

Clean Energy Finance Solutions: Central & Eastern Europe

Cambridge Programme for Sustainability Leadership (CPSL) in cooperation with the Regional Centre for Energy Policy Research (REKK) at Corvinus University, Budapest, Hungary

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Summary

Building on its success in convening core parts of the finance value chain around sustainability challenges, CPSL is drawing together this work in a form that is suitable for policy makers and investors wishing to engage in the Central and Eastern European region. This project builds on the successful UK-Hungary Finance Forum held in London on 24 October 2011.

PRIMARY CONTACT

Sandrine Dixson-Declève, CPSL, Brussels

Tel: +32 2 894 9320

Email: Sandrine.Dixson@cpsl.cam.ac.uk

www.cpsl.cam.ac.uk



The Clean Energy Solutions: Central & Eastern Europe project is the result of the Low Carbon Finance Forum in October 2011 initiated by Gregory Baker, UK Minister of State for Energy and Climate Change in cooperation with Tamas Fellegi, Hungarian Minister for National Development. The Forum recommended undertaking analysis and establishing a group of experts to focus on unlocking private finance for low carbon investments in a few Central and Eastern European countries.

This report and country annexes have been produced by the Cambridge Programme for Sustainability Leadership (CPSL), Cambridge, UK in cooperation with the Regional Centre for Energy Policy Research (REKK) at Corvinus University, Budapest, Hungary. The CPSL authors of the main report are Sandrine Dixson-Declève, Katharine Thoday, and Hendrik Jan Laseur with editorial assistance from Francesca Raphaely, Elaine Craig and Helen Spence-Jackson. The REKK authors of the country and regional summaries, and annexes are Péter Kaderják, László Szabó, Borbála Tóth, Lajos Kerekes, Zsuzsanna Pató, and András Mezősi.

An Advisory Committee has provided high-level guidance to the project team. The Advisory Committee consists of senior representatives and experts from the private and public sectors:

- Andreas Bierman - Senior Policy Manager, Energy Efficiency and Climate Change Team, European Bank for Reconstruction and Development (EBRD)
- Murray Birt - Assistant Vice President, Deutsche Bank
- Marta Bonifert - Executive Director, Regional Environment Center (REC)
- Tzvetelina Borislavova - Clever Synergies Investment Fund
- Marian Dobrin - Head of Studies and Project Financing Department, Energy and Environment Division, The Romanian Institute for Studies and Power Engineering
- Manuel Dueñas - Deputy Head of Division, Climate Change & Environment (NPST), European Investment Bank (EIB)
- Sarah Eastabrook - Director of Policy Development, Environmental Policies and Global Advocacy, Alstom
- Christopher Knowles - Associate Director, European Investment Bank (EIB)
- Julian Popov- Chairman, Bulgarian School of Politics
- Roman Portužák - Manager of Internal and International Activities, VŠB Technical University of Ostrava

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- Representatives from the Regional Environment Center (REC) local offices in Bulgaria, Czech Republic, Hungary and Romania
- Richard Folland - JP Morgan
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- Tóth László - MSZT (a Hungarian wind association)
- Bohislav Malek and Tomas Vorisek - SEVEN s.a (a Czech energy efficiency consultancy)
- Ken Lefkowitz - New Europe Corporate Advisory Ltd

The Report has been structured in the following manner for enhanced readability and ease of use:

- Section 1 (Chapters I-II) summarises the overall project and outcomes,
- Section 2 (Chapter III) summarises the country overviews and makes the relevant links to the extended country reports,
- Section 3 (Chapter IV) draws trend data across the four countries and lays out possible regional opportunities, and
- Section 4 (Chapter V) concludes and makes clear recommendations on what can be undertaken to drive further investment across the region.

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I. INTRODUCTION:

The aim of this report is to highlight the opportunities that exist in renewables in terms of large-scale cross border cooperation, job creation and growth in order to enhance dialogue between Governments and the investment community when considering the future energy profile of the region. The project's scope has initially been limited to exploring the opportunities that exist in renewable energy development in the power sector in Bulgaria, the Czech Republic, Hungary, and Romania.

Discussions on renewables in the countries selected have often been limited by increasingly entrenched views around the nature of burden sharing to meet EU targets and as, in all countries across Europe, the challenge of engendering real system change in energy use and its generation, distribution and transmission.

The issue of cost and who bears it is central to this discussion. However indicators that show renewables expenditure as a percentage of GDP (figures sometimes considered in terms of EU burden sharing) miss the contribution that renewables can make to increasing energy security and lowering energy costs to consumers in the long term. The focus on cost also often ignores structural issues which can increase the attractiveness of investments.

The four countries studied suffer from over dependence on Russian gas flows coming from three major pipelines and severe inadequacies in gas transport infrastructure, reverse flow capabilities and insufficient integration of the gas network to Central Europe. As a result, the 2009 gas crisis hit the region's citizens the hardest across Europe.

All of the studied countries engage in nuclear electricity production. Plans for new-build nuclear units compete with Renewable Energy Sources in the Electricity sector (RES-E) for government support and funds in each country.

