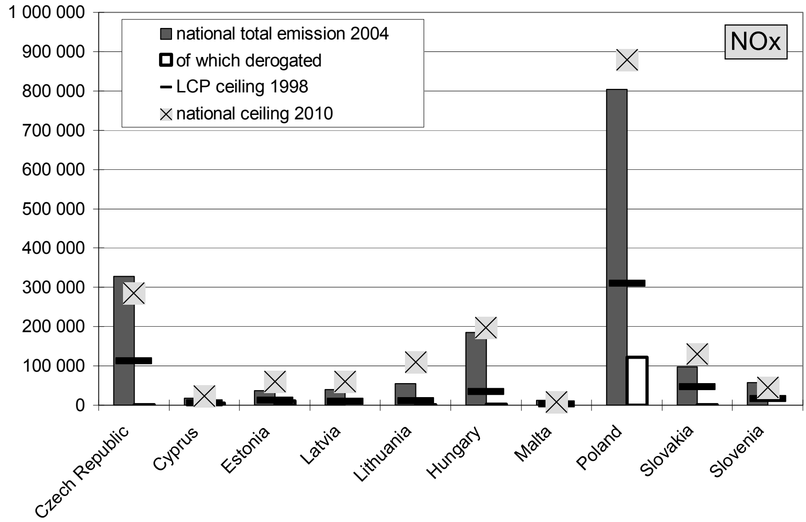
Source: EEA, EPER, LCP Directive, NEC Directive and Accession Treaties

Poland not only appears to be the most important polluter with the most polluting power sector but, also, to have negotiated the most delay in sulphur cleanup (SOx derogation allowances). Many countries have embarked on long efforts to reduce their total national SO2 emissions by 2010 to very close to their 2004 emissions or bellow. Thus it is right to assume effective environmental policy instruments to be implemented by EU-10 countries with regard to non-renewable power production, leaving plant operators with newly emerging environmental cost to be incurred as part of the unit cost.

The second major air pollutant of power sector combustion plants we survey in this section is nitrogen-oxides[131]. A well-known acidifying substance, it is also a potent pre-cursor of photochemical urban smog; therefore, it is getting increasingly hard to add a new major NOx emission source to the power sector, industry or transport sector if the existing ones would not reduce their NOx-intensity. Being large and scale-efficient, large combustion plants have been targeted by NOx policy, and were subject to derogation claims by new Member States, as shown by the following figure.

131 Referred to as NOx and measured in NO2 equivalent

Figure 4-20: NOx Emissions, Emission Ceilings and Derogation Allowances by New Member States and their large combustion plants (tonnes, NO2 equivalent)

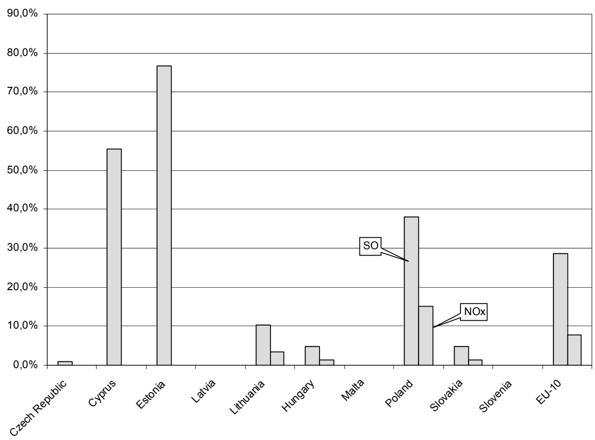


Source: EEA, EPER, LCP Directive, NEC Directive and Accession Treaties

National NOx ceilings appear to be somewhat more ambitious than those for SOx. Most new Member States agreed to cap their overall national NOx emissions by 2010 at their 2004 emission levels. This is especially challenging for the power sector given that NOx emissions by the transportation sector have been growing uninterruptedly in most European countries. In case of SOx, there are no such aggressively growing sectors to compete for the share under the tight overall emission cap.

Derogation allowances for NOx are less significant in absolute terms than those for SOx, though relative data is much more informative. Many governments opted for the slow phase out of the most outdated and inefficient units, requiring somewhat longer grace periods to get enough alternative new power plant capacities invested. In other cases, the strategically important and/or economic plants received effective support to meet the sulphur emission limit values soon as possible. That is why we get a rather polarized picture from the derogation inventory if the volumes of delayed SOx and NOx abatement are presented as percentage of the national total emissions (see the following figure).

Figure 4-21: Rate of Yearly SOx and NOx Emissions Derogated by Accession Treaties as % of National Total Emissions in 2004



Source: EEA, EPER and Accession Treaties

The relatively small power sectors of Cyprus and Estonia have received very high rates of derogation allowances for sulphur emissions with Estonia in the front by more than ¾ of its national total SOx emissions. In the EU-10 as a group, the overall rate of postponed annual sulphur cleanup in the power sector is almost 30% of the sum of total national yearly SOx emissions, with Poland being the most significant weight pulling the figure upwards.
The yearly amount of power sector NOx emissions entitled for a transition period before abatement is a lesser part of national total emissions of the pollutant in each new Member State. While Poland with the biggest power sector in the group achieved 38% derogation allowances for its national SOx emissions, its derogation allowance is not more than 15% of its national NOx emissions. The overall rate of NOx derogation allowances for EU-10 is 9% of yearly NOx emissions by EU-10 (compared to almost 30% in case of SOx). In the following

Table 4-6 we present the annual amounts of delayed pollutions we estimate based on EPER installation data and the deadline for the grace period by countries and pollutants. Besides diplomatic muscle, technological assets and natural endowments seem to have determined the pace of implementing EU environmental policy targets in the power sectors of EU-10.

Table 4-6: Estimated Annual Amounts of Delayed Cleanup of Power Sector Pollutants and Negotiated Termination of Grace Period of 2004 Accession Treaty

	SOx		NOx		PM10	
	annual derogation	until	annual derogation	untilt	annual derogation	until
	t	yr	t	yr	t	yr
Czech Republic	2 010	2008	0	2008	0	
Cyprus	25 110	see note*	0		0	
Estonia	68 390	2011; 2016			7 371	2011; 2016
Latvia	0		0		0	
Lithuania	4 390	2016	1 909	2016	0	
Hungary	12 156	2005	2 408	2005	0	
Malta	0		0		391	2006
Poland	473 038	2016	121 641	2018	see note:**	2018
Slovakia	4 750	2008	1 415	2008	0	
Slovenia	0		0		0	
EU-10	589 844		127 373		7 762	

* until one of the following conditions realizes: upgrade or significant change, natural gas imports start, electricity exports start, current boilers closed
** Emission data could not be found for the 29 municipal heating plants listed in Annex XII to the 2004 Accession Treaty

Source: EEA, EPER and Accession Treaties

We conclude that a significant air pollution clean-up policy has been enforced upon the EU-10 power sector, which definitely involves environmental costs for non-renewable energy producers. Nevertheless, renewable energy producers are enjoying a swift tightening of air emission standards in some of the new Member States, while tightening will take much longer in others. However, the observable time period has been too short to tell if laggards in incorporating external cost into the private costs of non-renewable energy producers would prove laggards in renewable energy growth.

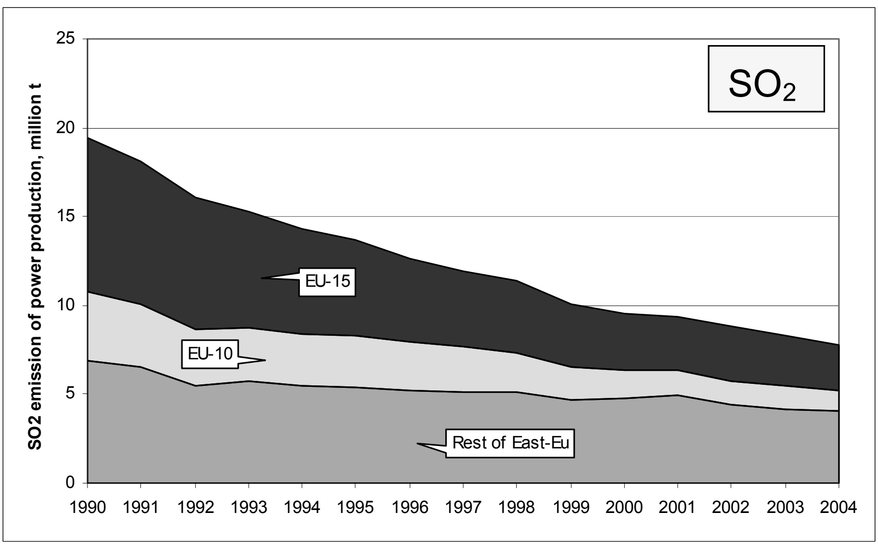
4.4.3. Observed Changes in environmental Performance of Non-Renewable Energy Production

Much effort has been made by EU and national environmental policy makers to improve the environmental performance of the energy sector. Regardless of the regulatory instrument of choice, this process has definitely imposed more and more environmental costs on energy producers. Without adequate cost data, we use emissions data to illustrate that this environmental regulatory process has been effective and pollutions have been reduced, assuming much environmental costs at the non-renewable power plants. We carry on by discussing the cases of three major air pollutants of thermal combustion power plants.

As soon as a control instrument is set for any pollutant, producers with substantial emissions start an adjustment process to find their private optimum of emissions.[132] A non-renewable power plant has many options to abate its emissions of air pollutants. It can switch to cleaner fuels or it can improve its technical assets or technology processes. Besides such substantial changes to fuel and core technical assets, the company can apply subsidiary devices at the power plant to filter and hold back pollutants at the end of the production process, frequently referred to as end-of-pipe abatement techniques. And finally, the company might come to the conclusion that the optimal response requires production cut-back. Any combination of these options might be suspected when we look at the past 15 years of air emissions of power plants in the EU-15 and EU-10 alike.

Firstly, we consider sulphur emissions. As a major source of acidification, sulphur-dioxide (SO2) has long been a target for pollution control policy all over Europe. The following chart (Figure 4-22) shows, however, that EU-15 countries could more swiftly desulphurise their power plant sectors than EU-10 countries. We use a group of several other East-European countries[133] by the name “Rest of East EU” to benchmark our observations.

Figure 4-22: SO2 Emission of Power Production in EU-15, EU-10 and Rest of East-European countries (1990-2004, million tonnes)



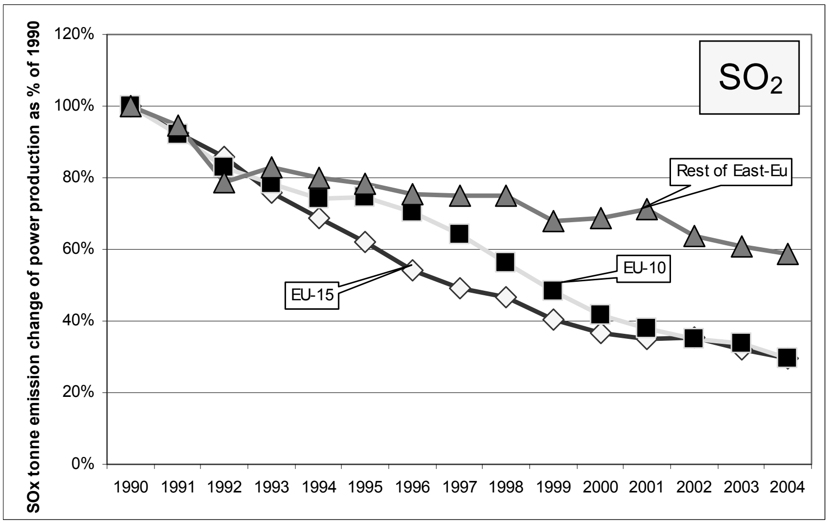
Source: EEA, EUROSTAT

The chart describes the major trends of change, but would not answer whether EU-10 countries did any better than the rest of Eastern-Europe in desulphurising their power sector, an important question if the effectiveness of EU enlargement is examined. The next chart (Figure 3-23) was designed to unveil differences in rate of change of SO2 emissions in the three groups.

132 The private optimum of emissions is best defined as the level of emissions for any regulated company where the cost of reducing its emissions with an incremental unit equals the benefit of cleaning up one more unit of pollution. More formally, where the company’s marginal cost and marginal benefit of pollution control are equal.

133 Belarus, Republic of Moldova, Russian Federation, Ukraine, Bulgaria, Croatia, Macedonia FYR, Romania, Serbia – Montenegro, Turkey.

Figure 4-23: SO2 Emission Change of Power Production (as % of 1990)



Source: EEA, EUROSTAT

A positive picture emerges. While most of Eastern Europe suffered the collapse of their centrally planned heavy industry sectors in the 1990s, this led to an approximately 30-40% decrease of SO2 emissions by the power sector in the group of East-European countries that did not join the European Union in 2004. The rate of desulphurisation has been as much as 70% in EU-10, not less than the clean-up rate of the EU-15 power sector.

A very similar story is outlined in the case of dust emissions by the power sector[134]. Declining overall emissions apply to all three groups of countries (Figure 4-24), but EU-10 countries fare much better than the rest of Eastern Europe when emission volumes are broken down to rates of emissions change (Figure 4-25).

Figure 4-24: Dust Emission of Power Production in EU-15, EU-10, Rest of East-European countries, 1990-2004 (million tonnes PM10 equivalent)

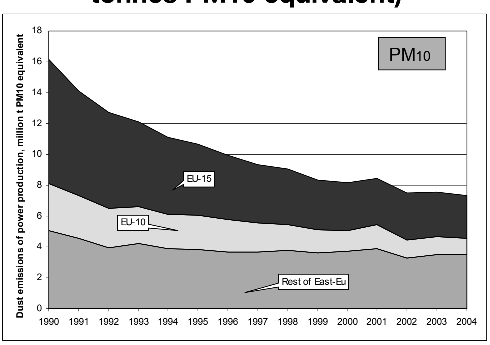
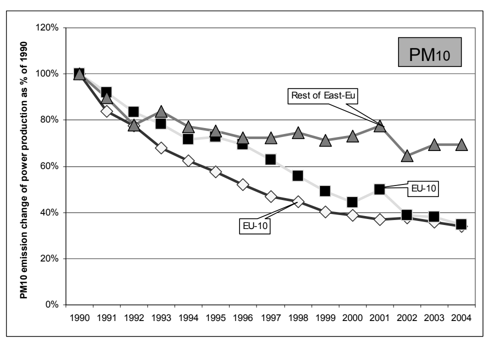


Figure 4-25: Change of Dust Emission by Power Production as % of 1990, PM10 equivalent



Source: EEA, EUROSTAT

134 Dust emissions are measured in PM10, particles of 10 micrometres or less.

Finally we present our observations for nitrogen-oxides.[135] Reducing them is rather easy down to a certain point, but not below that. The clean-up process seems much slower overall than it was for SO2 or dust (see Figure 4-26). If changes are seen as a percentage of 1990 NOx emissions, it reveals that actually EU-10 countries could relatively reduce most of their power plants' NOx emissions (almost 60% of the 1990 volume by 2004), while other East-European countries not joining the EU in 2004 could only decrease their NOx from power plants by less than a quarter, and EU-15 countries could not abate more than 40% (see Figure 4-27). The 'success story' of EU-10 can be explained by the combined effects of the relatively outdated power plant assets operated all over Eastern Europe that are fairly cheap to de-NOx, and the regulatory pressure coming from the accession process prior to the 2004 enlargement, which enforced an effective de-NOx policy upon the EU-10 group of East-European countries.

Figure 4-26: NOx Emission of Power Production in EU-15, EU-10, Rest of East-Europe (1990-2004, million tonnes NO_2 equivalent)

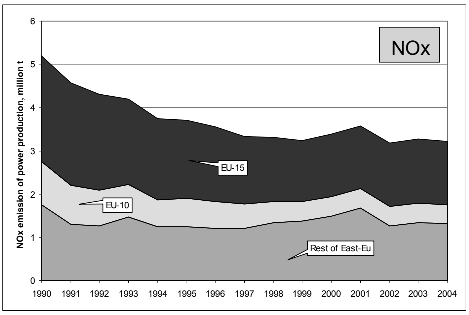
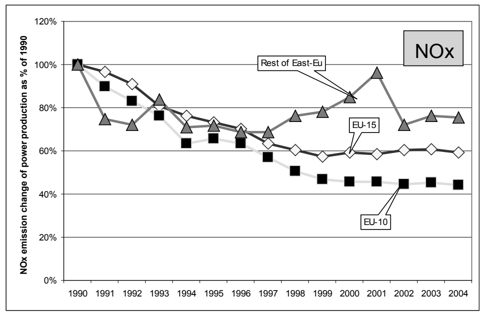


Figure 4-27: NOx Emission Change of Power Production as % of 1990, NO_2 equivalent

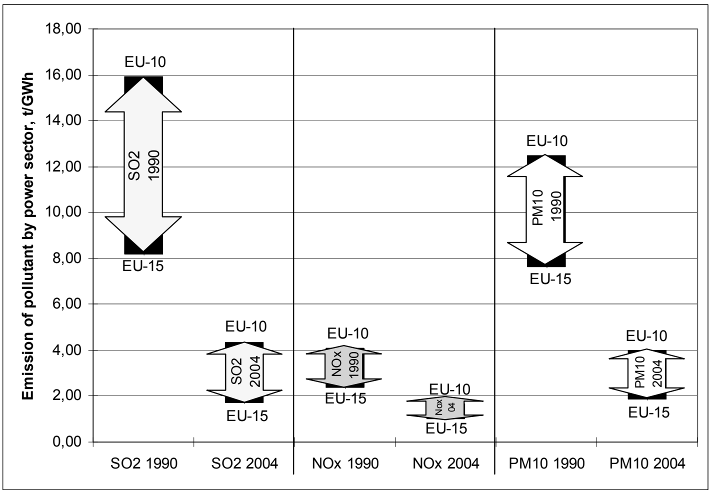


Source: EEA, EUROSTAT

The following chart (Figure 4-28) summarises the cleanup trend observed in the power sector of EU-10. There is a clear convergence between the unit pollution of electricity production in EU-10 and EU-15 countries. Although EU-15 have reduced their unit pollution of electricity production significantly, EU-10 countries have managed to catch up. Part of the tribute may certainly go to the EU accession process, which enforced major improvements in the environmental performance of combustion plants.[136]

135 Referred to as NOx and measured in NO2 equivalent
136 See previous section on implementation of EU environmental policy for reference.

Figure 4-28: Narrowing Gap of Air Pollution by Power Sector in EU-15 and EU-10, (1990-2004, tonnes per GWh)



Source: EEA, EUROSTAT

4.5. Effective internal market policy and competition policy

4.5.1. Introduction

Besides environmental policy regarding non-renewable energy sources, the second most influential EU policy area that has played a crucial but indirect role in the penetration of renewable energy sources is energy policy, especially the Internal Market policy. Major achievements have been made in order to create a competitive and non-discriminatory regulatory framework for the electricity and natural gas sectors. This policy area is explicit about pulling down monopolistic supply structures, liberalizing heavy state regulations, creating lean and fair market regulations, facilitating electricity labelling, switching of supplier and grid access. These are all important elements of a positive regulatory framework from the viewpoint of any new investment in the energy sector. In new Member States, it is even more influential, because their energy sectors have only recently emerged from the state owned, vertically integrated and centrally planned operating model.

Implementing the EU internal market policy brings a new, efficient and feasible business model to the EU-10 energy sector, a kind that new Member States could have enforced only much slower, if ever.

In order to create competitive fuel and electricity markets, the EU has been running antitrust surveillance and a stringent competition policy regarding illegal state aid to incumbent energy companies. The electricity sector has been famously burdened with full-blown and invisible direct and indirect state support schemes the world over, the EU-10 providing more negative than positive examples. Typical of the kind have been unfair tariff design, discriminatory access to grids, authorised cross-financing and long term power purchase agreements. The EU competition policy has been a very powerful brother-in-arms for all new Member State governments who has wished to dismantle obstacles to fair competition. The most positive effect can be seen as a consequence of terminating long term power purchase agreements, what spells closure to a lot of inefficient, polluting, outdated power plant, leaving room for renewables at the margin or as part of a complex refurbishment project.

4.5.2. Renewable Energy at More Affordable Prices

As a consequence of environmental regulation of non-renewable energy sources, terminating illegal state aid to and eliminating cross financing of inefficient producers has resulted in increasing costs for many energy producers, especially for the outdated fossil power plants. Some of them could not survive, others at the margin of supply have contributed to rising prices. In the meantime, a lot of renewable energy technologies have improved efficiency significantly, sales of some renewable energy technical assets have expanded, competition started and development has been induced by carbon finance possibilities, thus, as a most welcome consequence, renewable energy prices have fallen considerably. The two effects combined, rising costs for non-renewables and decreasing costs for renewables, have made some types of renewable energy production as the best choice from the market even without excessive state support.

Besides direct support schemes, there is a significant endogenous driver that indirectly contributes to the penetration of renewable energy production: technological progress. The term refers to a whole range of processes that improve the efficiency of any given industrial technology: innovations, research, development, labour specialisation, new production methods, upscaling of sizes, design improvements, etc. These factors of experience combine in many ways, and most emerging industries enjoy the combined effect: the more the cumulative installed production capacity the lower the unit cost of production. The effect is frequently referred to as the experience curve model or learning curve model because the concept is generally illustrated by unit cost as a function of total installed production capacity.

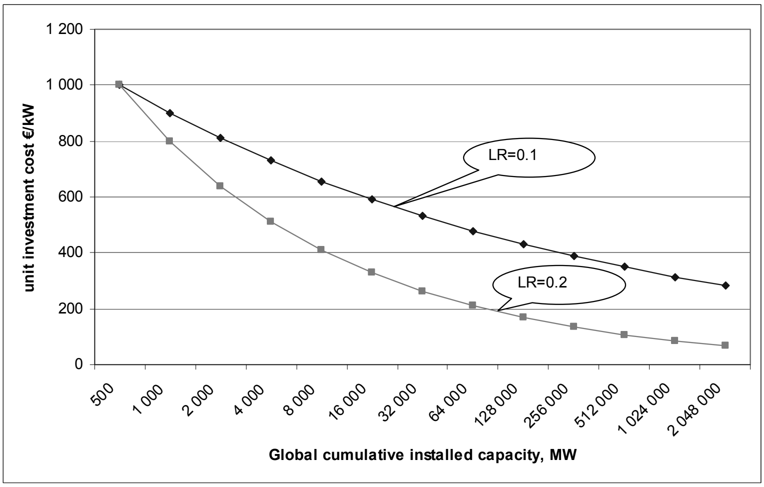
To demonstrate the significance of technological progress with regard to renewable energy penetration in the new Member States, we develop a simplified demonstration of the concept of experience curves based on examples from wind turbine literature.[137] As we later conclude, most renewable energy technologies are distinguished by powerful experience curves. We chose wind electricity as an example because of the awareness it has raised among researchers and investors alike.

Wind turbine installation has soared since the late 1990s the world over, with a total of almost 60 GW accomplished by 2005.[138] The total installed capacity of wind turbines has been doubled four times in the past decade.[139] Such a boom is a great period to enhance experience about production, installation, operation and maintenance of wind turbines. All these contribute to cost efficiency, so cost reduction is explained by factors of experience that builds as the total installed capacity increases. A typical way to express this effect is to estimate the ratio of cost reduction as the cumulative installed capacity doubles. This ratio of cost reduction explained by experience is referred to as progress rate (PR).[140] The rate of costs that is saved by experience is called learning rate (LR); the higher the learning rate the steeper the costs fall.[141]

The following numerical example is based on typical wind turbine data found in empirical literature, characteristic for cost data that wind energy investors to EU-10 encounter.[142] The first graph (Figure 4-29 below) illustrates the effect of experience on unit installation costs for wind turbines. A learning rate of 10% means a slower path of cost reduction compared to the steeper curve of 20% learning rate.[143]

137 GWEC (2006) Jamasb, T. (2006); Neij (1999); Coulomb, L., Neuhoff, K. (2006)
138 GWEC (2006)
139 Junginger, M. et al (2005)
140 An observed PR of 85% means that costs drop to 85% of the previous level by the time the cumulative installed capacity doubles.
141 LR = 1 – PR. If the observed PR is 85%, it means that 15% of the costs are saved by factors of experience by the time the cumulative installed capacity doubles. (LR=0.15).
142 For the sake of simplicity, no discounts were made for time preference in the following examples.
143 Junginger, M. et al (2005) suggests that the larger the wind parks the more effect economies of scale would articulate. Based on their estimate for a global experience curve for wind farms, Juninger et al suggest a progress rate as low as 77% to 85%, with an average of 81%. (pp. 148.)

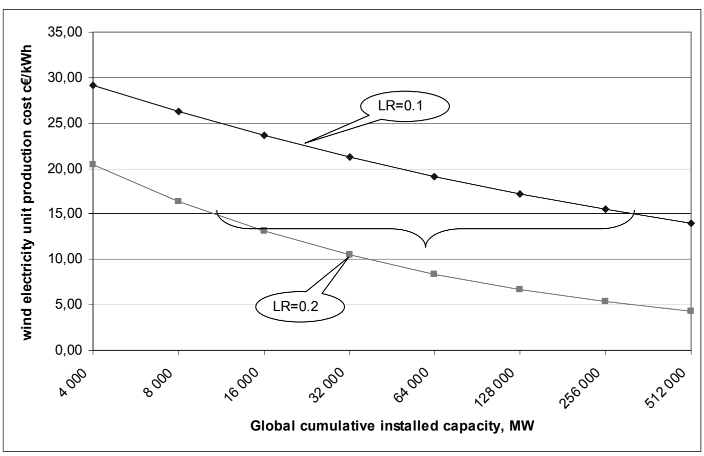
Figure 4-29: Simplified Global Experience Curves for Wind Energy with Learning Rates in the Range observed by Empirical Studies



Source: REKK

Significantly different unit investment costs would cause average cost of wind electricity production to differ as well, because variable costs are very close to zero. But the most important effect to note is that falling unit investment costs would definitely yield falling production unit cost, even with lower rates of learning. The following graph (Figure 4-30) is focused to the period while the global cumulative wind turbine capacity grows from 4 to 512 GW, wind electricity unit cost calculated with 2500 hours of average yearly operation.

Figure 4-30: Wind Energy Experience Curves show fast falling Electricity Unit Production Costs with observed learning rates



Source: REKK

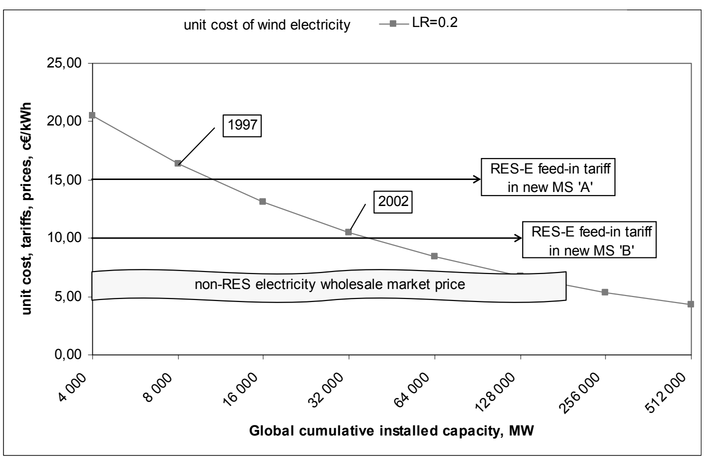
Wind electricity prices fall considerably even with modest rates of learning. Note for example, however, that a learning rate of 10% requires cumulative capacities to double more than four times for the wind electricity prices to fall below 15 cents compared to the cumulative capacity that is required for prices to fall below 15 cents if the learning rate is 20%.

As discussed in the first section of the chapter, new Member States heavily rely on universal purchase obligation regarding renewable electricity. This entails feed-in tariffs that are long-standing enough for investors to make credible payback assumptions, usually as long as 8 to 10 years. As shown above, these relatively stable tariffs are set in a world of constantly decreasing renewable electricity costs, which we proxy by wind electricity.

The following chart (Figure 4-31) demonstrates that sooner or later renewable electricity costs would hit the level of any feed-in tariff regime, the higher the feed-in tariff (and the learning rate) the sooner. The curve below is an experience curve with a progress ratio of 80% (learning rate of 20%).

Let us assume two of the new Member States, each running a feed-in tariff regime. In our example, none of them could get any wind energy investment until 1997 because the regime buying price was too low for the infant industry (cumulative capacity not more than 8 GW globally). As cumulative capacity grew, various factors of experience kept costs falling, and, at one point, new Member State ‘A’ starts to encounter wind energy investments beginning to flow in the country. New Member State ‘B’ is not on the wind energy map until 2002-2003.
By 2003, global capacities over 32 GW have doubled twice since 1997 and even the relatively lower feed-in tariff of country ‘B’ turns to be enough for wind energy producers to start investments. As the chart suggests, technological progress could soon make wind energy competitive with non-renewable electricity, and then wind electricity production would increase without any state support program.

Figure 4-31: Feed-in tariff regimes in a world of technological progress



Source: REKK

Hence, concluding our argument, renewable energy feed-in tariffs need not be excessively high in new Member States to attract renewable energy investors if the industry is characterized by strong technological progress. Even modest feed-in tariffs can turn very attractive as the industry develops along steeply declining experience curves. There comes a time when a pure purchase obligation without any price premium would be enough attraction for a more mature industry.

The above example might be true for wind electricity, but less so for other renewable energy industries. However, a recent study suggests relatively high learning rates for many other renewable technologies (LR>0.5 for waste-to-electricity, LR>0.2 for solar thermal power, LR>0.1 for wind – onshore, LR>0.08 for wind – offshore)[144]. The case might be similar for other, non-electricity renewable energy technologies as well (e.g. biofuels, renewable heat).

Altogether, this section has argued to take note of the considerable cost reductions of some renewable energy technologies when the recent advances of renewable energy utilisation is surveyed in new Member States. The 2004 EU Enlargement has turned the economies of these countries into more secure places to invest, thus EU-10 would start to enjoy renewable energy products at more affordable prices sooner than other non-EU East-European countries. This, we believe, is another considerable indirect driver for renewable energy penetration.

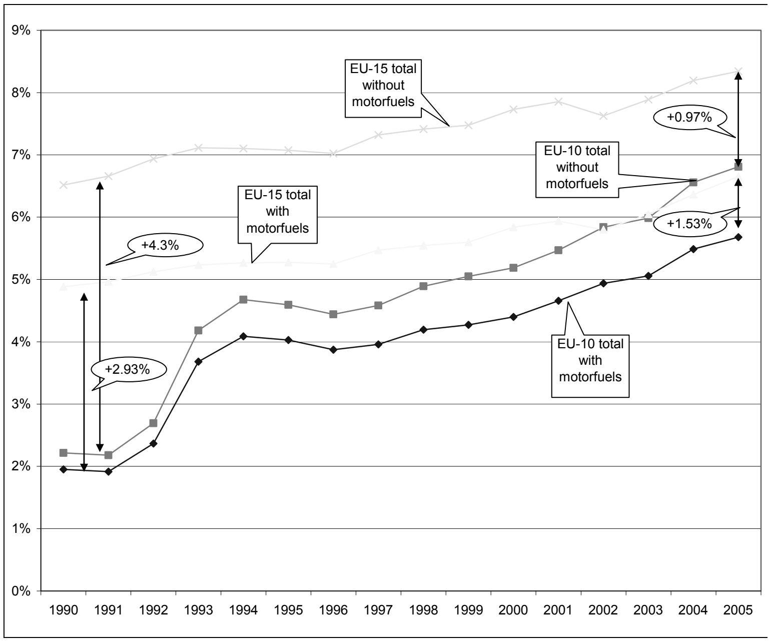
4.6. Conclusions: Renewable Energy Sources

4.6.1. Conclusions

The chapter on renewable energy sources analysed the achievement of the EU-10 towards the community targets in the field of primary renewable energy generation, renewable electricity consumption and renewable motor-fuels consumption in the context of national support policies. It also examined the drive behind the positive tendencies in this group of countries.
As far as renewable primary energy consumption targets are concerned the 10 new Member States have vastly different shares of renewable sources due to their various natural endowments and to a lesser extent to their support policies. The evolution of RES shares in the EU-10 as a group shows distinctive pattern compared to the EU-15. The EU-10 is gradually levelling up to the EU-15 since 1990 and doubled the share of RES in the respective period (2% -> 4,5%) mainly due to the quick increase of heat production from renewable energy sources in the EU-10 (Figure 4-32). This is in striking contrast to RES-E generation where the EU-10 to EU-15 gap appears to be stable. The share of RES heat as % of total heat increased especially between 1991-1994 with households and some district heating to provide a strong and stable consumption of renewable energy sources.

144 Jamasb. T. (2006)

Figure 4-32 The share of production from renewable energy as % of total primary energy consumption with and without motor fuels



Source: EUROSTAT

As for the rest of energy use segments, the new Member States seem to be failing to comply with their EU obligations. New Member States reaching their own national RES-E targets in the process of accession show a rather poor compliance pattern: only Hungary (due to the partial conversion of conventional power plants to biomass) and Latvia (due to its large share of hydropower) have already fulfilled their obligation, the others are all lagging behind. Envisioning a linear path between 2003 and 2010, apart from the Czech Republic no other countries will reach their respective EU target. The implementation of a fully operational Guarantee of Origin system to facilitate trade in electricity from renewable energy sources and to increase consumer transparency shows a somewhat similar picture. Despite that fact that the EU-10 was required to set up such a system by 2004, so far none of them have done so even though the Czech Republic, Estonia, Malta, Poland and Slovakia have passed the required rules. The findings of the 2006 Biofuels Progress Report by the EU Commission i.e. that the 5.57% target by 2010 at the community level will be difficult to meet, is to a great extent due to the serious underperformance of new Member States. The consumption figures in these countries are all bellow 1% (as of 2006) with Cyprus and Malta failing to define a target for 2010.

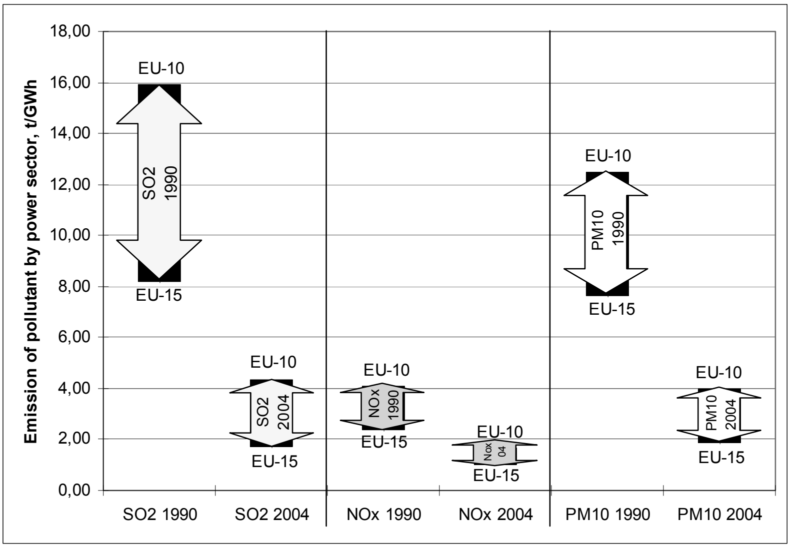
Both the volume of investment support schemes and investments per se have been increasing in the period under consideration. Investment support schemes for RES-E in the majority of the new Member States (Cyprus, Estonia, Hungary, Malta, Slovakia, Slovenia, Poland) have been introduced or updated around or after 2000. At the same time the various foreign (bilateral) and international financial sources to promote the production and consumption of renewable energy have been crowded-out and overwhelmed by EU sources opening up the EU-10 to improve thier chances to comply with their targets set at their accession. At the same time, EU-10 developed gradually a bigger and more balanced RES-E portfolio by embracing wind-turbines and firewood beside the existing legacy of hydro power and municipal solid waste incineration. We would like to stress however that no evidence was found that the growth in installed capacity was (only) induced by EU driven investment funds and incentives.

The support policy choice of the new Member States in general seems to be adequate for the current developmental phase of RES-E technologies being in their infancy. Total RES-E production in this group of countries is stagnating but it is due to the fluctuating and generally low load factor of the massive hydro capacity in the region. Non-hydro RES-E shows a high rate of growth. Behind this state of affairs is the dominant form of production support i.e. general purchase obligation with an authority feed-in tariff introduced or updated around or after 2002. Some countries moved on to quota based regulation but it remains to be seen if the sector is mature enough to provide enough supply in the current regulatory environment.

The causal link between biofuel consumption and the implementation of support schemes is more straightforward than in the case of RES-E. The virtually zero consumption in 2004 (except Poland, the Czech Republic, and Slovakia) changed to the positive range by 2005 (except for Cyprus and Estonia) albeit remaining below 1%, this renders compliance with the EU target rather unlikely. In parallel, in the majority of the countries support schemes were realised around this time in the form of partial or total exemption from excise tax introduced uniformly in all countries. Other forms of support include reduced VAT, exemption from pollution tax, quota obligation, tax relieves for electrical vehicles, financial aid and price rebates for producers. The Czech Republic took an alternative policy direction by introducing a mandatory biofuels rate as a percentage of total marketed motor fuels and thus shifting the cost from tax-payers to car owners and the transport sector. The merit of this regulatory path is not perceived as yet.

While the new Member States implemented renewable energy support policies their utilisation of renewable energy sources increased significantly. However, potentially some other significant drives could stand behind the penetration of renewable energy sources beside the unquestionable positive impact of the EU enlargement process. Environmental policy targeting non-renewable energy sources increase their cost leading to increasing prices and decreasing volumes, while renewable energy enjoys a competitive edge over them to the extent it is less environmentally costly. In power generation this means the need to potentially reshuffle the merit order so as to open up the market for renewable based production. In sum, any tightening in environmental regulation improves the chances of non-polluting renewables to increase their market share. The transposition of the Large Combustion Plant Directive, in this vein, forced non-renewable power generators in the EU-10 to mitigate their air pollution with various time frames depending on the grace periods granted at the accession negotiations. Observed changes in airborne emissions in the past 15 years in the new Member States aligns with this reasoning as it shows quickly decreasing emission levels for the major pollutants (SO2, NOX, PM10). There is a clear convergence between the unit pollution of electricity production in the EU-10 and the EU-15 countries (Figure 4-33). Although the EU-15 has reduced their unit pollution of electricity production significantly, the EU-10 countries have managed to catch up. The positive impact of the accession becomes even more accentuated when compared to the non-acceding CEE countries as a benchmark to find out that these countries do not reproduce the success story of the EU-10. Part of the tribute may certainly go to the EU accession process, which enforced major improvements in the environmental performance of combustion plants.

Figure 4-33 Narrowing Gap of Air Pollution by Power Sector in the EU-15 and the EU-10, (1990-2004, tonnes per GWh)



Source: EEA, EUROSTAT

Besides environmental regulation, internal market and competition policy has an indirect leverage on the penetration of renewable energy sources. It does this by pulling down monopolistic supply structures, liberalizing heavy state regulations, creating lean and fair market regulations, and most importantly terminating long term power purchase agreements. In addition it can shift the generation portfolio from old polluting power plants to renewable based generators at the margin.

The combined effect of the advancement of renewable technologies and the availability of carbon finance cut the costs of renewable energy. This evolution coupled with the rising cost of the non-renewable sectors have made some types of renewable energy production as the best choice from the market even without excessive state support, further supported by the higher investment security accompanied with EU membership.

4.7. Res Conclusions and recommendations

Conclusion: Environmental Regulations

Tightening environmental regulation improves the chances of non-polluting renewables to increase their market share. The transposition of the Large Combustion Plant Directive, in this vein, forced non-renewable power generators in EU-10 to mitigate their air pollution with various time frames depending on the grace periods granted at the accession negotiations. Observed changes in airborne emissions in the past 15 years in the new Member States aligns with this reasoning as it shows quickly decreasing emission levels for the major pollutants (SO2, NOX, PM10).

Recommendation: Environmental Regulations

Environmental policy – more specifically air pollution control - targeting the non-renewable energy sector has considerable impact on the penetration of renewable energy production apart from contributing directly to cleaner air. The utilisation of renewable energy sources hence can be supported by the full and timely implementation of the EU environmental policy package by minimising the grace periods granted to acceding countries.

Conclusion: Rising Renewable Energy

The evolution of RES shares in EU-10 as a group shows distinctive pattern compared to EU-15. EU-10 is gradually levelling up to EU-15 since 1990 and doubled the share of RES in the respective period (2% -> 4,5%) mainly due to the quick increase of heat production from renewable energy sources in EU-10.

Recommendation: Rising Renewable Energy

More policy emphasis should be placed on the direct heat use of renewable energy sources. The 2004 enlargement shows households and district heating constitute a rather important and stable demand for renewable energy sources. This should be considered when setting targets for the share of renewable sources in the total primary energy consumption.

Conclusion: Limited Biofuel Development

The findings of the 2006 Biofuels Progress Report by the EU Commission i.e. that the 5.57% target by 2010 at the community level will be difficult to meet is to a great extent due to the serious underperformance of the new Member States. The consumption figures in these countries are all bellow 1% (as of 2006) with Cyprus and Malta failing to define a target for 2010.

Recommendation: Limited Biofuel Development

The option of differentiated commitments is recommended when setting biofuel targets in further enlargement processes reflecting the vastly different natural endowment of newly acceding states. It can prove to be crucial in avoiding unwanted consequences of flat rate targets such as input trade that could incur considerable transport related environmental damage.

Conclusion: Biofuel Support Schemes

There is a causal link between biofuel consumption and the implementation of support schemes. The virtually zero consumption in 2004 (except Poland, the Czech Republic, and Slovakia) changed to the positive range by 2005 (except for Cyprus and Estonia) At the same time, in the majority of the countries, support schemes were realised around this time in the form of partial or total exemption from excise tax introduced uniformly in all countries. The Czech Republic took an alternative policy direction by introducing a mandatory biofuels rate as a percentage of total marketed motor fuels and thus shifting the cost from tax-payers to car owners and the transport sector.

Recommendation: Biofuel Support Schemes

The merits of biofuels obligation should be considered more seriously not only in the context of future enlargement but in the community as a whole. Such a policy design reflects the polluter-pays principle by making car owners and the transport sector paying for the total cost of the biofuels sector without draining the taxpayers' central budget.

Report on energy efficiency

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5 chapter

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5. Report on energy efficiency

Introduction: Energy Efficiency

In May 2004 ten countries joined the European Union (EU). Eight of these countries are former communist countries of Central and Eastern Europe and the Baltic region. Since the fall of the communism for eight of the countries their energy sectors underwent fundamental reforms and restructuring. After adopting European legislation, the main framework of their energy efficiency policies should be in line with EU requirements. The questions to be asked in this chapter are: What has been the impact of the Accession process in the field of energy efficiency? Are the economies of the New Member States (NMSs) less energy intensive and what have been the drivers behind decline in energy intensities? Are NMSs enforcing EU directives in spirit and not only on paper? Three years after Accession its impacts should be identifiable and should serve to draw important lessons. This includes the actual effectiveness of the enlargement processes in the field of energy efficiency and improvements for the future enlargement processes. The present chapter evaluates the impact of the 2004 Enlargement in the field of energy efficiency by looking at the following issues:

- Have the regulatory framework and investments resulted in a reduced energy intensity of the economies of the new Member States?
- To what extent the New Member States (NMS) are complying with their obligations in the field of the promotion of energy efficiency?

First, we examine the general energy efficiency trends in NMSs since the mid-1990s by looking at the evolution of energy intensities and analyses the major drivers behind these trends. Second, we analyze the extent to which NMSs are complying with their obligations with respect to energy performance of buildings, cogeneration, and labelling of electrical appliances and reviews existing national policies and measures for promoting energy efficiency to provide an overview whether NMSs are complying with European energy efficiency policies in spirit or on paper only. Table 5-1 present the acquis central for the present study. Finally, we look at public institutions for energy efficiency. The full report on which the present chapter is based also examines the evolution of public funding for energy efficiency in NMSs and, taking as a proxy the activity of energy service companies (ESCOs) in each country, sheds light as to evolution of private expenditure. The full report presents further both quantitative and qualitative data and analysis supporting statements made in the present chapter.

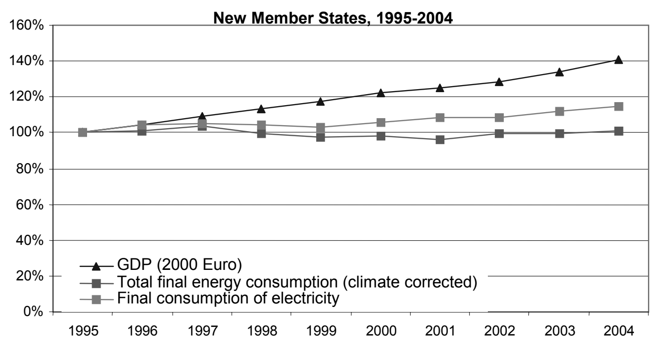
The present study concentrates on the energy efficiency acquis that were effective at the time of the 2004 Enlargement, thus leaving out important recent Directives, such as Directive 2005/32/EC on the eco-design of Energy-using Products (EuP) and Directive 2006/32/EC of on energy end-use efficiency and energy services.
Figure 5-1 shows the decoupling between economic growth, final energy consumption (corrected for climate) and final electricity consumption in NMSs and the EU-15 over the period 1995-2004.

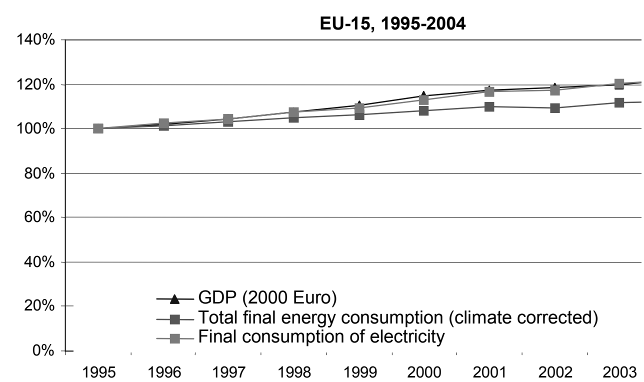
On average GDP grew by 40 % in the 10 NMSs over the period 1995-2004, while final energy consumption (corrected for climate) remained roughly at 1995 level and final electricity consumption increased moderately – on the average by 15 % for the 10 NMSs in 2004 as compared to 1995. This shows that the period since mid-90s till Accession was characterized by high economic growth in NMSs with a low progression in energy consumption or even a reduction in some countries (for example Poland). In the EU-15 GDP grew by roughly 20% over the same period, while climate corrected final energy consumption increased by 12%. Final electricity consumption increased with the same rate as GDP in the EU-15, i.e. by roughly 20% over the decade in question. The next section examines this decoupling between economic growth and final energy consumption in greater detail over the decade preceding the Accession.

Table 5-1 European legislation on energy end-use efficiency covered in study

Directives for the promotion of energy end-use efficiency	Adoption	Transposition	Coverage in the present study
Labelling Directives (9) and Efficiency Standards (3)			X
Energy Performance of Buildings Directive (EPBD)	Nov. 2002	Jan. 2006 (almost all MSs will make full use of the 3-year extension)	X
CHP Directive	Feb. 2004	Feb. 2006 (delayed because of comitology)	X

Figure 5-1 Decoupling of economic growth, final energy consumption (climate corrected) and final electricity consumption in New Member States and in EU-15, 1995-2004 (1995=100)





Source: Enerdata, calculations of the authors

5.1 Energy intensity of the economies of the new Member States

The key indicator to follow the development in the efficiency of energy use is energy intensity. It shows the amount of energy necessary to produce one unit of GDP. Any change in energy intensity is due to the combined effect of a few factors that can work in opposite directions, most importantly:

1. Efficiency improvements via the spread of energy efficient equipment, behaviour and practices,
2. Changes in the GDP structure between sectors (structural changes),
3. Increase in energy substitutions favouring energies with high end-use efficiency (e.g. district heating, natural gas), and
4. Improvement in living standards (affecting e.g. the level of heating or cooling comfort, household appliance utilisation).

The indicator of energy intensity is subject to a number of adjustments in order to correct as much as possible for the effect on the change in energy intensity change of other external factors, not related to efficiency improvements. Most importantly these adjustments aim at correcting for the impact of economic structures and climatic differences. This allows a meaningful comparison among countries with different economic and industrial structures and with different climates, as well as allowing a look at the trends in a given country over time, clearing the impact of structural changes. Trends can be observed that exclude changing economic structures and weather conditions. This section uses data and indicators commercially available from the World Energy Database of Enerdata (NRD-Link 4.1.NMC software); explanation on the technicalities and methods used for corrections are available from the software database and online.[145] At the time of writing the present draft report (spring-summer 2007) the NMC dataset was available till 2004 (with gaps for some countries). Nevertheless this is the most comprehensive set with data and indicators for energy efficiency analysis in countries across Europe.

It needs to be emphasised at this point that the choice of reference period – 1995-2004 – determines the trends and developments discussed in the sections to follow. This period has been chosen to capture the pre-Accession process and also due to data availability from the World Energy Database of Enerdata. It should be noted however that major reforms took place in most countries in the period between 1990 and 1996-97. This has an impact on the results and their interpretation insofar as the Enerdata dataset used applies a Divisia decomposition, which takes into account structural changes compared to the previous year.

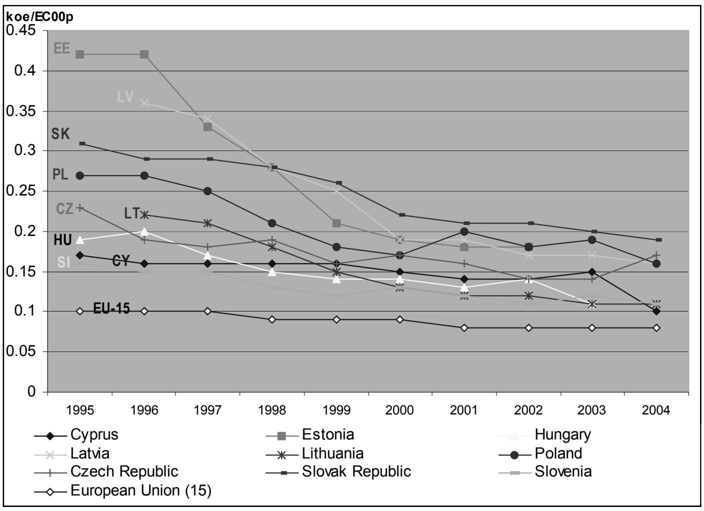
Over the 90s the restructuring of gross inland consumption in NMSs was more linked to changes in the structure of final energy demand than to fuel changes in the power sector. Primary demand for coal has dropped as a result of substitution by natural gas in the residential and tertiary sector and the significant contraction in demand from more efficient and re-structured industrial sector. It has been stated that gas' growing share in NMSs was more linked to a rise in domestic and tertiary demand than to a rapid expansion of gas-fired generation (Global Insight and IWW 2004).

145 The compilation of data and indicators for NMSs has been supported under the Intelligent Energy Europe program, see www.odyssee-indicators.org (see also concise definitions of indicators used in the present work).

5.1.1 Final energy intensity trends: 1995-2004

Final energy intensity reflects the energy productivity of final consumers, excluding energy transformations (the power sector is discussed in a separate section) and non-energy use. Figure 5-2 shows final energy intensity in New Member States adjusted for industry, economic structure and climate and expressed in purchasing power parities (PPP).146 The adjustment for industry, economic structure and climate avoids penalizing – e.g. identifying as inefficient – countries with a larger share of energy intensive industrial branches and/or colder climates, while rewarding – e.g. calling efficient – countries with smaller share of energy intensive branches and/or warmer climates.

Figure 5-2 Final energy intensity adjusted for industry, economic structure and climate (PPP, 2000): years 1996-2004



Source: Enerdata. Note: Energy intensity is expressed in Euro at 2000 prices and 2000 purchasing power parities (EC00p)

As can be seen in 1996 all NMSs had adjusted final energy intensities that on the average were more than 2 times higher than the EU-15 average; some countries (Estonia, Latvia and Slovakia) had adjusted final intensities more than 3 times higher than the EU-15 average. Because the adjusted final energy intensity corrects the differences in economic and industrial structure as well as the difference in climate, this gap between adjusted final intensities in NMSs (Candidate Countries at that time) and EU-15 can be explained by inefficiencies, as well as quicker decline in GDP than in energy use due to collapsing heavy industries in the early years of transition.

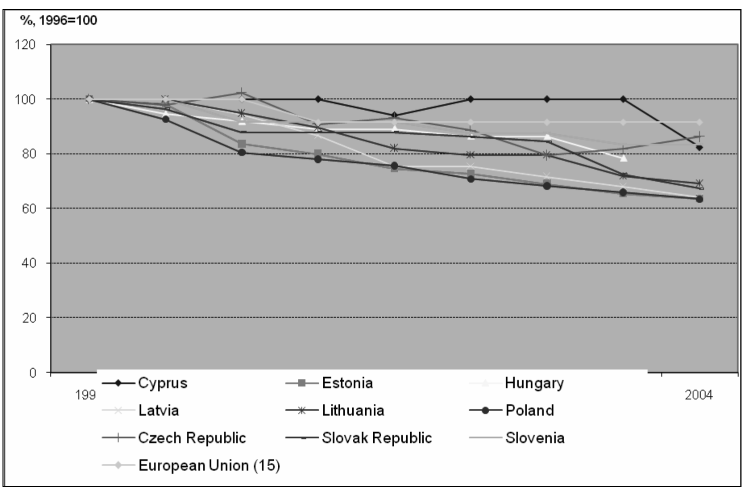
As early as 2000 the gap between energy intensities in NMSs and the average EU-15 began closing: the average difference between NMSs and the EU-15 started decreasing, but still

146 Enerdata defines the final energy intensity at reference economic structure as a fictitious value of the final intensity of a country calculated by taking for each economic sector and industrial branch the actual sectoral intensity of the country and the economic structure (i.e. the share of each sector and branch in the GDP) of a reference country (e.g. the EU average for instance). The final energy at reference climate is calculated by scaling the space heating consumption of households and service to a reference climate (e.g. EU average) on the basis of degree days. Because the adjusted structure takes for each year the EU-average structure, it is changing over time and is thus only suitable to give a snapshot comparing different countries in a given year and not for observing trends over time in the same country (in-country trends are presented next).

remained large. In 2004 a few countries already had adjusted final energy intensities close to the EU-15 average. While the gap between NMSs and the EU-15 average is closing, as of 2004 all NMSs still have adjusted final energy intensities above EU-15 average and in some cases (Poland, Slovakia, Latvia) as much as twice as high as the EU-15 average. For most NMSs adjusted final energy intensity is still more than 50 % higher than the EU-15 average, which signals significant inefficiencies. Among the 13 countries that have adjusted final energy intensities of 120 % EU-25 average the number of old and NMSs from 2004 Enlargement is equal (six each, plus Bulgaria); however among the five worst performing countries there is only one 'old' MS.

Since the collapse of the communist regimes, the economies of eight of the NMSs underwent major structural changes towards less intensive economic structures and more value added production. Some have held that structural changes have been the single major driver of energy intensity decline in NMSs. This however does not appear to be the case: in order to eliminate the impact of structural changes on the indicator energy intensity, it is instructive to look at final energy intensity at constant economic structure.[147] By looking at the evolution of this indicator one can observe national trends in energy efficiency over time, clearing energy intensity from the influence of structural changes and weather. Final energy intensity cleared from the impact of structural changes declined by approximately 30 % between 1996 and 2004 on the average in the post-communist NMSs (see Figure 5-3). The Baltic States, Poland and Slovakia saw the greatest decline in final energy intensity at constant economic structure: between 1996 and 2004 this indicator went down by almost 40 %. For a comparison final energy intensity at constant structure went down by mere 10% in the EU-15. In the Baltic States and Poland the decline in energy intensity cleared from structural changes was greatest in the late 90s, while in Slovakia and Hungary it was greater after the turn of the 21st century (see appendix in the full report).

Figure 5-3 Final energy intensity at constant structure (climate corrected) in NMSs 1996-2004 (1996=100)

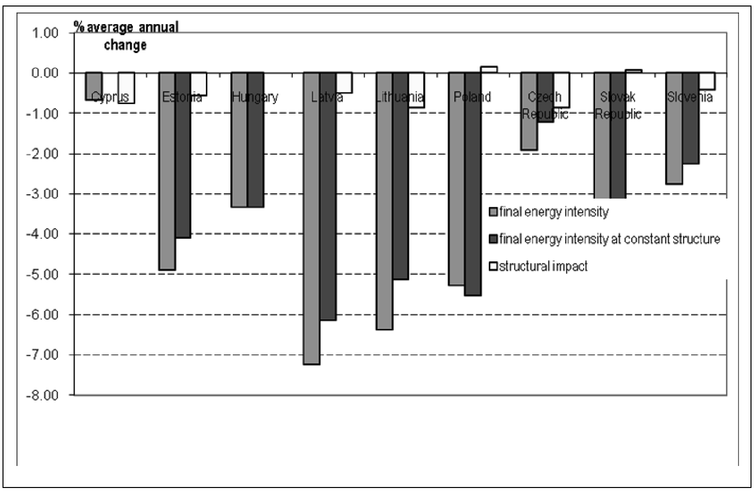


Source: Enerdata. No data for Hungary for 2004

147 According to Enerdata definition the final energy intensity at constant structure is a theoretical intensity that would result from all sectors growing at the same rate as the GDP (i.e. constant GDP structure and constant structure of industry) and using the actual values of sectoral intensities. The calculation of the indicator by Enerdata is carried out at the level of the 7 sectors (mining, manufacturing, construction, agriculture, tertiary, transport and residential) and 10 major industrial branches.

To show the exact impact of structural changes of the economy on the energy intensity change in each country, Figure 5-4 compares the changes in the actual energy intensity with the changes in energy intensity at constant structure over the period 1995. At the level of the entire economy the impact of structural changes on energy intensity improvements – shown by the yellow bar – has been limited in most NMSs in the period indicated (different is the case of manufacturing, which is discussed in the next section). The only exception is the Czech Republic, where structural change accounted for more than 40% in final energy intensity decline in the period 1996-2004 and Cyprus, where the entire improvement in energy intensity was due to structural change. Structural impact accounted for 15% of final energy intensity decrease in Slovenia. In Lithuania, Estonia and Latvia structural change accounted for 13%, 12% and 7% of the decrease in final energy intensities, respectively. All these countries moved to less intensive structures of their economies. Poland and to a very insignificant extent Slovakia have moved to more energy intensive economic structures in the period 1995-2004.

Figure 5-4 Average annual changes in final energy intensity (actual and at constant structure), the impact of structural change, 1995-2004



Source: Enerdata, calculations of the author. Note: Data for Latvia and Lithuania starts from 1997, for the Slovak republic and Slovenia from 1996 (not 1995). No data on Malta, hence this country is omitted.

A closer examination of the impact of structural changes in the two sub-periods – 1995-2000 and 2000-2004 – reveals that the impact of structural changes was much stronger in the period 1995-2000 accounting for as much as 15-40% of final intensity decrease in the Baltic States and 5-10% of the intensity decrease in Poland, Hungary and Slovakia. The stronger impact of structural changes in the late 1990s is attributed to foreign direct investments: the move towards lower energy intensity occurred as mass privatisation was completed and large green field investments turned productive. In the period 2000-2004 the impact of structural changes was mostly towards more intensive structure: it should be again noted that the decomposition method used in the present dataset always takes into account structural changes compared to the previous year.