II. SUMMARY OF OUTCOMES:

Detailed background checks and evaluations were undertaken for each country. This final report has been refined from approximately 100 pages of comprehensive analysis. The findings clearly indicate that there remains significant potential for further renewable energy electricity generation in Bulgaria, the Czech Republic, Hungary and Romania that could generate employment and investment opportunities.

To take advantage of these opportunities this report recommends:

- Building capacity
- Improving the connectivity and distribution of electricity generated by Renewable Energy Sources (RES) projects by investing in the up-grading and interconnection of transmission grids at national and regional levels
- Developing more intelligent incentive schemes to improve predictability and sustainability and reduce the cost of capital
- Developing a pan-regional view of energy investments
- Fostering a domestic RES industry by supporting entrepreneurship
- Supporting public-private risk sharing for RES-E

III. COUNTRY OVERVIEWS:

BULGARIA

Recommendations to Increase Investment Opportunities:

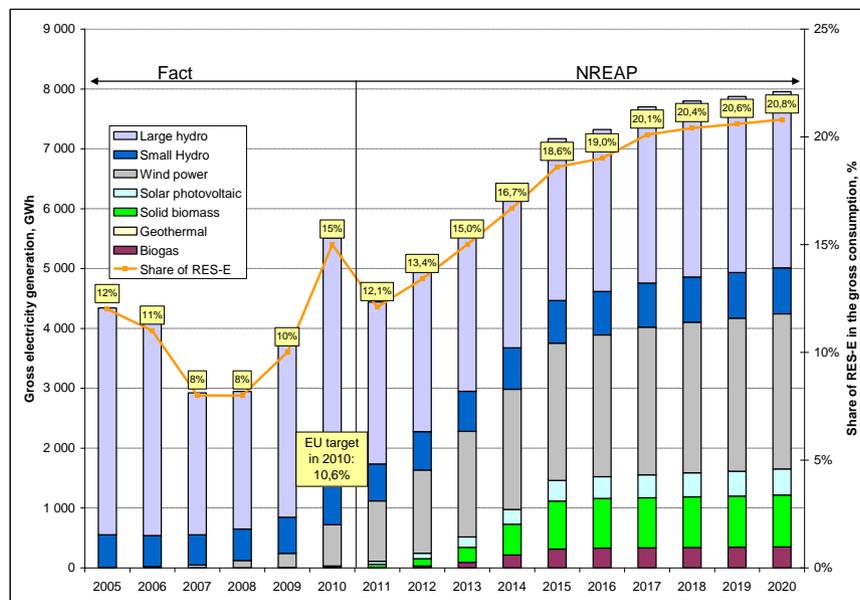
- RES-E targets could be reviewed in light of interest in investment and increased competitiveness in wind.
- Fair distribution of network development costs between investors and grid companies could speed up network upgrades.
- Increased transparency of the quota allocation for RES-E network connections could improve investor confidence.
- Secondary regulations for optional FIT for installations under 1MW should be developed as soon as the European Commission approves the plan.

Background:

- The Bulgarian electricity market is less developed compared to other Eastern European countries. Functioning of the market is hindered by widespread price regulation and long-term power purchase agreements (PPAs). Although government officials argue that long term contracts help to keep prices down and attract investors, the result is the dominance of the electricity wholesale market by state-owned electricity company NEK (its electricity sales add up to close to 90% of gross national consumption). A liquid wholesale and balancing market is almost non-existent.
- Several power plants have been privatised by foreign investors like CEZ, AES and Contour Global. Distribution and retail businesses are fully owned and operated by European electricity companies (E.ON, CEZ, and EVN). Partial privatisation of NEK and sale of minority shares in distribution companies is on the agenda. This is a mix of the state treasury needing revenue as well as efforts to bring more transparency into the energy sector.
- Bulgaria's power generation fleet is heavily reliant on nuclear and lignite with large excess capacity, which has made the country a significant net electricity exporter. However, excess capacities may disappear by 2015, as several old and inefficient lignite fired thermal plants should be decommissioned to comply with EU environmental legislation.

- Until recently, Bulgaria has focused its energy priorities on building a 2000 MW nuclear power plant in Belene to preserve its security of supply by 2020. At the end of March 2012, the government abandoned plans to go ahead with Belene and is instead proposing to build a new unit at the existing Kozloduy nuclear plant.
- Bulgaria has implemented all the relevant RES Directives (2001/77/EC and 2009/28/EC).
- The 2020 RES-E target of Bulgaria is 20.8% of the gross electricity consumption. RES accounted for 15% of gross electricity consumption in 2010, far exceeding former expectations. However, these figures should be treated with caution. The relatively high target as well as the present RES-E production level reflects traditionally strong hydropower production: close to 90% of this impressive figure can be attributed to the high production of old hydropower plants.
- Since 2007 Bulgaria has a differentiated feed-in tariff (FIT) support regime in place with obligatory purchase of RES-E, priority connection of RES generation to the grid, long-term PPAs and limited annual feed-in tariff adjustments. Due to the previous attractive regulatory framework and lucrative feed-in tariffs a flood of investments was seen in 2008, with 450 MW of new wind and solar capacity coming on line by 2010, and 12 GW, partly speculative, in applications.
- The present investment environment for RES-E is defined by the following major factors:
 - The government response to unexpected interest from investors was a new, rather restrictive Renewable Energy Act passed in April 2011.
 - A quota for the renewables' grid connection is to be introduced and will be allocated according to presently unknown rules.
 - The eligibility period for feed-in tariffs for wind and solar Photovoltaic (PV) was reduced. The main driver behind this policy shift was the fear of the high cost of renewable support systems and grid development, and the falling cost of renewables, especially solar.