5.1.2. Drivers

Over the period 1995-2004 NMSs have seen a significant decline in final energy intensity.[148] As demonstrated in the previous section, structural changes in the economies of these countries have not been a major driver of this decline over the period 1995-2004. Clearly the Accession process has provided a major impetus to the improvement of energy efficiency in NMSs, mostly via associated general economic drivers and indirect policy impacts. The most important among the drivers behind energy efficiency improvements have been energy prices, growing economic output and economic cooperation with EU-15 countries, changing structure and modernisation of the industrial sector (see 1.1.3), the decommissioning or refurbishment of inefficient Soviet-era technologies, and competitive pressure in an ever-globalising world.

Increased activity in economic and business processes associated with both the transition to market economy and the Enlargement contributed significantly to energy intensity decreases in NMSs. Healthy economic growth and new investments gave rise to efficiency gains since new investments applying modern technologies are more energy efficient than existing installations. NMSs experienced the global trends towards more added value industry with structural changes bringing on average 10% energy intensity decrease in most countries in the decade prior to Enlargement with a more pronounced impact of structural changes in the late 1990s.[149] In addition, economic cooperation with EU countries and the move of EU-15 companies to produce in the NMS countries contributed to the changing structure of economies and industries in NMSs. During and after the late 1990s a lot of modernisation took place in NMSs also due to complete amortisation; this has been a window of opportunity for energy efficiency to “piggy-back” on general equipment replacement.

Heavy energy price increases that accompany the gradual ongoing phase-out of direct and indirect energy price subsidies and the fact that in some NMSs energy prices have grown a lot in both absolute and relative terms show that energy prices also have played a role in efficiency improvements.[150] After the late 1990s most NMSs have been abolishing state-controlled price regimes and gradually phasing out direct and indirect price subsidies, which often meant heavy price increases. For example, looking at the ratio of industry to household electricity prices in the Visegrád countries (see Figure 5-5), one can see how cross-subsidization between industrial and residential prices gradually decreased over the 1990s and had finally approached the EU-15 level at the time of Accession. Although a lot of cross-financing practices have been ended before privatization took place (or parallel to that), some forms of broad indirect subsidies still remain in some countries[151]. As the process of energy price increase has been going in parallel with a serious growth of GDP, housing, consumption, etc., it is very hard to attempt a de-coupling of the two effects in the scope of the present project.
Energy price levels in NMSs have been exceeding these in ‘old’ MSs in purchasing power parities. Furthermore, looking at the relative increase in energy prices – change in consumer

148 Over the 90s the final energy demand in NMSs witnessed major changes both on fuel and on sectoral bases. On a fuel basis there has been a shift away from coal towards oil, electricity and gas driven demand. The share of heat in final energy demand decreased significantly over the 90s. In the same period a significant sectoral shift in final energy demand took place with large increases in the share of households and tertiary sectors and also the transport sector (Global Insight and IWW 2004; Global Insight and IWW 2005).

149 the impact of structural change has been stronger in the industrial sector

150 It would be enlightening to look at the exact impact of energy price changes on the changes in sectoral energy intensities (cleared from structural effects or weather effects in the case of household consumption). However, due to lack of a sufficient number of observations on sectoral energy intensities at constant structure (only 10 annual observations available from the NMC database), looking even at a simple correlation between changes in sectoral energy intensities at constant structure and changes in energy prices cannot produce meaningful results.

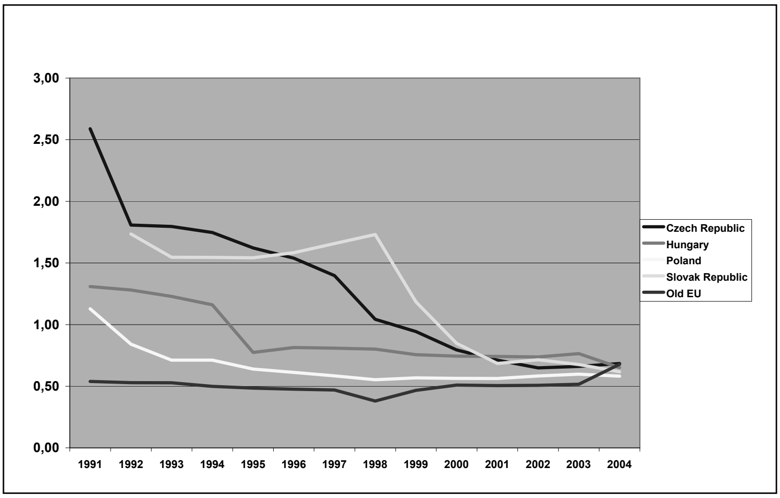
151 For example see the residential gas price calculation formula in Hungary.

price index (CPI) and change in retail price of electricity and natural gas – in the Czech Republic, Hungary and Poland one can observe that both inflation has been high in these countries and at the same time retail prices of electricity and natural gas have grown at a rate much faster than consumer prices (see appendix in the full report).

It is thus reasonable to expect that energy price increases triggered short-term price responses (typically behaviour related, i.e. energy management) and set the ground for long-term investment-related responses (i.e. equipment, processes).

Finally, fuel poverty and affordability have had an impact in terms of comfort restrictions that lead to reduction in energy consumption.

Figure 5-5 Ratio of Industry/Household electricity prices



Note: Using PPPS. The prices include tax and were measured in $/kWh.
Source: IEA (2005c), Eurostat, calculations of the authors

As discussed later in this section, one can expect that energy efficiency acquis transposed as part of the Accession process has had some effect on energy intensity decrease in NMSs, but this effect could have been significantly larger with a more robust national commitment and implementation effort. Since the 2004 Enlargement the body of energy efficiency acquis has grown: transposition of some important directives was only obligatory after 2004 (2006 in the case of the CHP and EPBD, see discussions later) and new directives were adopted (the Ecodesign Directive 2005/32/EC and the Energy Services Direvice 2006/32/EC). With proper implementation and enforcement efforts at national level, these regulations together with general environmental regulations (such as the IPPC Directive, the EU ETS, energy taxation) being introduced as part of the Accession process have the potential to spur investments in energy efficiency in future enlargments.

Other drivers of energy efficiency in NMSs include technological developments and social and individual behaviour: while these can develop independently following market incentives, in NMSs they often need additional support by government policies, resources or actions.

5.1.3. Final energy intensity in the industrial sector and manufacturing

There has been a very rapid decrease of the energy intensities of industry in most NMSs: on the average the decrease was around 8%/year across NMSs over the period 1995-2004, which is way above the decrease in the EU-15. The decrease in the energy intensity of manufacturing in Poland and Estonia has exceeded 10 %/year over the period 1996-2004. The reduction in intensities has slowed down in most NMSs since the turn of the century (Lapillone and Pollier 2007b). Some NMSs – the Czech Republic and Slovakia, for example – still have a high share of industry exceeding 40% of final energy consumption; however least energy intensive branches (equipment) in these countries account for most of the value added of manufacturing (Lapillone and Pollier 2007b).

However part of the decrease in industrial energy intensity has been due to changing structure of the industrial sectors in post-communist NMSs, including decommissioning and closures. The impact of structural changes on the energy intensity of manufacturing has been rather strong in some NMS over the period 1995-2004, especially in the Czech Republic, the Baltic states, Hungary, Cyprus and Poland (see Figure 5-6). The negative value of impact of structural changes (yellow bar) indicates move towards less energy intensive manufacturing branches for most of countries – over the given period this move has been very pronounced in the Czech Republic and the Baltic states (esp. Lithuania) and to a lesser extent in Hungary, Cyprus and Poland. The positive value of the structural changes indicator shows move to more energy intensive manufacturing branches – the case of Slovakia and especially Slovenia over the period 1995-2004. The case of Lithuania is especially noticeable – the actual energy intensity of manufacturing decreased by almost 9 %/y, but this was entirely caused by structural changes and indeed in constant structure the energy intensity increased by 2 %/y. Structural changes explain roughly one third of the overall final energy intensity reduction of manufacturing in Estonia, Poland and slightly less in Hungary; structural changes account for more than half of the intensity decrease of manufacturing in Latvia and the entire decrease of intensity of manufacturing in the Czech Republic. It is hard not to attribute part of the decline in manufacturing energy intensities to higher energy prices.

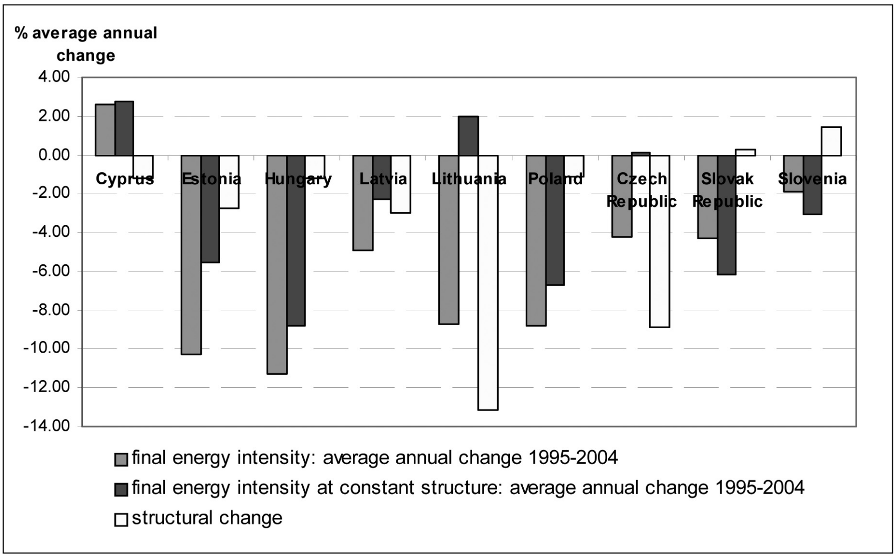
The preliminary estimates of annual progress in energy efficiency in industry over the periods 1996-2004 using the ODEX energy efficiency index152 (Lapillone and Pollier 2007b) reveal that industrial energy efficiency progress was uneven among countries: in Poland it exceeded 7%/year and in Hungary it was 5%/year.

- Clearly the industrial sectors of NMSs saw huge energy intensity decreases, even if some of these were driven by structural change. Nevertheless one can conclude that despite the absence of specific European legislation on energy efficiency in industrial equipment, processes or practices:
- the industry of NMS has undergone a process of restructuring and modernization subsequent to privatisation and in response to global competitive pressure.
- efficiency improvements have occurred due to impact of rising energy prices, and

efficiency improvements have occurred due to the impact of policies and measures that have had an indirect impact on efficiency in industry (the CHP Directive and national CHP promotion schemes, the EU ETS, IPPC Directive, voluntary programs);

152 ODEX is an overall energy efficiency index constructed within the framework of the Odyssee project, calculated as a weighted average of the unit consumption index of each sub-sector or end-use, with a weight based on the relative consumption of each sub-sector in the base year; to reduce fluctuations a 3-year moving average is used.

Figure 5-6 The impact of structural change on energy intensity of manufacturing, 1995-2004 (average annual change in final intensity of manufacturing at actual and at constant structure)



Source: Enerdata, calculations of the author.

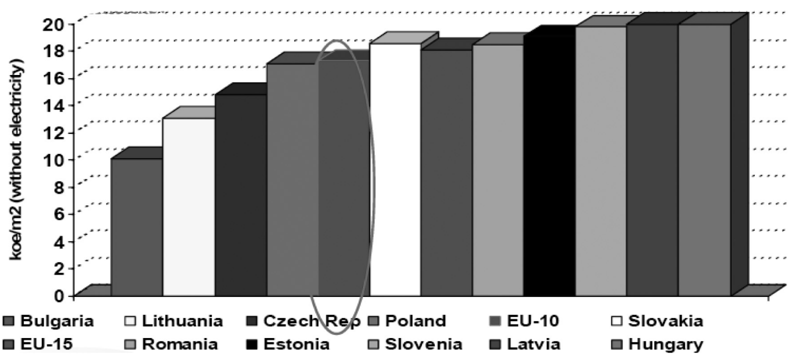
5.1.4. Trends in the residential sector

In this work we use the energy consumption per square meter as a indicator for energy efficiency in the residential sector. Two thirds of energy consumption of buildings is used for heating and cooling, making a large part of demand determined by climate and weather conditions. This is what necessitates scaling the unit energy consumption per square meter to average European climate in order to compare space heating consumption of countries with different space heating requirements[153]. Figure 5-7 shows the average consumption per square meter for thermal uses in NMSs adjusted for EU-15 average climate. While high values indicate poorer efficiency, low values should be interpreted with caution. As Lapillone and Pollier (2007c) note, low value of thermal consumption per square meter does not necessarily mean efficiency, but can reflect drastic price increase and restriction of comfort. In other words households in NMSs may consume less heat and electricity (Figure 5-7 only shows thermal uses) because they cannot afford to heat, light, etc. their houses adequately. Expressed in purchasing power parities, energy prices in NMSs are often higher than in 'old' MSs (IEA 2005b). Inadequate heating and restriction of comfort in NMSs is shown by the considerably high percentage of households reporting that they cannot afford to keep their homes adequately – around 20 % in most post-communist NMSs cannot afford to heat their homes adequately (Eurostat 2005). In Central and Eastern European countries the reported share is between 3 % in Slovenia and 17 % in Slovakia, while in the Baltic states it is considerably higher, exceeding 30 % in Latvia and 50 % in Lithuania (Eurostat 2005). For comparison the same survey (Eurostat 2005 and references herein) shows that in more than half of the old MSs less than 10 % of respondents

153 Unit consumption is scaled to space heating consumption to the average climate in the European Union on the basis of a relative number of degree days. Note that the Figure below is based on revised for unit consumption per dwelling (as of early 2007), provided in personal communication with an Enerdata expert and the Enerdata values on dwelling size.

claim they cannot warm their houses adequately[154]. Some social groups, such as pensioners, are more hit by these changes than others.

Figure 5-7 Average consumption per m2 for thermal uses with climatic corrections (koe/m2)



Source: Lapillone and Pollier 2007c

Restrictions of comfort have a lot to do with the share of disposable expenditures spent on household fuel and electricity as a percentage of total private consumption: for example in Slovakia in 2002 households spent 10-15% of their revenues on energy bills on average and this percentage was about 25-30 % for low-income families as compared to less than 3 % of revenue of German households for energy bills (IEA 2005b); in Poland average household expenses on fuel are also around 10% of disposable income (Ürge-Vorsatz et al 2003 and references herein). In Lithuania in 2001 households spent on average less than 10 % of disposable income on fuel and electricity (Ðtreimikienë and Zaikienë 2004); interestingly Ðtreimikienë and Zaikienë (2004) show that the poorest fifth of the population in Lithuania spends even smaller share of their disposable income on household fuel and electricity, which clearly shows self-restriction on consumption[155].

Inadequate heating is related to poor quality of housing: in the post-Communist NMSs on the average almost 30 % of households report rot in their houses (windows, doors and floors) and almost 20 % of households report damp and leaks (Eurostat 2005). For comparison in EU-15 countries leaky roof, rot in window frames, and damp walls are reported by less than 20 % in all countries with the exception of Greece and Portugal. IEA (2004a) quotes a 2001 estimate of the World Bank according to which heat losses within buildings in Eastern Europe are 25-40 % higher than the design values.

The trends in residential electricity consumption in NMSs differ by country with very rapid growth in some countries (Malta, Cyprus, the Baltics) and decrease in others (Slovakia and the Czech Republic). It needs to be noted that the decrease in electricity consumption per dwelling in Slovakia and Czech Republic, as well as low growth in residential electricity consumption in Slovenia, Hungary and Poland, are explained to a certain extend by price increases (around 18%/year in the period 1996-2004 in the case of Slovakia, 10%/year in the Czech Republic and Hungary) (Lapillone and Pollier 2007c). The structure of residential electricity consumption is also worth noting: in NMSs refrigerators and freezers, together

154 The share of respondents that clam they cannot adequately warm their homes exceeds 40 % in Spain and Portugal

155 What percentage of total income is spent on household energy depends on the price of purchased fuel, the mix of fuels used and the level of residential energy demand per unit of income (Unander 2004).

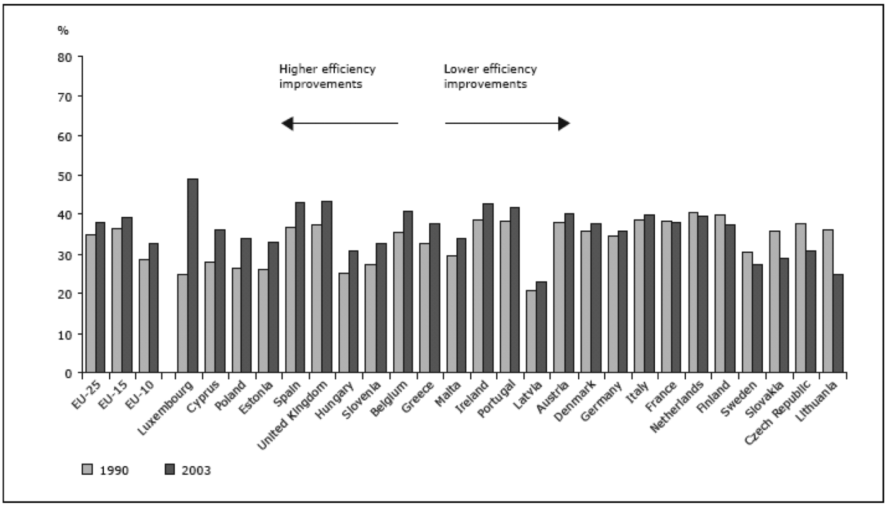
with lighting are more constitute the largest electricity end-use; very little electricity is used for space heating and cooling (unlike the EU-15 where electric space heating is the largest electricity end-use) (Bertoldi and Atanasiu 2007).

All these, along with the more limited and slower responsiveness of the residential sector to price signals, points towards a greater importance of policy action in the residential sector, especially with respect to housing, both at national and European levels. While regulations have an important role to play in new construction and with respect to efficiency in household appliances and lighting consumption, in existing buildings financing mechanisms have a crucial role to play due to slow refurbishing cycles. Since households may have more difficult access to capital markets than industrial consumers and/or are unwilling to invest in energy efficiency due to well-known barriers to energy efficiency, coupling of financial incentive schemes with strengthening policy actions in residential energy efficiency should be a priority. This is even more important given that with rising living standards the share of the residential sector in final energy consumption is growing. Especially fast is the growth in electricity consumption in the residential sector, pointing to the need of special policy attention.

5.1.5. Efficiency of conventional thermal electricity production

The efficiency of electricity production from conventional thermal power plants improved steadily between 1990 and 2003 in most NMSs, most notably Cyprus, Poland, Estonia, but also Hungary, Slovenia and Malta (EEA 2006). This was due to the closure of old inefficient plants, improvements in existing technologies and the installation of new, more efficient technologies. Significant decreases in the efficienc y of electricity production were seen in Lithuania and the Czech Republic between 1990 and 2003, but a closer examination shows a sharp fall in efficiencies during the period of economic transition in the early 90s due to the low utilisation of plants. This was followed by steadily increasing efficiencies in more recent years due to higher load factors on existing plants, refurbishment and new investment. In the NMSs, the efficiency in electricity generation increased at a higher rate (+ 3.7 %) than in the EU-15 Member States (+ 2.5 %) between 1990 and 2003. Despite this converging trend, the electricity conversion efficiency is still 6.9 % lower in the new Member States on average (EEA 2006). Gas-fired generation technology has seen the largest increases in efficiency, growing at an average annual rate of 2.9% for all NMSs in the period 1993-2003 (Global Insight and IWW 2005). Significant advancements in power generation efficiency have been the result of increased penetration of combined heat and power systems (see discussion and case studies later).

Figure 5-8 Efficiency of electricity and of electricity and heat production from conventional thermal plants, 1990 and 2003



Source: (EEA 2006)

Note: the efficiency is calculated as total electricity output from conventional thermal power plants divided by total fuel input. In some Member States, the efficiency of combined heat and electricity production increased faster than that of electricity production alone. Source of data: Eurostat

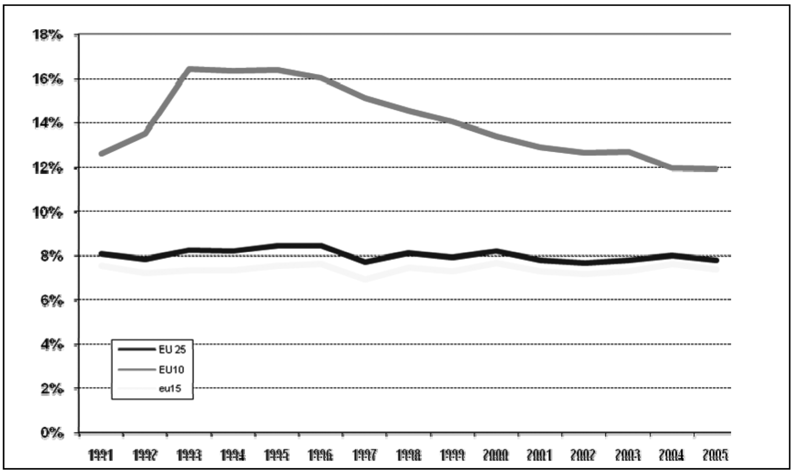
Over the period 1990-2001 there was a large share increase of hydro in total installed capacity (especially in the first half of the 1990s) in NMSs and, to a lesser extent, of nuclear capacity, accompanied by reductions in the share of conventional power stations. Generation of electricity from gas was the fastest growing segment in NMSs, increasing by 68% between 1990 and 2003, with the second most rapid increase being production of electricity from nuclear, which grew by 26 % over the same period[156] (Global Insight and IWW 2005).

From efficiency point of equally important to fuel switch, there have been significant reductions in the volume of electricity network losses from 1993 onwards (see Figure 5-9). Transmission and distribution losses declined from over 16% in 1993 to 12% in 2003 on the average in NMSs; however there still remains a large gap between NMS average and EU-15 average values (below 8%). A large share of this is due to commercial losses (theft and non-payment) – on the average almost 20% of households in post-communist NMSs state that they are facing utility bill arrears (Eurostat 2005).[157]

156 The Czech Republic, Slovakia, Hungary, Lithuania and Slovenia have nuclear capacity.

157 Utility bills go beyond energy-related bills, but the share gives an orientation about the scale of the problem. The lowest share is 7 % in the Czech Republic, the highest 25 % and 28 % in Latvia and Poland, respectively.

Figure 5-9 Electricity network losses in NMSs and EU-15, 1991-2004



Source: Eurostat 2005, calculations REKK[158]

5.1.6. Summary and conclusions: section 2

Energy intensity is the key indicator to follow the development in the efficiency of energy use. The period between mid-90s and Accession was characterised by rapid decrease in energy intensities in NMSs: during the decade prior to 2004 Enlargement energy intensities have been falling faster in NMSs than the EU-15 average, which implies strong decoupling of energy use from economic growth. Since the collapse of the communist regimes, the economies of eight of the NMSs underwent major structural changes towards less intensive economic structures and more value added production. Nevertheless at the level of the entire economy structural changes have not been the single major driver of energy intensity decline in NMSs: final energy intensity cleared from the impact of structural changes declined by approximately 30% between 1996 and 2004 on the average in the post-communist NMSs. For a comparison, final energy intensity at constant structure went down by 10% in EU-15. The Baltic States, Poland and Slovakia saw the greatest decline in final energy intensity at constant economic structure: between 1996 and 2004 this indicator went down by almost 40%. Over the period 1995-2004 on macro level the impact of structural changes on energy intensity decrease has been limited in most NMSs, accounting for around 10% of energy intensity decrease in most countries; a closer examination of the impact of structural changes over time reveals that it was stronger in the period 1995-2000 with mass privatisation, massive foreign direct investments (including large green field investments) and a shift towards lower energy intensity and higher added value industrial branches. However, despite obvious progress over the decade before Accession, as of 2004 the adjusted final energy intensities of NMSs were still mostly above EU-15 average and in general higher than can be expected for their level of economic development[159].

158 The above calculations are based on Eurostat data on distributions losses and energy available for final consumption. The distribution losses consist of losses due to transport or distribution of electrical energy, heat, natural gas and derived gases. Energy available for final consumption covers the energy placed at the disposal of final users. For the above indicators only the category of electricity was used .

159 The expectation is that rising GDP/capita drives falling energy intensities. However in Appendix J look at GDP/capita in purchasing power standards and final energy intensity adjusted for economic and industrial structure and climate in two NMSs in Central Europe, two Baltic NMSs and EU-15 average in 1995, 2000 and 2004 and over the

Progress in energy efficiency in industry over the period 1996-2004 was uneven among NMSs countries: in Poland it exceeded 7%/year and in Hungary it was 5%/year. While energy intensities of industry decreased in most NMSs, in some cases exceeding 8%/year in the period 1995-2004, part of this intensity decrease has been due to changing structure of the industrial sectors in post-communist NMSs, including decommissioning and closures. The impact of structural changes on the energy intensity of manufacturing has been rather strong in some NMS over the period 1995-2004, especially in the Czech Republic, the Baltic states, Hungary, Cyprus and Poland. It seems likely that part of the decline in manufacturing energy intensities is attributable to higher energy prices.

While households in NMSs consume energy for space heating comparable to EU-15 average per square meter, this might have less to do with adequate thermal characteristics of buildings than with restriction of comfort and self-restriction of consuming energy services (e.g. inadequate heating and lighting levels). Expressed in purchasing power parities, energy prices in NMSs are often higher than in ‘old’ MSs and on the average one in every five in most post-communist NMSs cannot afford to heat their homes adequately, this share being much higher in the Baltic states. In post-communist NMSs approximately one in three households report rots in their houses (windows, doors and floors), one in five report damp and leaks and in general heat losses within buildings in Eastern Europe were estimated to be much higher than the design values.

All these, along with the more limited and slower responsiveness of the residential sector to price signals, points towards a greater importance of policy action in the residential sector, especially with respect to buildings (housing), both at national and European levels.
Finally, the efficiency in electricity generation in NMSs increased at a higher rate than in the EU-15 between 1990 and 2003, however in 2003 still remaining below EU-15 average. Significant advancements in power generation efficiency have been the result of increased penetration of combined heat and power systems. Gas-fired generation technology has seen the largest increases in efficiency. In addition, over the period 1990-2005 there have been significant reductions in the volume of electricity network losses from 1993 onwards: transmission and distribution losses declined from over 16% in 1993 to 12% in 2003 on the average in NMSs. The remaining gap in network losses may be explained largely with theft and non-payment.

entire period. The figures show that the adjusted final energy intensities of these countries are higher than can be expected for their level of economic development: for instance GDP/capita in PPS in the Czech Republic in 2004 was close to the value of the EU-15 in 1995, but adjusted final energy intensity in the Czech Republic was 50 % higher than this of EU-15 in the respective years.

5.2 Obligations in the field of the promotion of energy efficiency

This section examines national policy frameworks introduced in NMSs to promote energy efficiency before going into detail of implementation of specific European legislation on energy efficiency in NMSs (Table 1-1 in provides a list of energy efficiency acquis effective at the time of the 2004 Enlargement).

5.2.1 Policies and measures promoting energy efficiency in NMSs

Table 1-2 below provides a summary of the national energy efficiency policy frameworks in NMSs. The full report contains country fact sheets with energy efficiency policies and measures. While energy efficiency needs to be integrated into national energy policies, the existence of dedicated energy efficiency primary legislation gives a stronger signal about actual commitment to implementing stated objectives. A comprehensive energy efficiency law sets the legislative framework for energy efficiency; this can include energy efficiency and energy conservation targets, measures to achieve these, institutions and financial means and frameworks to ensure implementation, monitoring and evaluation. As of early 2007 energy efficiency acts are rare in NMSs: in almost all NMSs the legislative framework for energy efficiency is set via general energy, electricity or heat laws. The Czech Republic is a notable exception with the Energy Management Act introduced in 2000. In Poland there is an Act on Thermo-Modernisation and a related fund.

Energy efficiency strategies have been introduced in almost all NMSs. However the general lack of comprehensive national studies on energy conservation potentials makes it less clear how priority measures in strategies have been set. More importantly it is often unclear how activities envisaged in national strategies will be financed, monitored and evaluated. Almost all NMSs have declared a general target (or targets) to decrease energy intensity, increase energy efficiency or stabilise energy consumption growth. While such targets do constitute an open and verifiable commitment that can serve as a guidepost for analysts, benchmark for project promoters and a force that can catalyse governmental action, often such targets are rather general declarations. Quantitative energy efficiency targets have not been broken down into annual targets and/or into sectoral targets (in Slovenia there are sectoral saving targets) and there has been no rigorous monitoring of progress against the target[160]. The existence of various goals in different national policies and international agreements and often no clear direction anywhere has been a problem. In many occasions the baselines against which relative targets have been calculated undermine the meaning of the intensity improvement. For example in Hungary the tentative target of annual energy intensity decrease of 3.5 % is estimated against a business-as-usual scenario of 5 % annual GDP growth (since 2000 actual GDP growth has been around 4 %/year) and a growth rate of energy consumption of 1.5 %/year. Finally, action plans have often failed to clearly define ‘implementation calendar’ with roles and responsibilities of each organisation involved.

With the transposition and implementation of the Energy End-Use an Energy Service Directive this situation is expected to change insofar as NMSs introduce and enforce measures to meet a national saving target.

160 There have been no systematic efforts at national level in any country to monitor progress against targets that has been attributable to increased efficiency rather than other factors, such as price increases and structural changes.

Almost all countries have introduced grants and/or soft loan support schemes promoting energy efficiency measures that cover all energy end-use sectors. However a major critique in most countries is the lack of systematic monitoring of the impact and cost-effectiveness of these; an interesting example of monitoring activity is the penetration indicators for different measures stipulated in the grant program in Cyprus. In addition amounts distributed under such programs have fluctuated greatly among years, jeopardising policy continuity with respect to energy efficiency promotional activities.

Research funds for energy efficiency have been scarce and usually focussed on fossil fuel and nuclear research. Policy research that is instrumental for policy design remains a largely under-financed activity, which puts national policy-makers at risk of designing policies without understanding where the big saving potentials are and ensuing inefficiencies in the distribution of public resources and implementation difficulties.

Voluntary agreements are rare (e.g. Estonia). Utility demand-side management programs are virtually unknown in the region. On the contrary utilities have engaged in encouraging consumption – for example in Hungary an electricity distribution company was engaged in promoting air conditioning, including via financial incentives.

Information activities have been undertaken by the institutions in charge of energy efficiency policy formulation and implementation, however this has mostly been done via scattered projects rather than a comprehensive, sustained and continuous attempt to engage the public in energy efficiency actions (see more details in the section on labelling).

In all NMSs energy is subject to basic VAT rate (sometimes district heating is excluded). All NMSs have various transitional arrangements under the Energy Tax Directive. Slovenia and Estonia have introduced a carbon tax and the Czech Republic will be introducing a carbon tax in 2008. In the Czech Republic a green tax reform is planned. An interesting observation is that Hungary has the highest excise duties on heavy fuel oil for heating in the EU, Cyprus and Malta have high excise duties on natural gas for heating, Slovenia has a very high excise on coal and coke for heating, and Poland has fairly high excise tax on electricity.

Some integrated policy tools have been introduced in a few countries: for instance energy audits are mandatory for large energy users (public and private, above certain thresholds) in the Czech Republic and there is a possibility to apply for a subsidy to undertake an audit. In Poland an energy audit is a pre-condition for applying for support under the Thermal Modernisation Fund: support can be granted if an energy audit shows that the investment can be paid back within 10 years using energy savings. Similarly in Slovenia the preparation of a local energy concept is a condition for state aid for energy projects according to the Energy Law. Further examples of successful integration of energy efficiency objectives in larger economic policies include Hungary (the Szechenyi plan that places energy efficiency measures in a medium-term economic development plan) and Slovakia (the action plan 2002-2012 developed with the support of the World Bank).

Last, but not least, environmental criteria in public procurement have only been mandated in the Czech Republic, while such criteria can be included on a voluntary basis by public bodies in Hungary, Latvia, Poland, Slovakia and Slovenia. However cash-constrained municipalities may tend to go for the lowest first-cost investment offer rather than for minimising lifecycle operational costs and thus simply allowing for inclusion of environmental criteria in public tenders may lead to limited results.

As the sections to follow will demonstrate, NMSs have focused policy efforts on transposing European directives, but shown less commitment to actual implementation, proper enforcement, and pro-active energy efficiency related policy-making beyond the acquis. While NMSs have declared their support to energy efficiency in principle, they have generally introduced a scattering of 'soft' policy documents and of investment support schemes insofar as budgetary constraints allow it, while the necessary acts, self-sustaining financial resource and institutional backup are still mainly lacking, therefore severely limiting the impact of policy declarations. This has also been largely attributed to limited local institutional capacity, political and stakeholder support. The Czech Republic is the only country where there is a dedicated energy efficiency law, where green products are prioritised in public tenders and where energy audits are mandatory for both public and private large energy users.

Table 5-2 Energy efficiency policies and measures in New Member States

	CY	CZ	EE	HU	LV	LT	MT	PL	SK	SI
Dedicated (separate) Energy Efficiency Law	No	Yes (Energy Management Act)	No	No	No, but proposal pending	No	No	Yes (Thermo-Modernisation Law); a new EE law in preparation	No	No
Energy saving targets in secondary legislation	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
Preferential loan schemes for EE R: residential sector, P: public sector, I: industrial sector	No	Yes (R,P)	Yes (R)	Yes (R, I, P)	Yes (R,P)	No	No	Yes (R,P)	No	No
EE subsidy programs R: residential sector, P: public sector, I: industrial sector	Yes (R,I,P)	Yes (R, I, P)	No	Yes (R, I, P)	Yes (R,P)	Yes (R)	Yes (R)	Yes (R,P)	Yes (R, I)	Yes(R, I, P)
Research and development funds for EE	No	No	No	Yes	No	yes	No	No	No	No
Utility demand-side management programs	No	No	No	No	No	No	No	No	No	No1
Environmental or EE provisions in public procurement	No	Mandatory	No	Voluntary	Voluntary	No	No	Voluntary	Voluntary	Voluntary

	CY	CZ	EE	HU	LV	LT	MT	PL	SK	SI
Provisions for energy audits	No	Mandatory for large energy users	Yes	Yes	Yes	Yes	No	Mandatory for state subsidy	No	Yes1
Energy taxation (transitional arrangements under the Energy Tax Directive)	No transitional provisions besides the ones in the Treaty of Accession.	Total or partial exemptions on electricity, natural gas, solid fuels Green tax reform planned	Transitional arrangemen ts: electricity, exemptions for oil shale	Transitiona l arrangeme nts: electricity, gas and solid fuels for district heating	Transitional arrangement: heavy fuel for heating, electricity, natural gas, solid fuels	Full exemption till 2010L electricity, gas, solid fuels	Transition al arrangeme nts: electricity, natural gas, solid fuels	Transitional arrangements: heavy oil for heating, electricity, natural gas, solid fuels	Transitional arrangements: electricity, natural gas, solid fuels	Transitiona l arrangeme nts: natural gas
Information campaigns, awareness raising for EE	Yes	Yes	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes
Voluntary agreements	No	No	Yes	No	No	No	No	No	No	No
VAT rates on energy, preferential/reduced rates	15%VAT	19%VAT 5% for heat	18%VAT 5% for DH	20%VAT	18%VAT	18%VAT, 9%VAT heating	18% VAT, 5%VAT for electricity supply	22%VAT	19%VAT	20% VAT
Carbon taxation	No carbon tax.	Carbon tax to be introduced in 2008	GHG tax	No carbon tax	No carbon tax.	No carbon tax	No carbon tax	No carbon tax	No carbon tax	Carbon tax.

5.2.2 Major policy drivers and priorities on the energy efficiency policy agenda in NMSs

To establish the major policy drivers and the origin of policy priorities on the energy efficiency agenda in NMSs, a questionnaire was distributed among officials of the energy efficiency state administration in NMSs. Responses were obtained from nine of the 2004 NMSs (with the exception of Poland); the results are summarised below and the list of respondent organisations – seven national administrations (energy efficiency agencies or Ministries), one university representative (Malta) and one researcher (Latvia) – is included in the List of personal communications at the end of the present document. Despite numerous and sustained efforts of the authors to contact state authorities and energy efficiency experts in Poland over the period May-July 2007, no response on the questionnaire could be obtained.

All countries indicated that the strongest driver for introducing new energy efficiency policies were legal requirements associated with EU membership. Second strongest driver were environmental concerns (Czech Republic, Latvia, Malta, Slovakia and Slovenia), security of supply (Estonia), national competitiveness (Hungary) and social policy issues (Lithuania). In preparing energy efficiency policies employment creation, network stability and successful lobbying of interested businesses were indicated as important factors too.

Another interesting point is whether NMSs place a comparable focus on the supply side or on demand-side energy efficiency. A good proxy for this would be the distribution of public funds for energy efficiency among supply and demand-side sectors. Such information is generally not available, but nine NMSs supplied qualitative information in the scope of this project on the sectors that use the largest share of public funds for energy efficiency available. The complete results are summarized in the full report.

Supply side energy projects generally get the largest share of public funds for energy efficiency in half the countries represented. In Lithuania the highest share of governmental funding went to public buildings while in Slovakia in the industrial sector. In Cyprus, Malta and Slovenia the largest share of governmental funding went to the residential sector. The residential sector is high on the agenda in the Czech Republic, Estonia, Latvia; in Hungary and Cyprus industry is the second sector that benefits from public support. Public buildings usually only come after the energy sector and residential (and in some cases industrial sector) when it comes to public funds for energy efficiency in the countries presented; Lithuania, Malta, Slovenia and Slovakia put a strong focus on energy efficiency in the public sector.

In two of the nine responding countries a shift in governmental funding priorities has been reported: in Latvia earlier the energy sector received the largest share of public funds, now public buildings and residential sector receive the largest share of public funds, while in Cyprus earlier industry and tertiary received the largest share of public funds, while now the importance of the residential sector as a recipient of governmental energy efficiency funds is growing. In Latvia this change has been explained primarily by social policy issues and legal requirements related to EU membership. In Cyprus this change has been explained by legal requirements associated with EU membership, environmental concerns and security of supply issues.

Finally, the nine NMSs that participated in the survey indicated the three sustainable energy policy areas where strongest policy and legislative effort has been made over the period 2000-2005. Product-related legislation (household appliances), energy performance of buildings, along with RES-E and efficient generation are the areas quoted by almost all countries as the focal points of their legislative and policy efforts in the Accession period. Not surprisingly these are the areas with European legislation. On the other hand none of the countries indicated particular effort in areas such as public procurement or energy service promotion or involving energy suppliers in energy service provision. In some countries giving financial incentives has been an important area (Cyprus, Hungary, Lithuania, Malta and Slovakia).

5.2.3 Energy performance of buildings directive

The objectives of the Energy Performance of Buildings Directive (EPBD) are promoting the improvement of energy performance of buildings within the EU through cost-effective measures and convergence of building standards towards those of Member States, which already have ambitious levels. Within the EPBD framework Member States are to:

- Establish the details of methodology (based on technical annex; taking account of existing and draft European standards);
- Set minimum energy performance requirements;
- Establish the details and format of certification systems;
- Establish the details of boiler/AC inspection/assessment schemes.

The deadline for complete transposition of the EPBD came almost two years after the Enlargement: on 4 January 2006 with possible extensions under the provisions related to certification schemes and inspections of boilers and air-conditioning systems only justified by lack of qualified and/or accredited experts. The complexity of the Directive in terms of establishing national calculation methods and software tools, certification of existing buildings, experts, training and financial issues has slowed down progress. Among the 25 MSs (in 2006) only 10 countries notified transposition of the Directive fully or partially by the deadline. Denmark, Ireland and Italy notified full transposition, while Austria, Belgium, Germany, Lithuania, Latvia, Poland and Slovakia notified partial transposition. By December 2006 15 Member States received a reasoned opinion from the Commission, out of these 6 are New Member States: Cyprus, Malta and Hungary (reasoned opinions sent in June 2006), the Czech Republic and Slovakia (reasoned opinion in October 2006) and Slovenia (reasoned opinion in December 2006).

Table 5-3 summarizes the legal context of transposing the EPBD, as well as the administrative bodies in charge of this. As of the end of 2006 many New Member States – old and new – have already enacted legislation or have it at a very advanced stage of legislative procedure. As can be seen from the table some countries have introduced or are in the process of promulgating new laws (for instance Latvia and Slovakia), other countries amended existing acts. Secondary legislation has been introduced or is in process of being prepared or promulgated in all NMSs. Due to the diversity of provision responsibility for different parts of the EPBD is often shared between different ministries, which slows down the process.

Table 5-4 summarizes the implementation of the main themes of the EPBD in NMSs[161]. With respect to the calculation procedure, it can be seen that some NMSs have already adopted the calculation procedures and have the software in place (Hungary and Lithuania), while other have the procedure in pending legislation (Poland and Slovakia), or have it under development with a specified date of implementation (Estonia, Latvia and Slovenia). Requirements for new and for existing buildings are mostly in place (Hungary, Latvia, Lithuania, Slovakia and Slovenia) or planned (Poland and Estonia).

161 Information in the table represents state of the art of late 2006 or early 2007.

With respect to certification of buildings Lithuania introduced certification for new buildings from 2007 and Slovakia introduced certification for small residential buildings. A general trend is the application of certification first in new buildings and then (or at the same time in some cases) in existing buildings. Most countries plan introducing certification for new buildings from 2008 and for existing buildings from 2009: thus certification for all buildings from 2009. Implementation is more advanced in residential buildings than in non-residential buildings and on public display. Certification for new buildings is quite different from certification of existing buildings: the details of construction, descriptions and plans are more easily available for new buildings, there are no metered consumptions and the possibility of providing recommendations for improvements will be relatively limited. Implementation is more advanced in residential buildings than in non-residential buildings and on public display (EPBD Buildings Platform 2006).

Inspection of boilers and especially of air conditioning systems is the area where a lot of complexities occur. Some countries plan to introduce inspections from 2008 (Slovakia, Lithuania and Estonia), most envisage boiler and air conditioning inspections from 2009.
In most countries requirements for independent experts have been defined and training materials are under preparation (with training institutions already appointed in Lithuania, for example).

While as of January 2007 Slovakia reported full transposition of the EPBD, it is clear by now that most NMSs – and indeed most MSs - request the 3-year extension. The expectations are that in the course of 2007 and 2008 building certification will be well underway in some NMSs for new buildings, public buildings and, to a lesser extent, existing buildings. The whole EPBD will not be in force across the whole Europe before 2009 (Maldonado 2006).

Negative factors that undermine implementation efforts at national level include administrative hurdles, such as lack of staff and contrary interests among implementing institutions, along with lack of awareness of the positive effects of the EPBD on national economics and the variety of approaches among MSs that hinders exchange of experiences (Elsberger 2007).

Table 5-3 Legal context and implementing bodies of EPBD in New Member States as of end of 2006

	Legal context	Implementing bodies	Further notes
CY	Energy Performance Building Regulation (EPBR) is under preparation	Ministry of Commerce, Industry and Tourism	Reasoned opinion sent on 28 June 2006
CZ	Amendment of the Energy Management Act, An executive decree to the Energy Management Act has been developed and submitted to the Ministry of Industry and Trade	Ministry of Industry and Trade	Reasoned opinion sent on 12 October 2006.
EE	Act transposing the EPBD and amending 5 different legal acts promulgated in September 2006. The execution orders to be prepared by the Ministry.	Ministry of Economic Affairs and Communications	
HU	Articles 3,4,5 and 6 – Ministerial Order TNM 7/2006 in force since September 2006 Article 8 – text prepared since 2005, no order yet (uncertain whether certification should be a pre-condition for real estate ownership)	Formerly State Office of Housing and Building (art. 3,4,5,6 and 7) and the Ministry of Economy and Transport (art. 8 and 9). The State Office was closed in June 2006, now Housing Affairs department of the Ministry of Local Government and Regional Development	Reasoned opinion sent on 28 June 2006
LV	Draft Building Energy Efficiency Law (intentions to promulgate in 2007)	Ministry of Economy	
LT	Additional article in the Law on Construction (art. 2,4,5,6,7), Law amending the Law on Energy (art. 8 and 9) Acts of “Technical provisions of construction”, source: Dilkyte 2006	Ministry of Environment (art. 3,4,5,6,7 and partially 10) and Ministry of Economy (art. 8,9, and partially 10). Certification Centre of Construction Products (MoE).	

	Legal context	Implementing bodies	Further notes
MT	Legal Notice 238/2006 “Minimum Requirements on the Energy Performance of Building Regulations, 2006” under the Malta Resources Authority Act – art. 4, 5 and 6.	Building Construction Industry Department	Reasoned opinion sent on 28 June 2006
PL	Ordinance of the Ministry of Infrastructure from 2002 on technical conditions and location required for buildings (partial implementation) In Dec. 2006 a new version of the draft Act on buildings and apartments energy assessment system and inspection of installations within a scope of energy efficiency. In 2006 the draft version of the Act about building energy performance and inspection of various appliances, together with necessary amendments to the existing regulations and acts such as Thermomodernisation Act, Act about Real-Estate Economy, and Building Code was developed. In October 2006 Chancellery of the Prime Minister asked the Ministry of Construction to analyze once again all legal obligations allowing the EPBD implementation	Ministry of Construction	Partial implementation was introduced by the Ordinance from 2002
SK	Act 555/2005 on Energy Performance of Buildings in force since Jan 2006, execution Order 625/2006 of the Ministry of Construction and Regional Development, Act 17/2007 on regular inspections of boilers, heating systems and air-cond systems	Ministry of Construction and Regional Development (art. 3,4,5,6,7) and Ministry of Economy (art. 8 and 9)	Reasoned opinion sent on 12 October 2006
SI	Building Construction Act (art. 3,4, 5.1. and 6), Amendments to the Energy Act (art. 5.2, 7, 9, 10), Environmental Protection Act (art. 8 and 10). Rules on efficient use of energy in buildings (art. 3,4, 5/1 and 6) will be adopted in or after the second quarter of 2007.	Ministry of Environment and Spatial Planning	Reasoned opinion sent on 12 December 2006

Sources: (BEEN 2006), (EPBD Buildings Platform 2006)

Table 5-4 Status of transposition of the EPBD in NMS (status as of the end of 2006)

	Calculation procedures	Requirements for new buildings	Requirements for existing buildings	Certification of buildings	Independent experts	Inspection of boilers and air conditioning
CY	Energy Performance Building Regulation (EPBR) is under preparation; CEN standards used	Under preparation			Definition of the independent experts not yet finalized; experts should be accredited (regulation on the security of the electromechanical installations)	
CZ	A calculation methodology proposed in the draft implementing regulation to the Energy Management Act	Set in the draft implementing regulation to the Energy Management Act	Same as for new buildings, set in the draft implementing regulation to the Energy Management Act	From Jan. 2009	Energy auditors and authorized engineers to be trained	Set in the draft implementing regulation to the Energy Management Act: inspections of boilers mandatory from January 2007, of air-conditioning systems from January 2009

	Calculation procedures	Requirements for new buildings	Requirements for existing buildings	Certification of buildings	Independent experts	Inspection of boilers and air conditioning
EE	Planned for January 2008***	Planned for January 2008. Dependent on the function and type of building and may cover max. acceptable U-value and max. consumption per m2 of floor area	Planned for January 2008 the latest. Different from requirements for new buildings.	For new and existing buildings: January 2009	Detailed requirements for energy auditors and certifiers: planned January 2008	Boiler procedures in the executive orders to be drafted. Mandatory from January 2008. AC procedures under discussion, executive order expected before the end of 2008. Option B (advice)
HU	Adopted. Software tool	Requirements in force for building permits requested after Sept. 2006. Depend on function, type and surface to volume ratio of buildings. 3-tier: max. U-value, specific heat demand coefficient (W/m3K),, primary energy consumption/m2	Requirements in force since Sept. 2006 in case of major renovations of existing buildings above 1000 m2 or where the added value of investment is more than 25 %. Same as for new buildings	No regulation yet. Unclear if certification should be a pre-condition for real estate ownership. Expected certification in 2007;	No regulation on training of independent experts. Hungarian Chamber of Engineers and Hungarian Chamber of Architects in charge of training.	No regulation yet. Executive order on inspection of air conditioners not before the end of 2008. Discussions in progress between Ministry of Economy and Transport and professionals

	Calculation procedures	Requirements for new buildings	Requirements for existing buildings	Certification of buildings	Independent experts	Inspection of boilers and air conditioning
LV***	Planned for 2009	Not adopted yet for all new buildings. Amendments (2006) of the Latvian Building Code (2001)	The same as for existing buildings, adoption planned for 2009	Planned for 2009, a prototype developed by the Housing Agency The draft Law on EE foresees a regulation on energy certificates	No training yet; the draft Law on EE foresees a regulation on energy auditors and energy auditors register;	Not adopted yet
LT	Adopted (Building Technical Regulation), Software adopted	In place The performance class of new buildings (building part) no less than C.		For new buildings: in force from January 2007, for existing and refurbished existing – from January 2009.	Two training institutions. Training materials for boiler inspectors under preparation.	Inspection of boilers above 10 kW effective rated capacity from 2007; inspection of boilers 20-100 and AC systems above 12 kW – from 2008
MT	Not adopted yet Draft procedure for residential buildings	In place Minimum requirements for the energy performance of buildings set for separate building elements (floors, windows, walls and roofs).	In place Minimum requirements for the energy performance of buildings set for separate building elements (floors, windows, walls and roofs).	Not adopted yet 3-year extension requested for art. 7, 8, 9 and 15.	Expected by the end of 2008.	Under discussion Draft expected by the end of 2007.

	Calculation procedures	Requirements for new buildings	Requirements for existing buildings	Certification of buildings	Independent experts	Inspection of boilers and air conditioning
PL	In the draft law and secondary legislation, planned for Autumn 2006***	Maximum U-value and infiltration coefficient. Requirements the same for all building functions and types. planned for Autumn 2006***	Requirements the same for existing, modernized or extended, buildings as for new ones. planned for Autumn 2006***	Existing buildings (sold, rented or modernised): from January 2008, New buildings: from January 2009 Execution order for certificates and inspection to be adopted by February 2007.		In the draft law, mandatory from January 2009 Execution order for certificates and inspection to be adopted by February 2007.
SK	Methodology in the law (final procedures should be adopted after CEN standards)	In place Depend on the type and function of the building and may cover max. U-value, requirement for the heat use, maximum total delivered energy per m2 of floor area	In place Depend on the type and function of the building and may cover max. U-value, requirement for the heat use, maximum total delivered energy per m2 of floor area	Obligatory for all buildings after January 2008 (introduced for small residential buildings from January 2007)	Regulations under preparation, Slovak chamber of building engineers will be in charge	Act 17/2007 on regular inspection of boilers, heating systems and AC systems, adopted in December 2006, to fully enter into force in January 2008. Three execution orders in preparation.

	Calculation procedures	Requirements for new buildings	Requirements for existing buildings	Certification of buildings	Independent experts	Inspection of boilers and air conditioning
SI	under development Rules on efficient use of energy in buildings to be adopted in the coming months (status April 2007): new methodology	under development the existing Rules on thermal protection and efficient use of energy in buildings from 2002 requirements for new buildings are set on the level of heat demand; some requirements for renovations of existing buildings are set (maximum U-values for building envelope elements). The new rules will strengthen these requirements by approx. 25-30%.	under development	Regulation on energy certification of buildings under development, to be adopted in September 2007. Certification of new buildings to start in early 2008, for other buildings in early 2009.	The training of independent experts will follow adoption of the regulation. It is planned in last three months of 2007.	Boiler inspection already in place since 2004 within the Environmental Protection Act, additions at the end of 2007. AC inspection at the beginning of 2008. Additions to Env. Protection Act on inspection of boilers and air-conditioning expected in September 2007.

* information as of August 2006,** information as of January 2007,*** information as of May 2006, source: Petersdorff 2006

Sources: (BEEN 2006), (EPBD Buildings Platform 2006), national experts

5.2.4 CHP Directive

Originally the complete transposition of the CHP Directive (2004/8/EC) was to be established by 21 February 2006, almost two years after the Enlargement. The core of the Directive are harmonized definitions, as well as establishing a guarantee of origin, access to the electricity grid, identification and elimination of administrative barriers, possibility of support systems for high efficiency CHP, analysis of the national potential in Member States and statistical requirements. The Directive will have an impact on the national regulatory framework because it obliges MSs to evaluate existing legislative and regulatory frameworks, to reduce barriers (prices and costs, grid system issues, lack of internalisation of external costs in energy price, administrative procedures) and to remain competitive in both heat and electricity market within the context of liberalization (removal of cross subsidies, establishing reference values for the separate production).

a) Progress with formal transposition

Main issues which should be considered by the Member States when implementing the CHP Directive are:

- National studies on CHP potential;
- Guarantee of Origin[162]
- Reports on administrative procedures;
- Progress reports;
- Statistical data;
- Regular monitoring

Table 5-5 summarises the status of transposition of the major provisions of the CHP Directive as of March 2007. With respect to the formal transposition of the CHP directive, some NMSs are well advanced and close to completion: some are targeting second half of 2007 for complete transposition. Areas most commonly quoted as still in work include Guarantees of Origin, reference value transpositions and requesting further guidelines (Cogen Europe 2007).

162 The CHP-GO will be based on the reference values, adopted officially by the Commission on 18.12.06. Member States have to do it themselves or through bodies independent of generation and distribution within 6 months from the official adoption of these reference values. Schemes for CHP-GO are not necessarily linked to national support schemes for CHP, but this is allowed.

Table 5-5 Status of implementation of the CHP Directive as of March 2007

	CHP Directive Transposition	Guarantee of origin	Progress report
CY	Primary legislation in progress, will be voted soon. Secondary legislation is being developed. National potentials will be ready in August 2007. Proposing support of feed in tariffs with priority access to the grid up to a cap level.		Submitted
CZ	The CHP directive is 90% covered in legislation. Waiting for Guidelines to be published to complete the process. Law 458/2000.		Reported in late 2006
EE	Amendments to the energy law come into force on 15 May covering the Transposition of the Directive	Work in progress	
HU	Transposition virtually complete. Feed-in tariff.	GoO proposal March 24th, expected by August 2007	Submitted (March 24th)
LV	Feed-in tariff and price setting (Starr 2006).		
LT	Transposition virtually complete. Reference values will be in force in May 2007. National potentials are complete. Energy Law; principle aim to increase competition in DH. CHP quotas.	Draft rules for GoO are prepared	Submitted
MT	Transposition completed in 2006. Reference values will be put in place in March 2007. Have started the national potential assessment	GoO proposal being prepared (to be in place in late March 2007)	Submitted (March 24th)
PL	Law amendment of January 2006 to implement CHP directive for GoO. Potentials report in progress. Purchasing obligation.	GoO legislation will be in force on 1st July 2007.	
SK	Not fully transposed. A separate act to cover CHP is being prepared and is close to the final stage of legislative procedures (Act on the Promotion of Highly Efficient CHP production And a Decree defining criteria for the support of CHP production)	GoO will be covered in new legislation (Decree defining the scope and template of the application for the certificate of origin of the electricity produced by the highly efficient CHP)	Immediate dispatch (as of early March 2007)
SI	Transposition is in place in main energy law. National potentials are already available	GoO for green electricity already exists, law will be changed in April to include CHP.	

Source: (Cogen Europe 2007)

b) CHP in NMSs

In the context of discussing CHP deployment the existence of large district heating (DH) networks in post-communist NMSs needs special attention. DH can be an efficient option for CHP, especially for urban households.

While there is a strong history of DH and cogeneration in post-communist NMSs, DH systems are still rather wasteful – IEA (2004a) estimates that production losses of DH systems in Central and Eastern Europe and the former Soviet Union are between 15 and 40%, while distribution losses are 15-25 %[163]. Often pipes suffer from external and internal corrosion, leading to frequent leakages. Heat losses are aggravated by inadequate pipe insulation, which is often not thick enough or of poor quality (IEA 2004a). This points to the fact that many existing DH systems require extensive refurbishment, however often DH companies are not considering conversion to CHP. This is because prevailing cost-plus regulation may provide little incentive to reduce costs (e.g. by improving the efficiency of systems even where this is cost effective), but rather an incentive to overspend or overstate costs: if a company reduces costs, its profit also goes down (IEA 2004a). Often cost-plus regulation only allows fuel and operational cost, but no asset depreciation or return on capital. Some form of incentive regulation (usually price cap) has been introduced or is being designed in the Czech Republic, Estonia, Hungary, Lithuania and Poland. The somewhat uneven deregulation of prices - the prices for some sources of energy moving towards market prices quicker than others, and DH delivery to households typically not the first one to be at market cost - provides no economic resource for refurbishments. Finally, lack of individual consumption control (fixed flat payments in non-metered flats) and billing on the basis of consumption often makes DH less appealing to residential consumers than more flexible individual heating.

While many NMSs have implemented programmes to rehabilitate DH with private financing or support from international organisations (EBRD, the World Bank), still very sizeable investments are required to improve energy efficiency in DH. Regulatory reforms, in particular cost reflective prices, are needed to ensure resource for the rehabilitation and modernisation of existing DH networks. Cost recovery in tariffs should include provisions for necessary investment, depreciation, bad debt and other costs of operating a sustainable business, as well as reasonable rate of return. After a period of significant decrease in DH in NMSs in the late 1990s, a phase of stabilisation started at the turn of the millennium with some NMSs even registering a slight increase.

With regard to the share of CHP within DH supply, as of 2005 the gap between the old and new EU Member States starts to narrow: a slight increase in the range of 1-2% was registered in Central and Eastern European (CEE) countries in 2001-2003 as a consequence of the application of support schemes especially developed for small scale (gas engines) and medium sized CHP units (Euroheat and Power 2005). The share of district heating produced in CHP units varies among different countries between 35% (in Baltic states) and 72% in Hungary in 2003. Hungary registered the highest increase of share of CHP in DH due to support schemes favouring mainly the development of gas engines and medium size CHP units over a long period (see a detailed case study of Hungary in the full report. An upward trend can be noticed in all the countries in the region benefiting from CHP support schemes and financial resources allocated for replacement of Heat Only Boilers capacities by CHP units.

163 In many cases real heat losses are difficult to estimate because of inadequate or non-existent metering equipment (IEA 2004a).

Table 5-6 summarizes the national support schemes in NMSs. There is a trend for introducing feed-in tariffs for all electricity from CHP; however if the efficiency thresholds as defined in the Directive are not reached, only a proportion of the electricity counts as good quality CHP electricity. The full report provides in-depth analysis of success factors and reasons for stagnation in two case studies – Hungary and Poland – that have seen opposite trends in CHP deployment. In addition the full report provides brief CHP country profiles of NMSs[164].

Table 5-6 CHP support schemes (status 2004) in Central and Eastern European countries and the Baltic States

	Purchasing obligation	Tariff support	Capital incentives	Comments
Czech Republic	X	X	X	Legal provisions prescribing a mandatory CHP-oriented energy audit in the case of new installations or major reconstructions 5 MW (EEA).
Estonia	X (RES)	X (RES)		
Hungary	X	X*	X*	Purchasing obligation and guaranteed price for capacities below 50 MW
Latvia	X	X		Purchasing obligation for units below 4 MW, feed- in tariff. For the feed-in apart from efficiency threshold, at least 75% of heat to be supplied to a DH system.
Lithuania				
Poland	X			Priority for heat produced in CHP units
Slovakia	X			
Slovenia	X	X	X	There is a carbon tax in SI

Source of data: (OPET 2004) and others

5.2.5 Minimum energy performance standards and energy labelling of household appliances

The three main labelling schemes in the EU are the EU Energy Label for household equipment (comparison label that is compulsory for certain appliances), the Energy Star for office equipment (voluntary endorsement label) and the Ecolabel for products and services (voluntary endorsement label). The present study only reviews the effects of the EU legislation on mandatory labels for household equipment because the other two schemes – the Energy Star[165] and the Ecolabel – contain no specific implementation provision for MSs[166].