Figure 1: Yearly projected RES-E gross electricity generation between 2005-2020, GWh¹



The government currently sets an overall limit to RES promotion: when the mandatory target set by the National Renewable Energy Action Plan (NREAP) is met, no further projects can apply for the preferential prices and mandatory purchase agreements signed between renewable producers, and NEK or public suppliers. It is therefore likely that growth across Bulgaria's RES sector will slow down in the short term relative to recent years.

Opportunities:

- Bulgaria has good wind resources especially in the North-East, along the Black Sea coast and in the South West. Until the end of 2011 about 500 MW of wind capacity had been developed by local and foreign private investors. Mid-term potential is estimated to be around 3 GW and the government is seeking to reach around 1.4 GW by 2020. Over half of the increase in energy capacity planned between 2010 and 2020 is expected to be sourced via wind power. Already, numerous projects with final or guaranteed preliminary contracts are providing opportunities for investors who prefer ready-to-build projects that have all permits including the final grid connection contract.
- Solar potential is significant: for most of the country solar radiation is 20% higher than for Germany. 300 MW of new solar capacity is expected to be built by 2020 according to the NREAP. There are large solar PV projects proposed, especially in the South, but the government's preference is clearly to shift the development of PV parks to industrial areas, rooftop and facade

¹ Source: Ministry of Economy, Energy and Tourism (MEET) and National Renewable Action Plan (NREAP)

wall installations, and smaller capacities. The simplified licensing procedure for these rooftop and façade wall installations and no need of grid connection (much less front-end risk) create an easy entry to this market.

- Bulgaria is an agricultural country with large biomass potential, but a limited growth of 150 MW is planned in terms of electricity capacity from biomass by 2020. Growth of biomass use is much more pronounced in the heating sector (about 350 MW of thermal capacity). There is a clear preference for biomass and biogas projects from the government (indicated by increased feed-in tariffs and indexation) but thus far not much has been realised.
- Bulgaria's huge hydro potential is exploited to a large extent. Taking into account environmental restrictions and the pressing modernisation needs of operating hydro power plants, it is not realistic to expect significant capacity increase. In the NREAP a modest development of around 300 MW of capacity is envisaged between 2010 and 2020, with tariffs given predominantly to small hydro installations.
- Net importer status is an opportunity for renewable projects to gather ground without harming the interests of existing conventional power plants. However, preference for other competing projects to fill the supply gap (e.g. new nuclear or lignite fired plant) may erode this opportunity.

Limitations:

- The main barrier to RES-E development in the short run in Bulgaria is erratic market support. Bulgaria had generous feed in tariffs that led to a huge surge in RES applications. However new renewable policy is more restrictive, aiming to limit investment (and renewable support) to the level needed to fulfil the mandatory target set by the European Union.
- Another difficulty to overcome is the lack of capacity on the transmission grid. This is most relevant for the wind projects in the wind-rich North-East part of the country. The Transmission System Operator (TSO) has a legal obligation to develop the grid in line with the 10-year network development plan, however, penalties if implementation is slow are too easily avoided.
- Bulgaria is the second richest country in Europe in terms of diversity of bird fauna, and one of Europe's biggest bird migration routes (100 km wide) passes through the eastern part of Bulgaria. This also happens to be the area with the best wind resources. Environmental concerns are now resulting in stricter environmental licensing of wind turbines especially for those projects that threaten the migrating birds and bats in the northeast of the country.
- Another challenge is the restriction of land use for renewable purposes. Agricultural interests are raised by the Government in relation to ground mounted PV projects. Measures have been introduced to reserve the most fertile land for farming and ban the re-designation of the most

productive farm land for the development of photovoltaic parks.

- Licensing is always an awkward issue. In Bulgaria a high number of permits are required and numerous administrative bodies must be contacted. On the whole, licencing in Bulgaria for large renewable projects is burdensome, but does not cause more difficulties than in other Eastern accession countries. One of the achievements of the new RES law is the simplified licensing procedure for rooftop solar installations.

CZECH REPUBLIC

Recommendations to Increase Investment Opportunities:

- The investment environment for RES-E could be stabilised by the passage and implementation of new secondary regulations.
- Streamlining the RES-E licensing procedure and making it fully transparent, with a focus on environmental licensing and grid access, could significantly improve the investment climate for RES-E (concentrating on wind and biomass resources).
- Secondary regulations for optional FIT for installations under 1MW should be developed as soon as the European Commission approves the plan.

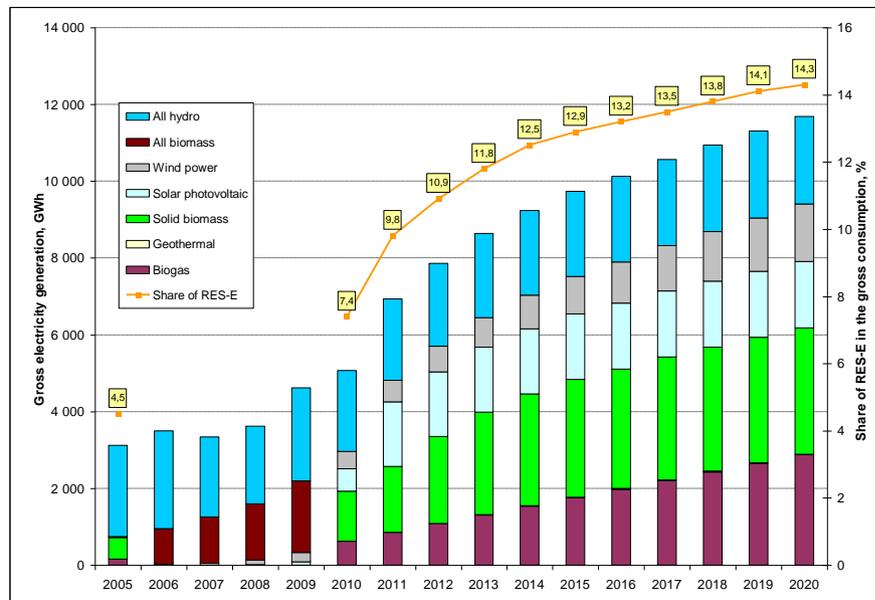
Background:

- The Czech electricity market is a mature market that facilitates the entry of RES-E investors. A major investment boom has taken place in this market segment in the past three years.
- The power generation portfolio of the Czech Republic is dominated by plants using domestic coal and nuclear production. This rather inexpensive generation mix, the strong interconnections and its substantially oversized power plant sector compared to domestic load enable the country to be a significant exporter in the Central Eastern European (CEE) region. The Czech Republic is also the leader of electricity market integration in the region. The country is already price-coupled with Slovakia. Hungary, Poland and Romania plan to join this regional market by 2014.
- The Czech electricity market is highly concentrated. The state-owned CEZ represents a high share in both electricity generation and distribution. CEZ has limited involvement in the renewable sector but ambitious plans in expanding its nuclear and fossil-based portfolio. Consequently it might see a threat in RES-E developments, as they reduce its opportunity to put forward and finance its own projects. Interestingly, CEZ is a predominantly conventional producer within the domestic market but possesses significant RES-E capacities in the region, e.g. wind parks in

Romania.

- Conventional generation is coupled with only moderately attractive conditions for most RES-E technologies. The Czech Republic has less potential in solar electricity and wind compared to other countries in Europe and in the CEE region. The country met its RES-E indicative targets set under Directive 2001/77/EC (8% of gross electricity consumption for the Czech Republic). The Czech Republic reached an 8.32% RES-E share in 2010 on gross electricity consumption and a 6.87% RES-E share on gross electricity production, and it aims to attain 13.5% by 2020 on gross final consumption which includes electricity, heat and transport.
- The Czech Republic has implemented all the relevant Renewable Energy Sources (RES) Directives (2001/77/EC and 2009/28/EC).
- The RES-E promotion system, established in 2005, introduced a mix of a generous FIT with an optional market premium system, which attracted numerous investors into the PV sector. In 2010 the Czech Republic ranked 3rd among those countries with the highest yearly installed PV capacity worldwide (1.5 GW PV capacity). In that year alone the country's regulator had to cope with more than 15,000 license applications, which demonstrates that if political will supports RES-E developments, large-scale progress is feasible.
- The unexpected growth in PV capacities in 2009-2010 was fuelled by a generous FIT, by a delayed regulatory response and by the fear of investors that the support policy would soon change. This development must be assessed in the context of the country's low solar irradiation, which is estimated to be 40% lower than in Mediterranean countries and much lower than Bulgaria's.
- The present investment environment for RES-E is defined by the following major factors:
 - The high impact of RES-E related costs on final customer prices – an increase of over 10% due to RES-E in 2010 only.
 - A regulation inconsistent with market developments (e.g. a very tight 5% limit to annual FIT reduction) and the slow reaction of politicians.
 - Awkward government communication has had a role in undermining investor confidence and has resulted in a rush to secure the generous level of subsidy offered before it is terminated.
 - In addition, the PV boom appears to have crowded out other RES-E technologies, as their development was sluggish during the same period.

Figure 2: Yearly projected RES-E gross electricity generation between 2005-2020, GWh²



Opportunities:

- According to the NREAP targets, the remaining additional RES-E capacity increase is expected in wind and mainly biomass (both biogas and solid biomass). The recent increase in PV capacities leaves little room for further investment into this technology. The new law on Energy Resources determines the maximum FIT for any new RES-E development (approx. EUR 175/MWh).
- Co-firing of biomass in old fossil units will be excluded. Only highly efficient cogeneration units remain eligible, which creates business opportunities for new biomass plants.
- Improvement of electricity grid infrastructure in the CEE region (especially in Germany) would enable easier grid access and simplified licensing procedure in the country.