164 The country information is based on information available in the framework of the Cogen Challenge project; unless indicated otherwise the information is as of December 2005-January 2006.

165 Except for a minor requirement regarding Energy Star to appoint a national contact point.

166 The Eco-design Directive adopted in 2005 is not considered in the present report: while it sets a framework for performance criteria which manufacturers must meet in order to legally bring their product to the market, it does not yet prescribe specific measures or standards and sets no overall energy saving targets. The Directive makes provision for the introduction of implementing measures, which can be minimum energy performance standards (MEPS) or other mechanisms. Since earlier Directives for MEPS already contain efficiency requirements for certain products these are to be integrated into the Eco-

The labelling directives (see Table 5-7) define the type of appliances to be included in the labelling regime and specify implementation details, such as the measurement standards and methods to be used in obtaining the information relating to energy consumption, the technical documentation required, the design and content of the label, the location where the label shall be fixed to the appliance, the content and the format of the fiche, on which must be included the information appearing on the label. The Labelling Framework Directive (92/75/EEC) applies to the following types of household appliances, even where these are sold for non-household uses: refrigerators, freezers and their combinations; washing machines, dryers and their combinations; dishwashers; ovens; lighting sources; air-conditioning appliances. Household appliances offered for sale, hire or hire-purchase must be accompanied by a fiche and a label providing information relating to their consumption of energy (electrical or other) or of other essential resources. The supplier must establish technical documentation sufficient to enable the accuracy of the information contained in the label and the fiche to be assessed. *Member States must take the necessary measures to:*

- ensure that all suppliers and dealers established in their territory fulfil their obligations under this Directive;
- prohibit the display of labels, marks, symbols or inscriptions relating to energy consumption which do not comply with the requirements of this Directive and which are likely to cause confusion, with the exception of Community or national environmental labels;
- launch educational and promotional information campaigns aimed at encouraging more responsible use of energy by private consumers.
- Where Member States have grounds for suspecting that the information contained in labels or fiches is incorrect, they may require suppliers to provide evidence.

Energy labels complement energy efficiency standards in some product groups. Minimum energy performance standards have been introduced for hot-water boilers, for household electric refrigerators, freezers and combinations thereof, and for ballasts for fluorescent lighting. Energy-efficiency standards are procedures and regulations that prescribe the energy performance of manufactured products, prohibiting the sale of products that are less efficient than a minimum level. These encompass protocols (or laboratory test procedures) for obtaining a sufficiently accurate estimate of the energy performance of a product in the way it is typically used, and target limits on energy performance (maximum use or minimum efficiency) based on a specified test protocol. Member States are obliged to take all necessary measures to ensure that appliances covered by minimum efficiency requirements can be placed on the market only if they meet the requirements as calculated according to the procedures defined in the directives.

The Directives related to energy efficiency standards and appliance labelling are listed in Table 5-7.

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design Directive framework and considered as the basis for implementing measures.

Table 5-7 EU legislation: standards and labelling for household appliances

Directive	Description
Standards	
92/42/EEC	Efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels
96/57/EC	Energy efficiency requirements for household electric refrigerators, freezers and combinations thereof
2000/55/EC	Energy efficiency requirements for ballasts for fluorescent lighting
Labelling	
79/530/EEC	Voluntary framework for energy labelling – due to disagreements over technical measurement standards, only the directive for electric ovens was approved (79/531/EEC)
92/75/EEC	Labelling framework directive – explains the way that information should be provided to consumers, as well as which appliances should be covered by a labelling scheme – need to comply since 1 January 1994. Cancels Directive 79/530/EEC
2003/66/EC	Labelling of electric refrigerators, freezers and their combinations and amending Directive 94/2/EEC
95/12/EC	Labelling of household washing machines
95/13/EC	Labelling of electric tumble dryers
96/60/EC	Labelling of combined washers and dryers
97/17/EC	Labelling of dishwashers
98/11/EC	Labelling of household lamps
2002/40/EC	Labelling of household electric ovens
2002/31/EC	Labelling of household air-conditioners

The provisions of the directives have formally been fully transposed in all 10 NMSs. Because the impact of standards and labels ultimately depends on the information provided being available and accurate, in the present study the degree of compliance with the spirit of standards and labelling acquis is evaluated based on the following key supporting elements of an effective regime: (a) capacity for proper monitoring and enforcement (standards and labelling) and (b) educational programs for consumers and retailers, and awareness raising campaigns (labelling).

The task of conformity assessment is to check that rated performance levels are real and ensure that incentives for market actors to comply are sufficient: merely setting standards and displaying labels may have limited impact in terms of real energy savings. It has also been recognised that good market surveillance is fundamental for the compliance of the Eco-design of EuP framework directive that will cover these fields in the future; the Eco-design directive is outside the scope of the present study as it was not effective at the time of 2004 Enlargement.

The evaluation relies on previous research on the topic, in particular the Energy Efficiency Appliance Early Adoption project (CTI 2002), the ELAR project (SEVEn 2004), deliverables from the ongoing CEECAP project (KAPE 2006; LEI 2006; SEVEn 2006)[167], information available

167 Note that these are not governmental programs, but projects initiated and funded by international donors (the IEA, the European Commission).

from the Collaborative Labelling and Appliance Standards Program (CLASP)[168], as well as other sources (Soehl 2002). A questionnaire was distributed among national stakeholders from state administrations engaged in appliance labelling and manufacturers' associations in order to verify and update some information from literature. Responses were obtained from the national bodies in charge of monitoring of appliance labelling in Cyprus (the Cyprus Institute of Energy), the Czech Republic (State Energy Inspectorate, the Czech Energy Agency, SEVEn), Estonia (Technical Inspectorate), Malta (Malta Resource Authority), Poland (KAPE), Slovenia (Ministry of Environment and Spatial Planning), as well as from two country offices of CECED (Czech Republic and Hungary).

Appliance imports from outside the EU are causing increasing concern among European manufacturers. Appliance imports from outside the EU are subject to e.g. the EC safety requirements and certifications, an issue that is beyond the scope of energy efficiency. The customs mechanisms in NMSs are part of the EU customs mechanism and follow common procedures. Various national bodies in NMSs (e.g. consumer protection authorities) are engaged in supervision of product safety (technical requirements and testing). These bodies maintain cooperation with customs authorities. In addition all NMSs are part of the Rapex[169] system, which ensures information about dangerous products identified in the MSs is quickly circulated between the Member States and the Commission. During the accession process the central market surveillance agencies of most NMSs formed the so-called Trapex[170], which was supported through the PHARE scheme. Both Rapex, and its transitional predecessor Trapex, only focus on market surveillance for product safety of non-food products and not on surveillance for compliance with minimum energy performance standards.

c) Capacity for proper monitoring and enforcement

All countries have involved several services and agencies in appliance energy efficiency policy (see Table 5-8). All countries report the involvement of a Ministry and an energy agency with central roles in appliance energy efficiency policy. All countries also report the involvement of other institutions, often standardisation offices, trade commissions and/or consumer protection authorities. However, there have been indications that especially consumer and retailers' education and compliance monitoring as well as enforcement are areas that have not been always properly or unambiguously assigned to the appropriate services (CTI 2002). In the case of consumer and retailer education there have been ambiguities as to actual responsibility.

While over the last decade responsibilities for compliance monitoring and enforcement have been assigned, the actual pursuit of these actions seems to be still generally insufficient. Some countries perform (some) compliance monitoring – either retailer compliance or supplier compliance – but most of them have not set up appropriate schemes yet, sometimes because an adequate infrastructure is lacking. Many countries report difficulties in performing test measurements due to the lack of facilities (test laboratories) (Waide 2006). Thus because of the lack of budgets especially to perform suppliers' checks (check declarations), checks are mainly focusing on retailers' compliance (e.g. shop checks for existence of labels). As a best practice from NMSs, Malta has introduced a scheme of state-supported purchase rebates, which involves a form of compliance checking of appliances via verification of certified laboratory test reports or via other manufacturers' literature.

168 See www.clasponline.org
169 The European rapid alert system for dangerous non-food products
170 Transitional Rapid Information Exchange of Information on Dangerous Products

Cyprus: The Ministry of Commerce, Industry and Tourism, along with the Cyprus Institute of Energy are the bodies in charge of implementing legal tasks related to appliance labelling. The Cyprus Institute of Energy is engaged in drafting secondary legislation, market surveillance to monitor the compliance with labelling requirements and tracking mislabelling, application of sanctions in case of mislabelling, and consumer and retailer education. Less than 5 people are involved in these tasks. There are no testing labs in Cyprus; testing is provided by manufacturers and not subject to verification (note that there are no appliance manufacturers in Cyprus). There are legally defined sanctions in case of mislabelling but these have not yet been applied. Nevertheless warnings have been given thus far.

Czech Republic: The State Energy Inspectorate is responsible for controlling the accuracy of information on the labels, while the Czech Trade Inspection controls the presence of labels in the shops. The Czech Energy Agency is in charge of public information and education in the field of labelling. Formally these institutions are in charge of drafting secondary legislation, planning and executing product compliance verification, testing of appliances, planning and executing retailer compliance verification, market surveillance to monitor the compliance with labelling requirements and tracking mislabelling, application of sanctions in case of mislabelling, and consumer and retailer education. However the budget and staff capacities of the responsible government institutions are claimed to be insufficient – there are less than 5 people solely working on appliance labelling in all governmental institutions. Appliance testing is performed exclusively by manufacturers and not subject to independent verification; bodies such as the Electrotechnical Testing Institute and the Engineering Test Institute are in a position to undertake independent verification if they are commissioned to do so, but do not do so regularly and/or automatically. Currently, no tests are being conducted in the Czech Republic. In case of mislabelling there are sanctions, but these have never been applied. Electric ovens and electric water heaters have been labelled in the Czech Republic, while there is no European label.

Table 5-8 Administrative bodies, monitoring and enforcement of appliance labelling in NMSs

	Administrative body
CY	Ministry of commerce, industry and Tourism, Cyprus institute of energy
CZ	State Energy Inspection (accuracy of labels) Czech Trade Inspection (presence of labels)
EE	Technical Inspectorate (state surveillance); Ministry of Economic Affairs and Communications
HU	General Inspectorate for Consumer Protection
LT	Ministry on Economy, Lithuanian Energy Agency, State Energy Inspection, State Non-food Product Inspection (market surveillance)
MT	Malta Standards Authority (drafting legislation), Consumer and Competition Division of Ministry for Competitiveness and Communication (enforcement), Malta Resource Authority (rebates for efficient appliances)
PL	Ministry of Economy; Trade Inspectorate (1 main, 16 regional and 34 representations): presence and accuracy
SK	Slovak Trade Inspection (presence), Slovak Office of Standards; Metrology and Testing; Ministry of Economy; Technical and Testing Institute Piestany; Slovak Energy Agency;
SI	Ministry for the Environment and Spatial Planning, Ministry of the Economy (Market Inspectorate of the Republic of Slovenia)

Estonia: The Technical Inspectorate is the agency in charge of state surveillance, while the Energy department of the Ministry of Economic Affairs and Communication drafts and updates national legislation in the field of appliance labelling. In these two institutions less than 5 people altogether are in charge of market surveillance, application of sanctions in case of mislabelling, and consumer and retailer education. The most common market surveillance methods are shop inspections and website/catalogue inspections. Testing is performed by manufacturers and not subject to independent verification. However the Technical Inspectorate orders occasionally laboratory tests to determine the accuracy of the labels. There is a possibility for imposing fines for mislabelling; in case of non-compliance prescriptions are given and non-compliant products are removed by companies.

Hungary: The National Consumer Protection Supervision Agency is the authority monitoring appliance labelling. The Inspectorate performs shop inspections, as well as random accuracy checks usually based on yearly projects for checking groups of products. Most of the time, however, only small appliances are tested as the Inspectorate is constrained in laboratory space and there are logistics problems (Soehl 2002). Testing is performed by manufacturers and not subject to independent verification. The Commercial Quality Control Institute and the Hungarian Electro-technical Control Institute are responsible for the testing and certification of products when commissioned to do so. Theoretically technical information obtained when testing appliances should be made publicly available when testing; however in practice there is no testing to check declaration.

Lithuania: The main institutions involved in the implementation of the labeling scheme are the Ministry of Economy of the Republic of Lithuania, the State Non-food Inspectorate at the

Ministry of Economy (market surveillance institution) and the State Energy Inspectorate at the Ministry of Economy (state surveillance institution). Compliance assessment procedures are carried out by institutions designated and notified by the Ministry of Economy or by institutions authorized by the Ministry of Economy.

Malta: Malta Standards Authority is in charge of drafting legislation related to appliance labelling, while the Consumer and Competition Division of Ministry for Competitiveness and Communication is in charge of labelling enforcement (market surveillance and application of sanctions). Altogether 5-10 people in these institutions have some labelling-related tasks (even if not especially designated to work on labelling). The most common surveillance method is shop inspections; Malta Resources Authority, as the Government agency responsible for the rebate related to energy efficient appliances, is carrying out catalogue inspections and test report inspections of appliances registered for the rebate scheme. Approximately 1500 appliance models have been registered with the Authority, out of which verifications of certified laboratory test reports for 1000 models have been completed. There are sanctions for mislabelling, but these have not yet been applied.

Poland: The Energy department of the Ministry of Economy is in charge of drafting secondary legislation, as well as consumer and retailer education. The Trade Inspectorate is in charge of market surveillance in terms of both presence of labels in shops and accuracy checks: more specifically planning and executing product compliance verification, retailer compliance verification and application of sanctions in case of mislabeling. The Inspectorate consist of a Main Inspectorate, 16 Regional Inspectorates and 34 Representations of Trade Inspectorate and has also a network of testing laboratories. However only less than 5 people are working specifically on appliance labelling in the Trade Inspectorate and up to 10 people in the Ministry. This appears very insufficient given the size of the country. On request of the Trade Inspectorate an independent verification can be done by the Polish Centre for Testing and Certification if the Trade Inspectorate wants to verify the accuracy of a label. While in principle regular laboratory tests to determine the accuracy of the information on labels should be done, in practice this happens very rarely. There are sanctions for non-compliance with labelling provisions, but these have not yet been applied.

Slovakia: The Slovak Trade Inspection is the governmental organization responsible for control of energy labels presence and their proper display on the electric appliances (shop inspections).

Slovenia: The Ministry for Environment and Spatial Planning, along with the Market Inspectorate at the Ministry of the Economy are in charge of appliance labelling. In these two institutions less than 5 people altogether are in charge of drafting secondary legislation, market surveillance to monitor the compliance with labelling requirements and tracking mislabelling; application of sanctions in case of mislabelling; and consumer and retailer education. The most common market surveillance methods are shop inspections; appliance testing is performed by manufacturers and not subject to independent verification. There are sanctions for non-compliance with labelling provisions, but these have not yet been applied.

d) Appliance labelling: Information and educational programs for consumers and retailers

Sporadic information and education programs for consumers have taken place on a few occasions in some NMSs, but no country has developed yet a comprehensive and continuous vision for both communicating appliance labelling to the general public and at the same time training and involving appliance retailers in appliance labelling issues. Most information and educational programs have been (co)-financed by the European Commission or international donors, sometimes with the co-funding of manufacturers. Often regular trainings are done by manufacturers for their partners (basically as a part of products promotion).

The Cyprus Institute of Energy reports about consumer education campaigns by the government and also by the electricity utility company. The government has assisted with the preparation of compliance of importers and distributors of appliances. There have been educational campaigns for consumers in the Czech Republic, but none with significant regular state support and mostly done with European funding and by manufacturers as a general promotion of A-labelled products. A campaign targeted at appliance retailers has been organized under the CEECAP project (see below) under which a training manual is distributed to all retailers in Czech Republic. The Czech Energy Agency in principle supports such activities under the Energy Consultation and Information Programme. In Estonia only one education campaign has taken place in the framework of a project initiated by the Danish Energy Agency; the campaign was targeted at consumers (TV, brochure, articles in newspapers and magazines, participation in a talk show) and stands and brochures for retailers.

In Hungary the country office of CECED has undertaken two educational campaigns for consumers: one focusing on refrigerators (2006) and an ongoing focusing on washing machines (2007). These involve also household appliance manufacturers and importers, Electro-Coord Magyarország Kht (electronic waste recycling company) and retailers.

The Trade Inspectorate in Lithuania had awareness raising campaign in 2001-2002. A programme that includes education for consumers on energy labels started in Malta in early 2007. The program involves a rebate scheme for efficient appliances (see details later) and has brought the importance of appliance labels to the attention of consumers. Education seminars and training for retailers are due to start in September 2007.

In Poland the Trade Inspectorate has in its tasks also consumer guidance; some energy and environmental campaigns have been reported. However in the appliance labelling discourse consumer education is part of the tasks of the Energy Department of the Ministry. The National Energy Conservation Agency (KAPE) has been working on adopting the ELDA database for the Polish market. There have been other promotional activities related to energy efficient appliances, such as the Polish Energy Bus and the TREAM project. In Slovakia there has been an awareness raising campaign for efficient products undertaken by manufacturers.

The Ministry for the Environment and Spatial Planning in Slovenia has made educational campaigns for appliances covered by the labelling directives, while the Chamber of Commerce and Industry of Slovenia has undertaken information and motivation campaigns on energy labelling targeted at appliance retailers for appliances covered with energy labelling directives.

Some major international projects have been initiated throughout the late 90s, as well as prior to and after Accession to accelerate the penetration of energy efficient technologies. These have had a strong information and education element in some NMSs (for more details see the full report)

b) Appliance labelling: implementation challenges

While relevant national organisations have been involved in the implementation of household appliance labelling, insufficient consumer awareness, low incomes and inadequate testing and enforcement infrastructures are reported as barriers to effective implementation of appliance labelling in NMSs. Countries have transposed the EU energy labelling directives (even if with delays for the later directives). However often state organisations in charge of appliance labelling place a low priority on the topic. Some major unfavourable conditions with respect to effective household appliance labelling are present in NMSs in Central and Eastern Europe include (Krivosik, Klinckenberg, Mazurkiewicz et al. 2006; ANEC 2007):

- Passive transposition of EU acquis, lack of motivation for its updating or comments from national implementation bodies, low overall priority by the governments and the energy authorities.
- Insufficient support to the promotion of energy labelling from state organisations;
- Unclear responsibilities and control mechanisms lowering the market control mechanisms in some countries;
- No control of the information on labels between the competing manufacturers;
- Independent verification of manufacturers' claims is an exception rather than the rule. Whilst shop inspections are to some extent carried out in all NMSs and non-compliance penalties do exist, these have never been applied;
- High costs of testing that is difficult to finance, lack of concerted testing effort at European level;
- Low enforcement of sanctions in case of irregularities;
- Long delays for new appliance labels to be "visible" on the market, due to slow control and motivation procedures from the state;
- The presence of energy labels on appliances on shops varies considerably among countries.
- Low or no coordination and information sharing between and within the Member States.

In addition to low public awareness, retailers' support and good will, the limited resources for surveillance and for awareness raising undermine the impact of appliance labelling. The costs of verification tests are considerable and in general monitoring the accuracy of manufacturers' claims is more difficult and expensive compared to the monitoring of retailers' compliance. Market monitoring requires identification of labels that might be inaccurate and independently testing to verify the data (the average price of four appliances needed to prove non-compliance amounts to several thousand Euros) (Krivosik, Klinckenberg, Mazurkiewicz et al. 2006).

There have been indications from national authorities on challenges related to some ambiguities as to the legal responsibility for label provision: in many cases only the data strip is provided and not the complete colour label (even if according to the directive the supplier has too provide the entire label). In addition some national authorities (e.g. in Cyprus) have pointed at other challenges related to the lack of labelling provisions for advertising in magazines, newspapers, leaflet, Internet or tender documents. Another outstanding difficulty indicated in Malta is the lack of cooperation by manufacturers to provide short form copies of technical documentation to the importers. There is also a problem with verification of technical documentation issued by (mainly non-EU) manufacturers.

Nevertheless Enlargement has focused NMSs on legal issues related to household appliance labelling (transposing EU Acquis and implementing national policy frameworks, assigning responsibilities to organisations), market issues (retailer and market party information, and to an insignificant scale consumer information & education activities), and policy issues (European Union policy design and preceding market and product analyses, designing national policy supporting the implementation of energy efficiency legislation) (Waide 2006). Expectations are high that retailers will be involved in the policy for the green public procurement, which includes the purchasing of efficient appliances.

5.2.6 Conclusions: section 3

Legal requirements associated with EU membership have been the strongest driver for introducing new energy efficiency policies in NMSs. While NMSs have focused policy efforts on transposing European directives, they have shown less commitment to actual implementation, proper enforcement, and pro-active energy efficiency related policy-making beyond the acquis. Most existing challenges that undermine the effective functioning of European policies at national level appear to be rooted exactly in the fact that national administrations were concentrated on creating regulations that will transpose the vast body of European legislation, underestimating the creation of functioning implementation regimes at national level. Implementation challenges pertain in appliance labelling, energy performance of buildings, while progress with CHP has been often slow despite significant potentials in DH sector, for example.

It is clear that the lack of proper focus on enforcement of legislation has been severely limiting the potential impact of both European legislation and national policy initiatives. While almost all NMSs have adopted energy efficiency targets in secondary legislation, the necessary acts and financial and institutional resources have been lacking, therefore questioning the impact of having a target in place. Targets have rarely been backed by clearly defined actions plans specifying the implementation measures in each end-use sector, introducing ‘implementation calendar’ and defining sustaining financial resource and the responsibilities of organisations involved.

There are various implementation difficulties with existing European legislation. In general split and unclear implementation responsibilities slow down actual implementation of European legislation (for instance the EPBD and labelling), while lack of public awareness of the positive effects of European energy efficiency policies on national economies and individual welfare has contributed little to public understanding and acceptance of requirements associated with EU membership. For example, NMSs have so far largely failed to communicate the private benefits of building certification, risking the formation of public perception of energy performance certificates of buildings as yet another administrative hurdle. In a similar manner NMSs have not engaged in a dialogue with appliance retailers to foster highly energy efficient appliances and have done little to raise consumer awareness influencing their choice of appliance.

With respect to the EPBD, as of the end of 2006 many NMSs have already enacted legislation or have it at some stage of legislative procedure. The diversity of provisions of the Directive requires sharing the responsibility for implementing different parts of the EPBD between different ministries, which has slowed down the process. Lack of staff and contrary interests among implementing institutions, lack of awareness of the positive effects of the EPBD on national economics and the variety of approaches among MSs that hinders exchange of experiences have been the major implementation hurdles. Instead of communicating the economic benefits of building certifications, the debate in NMSs has been often focussed exclusively on the cost of certification. Some NMSs have already adopted calculation procedures or have the procedure in pending legislation. With respect to certification most countries plan introducing certification for new buildings from 2008 and for existing buildings from 2009. Implementation is more advanced in residential buildings than in non-residential buildings and on public display. Inspection of boilers and especially of air conditioning systems is the area where a lot of complexities occur. Most NMSs envisage boiler and air conditioning inspections from 2009. In most countries requirements for independent experts have been defined and training materials are under preparation (with training institutions already appointed in Lithuania, for example). However, NMSs have so far failed to introduce integrated and comprehensive programs that would facilitate the implementation of building certification once the provisions of the EPBD are transposed. Such integrated approach is key to success: beyond standards, NMSs need to provide information to building owners about the benefits of certification, organise education and training sessions for all stakeholders involved directly or indirectly in certification, introduce financial incentives (subsidies, tax incentives, etc.) promoting efficient construction and refurbishment of existing housing stock.

With regard to CHP, DH is a key positive legacy from the communist era for most NMSs. Its competitive position has however gotten worse due to large production and distribution losses, in some cases inability to compete against excess (low-cost fossil and nuclear) power generation capacity, slow price deregulation in the DH sector, inadequate cost recovery in tariffs that may not allow provisions for depreciation and necessary investment. The heat market opportunities have been shifting from DH refurbishment and upgrading to opportunities in the industrial and service sectors, especially in new greenfield housing and due to the growth in living standards. In the residential sector DH sees severe competition against flexible individual heating modes.

While appliance labelling may be seen as a straightforward case, there are serious loopholes in implementation, mostly related to unclear responsibilities and control mechanisms lowering the market control mechanisms (due to high cost of testing for an agency); insufficient support to the promotion of energy labelling from state organisations; low enforcement of sanctions in case of irregularities; insufficient promotion and consumer awareness and insufficient efforts to engage retailers. Thus while NMSs have fully transposed labelling legislation after joining EU in 2004 and sales of appliances by energy classes comparable to EU-15, low verification and control capacity and lack of priority within state organisations for this topic remain problematic. Most existing challenges that undermine the effective functioning of the labelling regime in NMSs are due to the fact that during the Accession period governments were concentrated on creating regulations that will make labelling obligatory.

While NMSs have declared their commitment to sustainable energy futures, implementation of European legislation and putting in practice national policies and action is still problematic.

5.3 Institutions for energy efficiency

The present section looks into the institutional aspect of energy efficiency in NMSs because properly staffed financed institutions are needed to implement legislation, policy declarations, strategies, programs and financing mechanisms. Different countries use different types of institutional frameworks to implement energy efficiency policies. Apart from a ministry or ministerial department responsible for energy policy formulation and monitoring tasks, efficient implementation of the energy efficiency acquis will require dedicated state bodies that can help move energy efficiency markets at an accelerated pace.

There are dedicated energy efficiency agencies in almost all NMSs. In Estonia there is no dedicated agency, while in Latvia and Slovenia previously existing agencies were merged with other agencies or transformed into ministerial departments. Ministries are undertaking most important legislative and regulatory functions related to energy efficiency, while the role of agencies is more 'light-handed' that include operational tasks such as policy research, awareness raising, information dissemination, training, program implementation, management of energy efficiency funds, conducting evaluation. Some national energy efficiency agencies also provide technical advice to energy customers and perform energy audits, while others are mostly focussed on the day-to-day management and administration of the state energy efficiency support programs and-or administering funds assigned to the country under international agreements and aid programs. The complex nature of energy efficiency policies that involve a large variety of specific activities, often results in energy efficiency issues distributed among a number of institutions, which makes the coordination of sectoral activities much more complicated. The sections about CHP policies, the EPBD implementation and appliance labelling demonstrate this statement.

The strategic planning for and the coordination of separate sectoral energy efficiency policies is often assigned to ministries that are often understaffed when it comes to energy efficiency expertise and place modest priority to the issue. In operational terms national energy efficiency agencies are both understaffed and often pre-occupied with managing governmental funding for energy efficiency projects. This hinders the creation, implementation, monitoring and evaluation of a comprehensive policy regime in the field of energy efficiency. In addition, comprehensive stakeholder consultation has been rare in the field of energy efficiency: for example few NMSs have involved appliance retailers in any action related to the implementation of appliance labelling. Last, but not least, as discussed below energy efficiency policy research is rather rare in NMSs and in many cases the industry is better 'prepared' than the state when it comes to promoting its interests related to EU acquis implementation. Table 1-29 summarises the institutional set-up in NMSs. The full report provides a more detailed overview of energy efficiency institutions in each NMS together with the concise task division.

Table 5-9 National energy efficiency agencies in NMSs

Country	Dedicated EE agency	Year of creation	Number of staff (year)	Country's population (2004 in million)
CY	Cyprus Institute of Energy Applied Energy Centre	2000	12 (2007)	0.74
CZ	Czech Energy Agency (plus 5 regional energy agencies)		20 (2005)	10.2
EE	-	-	-	1.35
HU	Energy Centre	2000	65 (40 permanent, 25 contracted) (2007)	10.1
LV	Latvian Energy Agency (till 1997), 1997: Energy Department of the Latvian Development and Investment Agency since then			2.32
LT	Lithuanian Energy Agency EE Research and Information Center of the Lithuanian Energy Institute	1993 1996	30 (2007) 11 (2007)	3.44
MT	Malta Resource Authority	2001		0.4
PL	Polish National Energy Conservation Agency 16 regional energy conservation agencies	1995	25 (2007)	38.2
SK	Slovak Energy Agency 2 regional agencies	1999	70 (2003): incl. regional offices	5.4
SI	Agency for the Efficient Use of Energy (till 2005), integrated into the Ministry of Economy and Spatial Planning	1996		1.99

As can be seen from Table 5-9, many national energy efficiency agencies appear seriously understaffed to fulfil their stated missions, including the enforcement of EU legislation and developing new national activities. The most striking example is Poland. With a population exceeding 38 million, Poland has a national agency that has a staff of only 25 and does not receive any public funding securing its funding from domestic and international sources. For a comparison Senter Novem in the Netherlands (with population of 16 million) has a staff of 1250 people, while Ademe in France (with population of 61 million) has more than 870 employees! Even if the scope of activities of the latter two agencies may be wider, the gap in institutional resource is obvious, which inevitably has an impact on policy formulation and most importantly enforcement. The Czech Energy Agency also has a modest staff of 20 versus a population exceeding 10 million; the Energy Center in Hungary has 40 permanent employees. For a comparison, the national energy efficiency agency CRES Greece (with a population just above 11 million) employs more than 130 people. It needs to be emphasised that staff numbers include administrative and supporting staff, not involved in the core expert activities of the agencies. The small size and limited intervention tasks of energy efficiency agencies aggravate the successful development and implementation of any set of coherent activities and programs to capture existing energy saving potentials.

There is thus a huge discrepancy between declared policy aims and the means, including human resources, to achieve them. With the existing high technical, economic, and market saving potentials in NMSs – on the average much higher than in many EU-15 countries – one would expect to see properly staffed and structured institutions if serious attention is given to the spirit, formulation, enforcement and monitoring of energy efficiency policies.

The poor institutional basis hinders policy formulation: for example in most CEE countries there are no studies about the technical and economic saving potentials in each end-use sector to determine the cost-effectiveness of various actions in these sectors (Ürge-Vorsatz et al 2003). This is due to the fact that policy research in the field of energy efficiency supporting the design of policy-making is rare in NMSs. The absence of up-to-date publicly available studies on economic saving potentials in different end-use sectors reveals that the design of the energy efficiency policies and actions, as well as financial support allocations, is probably based on back-of-the-envelope style calculations and/or on politically defined priorities. Thus national policy-makers risk designing policies without understanding where the big saving potentials are, which may cause great inefficiencies in the distribution of public resources.

A prominent development in the field of energy consumption data collection and analysis is the Odyssee project co-financed under the Intelligent Energy Europe program. However after a number of years of operation of the project, many participating many NMSs still appear somewhat passive: it is not entirely clear how much the data collected and indicators generated within the project are applied in practice in policy making at national level and what would be the commitment of NMSs to continue the data collection effort and analysis in case European funding ceases.

Finally, limited stakeholder consultation provides limited basis for working with the private sector (appliance retailers, architects, construction business) and consumers in the implementation of energy efficiency policies. For example, consumer associations in NMSs have very limited expertise in energy efficiency and tend to step in energy discussions only when issues such as residential energy prices or consumer safety are at stake.

In summary: the strong imbalance between declared priorities in the field of energy efficiency and the means and institutional efforts to achieve them is a major barrier to the efficient design, implementation and evaluation of energy efficiency policy and regulation.

5.4. Conclusions and recommendations

The present chapter has reviewed the role Enlargement has played in the improvement of energy efficiency in NMSs. It has examined the energy intensity trends in NMSs since the mid-1990s along with some major drivers behind these, analysed the extent to which NMSs are complying with their energy efficiency obligations and reviewed existing national policies and measures for promoting energy efficiency, concluding by looking into institutional matters. This section provides a summary of key findings along with recommendations as to how improvement in energy efficiency can be furthered in potential future enlargements and how to approach existing implementation challenges.

The key indicator to follow the development in the efficiency of energy use is final energy intensity, so the chapter has devoted substantial attention to its progress. The period between the mid-1990s and Accession was characterised by a rapid decrease in energy intensities in NMSs. Both the transition to market economy (in the 8 post-communist NMSs) and the Accession process worked towards reduction of energy intensities of NMSs. While adjusted energy intensities in NMSs still remain largely above EU-15 average for many NMSs, during the decade prior to 2004 Enlargement energy intensities have been falling faster in NMSs than the EU-15 average, which implies decoupling of energy use from economic growth. Final energy intensity cleared from the impact of structural changes declined by approximately 30 % between 1996 and 2004 on the average in the post-communist NMSs. The late 1990s saw especially fast reduction in final energy intensity cleared from structural impacts, in many cases exceeding 4%/year. Overall at the level of the entire economy the impact of structural changes on energy intensity decrease has been limited in most NMSs in the period indicated, accounting for around 10% of energy intensity decrease in most countries. The impact of structural changes in the economy was more pronounced impact in the late 1990s with mass privatisation, massive foreign direct investments (including large green field investments) and a shift towards lower energy intensity and higher added value industrial branches. Despite obvious progress over the decade before Accession, as of 2004 the adjusted final energy intensities of NMSs were still mostly above EU-15 average and in general higher than can be expected for their level of economic development. This indicates that there is still a considerable need for further efficiency improvements and for scaling up the ambitions and commitment of NMSs in the energy efficiency field.

Progress in energy efficiency in industry over the period 1996-2004 was uneven among NMSs countries, exceeding 5 %/year in some of the Visegrád countries. While energy intensities of industry decreased in most NMSs, in some cases exceeding 8%/year in the period 1995-2004, part of this intensity decrease has been due to changing structure of the industrial sectors in post-communist NMSs, including decommissioning and closures. The impact of structural changes on the energy intensity of manufacturing has been rather strong in many NMS over the period 1995-2004.

Clearly economic reforms that accompanied the Accession process have provided a major impetus to the improvement of energy efficiency in NMSs. General economic drivers and indirect policy impacts associated with the Accession process have had a greater effect on the improvement in energy intensities than the impact of the transposition of the energy efficiency acquis. These drivers include rising energy prices, growing economic output and economic cooperation with the EU-15 countries, the shutdown and/or modernisation of inefficient Soviet-era technologies and processes, and competitive pressures in an ever-globalising world. Given the looseness of many national efforts in the field of energy efficiency, the existing loopholes in implementing the energy efficiency acquis also due to institutional weaknesses and the 'mechanical' transposition, one can expect that the energy efficiency acquis had some effect on energy intensity decrease in NMSs, but they are not likely to have been a major direct driver in the indicated significant improvement in energy intensities. The impact of the energy efficiency acquis could have been significantly larger with a more robust national commitment and implementation effort. This may change in future enlargements by when the body of energy efficiency acquis would be much stronger, but it points to the importance of a profound understanding of the indirect implications of enlargement-related economic, legal and social processes on energy efficiency.

Economic growth itself and new investments gave rise to efficiency gains since new investments applying modern technologies are more energy efficient than existing installations. In addition since the late 1990s a lot of modernisation took place in NMSs also due to complete amortisation. NMSs experienced the global trends towards more added value industry with structural changes bringing on average 10 % energy intensity decrease in most countries in the decade prior to Enlargement with a more pronounced impact of structural changes in the late 1990s[171]. Economic cooperation with EU countries and the move of EU-15 companies to produce in the NMS countries contributed to the changing structure of economies and industries in NMSs. Thus the increased activity in economic and business processes associated with the Enlargement also contributed significantly to energy intensity decreases in NMSs.

Finally, heavy energy price increases that accompany the gradual ongoing phase-out of direct and indirect energy price subsidies have played an important role in efficiency improvement. Energy prices have grown a lot in both absolute and relative terms, exceeding in purchasing power parities energy prices in 'old' MSs. Combined with high energy intensities and growing consumption, the share of energy expenses of households and companies have increased (up to 20-30% of disposable income for low-income households), harming individual income and welfare. Similarly, businesses spend a larger share of their expenses on energy than their counterparts in the EU-15[172], which is harming competitiveness. In the residential sector heavy price increases have often resulted in restrictions of comfort and inadequate heating in households in NMSs. Thus often low thermal consumption per square meter in NMSs signals low heating temperatures. On the average approximately one in four households in post-Communist NMSs cannot afford to keep their homes adequately warm, increasing risk of mortality for most vulnerable population groups. This has been exacerbated by poor quality of housing: approximately one in three households in post-communist NMSs report rots in windows, doors and floors and one in five reports damp and leaks in their homes.

All these, along with the more limited and slower responsiveness of the residential sector to price signals, points towards a greater importance of policy action in the residential sector, especially with respect to housing, both at national and European levels. While regulations have a significant role to play in new construction, due to slow refurbishing cycles financing mechanisms are very important tool to foster efficiency in existing buildings. Since households may have more difficult access to capital markets than industrial consumers and/or be unwilling to invest in energy efficiency due to well-known barriers to energy efficiency, coupling of financial incentive schemes with strengthening policy actions in residential energy efficiency should be a priority (e.g. for measures such as wall and window insulation, automatic temperature regulation, class A equipment, etc…). This is even more important given that with rising living standards the share of the residential sector in final energy consumption is growing against a construction boom in NMSs. Especially fast is the growth in electricity consumption in the residential sector, pointing to the need of special policy attention.

171 the impact of structural change has been stronger in the industrial sector

172 IEA 2005b

Other drivers of energy efficiency in NMSs include technological developments and social and individual behaviour: while these can develop independently following market incentives, in NMSs they often need additional support by government policies, resources or actions.

The efficiency in electricity generation in NMSs increased at a higher rate than in the EU-15 between 1990 and 2003; despite this trend, the electricity conversion efficiency is still almost 7 % lower in the NMSs on average, not least due to age structure of existing capacity. In addition, over the period 1990-2005 there have been significant reductions in the volume of electricity network losses from 1993 onwards: transmission and distribution losses declined from over 16% in 1993 to 12% in 2003 on the average in NMSs vis-à-vis below 8% in the EU-15. Theft and non-payment account for a large share of the gap: approximately one in five households in post-communist NMSs report facing utility bill arrears.

In terms of energy efficiency policies and implementing measures, NMSs have focused policy efforts on transposing European directives, but shown less commitment to actual implementation, proper enforcement, and pro-active energy efficiency related policy-making beyond the acquis. This has been largely due to very limited institutional capacity and still low priority on national policy agendas of energy efficiency measures. While NMSs have declared their support to energy efficiency in principle, in practice most have introduced a scattering of 'soft' policy documents and of investment support schemes insofar as budgetary constraints allow it, while the necessary acts, self-sustaining financial resource and institutional resources are still mainly lacking, therefore severely limiting the impact of policy declarations. Thus, while NMSs have declared their commitment to sustainable energy futures, implementation of European legislation and putting in practice national policies and action is still problematic.

When it comes to national level policy-making, legal requirements associated with EU membership have been the strongest driver for introducing new energy efficiency policies in NMSs. Most existing challenges that undermine the effective functioning of European policies are due to the fact that during the Accession period governments were concentrated on creating regulations that will transpose the vast body of European legislation, underestimating the creation of functioning implementation regimes at national level. Implementation challenges pertain in appliance labelling, energy performance of buildings and progress with CHP has been often slow.

Split and unclear implementation responsibilities slow down actual implementation (for instance the EPBD and labelling), while lack of public awareness of the positive effects of European energy efficiency policies on national economies and short-sighted debates have contributed little to public understanding and acceptance of requirements associated with EU membership. For example, NMSs have so far failed to communicate the private benefits of building certification, risking the formation of public perception of energy performance certificates of buildings as yet another administrative hurdle. In a similar manner NMSs have not engaged in a dialogue with appliance retailers to foster highly energy efficient appliances and have done little to raise consumer awareness influencing their choice of appliance. This points that by and large many NMSs have so far failed to introduce integrated and comprehensive programs that would facilitate the implementation of the provisions of the EPBD and appliance labelling. The case of appliance labelling is further aggravated by unclear responsibilities and vague enforcement and control mechanisms that cast doubts over national implementation efforts.

In the context of cogeneration, for example, district heating is a positive legacy from the socialist era for most NMSs: if properly managed and adapted to customer's needs, it has the potential of being a more efficient and economical than other heating options. However its competitive position has gotten worse because of the wastefulness of the systems (production and distribution losses), the prevailing standard cost plus fees tariff methodology for heat that is providing little incentive for investment in refurbishment, competition from low-cost fossil and nuclear power generation, inflexible individual consumption control and billing practices. Existing DH systems require extensive refurbishment, however often DH companies are not considering conversion to CHP. This is because prevailing cost-plus regulation may provide little incentive to reduce costs (e.g. by improving the efficiency of systems even where this is cost effective), but rather an incentive to overspend or overstate costs. Often regulation only allows fuel and operational cost, but no asset depreciation or return on capital. This points that still very sizeable investments are required to improve energy efficiency in DH (also increasing the share of CHP) and cost recovery in tariffs should include provisions for depreciation and necessary investment, as well as reasonable rate of return.

Energy efficiency institutions are a crucial aspect for both policy design and implementation and a weak point in NMSs, marked by inadequate coverage of efficiency related tasks by institutional structures and insufficient staffing. Thus poor implementation appears to come less from a deliberate avoidance by NMSs than from differences in the level of efficiency of national bureaucracies. State administrations (Ministry's departments, national energy agencies and local energy centres) in the field of energy efficiency in NMSs often appear understaffed and under-resourced to fulfil their stated missions, including the enforcement of EU legislation and developing new national activities. There is thus a huge discrepancy between declared policy aims and existing high energy saving economic potentials on the one hand, and the means, including human resources, to achieve them on the other. In addition general lack of policy research on economic saving potentials in different end-use sectors reveals that the design of the energy efficiency policies and actions, as well as financial support allocations, may be disconnected from the reality of where the big conservation potentials are or from a robust understanding of the relative cost-effectiveness of different measures. Finally, limited stakeholder consultation provides poor basis for working with the private sector (appliance retailers, architects, construction business) and consumers in the implementation of energy efficiency policies. However, in NMSs often key stakeholders are not properly organised and represented, therefore making it difficult to have their interests represented in policy making at all: for example with the exception of large industrial consumer associations, consumer associations are largely disconnected from sustainable energy policy making.

5.5 RECOMMENDATIONS FOR FUTURE ENLARGEMENTS

While the Accession process has provided a major impetus to the improvement of energy efficiency in NMSs, the transposition of energy efficiency acquis is not likely to have been the single major direct driver in the indicated major improvement in energy intensities. This section has shown that transposing the acquis into national legislation is often not sufficient and enforcement problems have plagued the effective implementation of the acquis. Despite progress in the last decade, energy efficiency policy effort in NMSs is still far from striking a balance between the sizeable energy saving potential and sufficient resources for ensuring a sustained policy implementation to capture this potential.

To ensure that in future Enlargements of the EU Candidate Countries take a longer-term perspective beyond the passive transposition of European acquis, the Commission should assist Candidate Countries in the establishment of functioning implementation regimes at national level. It is a brave assumption that Candidate Countries, whose leading priority – also in government capacities – is economic growth, can adopt and effectively implement all energy efficiency acquis in just a few years, especially considering that this chapter of the acquis has grown since the 2004 Enlargement and thus will be an even more challenging task. Indeed ongoing implementation challenges point in the direction that support to national implementation is needed even after countries accede to the EU.

This section gives generic recommendations about the types of actions that the Commission may consider in assisting Candidate Countries in their efforts to not only transpose, but also effectively implement European legislation. The section also contains a set of specific recommendations about improving the implementation flaws of existing European legislation in the field of energy efficiency, as discussed throughout the chapter.

The Energy End-Use Efficiency and Energy Services Directive provides an important opportunity for improving policy frameworks in order to remove barriers that impede the efficient use of energy and to create conditions for the development and promotion of a market for energy services. It is thus of utmost importance that the Commission ensures that NMSs both undertake additional policy action and introduce energy efficiency measures, and tackle the implementation problems of existing policies.

a) Generic recommendations173

- To avoid a pattern of ‘mechanically’ transposing European legislation in patches, the Commission needs to assist Candidate Countries in designing comprehensive and coherent energy efficiency policy strategies and sectoral policies for enforcing European energy efficiency legislation. Ideally these include combinations of energy efficient technologies, programs and concrete actions to deploy them, and rational markets to maximise their impact;
- To stimulate the enforcement component of energy efficiency policies the Commission should require regular and rigorous reporting about the implementation progress of already transposed acquis completed by close monitoring via national and regional benchmarking as well as using existing studies and analysis by other organisations (Energy Charter Secretariat and IEA, for example) and other initiatives (NGOs and expert platforms, for example). The Commission should require Candidate Countries to establish clearly implementation responsibilities, unambiguous control mechanisms

173 See also IEA (2004b) and Ürge-Vorsatz et al (2003)

at national level to track non-compliance, and ensure the existence of meaningful and enforceable non-compliance regimes;

- Energy pricing reforms to achieve cost-reflective pricing, including tariff reforms and removal of direct subsidies and cross-subsidies, are instrumental for energy efficiency. However, in most economies in transition this is a highly sensitive issue and needs to be accompanied with appropriate tailor-made social support with an energy efficiency component;
- Economic and energy market reforms alone will not close the energy intensity gap with the 'old' EU MSs. Concerted efforts and targeted policies at national level are needed to achieve further improvements. Governments should devote a much higher level of resources (financial, human and institutional) into this area, considering the importance of the economic and social gains. Compared to 'old' EU MSs, in economies in transition economic and social gains are much higher on the policy agenda than environmental ones and get there much faster;
- To ensure efficient design, enforcement and monitoring of policies and regulations, the Commission should encourage Candidate Countries to secure appropriate institutional basis for energy efficiency. The European Commission may consider providing additional guidance and training to national administrations in streamlining implementation procedures at national level;
- Energy efficiency measures can deploy best results when integrated into end-use sectoral policies (buildings, industry, transport, etc.), as well as into policies on environment, urban planning, regional development and social issues;
- Since good data collection and research form the basic foundations for sound, effective policies, the Commission should encourage and assist Candidate Countries in financing policy research on energy conservation potentials in end-use sectors and in designing and implementing policies and measures to capture these. While end-use data appears sufficient to monitor developments and trends, at national level data and indicators appear insufficiently developed to identify energy conservation priorities for national action;
- This report has shown that much of the improvements in energy-efficiency during the accession process result from indirect impact of other economic, legal and social changes that result from Enlargement. Thus, in order to potentially be able to influence and leverage these better in the direction of sustainability, research on a profound understanding of the implications of the key, general economic, social and legal processes relevant from energy efficiency point of view and spurred by accession should be conducted at an early stage of the Accession process;
- The Commission should encourage and assist Candidate Countries in identifying and communicating economic, social and environmental co-benefits of energy efficiency actions among citizens and businesses;
- The Commission should encourage and assist Candidate Countries in promoting behavioural change towards sustainable energy consumption modes among citizens and businesses;
- Energy efficiency policy defines the objectives, means and institutional resources, identifying the responsibilities of state bodies. However stakeholder consultation and coordination is often missing. To facilitate the effective implementation of energy efficiency acquis the Commission should encourage Candidate Countries to strengthen national stakeholder consultation with professional bodies, NGOs, etc., also via strengthening consumer associations. The Commission should encourage the involvement of businesses actors and local authorities in national implementation efforts;
- Regional cooperation and participation to EU programmes promise a more rapid and effective resolution of implementation problems: the European Commission may

facilitate the transfer of best implementation practices among countries with similar political systems, policy traditions and levels of economic development;

- The Commission needs to assist Candidate Countries in identifying the impacts of European legislation on national policies in order to exploit synergies with existing national policies and avoid conflicts. For example in the case of social policies price subsidies can be replaced by tailored support for low-income consumers to insulate their houses, to invest in efficient energy equipment or via other investments into long-term improvements of energy efficiency;
- Where implementation difficulties are identified, the European Commission should come up with guidance about concrete tools to overcome these by ensuring public acceptance and institutional commitment. Such tools may include institutional twinning and training of staff of national administrations, supporting platforms of national policy makers, businesses, experts and representatives of the Commission, raising awareness among implementing authorities, businesses and the general public about the environmental, social and economic co-benefits of implementing the energy efficiency acquis;
- Implementation support efforts may need to be more focussed on poorly organised sectors with poorer lobbying capacity (e.g. the buildings sector). In addition, the Commission may facilitate the better organisation and stakeholder representation of insofar poorly represented but key stakeholders, such as consumer associations;

b) Specific recommendations related to energy efficiency acquis in force at the time of the 2004 Enlargement

Buildings

- Communicating the economic benefits of building certification and labelling among developers, architects, construction businesses, homeowners and tenants;
- Introducing financial incentives in the scope of the EPBD implementation regime for both low-energy construction (e.g. preferential loan and/or mortgage schemes, tax incentives) and for building refurbishment;
- Education and training, including professional development trainings to disseminate recent developments in the field are essential in the sector. Basic educational curricula of all professionals and trades related to the construction sector should include mandatory coverage of major energy-efficiency options such as passive solar construction. Free access to professional development in the field to provide training in cutting-edge energy efficiency construction know-how and technologies should be facilitated in all related trades and professions;
- Introducing schemes for the provision of tailored advice to building owners about measures to take in their property and practical assistance in implementing these.

Combined heat and power

- District heating, as a potentially appealing heating option from a sustainability perspective, has a high share in post-communist countries. Since there are many problems with DH systems, this area should receive much higher attention at EU level, especially during Accession;
- Develop incentive regulation to promote energy efficiency investment, demand-side measures and third party financing anticipating the abolition of price control.

Household appliance labelling

- Ensuring capacity for proper monitoring and enforcement. Assigning responsibility to appropriate agencies and ensuring proper staffing, including services such as consumer and retailer education, compliance and monitoring, and enforcement monitoring;

- Requiring monitoring the compliance of both manufacturers and retailers and application of sanctions in case of mislabelling;
- To exploit economies of scale, especially in product groups where appliance models do not vary greatly across MSs, laboratory testing of appliances can be coordinated across Europe. Laboratory testing could be done in one country and placed in a database for the benefit of all other MSs;
- Ensure dissemination of best practices in the EU and outside, including from on-going regional initiatives (CEECAP, for instance) and stimulate bilateral and regional co-operation.
- Supporting educational programs for consumers on energy labelling;
- Supporting countries in engaging retailers also via training to enhance understanding of energy;

Energy efficiency institutions

- Strengthening governmental, regional and local energy efficiency institutions to make them capable of efficiently enforcing the adopted legislation and policies and action plans;
- Capacity building for the development of the proper institutional background needs to also be related to commitment by the beneficiary state about the allocation of adequate financial and human resources once European assistance is over;

Better training and regular professional development training of staff in energy efficiency related institutions is essential, especially given the fast developments in the field and the limited past culture of education in the field.

Regulatory Framework and Implementation Capacity

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6. Regulatory Framework and Implementation Capacity

The Energy Acquis Communautaire

The Energy Acquis Communautaire identifies the body of common rights and obligations in the area of energy which is binding for all the member states of the EU. This broad definition includes rules and policies on:

- Competition;
- State aid (including support to the coal sector);
- The internal energy market (including liberalisation and the development of competition in the electricity and gas markets);
- Promotion of renewable energy;
- Energy efficiency; and
- Security of supply.

Since issues related to the promotion of renewable energy, energy efficiency and security of supply are covered in other parts of this study, the analysis here focuses on the regulatory framework with respect to the provisions contained in EC Directives 2003/54/EC, 2003/55/EC and Regulations 1228/2003 and 1775/2005. This chapter also assesses the administrative capacity of the national energy regulatory agencies.

6.1. Gap identification at-a-glance

The implementation of the Energy Acquis is a key point for the development of the Internal Energy Market (IEM). This implies not only bringing national legislation in line with the EU Directives, but also creating strong institutions and reliable enforcement procedures.

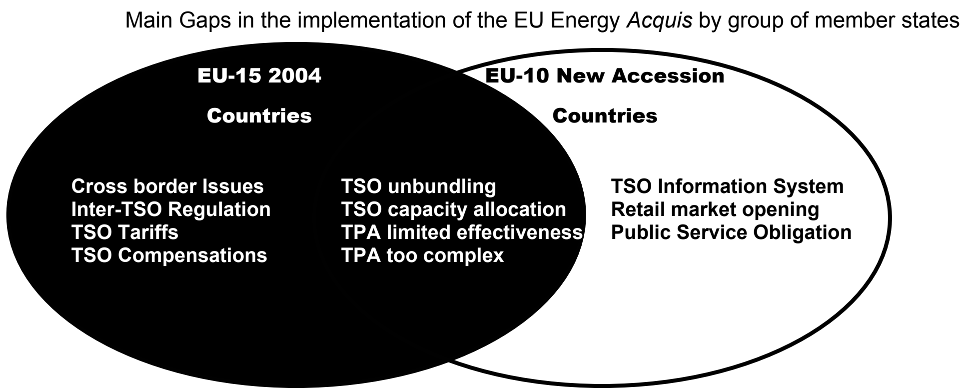
Since the adoption of EC Directives 2003/54/EC and 2003/55/EC most of the EU-25 member states, with some exceptions where derogations were granted (such as Latvia, Lithuania, Malta and Cyprus), have transposed the Directives into national legislation. However, the transposition of the Directives is only the first step in the development of the IEM which also requires, inter alia, a clear institutional framework and an independent regulator with adequate enforcement powers. At the same time, the structure of the sector remains an important factor for the development of an effective, competitive and sustainable internal market.

This part of the study focuses on assessing the degree to which the Energy Acquis has been transposed and implemented, and on identifying any remaining gaps in this implementation, particularly in the new member states. This assessment is based on:

1. Reports, statistics and quick fact sheets from the European Commission and other EU institutions;
2. Other reports from different institutions, including the Council of European Energy Regulators (CEER) and the European Regulators Group for Electricity and Gas (ERGEG);
3. The survey conducted for this study, using the responses to a purposely-developed questionnaire by the different stakeholders in the EU energy sector; and
4. An additional, final assessment carried out through CEER. Regulatory agencies were asked to review our analysis before final conclusions and recommendations. We received the comments of the German, Belgian, Austrian, Czech, Polish, Irish, English and Luxembourgian regulators.

The main issues with respect to which the Energy Acquis is still not fully implemented, are presented in the following figure. Some gaps are common to both old and new member states, while others are more frequent in one of these groups.

Figure 6-1: Regulatory Framework and Implementation Capacity



Source: Mercados EMI

The diagram clearly shows that both old and new member states face problems in areas that are crucial to the development of competition in the energy sector. Inadequate levels of third-party access (TPA) and of TSOs/DSOs independence, as well as the procedures for allocating capacity on the networks, seriously hamper the development of competition in the energy sectors of many member states and, consequently, the creation of a well functioning IEM.

In addition to these common issues, old member states face problems in the integration and coordination between TSOs and other cross border issues, while concerns in new member states mostly relate to retail market opening and the issue of public service obligation.

The problems faced by the new accession countries are issues that typically characterise the "early stages" of the liberalisation process and that have already been overcome in the old member states. However, looking forward and in the prospect of future enlargements, those issues should be carefully addressed in the pre-accession process. It may be worth reminding that at the time of accession the two new EC Directives 2003/54/EC, 2003/55/EC were about to come into force and this has meant that the new member states have had to implement the requirements of the first and second energy Directives almost at the same time. So, while the old member states had already restructured their vertically integrated monopolies and were mostly ready to push further along the liberalisation process, the new member states had a shorter time to undertake all the necessary changes to reform the structure of their energy sector. This may also help to explain why new member states are still dealing with issues that are more typical of recently liberalised markets.

Finally, it is important to mention that not all gaps in the implementation of the Acquis have the same adverse effect on the development of the IEM. For example, the lack of independence of the system operators may greatly distort access to networks, which is an essential feature for new entrants to operate in the market, and for the development of competition. Moreover, it may also slow down or otherwise distort the development of the network because, where TSOs and DSOs are part of the incumbent energy undertaking there is no incentive to facilitate the entry of new operators. On the other hand, some issues, such as the fact that public service obligations are not notified to the European Commission, do not have any major effects by themselves on the creation of a fully integrated energy market (it is however clear that the public service obligation may distort or hamper competition).

6.2. Main Framework

To assess the current situation in the development of the EU IEM, we start from a comparison of the Acquis's implementation status in the different member states, looking in particular at TPA, TSO/DSO unbundling, public service obligations and authorisation and tendering procedures. Table 6-1 and Table 6-2 below present this information together with tour assessment of the effectiveness and complexity of the national provisions transposing the Directives. The Tables also indicate whether member states are subject to infringement procedures launched by the European Commission for failing to implement satisfactorily the provisions of the Directives.

A colour coding system has been used for improving visual understanding of the results; the green colour indicates that no serious problems have been identified in the member state in the specific area (i.e. that the implementation has been effectively achieved); the yellow colour signals that the implementation process is not yet completed, or that only the minimum requirements have been achieved; the red colour highlights a situation where the implementation process has not yet started, it appears inadequate or serious problems have been identified.