Limitations:

- Swings in government policy toward RES-E in the past three years have mainly concerned PV technology. The corrective measures taken in 2010 and 2011 effectively stopped further PV penetration. Differences between ministries e.g. the Ministry of Environment and the Ministry of Industry and Trade contributed to this policy swing.
- The latest official energy strategy dates back to 2004 as updates have been continuously postponed, illustrating the government’s uncertainty in setting the future direction of the Czech

² Source: National Renewable Energy Action Plan (NREAP)

energy sector.

- Government communication, focusing mainly on end-customer energy prices, may contribute to weakening public support for further RES-E developments.
- The Czech Republic also faces problems with loop flows of power from German off shore wind farms through the Czech electricity grid which can increase the risk of blackout and limits capacities for new RES-E in the Czech Republic.
- Concerning hydro generation, there is little room for further capacity expansion. Additionally, hydro production shows very high variability due to rainfall patterns.
- Concerning wind energy, the country's most promising zones lie in natural protection areas, where obtaining a building license is often prohibited by law or extremely difficult, requiring the preparation of a detailed Environmental Impact Assessment.
- In general, policy support around low carbon technologies is low and follows climate sceptic political tendencies. The Czech Republic together with Romania and Poland does not currently support more ambitious GHG reduction targets. The government's concern is mainly around economic and financial costs, fuelled by the impact of the financial crisis.

HUNGARY

Recommendations to Increase Investment Opportunities:

- The RES-E licensing procedure could be streamlined and simplified with a focus on environmental licensing. A one-stop shop licensing regime with obligatory deadlines for administrative procedures could significantly improve the investment climate for RES-E.
- The investment environment for RES-E could be stabilised by passing and implementing the new feed-in tariff regulation (METÁR).
- Secondary regulations for optional FIT for installations under 1MW should be developed as soon as the European Commission approves the plan.

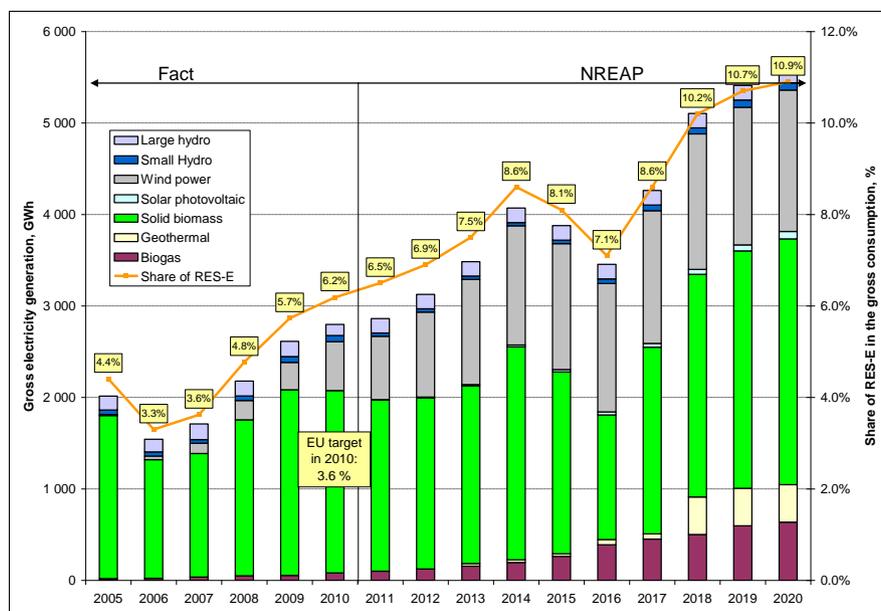
Background:

- The Hungarian electricity market is a mature, liberalised, 40TWh market with a heavy presence of multinational energy companies in all segments of the value chain (generation, distribution, supply) except for transmission which is state-owned. Hungary is well interconnected to its neighbours.
- The share of RES-E in gross electricity consumption was 6.2% in 2010. Hungary and Germany

were the only two EU member states that met their 2010 RES-E targets set under Directive 2001/77/EC (3.6% for Hungary).

- With regard to the promotion of renewable electricity, the country has pursued a cautious policy, consistent across different governments, since 2003. This relatively successful policy is characterised by the establishment of moderate targets and the application of cost-efficient RES-E support schemes, which have resulted in a slow but steady growth of the RES-E share in gross electricity consumption over the 2003–2010 period.
- Hungary has implemented all the relevant RES Directives (2001/77/EC and 2009/28/EC).
- To meet the targets set by the EU Directives, RES-E generation has been subsidised by FIT. Both the FIT regime and also the tariffs have been quite stable and transparent since the beginning.
- The present investment environment for RES-E is defined by the following major factors:
 - To keep end-customer electricity prices as low as possible ('freeze utility expenditures of households') is a short-term priority for the government. The government tries to control any inflationary pressure on customer prices, including RES-E promotion in the form of production subsidies. This puts a downward pressure on the overall RES-E support budget.
 - The recently passed 'Energy Strategy 2030' expresses a policy preference for preserving the present fuel mix diversity of electricity generation in the country. While a moderate further increase in the RES-E share is forecast (10.9% by 2020 on the basis of 6.2% in 2010), the strategy is also focusing on nuclear and new-build coal.
- Anecdotal evidence confirms that policy uncertainty is a major determining factor for investment in Hungary. Investors are ready to develop RES-E projects as soon as the present uncertainty around the RES-E production promotion scheme is resolved. The government promises to have a revised FIT scheme to become effective by January 2013.