Table 6-1: State of Implementation of Acquis Communautaire

Country	Third Party Access				TSO/DSO Unbundling						
	Directive Implemented?	Effective?	Complex?	Infringement process?	TSO Unbundling		DSO Unbundling		Effective?	Operational Transparency?	Infringement process?
					Sector	Type	Sector	Type			
AT	E&G	Good	Fair	NO	E+G	Legal	E+G	Legal	Good	Low (E)	G - LFN
BE	E&G	Poor	WD	LFN	E+G	Legal	E+G	Legal	WD	WD	NO
DE	E&G	Good	Fair	LFN (E)	E+G	Legal	E+G	Legal	WD	WD	NO
DK	E&G	Poor	Fair	NO	E+G	Own	E+G	Legal & Oth	Poor	Low	NO
ES	E&G	Good	Complex	NO	E+G	Own	E+G	Legal	Fair	Fair	G - CJ
FI	E&G	WD	WD	NO	E+G	Own	E+G	Legal	WD	WD	E - LFN
FR	E&G	Poor	WD	LFN	E+G	Legal	E+G	Oth	WD	WD	E+G - LFN
GR	E&G	Good	Complex	NO	E+G	Legal	E+G	Legal	Poor	OK	E - LFN
IE	E&G	Good	WD	NO	E+G	Own (E) Legal (G)	E+G	Oth	Fair	OK	E+G - LFN
IT	E&G	Good	Complex	LFN (E)	E+G	Own (E) Legal (G)	E+G	Legal	Fair	Fair	E+G - LFN
LU	E&G	Good	Complex	CJ	E	Legal	NO	N/A	Poor	OK	CJ
NL	E&G	Fair	Complex	NO	E+G	Own	E+G	Legal	Poor	OK	NO
PT	E - G (DEG)	WD	WD	NO	E+G	Own	E+G	Legal	WD	WD	NO
SU	E&G	WD	Complex	NO	E+G	Own	E+G	Legal	Fair	OK	E - LFN
UK	E&G	Good	Complex	RO (E)	E+G	Own	E+G	Own +	Good	OK	NO
CY	DEG	N/A	N/A	NO	E	Legal	E	Oth	WD	WD	NO
CZ	E&G	Fair	Fair	LFN	E+G	Own (E) Legal (G)	E+G	Legal	Fair	OK	E+G - LFN
EE	E&G	Poor	WD	NO	E+G	Legal	E+G	Legal	WD	WD	E - LFN
HU	E&G	Poor	Complex	NO	E+G	Legal	E+G	Oth	Poor	WD	NO
LT	E&G	Fair	WD	LFN (G)	E+G	Legal (E) Oth (G)	E+G	Oth	WD	WD	E - LFN
LV	E&G	Poor	Fair	NO	E+G	Legal (E) Oth (G)	E+G	Oth	Fair	OK	NO
MT	DEG	N/A	N/A	NO	DEG	N/A	DEG	N/A	N/A	N/A	NO
PL	E&G	Fair	Complex	LFN (E)	E+G	Own	E+G	Legal	Fair	Fair	E+G - LFN
SI	E&G	Poor	Complex	NO	E+G	Legal	E+G	Oth	WD	WD	NO
SK	E&G	Poor	Complex	LFN (E)	E+G	Own (E) Legal (G)	G	Legal	Fair	Fair	E+G - LFN

Source: own elaboration using information from: CEER Regulatory Benchmark Report 2005, EU Report on Energy Inquiry and Country Profiles, EU Quick Fact Sheets, ERGEG Countries' Report and own questionnaire

References:

E: Electricity
G: Gas
LFN: Letter of Formal Notice
DEG: Derogation or request for

RO: Reasoned Opinion
Own: Ownership
Oth: Other (managerial or functional)
WD: No Data available

CJ: Member State brought in front of the Court of Justice

Table 6-2: State of Implementation of Acquis Communautaire (continued)

MS	Public Service Obligation						Authorizations & Tendering Procedures			
	Consumer Legislation	Supplier of Last Resort	Security of Supply	Regularity	Quality	Prices of Supply	New Generation	Natural Gas		
								Construc.	Operation	Supply
AT	NO	E&G	E&G	E&G	E&G	E&G	Yes	Yes	Yes	Yes
BE	E&G	E&G	E&G	E&G	E&G	E&G	Yes	Yes	Yes	Yes
DE	E	E	WD	WD	WD	WD	WD	WD	WD	WD
DK	E&G	E&G	G	NO	NO	NO	Yes	WD	WD	WD
ES	E&G	E&G	E&G	E&G	E&G	E&G	Yes	WD	WD	WD
FI	E&G	E&G	E&G	E&G	E&G	E&G	Yes	Yes	Yes	Yes
FR	E&G	NO	WD	WD	WD	WD	Yes	WD	WD	Yes
GR	E&G	E&G	WD	WD	WD	WD	Yes	Yes	Yes	Yes
IE	E&G	E&G	E&G	E&G	NO	NO	Yes	Yes	WD	Yes
IT	E	E	E&G	E&G	E&G	E&G	Yes	Yes	Yes	Yes
LU	E&G	E&G	E&G	E&G	E&G	E&G	WD	WD	WD	WD
NL	WD	WD	WD	WD	WD	WD	WD	WD	WD	WD
PT	WD	WD	WD	WD	WD	WD	Yes	Yes	Yes	Yes
SU	E	NO	E&G	NO	E&G	NO	Yes	WD	WD	WD
UK	E&G	E&G	E&G	E&G	E&G	E&G	Yes	Yes	Yes	Yes
CY	E&G	E	E&G	E&G	E&G	E&G	Yes	Yes	Yes	Yes
CZ	E&G	E&G	TbI	TbI	TbI	E&G	Yes	Yes	Yes	Yes
EE	E&G	E&G	WD	WD	WD	WD	Yes	Yes	Yes	Yes
HU	E&G	E&G	WD	WD	WD	WD	Yes	Yes	Yes	Yes
LT	E&G	E&G	E&G	NO	TbI	TbI	Yes	Yes	Yes	Yes
LV	E	E	E	E	NO	NO	Yes	Yes	Yes	Yes
MT	E	E	WD	WD	WD	WD	Yes	WD	WD	WD
PL	E&G	E&G	E	WD	E	E	Yes	Yes	Yes	Yes
SI	E	E	E&G	TbI	TbI	E&G	WD	WD	WD	WD
SK	E&G	E&G	E&G	E&G	E&G	NO	Yes	WD	WD	WD

Source: own elaboration using information from: CEER Regulatory Benchmark Report 2005, EU Report on Energy Inquiry and Country Profiles, EU Quick Fact Sheets, ERGEG Countries' Report and own questionnaire

References:
E: Electricity
G: Gas
LFN: Letter of Formal Notice
WD: No data available
CJ: Member State brought in front of the Court of Justice
O: Ownership
L: Legal
TbI: to be implemented
TSO: Transmission System Operator
DSO: Distribution System Operator

The information provided in the tables is analysed below. The focus is on the main areas (TPA, Unbundling, etc) for which progress and drawbacks of the implementation process in the different member states are assessed, and similarities and differences between the old (EU-15) and the new (EU-10) member states are identified. Differences between the electricity and gas sectors are also highlighted where relevant.

A country-by-country analysis for the new member states is presented in Annex A of the original study.

6.3. Gaps in new accession countries vis-à-vis old member states

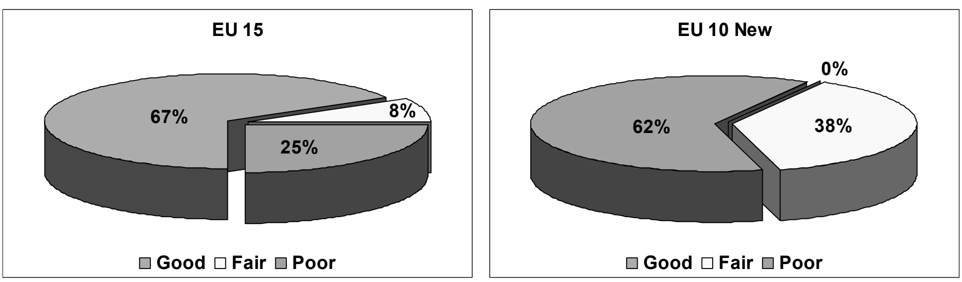
6.3.1. Third Party Access (TPA)

TPA provisions are possibly still the weakest aspect in the implementation of the EU energy Directives. The figures below illustrate the degree of effectiveness of these provisions in both old and new member states.

It is important to note that, even though TPA and TSO/DSO unbundling are examined as separate issues, they cannot be considered as completely unrelated. It is worth underlying that, as shown in

Figure 6-2, TPA presents a low degree of effectiveness in most EU-10 countries, despite the fact that it has been legally implemented in nearly all member states.

Figure 6-2 Third Party Access: Differences in Effective Implementation



Source: Mercados with the information presented on Tables 6-1 and 6-2. Percentages only consider non-blank spaces in the table.

While only a quarter of the old member states appear to have an ineffective TPA system, more than 60% of the new member states seem to be experiencing serious problems in this area. The most common problems that explain the poor performance of some of the old member states with respect to TPA in both electricity and gas markets are:

1. Discriminatory behaviour of transmission companies;
2. High sector concentration;
3. Captive markets; and
4. Long term contracts.

These problems represent not only a gap in the implementation of the Energy Acquis, but also reflect a structural problem in the concerned member states, where incumbent companies retain a large share of the market so as to hamper the development of competition. The new member states are also characterised by similar situations.

Discriminatory behaviour might arise from companies that are vertically integrated and in which a weak form of unbundling is unable to prevent the incumbent's strategic behaviour to block the access to the market by new operators. Horizontal concentration, where the incumbent firm is able to retain a large share of the market, is also a matter of concern because customers are not able to find competitive offers.

For example, the Czech Republic presents full concentration in the import-retail market of natural gas with only one company owning all gas grids; while in the electricity sector the effect of concentration in the generation and retail market are exacerbated by some bureaucratic issues. As a consequence, the effectiveness of TPA is almost negligible, resulting in an insignificant level of switching in the gas market and of only around 5% in the electricity market. Similar situations may be found in most new member states with small differences and some additional characteristics (such as in Poland, where the lack of proper specific secondary legislation affects the development of TPA).

Another important issue to remark is TPA complexity; in this case no important differences exist between EU-15 and EU-10 members. In many countries third party access is too complex especially when looking at legal requirements, congestion management and imbalances charges and procedures. Moreover, when companies try to access the transmission and distribution systems they often have to face problems related to information systems (data handling procedures) and information availability.

6.3.2. TSO/DSO Unbundling

The EU Directives require legal and functional unbundling of the Transmission System Operator (TSO) and of the Distribution System Operator (DSO) from other commercial activities. While ownership unbundling appears to be the best solution to provide efficiency and transparency and to avoid any discrimination or distortion in the access to the network, the EC Directives have not created such an obligation yet174, but leave to member states the possibility to introduce it.
The TSO's and DSO's Unbundling represents a key issue in the development of the EU IEM because controlling the transmission and/or the distribution system implies controlling the network flows as well as the access to the network. When TSO/DSO activities are performed within an integrated utility, it may be possible that the development or operation of the networks discriminates against existing or potential competing market participants. In this sense, TSO/DSO unbundling is closely related to TPA issues.

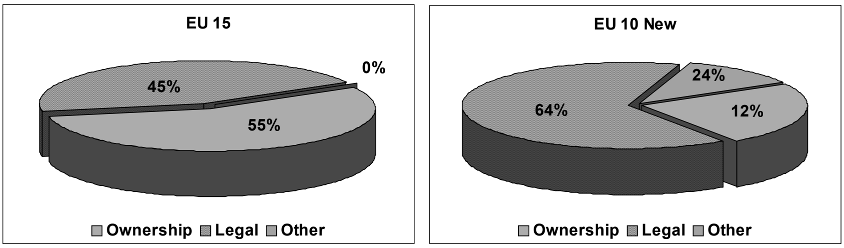
TSO Unbundling

Figure 6-3 below presents a summary of the situation with respect to TSO unbundling by type of legal requirement (gas and electricity are examined together as above). Three unbundling categories have been used: Ownership (maximum); Legal (minimum requirement by EC directive); and Other (representing other types of unbundling, such as managerial, etc.).

174 In September 2007 the European Commission published proposals for a third package of provisions, including new rules for the ownership unbundling of transmission system operation.

As it can be observed, ownership unbundling is the most frequently adopted solution in the EU-15, while legal unbundling is the most common form among new member states.

Figure 6-3 TSO Unbundling by Type of Legal Requirement



Source: Mercados from information in Table 6-1 and Table 6-2.

Legal unbundling relates to the decision making process inside the company, with the creation of a separate management structure for each unbundled activity, but also implies provisions related to the separation of accounts and the public availability of information (typically the unbundling of accounts). In this matter, TSOs in all EU-15 (with the exception of Germany where unbundling of accounts provisions is under implementation) are required to publish separated public accounts for unbundled activities. This situation differs significantly from the situation in EU-10 where TSOs in nearly half of the member states are not required to present (or are not presenting) separated public accounts. This applies to: Czech Republic (where information is presented to the regulator, but it is neither public nor audited), Malta and Cyprus; while Poland and Slovakia are in the process of implementation. Here as well, several member states benefit from derogation or extended deadlines for transposition.
Additionally, from the survey of stakeholders some additional issues related to TSO functions were identified. In the old member states' electricity sector, these issues usually relate to:

- Lack of inter-TSO coordination in terms of:
- Procedures in allocating capacity; and
- Transparent procedures for compensation;
- Tariffs not reflecting long run incremental costs; and
- Long term contracts having priority for interconnection.

In the gas sector of old member states, problems affect:

- Non transparency in capacity allocation mechanisms and congestion management procedures;
- Lack of market-based pricing rules for released interruptible capacity; and
- Non-transparent management of information.

For new member states, pitfalls in the electricity sector relate to:

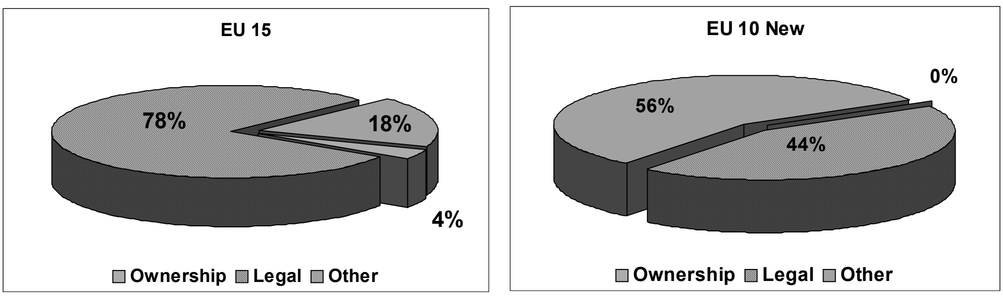
- Allocated capacity not being freely tradable;
- Tariffs not reflecting long run incremental costs; and
- Lack of published information related to the operation of the system.

In the gas sector in new member states problems are similar to those already stated for the electricity sector; additionally, it appears that there is scope for simplifying transactions and market-based pricing rules for released interruptible capacity through the development of more effective information systems.

DSO Unbundling

The figure below presents the current situation regarding DSO unbundling. Here as well, differences may be observed between old and new member sates. While in old member states legal unbundling is the most common type of requirement for DSOs, in new member states other types of requirements, different from legal and ownership, prevail. As in the case of TSO unbundling, some caution has to be taken when analysing these results. In some cases, such as Slovenia, the electricity DSO should have implemented legal unbundling before July 2007, while in the gas sector all DSOs are below 100,000 customers and therefore do not need to implement legal unbundling according to the EU Directive. A similar situation applies to Cyprus, Hungary and Latvia, where the latter had until July 2007 to implement the DSO's legal unbundling.

Figure 6-4 DSO Unbundling by Type of Legal Requirement

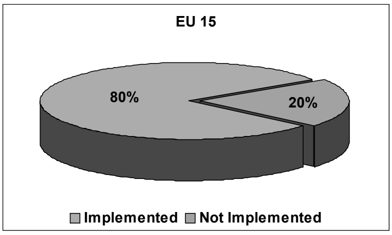


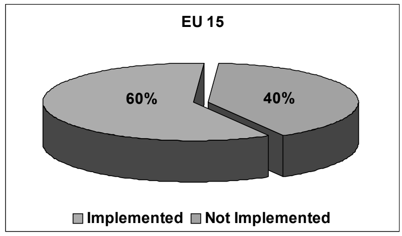
Source: Mercados from information in Table 6-1 and Table 16-2 Percentages consider that each country has two sectors (E and G) except in the cases presented in the table.

Public Service Obligations and Customer Protection

Public Service Obligations (PSO) and Customer Protection relate to all measures implemented by member states to ensure proper provision of service to the customers and to ensure that the service is performed in conditions of regularity, quality, security and accessibility. Most EU member states have adopted (or are currently adopting) at least in one sector, legal protections for customers, including the supplier of last resort (as, for example, in Latvia, Malta, Spain and Slovenia).

Figure 6-5 Implementation of Security of Supply Provisions





Source: Mercados from information in Table 6-1 and Table 6-2 Percentages consider only non-blank spaces; in addition, two sectors (E and G) are considered for each country except in the cases presented in the table.

Security of supply

Figure 6-5 above presents the current status of the implementation of security of supply provisions: in 20% of the cases in old member states and in 40% of the new member states, security of supply provisions are still to be implemented.
Regulated retail tariffs

Probably the main issue regarding PSO relates to the existence of regulated retail tariffs for all/some customers at values below the long-run average cost of the service. This issue deserves very close attention because it is a key point for developing an IEM. For instance, if the regulator sets "last resort" prices below economic cost, this creates a barrier to entry in the market and distorts competition between the incumbent and potential or actual entrants.

This problem is observed in several old member countries, like Austria, Denmark[175], Ireland[176], and Sweden. In the case of new member states, the problem is even worse: in almost all cases, the existence of distorted retail tariffs is an issue. As in the case of Spain, where regulation about retail tariffs is under review, the situation may change when the secondary legislation on the tariff of Last Resort is issued in the different member states.

6.3.3. Tendering and Authorization

In this area there seem to be no gaps as most of both old and new member states, have already implemented provisions for authorisations and granting of licences according to publicly available procedures.

6.3.4. The Need for Regulation

One final important issue which needs to be mentioned arises from the survey of energy sector stakeholders conducted for this study, and relates to the need for sound regulation in member states. Nearly half of the respondents from different countries commented on the need to improve regulation in both old and new member states as a requirement for reducing barriers to entry in the IEM. This issue seems to affect the electricity and gas sectors in a similar way.

175 In Denmark, for example, as stated in the Commission Staff Working Document: "…a price cap in the retail market seriously hampers the development of competition." Communication from the Commission to the Council and the European Parliament. (2007) "Prospects for the internal gas and electricity market". SEC(2006) 1709

176 Regarding Ireland, the same document comments: "…market participants noted that competition had been affected by the regulation of end-user electricity prices."

Some stakeholders from new member states also mentioned the lack of coordination between regulators in different member states, for opening the market in each jurisdiction to external competition as an issue requiring attention. This last topic is closely related to cross border issues also mentioned by respondents in old member states. This is an even more critical issue in the Baltic countries.

6.4. Administrative Capacity of Institutions

6.4.1. Introduction

After examining the implementation of the Energy Acquis in both old and new member states, here we examine the administrative capacity of the regulatory bodies.

The administrative capacity can be defined as the ability of the institutions concerned to fulfil the role for which they were established. Therefore an energy regulatory body may be defined as administratively capable when it is able to adequately regulate the national energy market in line with the national and EU requirements. For the purposes of this study, for EU requirements we mainly refer to the implementation of EU Directives 2003/54/EC and 2003/55/EC, and more in general of the Energy Acquis.

Administrative capacity is a difficult dimension to assess, as no objective direct measurement is possible. And significant subjective judgement on the quality of the regulation would be inevitably involved. Therefore in this study we have partly resorted to an indirect approach at evaluating administrative capacity. Our contention is that if an energy regulator has enough human and financial resources and sufficient independence from political interference, then it is likely to develop an adequate level of administrative capacity. The issue of the independence of regulator is addressed in the next section. Here we focus on the human and financial resources available to the different regulators in the EU.

The aim is to highlight if and where differences exist between regulators in old and new member states. We also aim at assessing the impact that strengthening projects which were run before accession, have had on the administrative capacity of the regulatory bodies of accession countries.

6.4.2. Comparison of Regulators' Resources in the Old and New Member States

As mentioned above, one of the parameters we use for evaluating the administrative capacity of regulators is the level of resources they have available. In this respect, we have selected two indicators in order to compare regulatory bodies across the EU, with the aim of determining if any differences between the old and the new member states may be observed.

The selected indicators are:[177]

- the level of staffing of the regulatory institutions; and
- the level of financial resources available.

In order to facilitate the comparison of these two indicators between member states some adjustments have been made to the raw data. The way in which this has been done for each indicator is explained below. The adjusted data are then presented in graphs in order to facilitate the comparison.

Level of staffing: in order to carry out the tasks and objectives assigned to it, an institution needs an adequate level of staffing (both in terms of numbers and of qualifications).

177 For regulatory bodies, data on their staffing levels and budgets are available in the CEER Benchmarking Report, published in 2005. Additional information has been collected directly from the involved institutions.

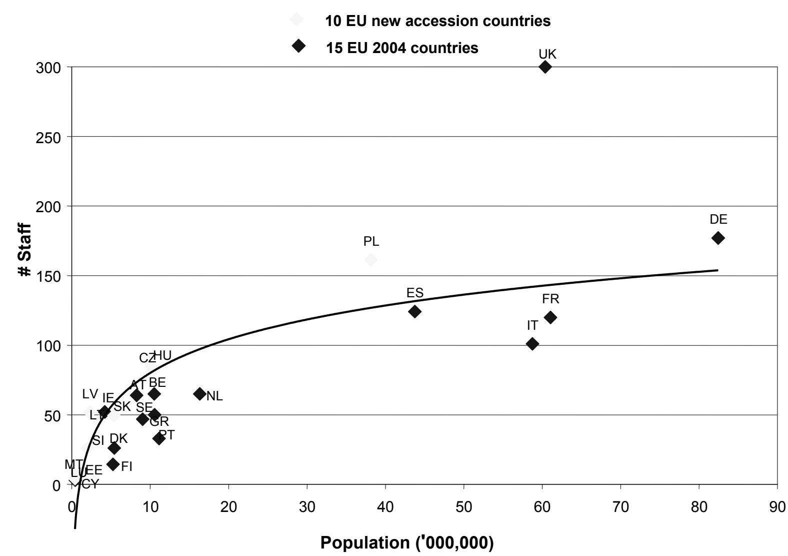
To compare the number of staff in the different regulatory bodies across Europe, two main adjustment factors have been taken into account: the overall level of the country's[178] population, and the number of sectors in which the regulatory body operates.

The country's population has been considered as a proxy variable that provides information on the size of the energy market in a member state, and, therefore, also of the staffing requirement of the energy regulatory bodies. The graph shows the level of staffing in direct relation with the population of the country.

However, the level of staffing has also been considered to be linked to the number of sectors covered by each regulatory body (i.e. the more the sectors, the larger the required staff). In order to take this into account when comparing the number of staff of the regulatory agencies in the different member states, an "equivalent" staffing level was computed by applying a discounting factor to the total staff based on the number of sectors that the body regulates, in many cases more than just electricity and gas. This adjustment only takes into account the fact that some regulatory bodies may be involved in further sectors other than just electricity and gas (i.e. district heating, transport, water, etc). Other factors, such as the actual tasks of the regulatory body, its actual enforcement powers or other organisational issues which may also influence the staffing levels, have not been taken into account.

The graph below compares the relation between the level of staffing of the 25 regulatory bodies adjusted by the number of sectors covered by each regulator, with the population in each member state.

Figure 6-6: Level of Staffing of the Regulatory Institutions in the EU



Source: Mercados EMI

As it may be expected, there is a positive relationship between the size of the country and the size of the regulatory bodies, the relationship however is not linear and the trend line that represents the level of staffing in comparison with the population shows economies of scale,

178 Source: Eurostat (2007) Statistics in focus - Population and social conditions - 41/2007 "First demographic estimates for 2006" (pp. 2)

i.e. the staffing needs in proportion to the population grow in a less than proportional way.

In addition, the above graph shows that the majority of the new member states employs a number of staff either on, or above, the trend line. On the contrary, most of the old member states are placed below the trend line in terms of staffing. Only two of the old member states are above the trend line: Germany and the UK.

It is worth noting that Poland and the UK[179] have a very high level of staffing compared to the remaining countries and have therefore an impact on the trend line. In the case of Poland, the large staff of the regulator is partially due to the fact that the Regulatory agency is also in charge of regulating a large district heating sector, liquid fuels and issuing and redemption of green and red (CHP) certificates; in the case of the UK, quality monitoring is a task carried out by OFGEM that is not common in most of the other regulators. The removal of the UK and Poland from the sample would lower the trend line and therefore move some of the new member states above the trend line. In the same way, some of the old member states, such as Ireland or Spain, would also be moved above the trend line. However, the relativities between old and new member states would not be significantly affected and, in general terms, the results of the analysis suggest that the new member states employ proportionally more personnel in their national regulatory bodies, which may indicate that they are facing more complex tasks: the implementation of the EU Acquis at the same time as they are supporting the structural reforms that are needed for the transition from a vertically integrated energy sector to a liberalised one.

However, the comparison should be considered with some care, because, as it was stated above, organisational factors or differences in the regulators' competences have not been taken into account. In this sense, further analysis has been performed with the aim of understanding whether the old and new member states show differences in the financial resources available.

Level of financial resources available: financial resources ensure that a regulatory body may adequately pay its staff and therefore compete for the best resources with other administrative bodies, as well as with the industry. Financial resources also ensure that the regulatory body can train its resources or undertake new activities if needed, and can be independent from the industry. For this reason, financial resources are taken into account to evaluate the institution's administrative capacity.

In the first instance the financial resources of regulators have been put in relation with the size of each country's population, because, as mentioned above, we believe this is a good proxy for the actual size and needs of the regulated sectors. Also, similarly to the procedure used for comparing the level of staffing, the first adjustment factor that has been taken into account is a discounting factor that has been applied to those regulators involved in sectors other than electricity and gas[180]. And again, the adjustment factor only refers to the number of sectors regulated by the body, but it does not take into account any differences in the competences of each regulator.

However, further qualifications need to be considered when comparing financial resources of regulatory bodies across the EU. Firstly, the purchasing power in each country is different, i.e.: the same basket of goods may not be acquired in two different countries at the same

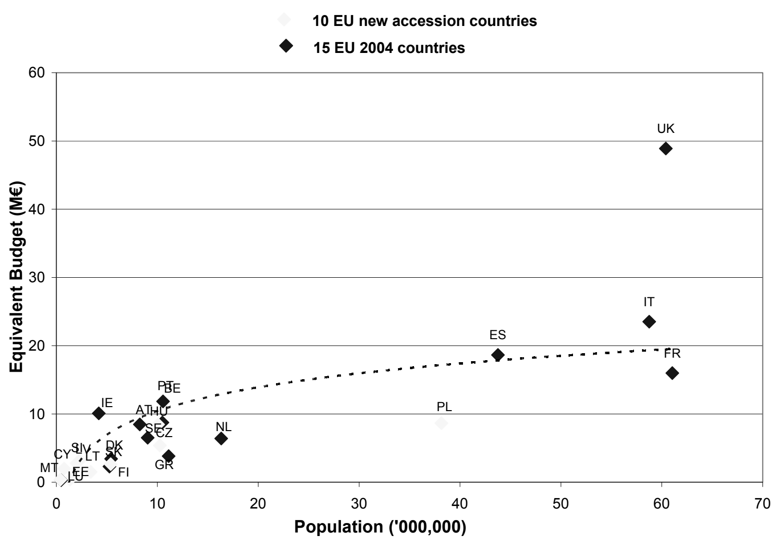
179 The UK data actually refers to Great Britain, as Northern Ireland has a separate regulatory body.

180 The discounting factors applied to the financial resources are the same as those applied to the level of staffing. It is difficult to assess how the additional tasks carried out by the regulatory bodies affect the financial resources.

price, and this may depend on the different level of prices in different countries. Therefore, a more objective comparison of financial resources available to a regulator is one that considers the value of financial resources in relation to the country's overall price level. Although this adjustment may introduce some distortions[181], this has been considered preferable to a crude comparison of data which would produce even more biased results. The aim of the correction is then, to make financial resources comparable across the countries. In order to take into account the different economic conditions between countries, which is particularly relevant for new member states - as the majority of them are below the EU-25 average in terms of GDP per person -, the financial resources of the different EU regulatory bodies have been adjusted by real 2005 GDP in purchasing power standards (PPS) per person employed[182], and they are compared assuming that all the countries are on the EU average. The GDP in PPS is a common tool used by the OECD for making this type of comparisons across countries, especially in those studies related to economic activities. Thus, GDP in PPS allows for direct comparisons among member states, so that all member states are considered as if the GDP per employed person were the same across the EU.

The following graph illustrates the relationship of financial resources available to the regulatory bodies with each country's overall level of the population.

Figure 6-7: Financial Resources of the Regulatory Institutions in the EU[183]



Source: Mercados EMI

In the above graph economies of scale are still observable. It is also possible to note that while the UK has remained well above the trend line also in terms of financial resources, this is not the case for Poland, which has a budget significantly below the trend line considering the large

181 For instance, in the case of Luxemburg, the 2005 GDP PPS per capita is very high; therefore, the adjusted budget decreases a lot from its nominal value. This has as an implication in Figure 2.3-3, that Luxembourg is placed well below both new and old member states. The position of Luxembourg may be affected by the GDP in PPS per employed person index, since Luxembourg is the richest country in the EU; it is therefore likely that the discount factor is decreasing the value of the financial resources of the regulator well below the actual level.

182 Available at: http://www.dgep.pt/EPOnline/div/Cint_port_ing.pdf

183 Germany is not included in the graph since no information is available neither in the CEER report nor in the regulator's annual report.

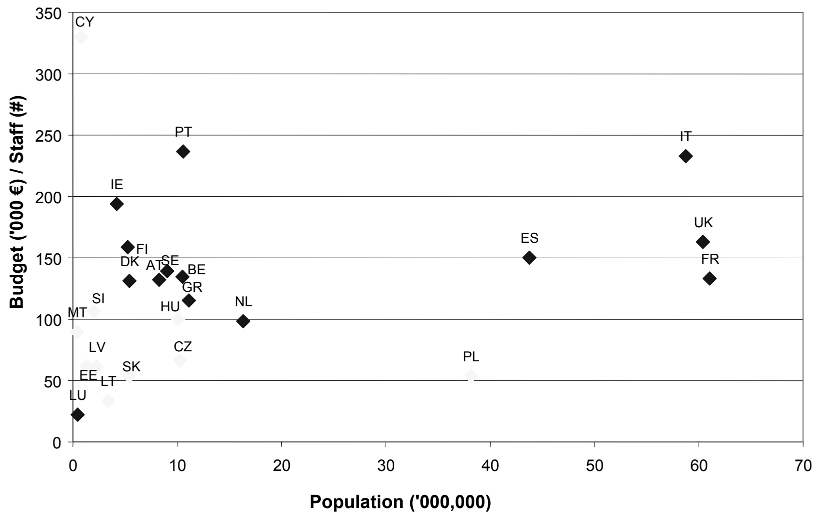
population of the country. But, in addition to the UK, Ireland and Italy may be added to the list of member states with financial resources of the regulator above the trend line. On the other hand, France, the Netherlands and Finland can be observed to be the countries with lower financial resources in relation with their population.

Overall, from the above graph it emerges that the new member states are placed mostly below the trend line. Moreover, even if the outlier countries were removed from the sample, determining a lowering of the trend line, most of new member states would still remain below this line. The old member states are variously scattered above and below the trend line. It is probably worth noting that the three Nordic countries (Denmark, Sweden and Finland) are below the trend line, with Greece and The Netherlands being the old member states with apparently the fewest resources.

Looking at these results, the first conclusion that might be drawn is that, although the regulators in new member states employ more personnel compared to their population, they tend to have smaller amounts of financial resources. However, as mentioned above, a further level of complexity needs to be introduced in our analysis of the financial resources, which takes into account the GDP in PPS per person employed.

The following graph shows the level of financial resources available per member of staff and in relation with the size of the country in terms of population. The previous adjustment factors related to the number of regulated sectors are still maintained, together with the GDP in PPS per person employed index. In this analysis the effect of the adjustment related to the number of regulated sectors is neutral because the discounting factor applied to the human resources is the same as the one applied to the financial resources (i.e. a regulatory body with one more sector to regulate is considered to have less human resources and less budget in a completely proportional way). Some differences would arise if the two discounting factors were different.