Figure 3: Yearly projected RES-E gross electricity generation between 2005-2020, GWh³



Opportunities:

- Biomass is the most significant fuel source for RES-E generation and this is planned to continue until 2020. Current large (>30 MW) old biomass plants are to be replaced by smaller (<20 MW) green-field projects with a total investment need of 300–400 MW by 2020.
- Although wind development in Hungary is lower than the European average, around 330 MW capacity has already been commissioned matching the set cap of 330 MW related to wind capacity and all capacity licenses have been allocated by the government. At the moment there is no wind development license available for investors. The government is planning to allocate an additional 410 MW of development licenses by 2020.
- Hungary has a relatively good PV potential. However, the RES-E support scheme has been cautious with regard to promoting relatively expensive PV generation. The present level of feed-in tariffs related to PV is very low compared to other countries (e.g. Italy, Germany) and does not induce investments. Also, Hungary’s NREAP forecasts a slow and minor development of PV in Hungary (63 MW by 2020). However, due to a dramatic decrease in the cost of PV installations, we forecast that investment in PV could perhaps be the most significant policy shift in this regard in Hungary.
- In the case of biogas, a stable growth is expected and by 2020 the total installed capacity will

³ Source: Hungarian Energy Office (HEO) and the National Renewable Action Plan (NREAP)

reach 100 MW. However, biogas potential is very limited, especially biogas produced in sewage or in landfill facilities.

Limitations:

- According to RES-E investors the two major investment barriers are the length of time required for environmental licensing and the cost of grid connection.
- RES-E licensing processes usually involve 3–6 main authorities and several specialised authorities (involved by the main authorities). The process is described as taking 1–3 months, but usually takes 10–12 months and sometimes up to two years.
- For systems that generate at least 50% of their electricity from renewable-source grid connection charges will not exceed 70% of the connection costs, while if the RES-E share is above 90%, the connection charges will not exceed 50% of the connection costs. Therefore there is no financial advantage for the system operator to integrate RES-E generators.
- Geographically there is very little potential for small-scale hydropower generation. In addition, due to political reasons there is no chance in the mid-term to build a large-scale hydropower plant.
- Use of the country's significant geothermal energy resources is planned primarily for heating purposes.

ROMANIA

Recommendations to Increase Investment Opportunities:

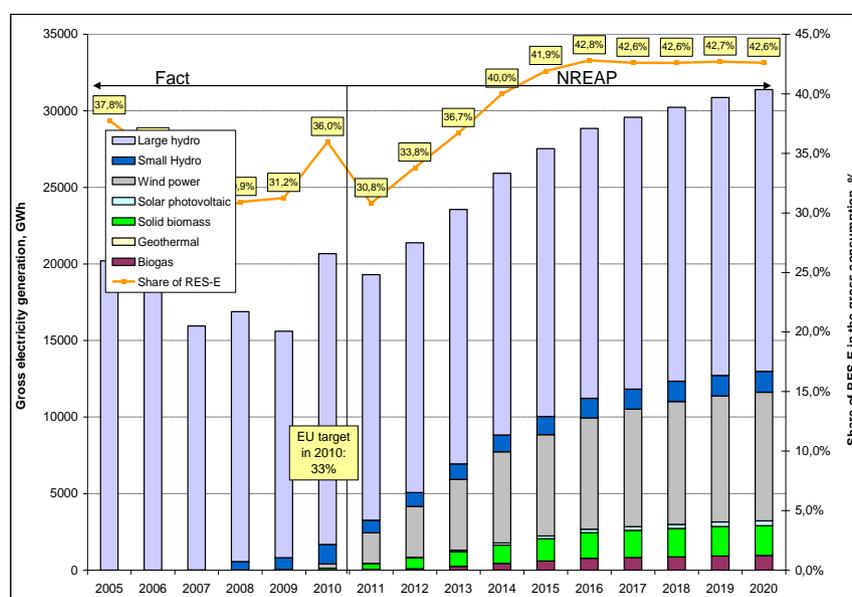
- Allocation rules for grid access could be announced in a way that creates transparency and maximises public revenue.
- Better incentives for Distribution System Operators to connect renewables to the grid could be provided and hence improve the position of RES-E developers in entering the market.
- Secondary regulations for optional FIT for installations under 1MW should be developed as soon as the European Commission approves the plan.
- Results for RES-E market monitoring could be published continuously so that market players can anticipate the corrections envisaged.
- Publishing a transmission system upgrade plan could better integrate fast growing wind and PV generation.

Background:

- Romania has a maturing electricity system (56TWh generation in 2010) with dominant state ownership in generation and transmission, and more foreign involvement in supply and distribution. The Romanian transmission system is well connected to its neighbouring states.
- Priorities for the Romanian power sector today are the partial privatisation of the state-controlled generators (Nuclearelectrica – 1400 MW installed nuclear capacity and Hidroelectrica – around 6200 MW installed hydro capacity) coupled with the expansion of nuclear generation capacity and rapid growth in renewables, particularly wind power.
- The privatisation process of major state companies halted in 2006 – mainly due to the Government’s plan to create a big ‘national champion’ generator – but it is likely to resume this year due to pressure from the IMF (which is engaged in a loan agreement with the country).
- Prices are partly market-based and partly regulated, both in the wholesale and the retail segments.
- Romania has implemented all the relevant RES Directives (2001/77/EC and 2009/28/EC).
- The share of RES-E in gross electricity consumption was 35.25% in 2010, predominantly due to the relatively high share of extensive large hydro generation capacities, and the fact that 2010 was a particularly good hydrological year. As a result Romania fulfilled its 33% target set under RES Directive 2001/77/EC.
- Renewable electricity (apart from large hydro) has been promoted by a system of tradable green certificates since 2005. Until 2010, Romania pursued a cautious policy that has resulted in the RES-E share in gross electricity consumption being dominated by small hydro.
- The promotion system was reformed in 2010 to accelerate RES-E penetration, aiming to reach Romania’s 2020 target. The original 2020 target set in the 2007 Energy Strategy at 38% was also maintained in Act 220/2008 and republished in 2010 but upgraded by the NREAP to 42.62%, reflecting the government’s commitment to move ahead in this policy field. The reform increases the subsidies for all RES-E technologies by varying degrees.
- Romania is currently experiencing an investment boom in wind generation. Installed capacity has increased almost tenfold in the past two years, and connection permits to the network have been issued for 17 000 MW, whereas the technical studies and public statements of the Technical Standards Order (TSO) indicate that the grid can only integrate 3300 MW (from which 1000 MW is already in operation). The conclusion of the framework conditions for RES-E investment in 2010 (on the number of green certificates for each technology and the eligibility period) might ease the reluctance of banks to provide loans for RES-E projects that have so far almost exclusively been funded from private equity.

- The present investment environment for RES-E is defined by the following major factors:
 - Investors are keen to benefit as much as possible from generous operational support that will be halved from 2018 onwards for all projects e.g. from two green certificates to one). Similarly, small-hydro investors are keen to secure the best locations for future development.
 - During the authorisation process of the support scheme with the European Commission, the government agreed to monitor the costs and incomes of RES producers and – in case of overcompensation – to take measures to reduce the support scheme. This reduction may happen as soon as 2013.

Figure 4: Yearly projected RES-E gross electricity generation between 2005-2020, GWh⁴



Opportunities:

- Biomass has been rather underutilised for electricity generation purposes and the NREAP indicates quite limited capacity growth from biomass by 2020 (one-tenth of wind and only a quarter more than PV). According to the NREAP, biomass is planned to be converted into heat (both in centralised systems and in households) rather than electricity.
- Romania has strong PV potential (better than Hungary, the Czech Republic and even Bulgaria), especially in its South-East region. As a result, the countries 2010 energy reform increased the

⁴ Source: Romanian Energy Regulatory Authority (ANRE) and the National Renewable Action Plan (NREAP)

volume of support to PV six fold (6 green certificates instead of one for each MWh). The NREAP, however, envisages a gradual uptake from 2012 onwards to result in a capacity of 260 MW by 2020. This target seems to be very conservative considering the extremely generous support PV has been granted under the new green certificate regime. It is therefore unlikely that the support scheme will trigger a boom similar to that of the Czech Republic

- As far as wind capacity is concerned, Romania is an absolute leader in the Central and Eastern European region, hosting a quarter of total capacities in the new member states (EU12). Similarly to solar, the South-East part of the country has the best environment for wind power. The bottleneck for future penetration is the capacity of the electricity grid to integrate large-scale, intermittent generation. The Romanian Technical Standards Order (TSO) sets this cap at 3300 MW while the NREAP calculates 4000 MW by 2020, suggesting that there are plans to reinforce the grid.
- The hydro potential in Romania is significant. Although no room exists for further large scale units, the development of small hydro plants is likely to continue and to double by 2020, gaining the second biggest share among renewables.
- In the case of biogas, a stable growth is expected to result in 195 MW of total installed capacity by 2020.
- As indicated in the NREAP, Romania's geothermal potential is planned to be used exclusively for generating heat.

Limitations:

- The application of green certificates for certain technologies still awaits the approval of the European Commission. This delay is blocking investment.
- Although Romania's regulator (ANRE) approved the methodology regarding the treatment of overcompensation (deduction of investment subsidy from operational support), the date of entry into force is uncertain.
- Wind developers have highlighted the following barriers:
 - Lack of allocation rules for wind permits create significant uncertainty for developers as the cost of project development might not be recuperated without proper integration to the grid. Therefore, project developers start actual construction only once they are fully licensed.
 - The lack of normative cost allocation methodology for grid connection.
 - For all technologies, licensing deadlines are often not met and thus can take several months if not years.