Figure 6-8: Financial Resources over Level of Staffing of Regulatory Institutions in the EU



Source: Mercados EMI

The new member states are in general well below the level of the old member states. The fact that the Dutch regulatory body is a department of the Competition Authority may have an impact in determining the relatively low values of the available financial resources per unit of staff. The main reason for Cyprus being so much above all other new member states is because, as stated earlier, the regulation activities present economies of scale in relation to the size of the sector/s and thus, for very small regulatory agencies, the share of fix cost in the total budget is very important.

Hence, the conclusions that may be drawn from the previous analysis are that, in general, the new member states have higher levels of staffing in their national regulatory bodies but lower levels of financial resources. Moreover, the level of financial resources per unit of staff is lower in new member states than in old member states. It is worth noting that a certain connection can be made between budgetary independence and the level of resources available to the regulatory body. Although it cannot be tested for all cases, in many countries, a high level of financial resources is linked with a high independence in budget definition (see Table 0-5 y 0-6).

6.4.2.1. RESULTS from the Questionnaires on Regulatory Capacity

The previous results indicate that there are significant differences between the different member states and, in particular, between the new and the old ones, and that these differences are particularly visible when it comes to the financial resources in relation with the level of staffing. These results are somewhat in line with what could have been expected and confirm that the resources available to the old and new member states are still somewhat different,

The following considerations can help to explain the differences in administration capacity expressed in terms of staffing and of financial resources:

- **Larger staff:** it has been noted that the regulatory bodies of new member states tend to have larger staff in proportion with the country's overall population. The first hypothesis that can help explain this difference is that we have not appropriately corrected for the number of tasks actually performed by the regulators (i.e. tariffs, licences, quality) and this may present some consistent differences between the old and the new member states. The second hypothesis, which in fact we believe may explain more, takes into account the findings on financial resources, and argues that human resources are the most affordable resource for institutions in new member states. It is also worth noting that the implementation of the EU Directives and of the whole Energy Acquis generates notable needs for larger staffing. Although this is certainly the case, it has also to be noted that these institutions' need for staff tends to grow overtime.

- **Lower financial resources:** the higher level of staffing should lead to higher costs in terms of labour costs. Much however depends on the staff composition of the regulatory body in terms of seniority. Our analysis shows that resources available to regulators in new member states are less than those available to regulators in old member states. A comparison with the level of salaries in the industry could help us to understand whether the regulator is able to recruit the right human resources to enhance its administrative capacity. As a matter of fact, as it can be seen in the Figure below, both, in the old and the new member states, the salaries in the regulatory agency is comparable to the civil servants' and lower than for equivalent professional level in the industry. There are however a few exceptions, such as Austria, Belgium, Spain, Sweden and Estonia. It is worth noting than in some cases, like the Italian one, salaries in the regulatory body are comparable to civil servants for autonomous institutions (i.e. Central Bank) that tend to be higher than the average for civil servants.

Figure 6-9: Salaries in Regulators against industry and civil servant

Salaries f**or professional staff** in the regulatory agency (excluding regulators)	AT	BE	DE	FI	FR	DE	GR	IE	IT	NL	PT	ES	SU	UK	CY	CZ	EE	PO	SK	SI	LV	LT	LU	MT	HU
Civil servants or government officials	H	H	C	C	C	C	C	C	C	C	C	H	H	C	NA	C	H	C	C	C	NA	C	C	C	C
Industry professionals of equivalent level	C	L	NA	L	NA	NA	L	NA	L	L	NA	L	C	C	NA	NA	L	NA	NA	L	NA	NA	L	NA	NA

H Higher
C Comparable
L Lower

- Lower resources per employed person: the general observation regarding the lower level of financial resources available overall is also verified, and the effect is even larger, when the resources are considered in relation with the level of staffing. Two hypotheses may help us explain these differences. In most EU countries the salaries of staff in the Regulatory Authorities are related to the salaries of other categories of civil servants. It may be the case that, in general, in new member states, which are mostly transition economies, civil servants are financially worse off than in the old member states. The second hypothesis is that in the new member states the resources available to the regulatory body are only the ones necessary to pay salaries. As a consequence, the staff would have less or no available budget over and above their salary. In these conditions good equipment, training of staff and participation in international activities become more difficult and may have an impact on the administrative capacity of the regulatory body.

Hence, the above information shows that the administrative capacity of the regulatory institutions in the EU differs between the new and the old member states. The answers to the survey provided by the different national agents taking part in the European energy sector provide a further explanation of the underlying differences between countries.

The results of the survey are summarised in Table 2-1 below which shows the main concerns of the regulatory bodies and of the other stakeholders ranked according to the importance attributed to them by stakeholders. The colour coding further helps to compare the position of the different issues in relation with the group of interest.

Table 6-3 Administrative Area to Be Strengthened by the Regulatory Body

Administration Area	Electric Companies	Gas Companies	Large Consumers	Institutions Old Members	Institutions New Members	Overall relevance (the lower the mark, the more relevant)
Network Tariff Regulation	3	3	1	4	3	2.8
Market Design & Monitoring	2	3	4	1	2	2.4
Energy Efficiency Issues	1	2	2	2	2	1.8
Unbundling Issues	3	3	1	2	1	2
Cross-border issues	2	1	1	2	2	1.6
Staff Training	1	4	3	3	1	2.4
Hiring more staff				3	1	2
Stable administrative policies				4	3	3.5
Budget				3	3	3
Outsourcing of activities				4	4	4
Organisational Issues	2	4	3	4	4	3.4
Service Quality Regulation	2	2	3	2	2	2.2
Licensing Issues	3	3	3	4	2	3
Regulatory independence	4	4	4	4	2	3.6
Transparency of decision making	1	3	3	4	3	2.8
EU Energy acquis implementation	1	2	1	3	2	1.8
Complaint Management	1	3	3	4	4	3
Financial & Technical information gathering process	2	3	3	2	3	2.6

Source: Mercados EMI

The results of the above table may be summarised as follows:

- Institutions of the old EU member states and institutions of the new accession countries have different priorities in terms of the regulatory framework.
- Electricity and gas companies have different regulatory needs.
- Large consumers are more aligned with the concerns of the institutions in the old EU member states.

Thus, it is clear that the different agents operating in the energy sector have different priorities regarding regulation. This seems plausible considering the agents' different incentives, especially when comparing the companies and the regulators. It might have been expected that the regulators would be aligned in priorities, but this is not the result arising from the survey. One reason that could help us explain these differences is the different stages of the liberalisation process. So, the concerns of regulators in the new accession countries seem to deal more with the early stages of liberalisation. This is in line with the findings of the previous paragraph in this chapter.

Hence, it appears that the differences between regulators in the old and new member states are not only in terms of staffing and resources but also in terms of content and priorities of the institution. In fact, the main concerns of regulators in the new accession countries are:

- Staff training;
- Hiring more staff;
- Unbundling issues;
- Cross border issues and licensing issues.

On the other hand, regulators in old member states are mainly concerned in improving their administrative capacity on:

- Market design and monitoring;
- Energy efficiency, unbundling issues and cross border issues;
- Service quality regulation and financial and technical information gathering process;
- Budget of the regulatory body and the EU Acquis implementation.

Thus, the common concerns of the two sets of countries are the cross border issues and the unbundling issues. The former is also shared by the gas companies and the large consumers. Both regulators and companies seem therefore to be quite aligned on the issues that are also high on the Commission's agenda, but that have not yet found a proper regulatory solution. It is interesting to note that these areas overlap with the areas where the implementation of the Acquis is weaker, as highlighted earlier in this chapter.

However, the remaining issues are different, in fact, while the regulatory bodies of the new member states are concerned with all the aspects relating to staff such as training or hiring, regulators in the old member states are more concerned with aspects like market monitoring, which are more in line with a mature liberalised market. These differences show that there is a different degree of maturity in the liberalisation process between old and new member states, which is most likely related to the complete change in the economic approach faced by most new member states.

It is especially significant that the new member states express the need for more staff and training, although, as it was previously showed, the regulators of the new member states appear to be above the EU-15 trend in terms of personnel. This could indicate that the need expressed is for more highly-qualified personnel rather than more support or junior staff.
On the contrary, regulators in old member states are more focused on the issues associated

with a mature market, which require a higher degree of qualifications. To do this, they need highly qualified staff on issues such as energy efficiency, market monitoring or regulatory implementation.

As a result of the analysis it may be concluded that the state of implementation of the EU legislation in the new accession countries is allowing the proper development of the first stage of the EU Acquis implementation, but, in order to properly develop the second stage, which will require more detailed and specific qualifications, the regulatory bodies in new member states are likely to be under some constraints and are expressing the need for some training and support. The survey also shows that training offered to regulatory agencies through specific accession programmes has been considered very useful by the recipients. We believe that the active participation of new member states in the international networks (CEER and ERGEG) is a very good instrument for exchanges related to the regulatory developments. Participation in these peer groups should be encouraged and, where needed, supported by the Commission to avoid causing delays in the proper development of the single energy market or, even worse, creating further differences between the two sets of countries.

A case example that refers to the specific experience of the Twinning project "strengthening the energy market regulator" between the National Control Commission for Prices in Lithuania and the Italian Ministry of Economy and Finance, is presented in Annex D of the original study. The particular enthusiasm of the respondent with regard to the project when replying to the survey has been decisive in focusing on this particular project.

6.4.3. Assessing the Independence of Regulatory Institutions

Establishing a baseline of competency for national regulatory authorities is a key to ensuring effective regulation and therefore the smooth functioning of the IEM. Thus, as laid out in EU Directive 2003/54/EC, "it is important that the regulatory authorities in all member states share the same minimum set of competences". In all EU member states, a separate national regulatory institution has been established to oversee the energy sector.

In this section we address the issue of the independence of regulatory agencies from the Administration (Ministries and other Government bodies). As already mentioned, we consider regulatory independence essential for the achievement of an adequate level of administrative capacity.

Table 6-4 below shows the year in which each national authority was established in both old and new member states. In most jurisdictions the regulatory authority is less than 10 years old and in many much younger. On average, regulatory authorities in old Member States are one year younger than their counterparties in old member states. However, significant differences in the tradition of regulation exist among both old and new member states. For example, the regulator in Hungary, which was established in 1994, predated most of the other regulators in both new and old member states, while the German regulator was the last one to be established two years ago.

A long-standing tradition of regulation may support the development of a culture of regulatory independence. However, independence may also be promoted and protected by statutory provisions and this is the aspect which we now turn to consider. One of the objectives of the analysis is to establish whether the independence of regulators in new member states is sufficiently promoted and protected, and how this compares with the situation in old member states.

This assessment is based on a number of different criteria, using a scoring system. In particular we consider the following aspects related to the activities and functioning of regulatory institutions:

- the role that the regulator plays in defining the methodology or the level of network tariffs. This is one of the most delicate functions of the regulator, and one in which the temptation of political interference is probably the greatest. It represents therefore, a good test of the actual regulatory power assigned to the regulators;
- the degree of the regulators' financial independence;
- the procedures for appealing against the regulators' decisions;
- the institution responsible for appointing the regulators; and
- the conditions under which the regulators can be removed from power.

In what follows we briefly comment on each of these aspects and the scoring – from 1 to 3 - applied for each of them. In general, a lower scoring (1) corresponds to a situation which is deemed to be most conducive to regulatory independence, while a high score (3) highlights conditions which may jeopardise such independence. Finally, it is important to emphasise that other aspects of a regulator's functioning may also have an impact on its independence. For example, the possibility for a regulator to be reappointed for consecutive terms can be claimed to potentially reduce his/her independence with respect to a situation in which only a single term of office is allowed, especially if the Administration is involved in the regulator's appointment. However, we have chosen the five aspects presented above because we consider them to be the most relevant.

Table 6-4: Year of Legal Foundation of National Regulatory Institutions

Old Member States	Year regulator legally established	New Member States	Year regulator legally established
Austria	2001	Czech Republic	2001
Belgium	2000	Cyprus	2003
Denmark	2000	Estonia	1998
Finland	1995	Hungary	1994
France	2000	Latvia	1996
Germany	2005	Lithuania	1997
Greece	2000	Malta	2001
Ireland	1999	Poland	1997
Italy	1997	Slovakia	2001
Luxemburg	1997	Slovenia	2000
Netherlands	1999		
Portugal	1997		
Spain	1997		
Sweden	1998		
UK	(Ofgas) 1986 (Offer) 1989 (Ofgem) 2000		
Average	1998	Average	1999

Source: Data from CEER Regulatory Benchmark Report Dec. 2005

6.4.3.1. *Price Setting*

The setting of network tariffs, or the definition of the related methodology, is a typical regulatory function, and in fact possibly the most typical. It is also one in which the contrasting interest of different sector stakeholders is strongest, as the tariff level has a direct economic impact on them (by determining the revenues for the network companies and costs involved in grid access for network users). The Administration may also have a direct interest in tariff setting even where network companies are not state-owned, as the level of tariffs may influence the rate of price inflations.

Strong power of the regulator in tariff or tariff-methodology issues is therefore an indication of the role that the regulator plays in the regulation of the energy sector.

In most EU jurisdictions regulators have powers to define the methodology for tariff setting, or to set the tariffs themselves. However, in many of these jurisdictions the Administration may have powers to approve, veto or modify the regulator's determination. In this case, the implication of these powers needs to be carefully assessed because they can range from a merely formal approval of what the regulator determines, to the power of freely modifying the regulator's proposal, without the need of any justification.

With respect to this aspect, the different jurisdictions have been scored according to the following criteria:

- a score of 1 has been assigned when the regulator has final authority in setting tariffs or in defining the tariff methodology, while the Government/Minister has no or limited power to intervene in the decision;
- a score of 2 has been assigned when the decision on tariff or tariff methodology is taken by the Regulator, but the Government/Minister has significant powers to set limits or otherwise influence the decision, or to modify it;
- a score of 3 has been assigned when the formal decision is taken by the Government/ Minister or Parliament, or, if the decision is to be based on a proposal by the Regulator, the final decision can deviate from this proposal.

In most member states, regulators have final authority on network tariffs, with very limited powers by the Administration. There are however a number of exceptions: in France, Greece, Hungary, Luxembourg, Poland, Slovenia and Spain network tariffs are approved by the Ministry, on proposal by the regulator, with differing degrees of freedom in modifying the regulator's proposal.

6.4.3.2. *Budgetary Authority*

A regulator's independence can be better protected by having control over the setting of its budget. Where the regulator sets its own budget, this is generally financed by a fee collected from the regulated sectors. Alternatively, the regulator can be financed by the central budget, but it is clear that in this case its independence is at risk of interference by the Administration.

With respect to this aspect, the different jurisdictions have been scored according to the following criteria:

- a score of 1 has been assigned if the regulator is allowed to set its own budget, within the limit defined by the law;
- a score of 2 has been assigned if the regulator's budget is set by the Government/Ministry or other institutions according to well defined procedures set in the law;
- a score of 3 has been assigned if the regulator's budget is part of the State Budget – which is approved by Parliament – and it is subject to discretionary modification by the Government in the preparation of the State Budget.

In most EU jurisdictions, regulators have sufficient budgetary authority. However, there are 10 member states where the regulator's budget is either controlled by a ministry or is part of the state budget, which goes through the normal parliamentary approval process.

6.4.3.3. Appeals Process

Appealing decisions made by regulators are an essential part of the regulatory process. The way in which the appeal process works is key in assessing the regulator's independence. It is clear that if the appeal is heard by the Government Administration, the independence of the regulator may be ineffective.

With respect to this aspect, the different jurisdictions have been scored according to the following criterion:

- a score of 1 has been assigned if the appeal is heard by the Courts, the Market/Competition Authority or Administrative Tribunals;
- a score of 2 has been assigned if the appeal is heard by institutions other than those in the judiciary system or the Administration;
- a score of 3 has been assigned if the appeal is heard by the Government/Ministry.

In all EU jurisdictions, appeals to the regulator's decisions are heard in the judiciary system or by the Market/Competition Authority. The most common scheme, which characterises 13 member states, involves the Administrative Tribunals. Civil Courts are responsible for hearing appeals in 8 member states.

6.4.3.4. Appointment and Removal Powers

Clearly, the process for the appointment of regulators and the definition of the situations in which a regulator can be removed from office are essential aspects in determining the degree of the regulator's independence. The appointment by the Government Administration, rather than by an institution like Parliament which represents a wider range of political interests, is clearly less conducive to protecting the regulator's independence. Appointment by the Head of State can also protect the regulator's independence even though much depends on how substantive this power is in practice (e.g. independence would be poorly protected if the formal appointment by the Head of State were based on a binding proposal by the Administration).
Similar considerations apply to the removal of powers. Where the situations in which the regulator can be removed from power are clearly specified in the law (e.g. in the case of gross misconduct or criminal proceedings) and do not lend themselves to discretionary interpretation, the independence of the regulator is best protected.

With respect to the appointment of regulators, the different jurisdictions have been scored according to the following criteria:

- a score of 1 has been assigned if the regulator is appointed by the Head of State or Parliament;
- a score of 2 has been assigned if the regulator is appointed by the Head of State or Parliament on proposal from Government/Minister;
- a score of 3 has been assigned if the Regulator is appointed by the Government/ Minister.

With respect to the removal of regulators, the different jurisdictions have been scored according to the following criteria:

- a score of 1 has been assigned if the regulator cannot be removed except in the case of gross misconduct;
- a score of 2 has been assigned if the regulator can be removed in specified cases by the Head of State or Parliament;
- a score of 3 has been assigned if the regulator can be removed by the Government or Minister.

In most EU jurisdictions, regulators are appointed by the Government Administration, with the concrete risk of political interference in the selection of the candidates. Also, in most EU jurisdictions, regulators can be removed by the Administration on a more or less discretionary basis. Only in 6 member states, the situations in which regulators can be removed are specified by law.

The following tables present the scoring on the above criteria for regulators in old and new member states respectively. The average score for regulators in new member states is only marginally higher than the average score for regulators in old member states (9.7 versus 8.7). Therefore, the independence of regulators in new member states enjoys a slightly lower degree of statutory protection than is the case of their counterparties in old member states. However, the picture in both groups is quite varied. The Italian regulator, which is the one enjoying the strongest statutory protection among the regulators in old member states, scores exactly the same as the regulator in Latvia, which is the most protected in the new member states. Also, the Polish and Slovenian regulators are only marginally worse off, in terms of statutory protection, than the Irish and Spanish regulators, which are the least protected in new member states.

However, it is clear that statutory protection is not the only way of ensuring effective independence of the regulator. As it was already mentioned, a culture of regulation and regulatory tradition may also assist in this respect. What must be clear, however, is that where such tradition and culture do not exist (as in the case of jurisdictions which have only recently reformed their energy sectors and introduced a modern regulatory approach), statutory protection is the most effective tool for promoting and protecting the independence of regulators.

Table 6-5 Regulatory Independence Scores Old Member States

	Regulatory Independence Scores (lower = more independence)					
Country (OMS)	Price setting & methodology (1-3)	Budgetary Independence (1-3)	Appeals Process (1-3)	Appointment Regulatory Authority (1-3)	Removal of Regulatory Authority (1-3)	Total Score
Austria	1	1	1	3	2	8
Belgium (CREG)	2	2	3	3	1	11
Denmark	1	3	1	3	1	9
Finland	1	3	1	2	3	10
France	3	3	1	1	1	9
Germany	1	3	1	1	2	8
Great Britain	1	1	1	3	3	9
Greece	3	1	1	3	1	9
Ireland	1	1	1	3	2	8
Italy	1	1	1	2	1	6
The Netherlands	1	1	1	3	3	9
Portugal	1	1	1	3	3	9
Spain	3	1	1	3	3	11
Sweden	1	1	1[184]	3	1	7
Luxemburg	2	1	1	2	2	8
Average	1.5	1.6	1.0	2.5	1.9	8.7

Source: Data from IERN International Energy Regulation Network 2006; analysis by REKK

184 Appeals to Court with exception of cases regarding local/regional distribution concessions with appeals to government.

Table 6-6 Regulatory Independence Scores New Member States

	Regulatory Independence Scores (lower = more independence)					
Country	Price setting & methodology (1-3)	Budgetary Independence (1-3)	Appeals Process (1-3)	Appointment Regulatory Authority (1-3)	Removal of Regulatory Authority (1-3)	Total Score
Cyprus	1	2	1	3	3	10
Czech Republic	1	3	1	3	3	11
Estonia	1	3	1	3	3	11
Hungary	3	1	1	3	3	11
Latvia	1	1	1	1	2	6
Lithuania	1	3	1	1	2	8
Malta	1	1	1	3	3	9
Poland	1	3	1	3	3	11
Slovak Republic	1	3	1	1	2	8
Slovenia	3	1	3	2	3	12
Average	1.4	2.1	1.2	2.3	2.7	9.7

Source: data from IERN International Energy Regulation Network 2006; analysis by REKK

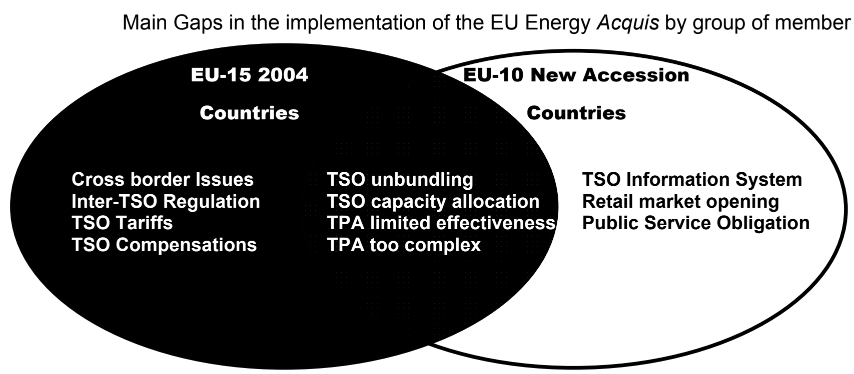
6.5. Conclusions and Recommendations

The implementation of the Energy Acquis is a key point for the development of the Internal Energy Market (IEM). This implies not only bringing national legislation into line with the EU Directives, but also creating strong institutions and reliable enforcement procedures.

Since the adoption of EC Directives 2003/54/EC and 2003/55/EC most of the EU-25 member states, with some exceptions where derogations were granted (such as Latvia, Lithuania, Malta and Cyprus), have transposed the Directives into national legislation. However, the transposition of the Directives is only the first step in the development of the IEM which also requires, inter alia, a clear institutional framework and an independent regulator with adequate enforcement powers. At the same time, the structure of the sector remains an important factor for the development of an effective, competitive and sustainable internal market.

The main issues with respect to which the Energy Acquis is still not fully implemented are presented in the following figure. Some gaps are common to both old and new member states, while others are more frequent in one of these groups.

Figure 6-10: Regulatory Framework and Implementation Capacity



Source: Mercados EMI

The diagram clearly shows that both old and new member states face problems in areas that are crucial to the development of competition in the energy sector. Inadequate levels of third-party access (TPA) and of independence of TSOs/DSOs, as well as the procedures for allocating capacity on the networks, seriously hamper the development of competition in the energy sectors of many member states and, consequently, the creation of a well functioning IEM.

In addition to these common issues, old member states face problems in the integration and coordination between TSOs and other cross border issues while concerns in new member states mostly relate to retail market opening and the issue of public service obligation.

The problems faced by the new accession countries are issues that typically characterise the “early stages” of the liberalisation process and that have already been overcome in the old member states. However, looking forward and in the prospect of future enlargements, those issues should be carefully addressed in the pre-accession process. It may be worth reminding that at the time of accession the two new EC Directives 2003/54/EC, 2003/55/EC were about to come into force and this has meant that the new member states have had to implement the requirements of the first and second energy Directives almost at the same time. So, while the old member states had already restructured their vertically integrated monopolies and were mostly ready to push further along the liberalisation process, the new member states have had a shorter time to undertake all the necessary changes to reform the structure of their energy sector. This may also help to explain why new member states are still dealing with issues that are more typical of recently liberalised markets.

The 2004 EU Enlargement therefore happened at a time when old member states were still in the process of implementing the 2003 Directives on the electricity and gas market. Therefore, their domestic markets were still suffering from significant imperfections and barriers to the development of competition. The situation with respect to the creation of the IEM in electricity and gas was even more problematic. Regulation n. 1228/2003 on cross-border exchanges in electricity was not yet implemented, as it required guidelines to specify, in workable details, the approaches to congestion management, inter-TSO compensation and network tariff harmonisation. While this Regulation included, in an Annex of the original study, guidelines on congestion management, it was common belief that these were too vague to be of any use, and work started immediately on drafting new guidelines. These were eventually issued at the end of 2006, to come into force at the beginning of 2007. In the gas market, the situation was even worse, as Regulation n. 1775/2005 on the use of gas networks would be issued more than one year after the 2004 enlargement.

Therefore, in 2004 the ten new member states joined an IEM still in the making. Moreover, apart from the regulatory framework, the structure of the electricity and gas sectors in many old member states was still characterised by large incumbents which might have lost the privileges of their former legal status of vertically-integrated monopolists, but still enjoyed significant market power and an ability to distort the market to their advantage. This shows that formal implementation of the provisions in the Energy Acquis is not sufficient to ensure the development of a competitive market. Effectiveness of the provisions is a more ambitious objective and our analysis shows that, at least in the areas of domestic and cross-border network access – key aspects for the development of a competitive IEM -, it is still not achieved in many member states.

In this situation, it would have been impossible to require new member states to conform to more stringent criteria, in terms of market structure and implementation of the Energy Acquis, than the actual performance of old member states in these areas, and our analysis shows that many of the problems still affecting the development of the IEM, in the areas of network separation and third party access, are common to old and new member states, even though possibly more severe in the latter.

The European Commission recently proposed a third package of measures aimed at addressing many of the aspects which emerged, in our analysis as well as in other assessments, as impeding the full development of the IEM. These measures are now going through the consultation and approval process and therefore it will be a few years before the new provisions will be fully implemented in all member states. However, these new provisions, that are working alongside those already implemented, will move the market standards of the IEM even higher, and may widen the gap between the way the energy sectors operate in potential future candidate countries and the requirements for participation in the IEM.

In this respect, the recommendation which emerges from our analysis for future enlargements is to ensure that any future candidate country fully implements the Energy Acquis and demonstrates that all the relevant provisions are working effectively before joining the EU. From our analysis, the areas which appear to be the most critical for the development of an effectively competitive IEM include appropriate separation of network operation from commercial activities – for which ownership unbundling may soon become the required standard, at least for the transmission network -, third party access, public service obligation and last resort tariffs.

The appropriate implementation and effective functioning of the provisions in the Energy Acquis require an active role by the sector Regulator who is typically responsible for issuing the necessary bylaws and for their monitoring and enforcement. It is therefore essential that Regulators are put in a position to be able to carry out their duties with adequate administrative capacity. As already explained, administrative capacity is very difficult, if not impossible, to assess in an objective manner, as it involves a judgement on the quality of regulation. However, we argue that there are two conditions which may significantly promote the regulator's administrative capacity: the availability of sufficient resources and their independence, both in their financing and from the Administration. We believe that if the interference of the Administration on the Regulator's activity is limited and if the Regulator has sufficient resources, then there is no reason why it should not develop and maintain an adequate administrative capacity. Independence from the Administration may be protected by statutory provisions or promoted by a tradition and culture of independent regulation.

Our analysis indicates that regulators in new member states generally have higher levels of staffing, but lower levels of financial resources. Moreover, the level of financial resources per unit of staff is lower in new member states than in old member states. It is worth noting that a certain connection can be made between budgetary independence and the level of resources available to the regulatory body. Although it cannot be tested for all cases, in many countries, a high level of financial resources is linked with a high independence in budget definition.

Our analysis also indicates that both statutory provisions and tradition and culture may be equally effective in this respect. However, where a jurisdiction is unable to benefit from a tradition and culture of independent regulation, statutory provisions protecting the independence of the Regulator becomes essential.

Our analysis shows that, on average, new member states enjoy a slightly lower level of statutory protection for the independence of Regulators when compared with old member states.

Looking forward, as new candidate countries are likely to lack a well established regulatory tradition and a culture of independent regulation, they should be required to introduce sufficiently effective statutory provisions protecting the financial and decision-making independence of regulation from the interference of the Administration. However, no statutory provisions can provide full protection, as there is always the requirement to maintain accountability of the regulator and, in any case, the appointment procedure is always open to political interference. Therefore, we also recommend that peer review, even of an informal nature, of the main decisions by regulators – in particular those affecting the development of the IEM, is promoted. We believe that, if Regulators were required to present and discuss with their peers the way in which key aspects of the regulatory framework in their respective jurisdictions are addressed, there would be a stronger pressure on developing effective regulation. The European Commission, in the third package proposal, envisages the creation of a regulatory agency with main responsibilities in cross-border issues. We propose that this agency, or any other entity which will be eventually established (or even ERGEG, in its current form) is entrusted with the responsibility of considering and formulating an opinion on regulations issued in the individual member states on a number of critical areas for the development of the IEM. Clearly, these opinions would not be binding, but it would be possible, for example, that a negative opinion requires the regulator to reconsider the decision (without any obligation to change it, but with a commitment to comment on the issues raised in the opinion). We believe that this scheme would assist those regulators – especially in new member states and, in prospect, in future accession countries - who do not benefit from a sufficient level of resources and independence to perform their duties more effectively and therefore, over time, increase their administrative capacity. In fact, it may even be envisaged that future accession countries be required to submit their regulatory activity to peer scrutiny even before accession. This would be in addition to any requirement stipulated in the accession agreement and monitoring carried out by the European Commission.

Our analysis also highlights that new member states have greatly benefited from the capacity building support received by multilateral agencies – and in particular the European Commission - ahead of accession. If anything, this support is judged as insufficient by the beneficiaries, who have expressed the desire for the support to continue being available even after accession. Therefore we propose that, in the case of future enlargement, support is planned for both the pre-accession period and for an initial period after accession. This support may take different forms, including the direct involvement of other Regulators in working groups or twinning arrangements.

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8 chapter

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