IV. REGIONAL OPPORTUNITIES & BARRIERS TO RES-E DEVELOPMENT

In the four countries under study, RES-E is at different stages of development, with a variety of specific possible routes to change the mix of traditional power generation and RES-E.

The following section compiles the main findings from the four countries studied and attempts to build a regional view, in terms of opportunities and the challenges from an economic, policy and finance perspective.

ECONOMIC ISSUES

Increasing Demand:

- Demand for electricity is correlated with economic growth. Despite the present recessionary environment, the Central and Eastern European (CEE) region is expected to experience economic growth over the next decade, and to narrow the gap with the rest of the EU.
- Due to lower disposable incomes, price sensitivity in the region is higher than it is in other parts of Europe. This is particularly the case in Bulgaria and Romania. Increased levels of income, as result of growth, enhance the ability for households to potentially absorb any higher costs of electricity, which may or may not be a result of renewable energy generation.

Shortfalls in Supply:

- The decommissioning of large facilities over the coming decade will lead to the need to replace their capacity. This provides both an opportunity and a risk for RES-E investments, as some countries may lock themselves into high-carbon projects for many years to come.
- For some of the countries, it is foreseen that a significant portion of electricity will need to be imported within a number of years posing an opportunity for diversification of energy resources to RES-E. From the perspective of energy security, governments will be looking for ways to fill the gap, and avoid dependence on neighbouring countries (particularly from non-EU members).

Decreasing Cost of Technology:

- Maturing technology (mostly in PV, and to a more limited degree, wind) is leading to a rapid decline in cost. Investment on a large scale in other EU countries, notably Germany and Spain, and new low cost Chinese technology has contributed to a significant drop in price over the last

couple of years. The lower cost improves the affordability of RES for consumers in the CEE region.

- In this context, it is interesting to note the widespread misperceptions on the cost of RES-E. The declining costs for RES and the increasing cost of fossil fuel mean that the former is gaining attractiveness rapidly, particularly when taking longer-term time frames into consideration. A recent study (BSW Solar) indicates that the cost of PV has dropped 60% since 2006.

Market Structure:

- Power generation in the region is dominated by big, state-owned incumbents. They operate large scale facilities using conventional energy technologies and feedstock's, predominantly nuclear and coal, with high sunk-cost and often significant excess capacity. This provides the incumbents with a strong incentive to oppose more flexible investments. As was noted above, the often state-owned entities have significant influence on government, which they use to discourage RES-E projects - often smaller scale and developed and operated by private sector players. In addition, RES-E investment and private sector interest is perceived to be predominantly foreign and hence governments and consumers complain of little local and national economic trickle down.
- RES-E is critically dependent on access to the grid – particularly in light of RES-E's intermittent nature. Limited access and low capacity of transmission grids, networks, and interconnections hamper the integration of RES in the region (most prominently in Romania and Bulgaria). Therefore, RES-E related efforts should primarily focus on identifying network, rather than generation related projects. Transmission as well as distribution level projects should make networks and their operation 'smarter'.
- Despite their interconnectedness and joint EU membership, there is considerable scope to take a more regional approach to market development. To date cross border projects in the area of hydro have created geo-political disputes rather than collaborative efforts.
- Investor interest has been very intensive in some areas in the four countries under analysis - PV in the Czech Republic and Bulgaria, and wind applications in Romania and Hungary.
- Network connection quotas have been established in several cases, but transparent and pre-defined queue management regimes to allocate connection rights are often still missing. These regimes should be developed and published as soon as possible.

POLICY DEVELOPMENTS

Political & Consumer Acceptance:

- Overall, the political will in Central and Eastern Europe to move into RES has been limited. Moreover, there is a noticeable trend in the opposite direction, possibly under pressure of the economic downturn that countries in the region and across the EU are experiencing.
- It also appears that climate change scepticism is on the rise, worsening the appetite for RES.
- In a sector dominated by state owned players, often monopolists in their market, inertia and vested interest work to block new entrants into the market. This is at least in part driven by employment considerations in traditional power generation industries. Transitioning into RES would potentially involve a loss of jobs in certain areas - although these losses could be compensated by gains elsewhere.
- There is a perception in the region that privatisation is undertaken by foreign investors and groups, rather than national interests, which leads to growing animosity. Furthermore, clean tech markets are predominantly outside the region therefore enhancing the view that the only reason the UK and Germany are pushing for decarbonisation in the region is to sell their products and companies.
- Fossil fuel subsidies remain present at comparable levels to some Western European member states (e.g. Spain, Germany) favouring conventional fossil fuel based generating companies. Furthermore, powerful agricultural lobby groups in some of the countries provide opposition to development, notably in biomass and PV due to competition regarding land-use.

Government Incentives:

- A key driver of investor interest in the renewable energy market is the availability of government incentives. A number of schemes are in place across the region, both on national and EU levels. As a further stimulant, EU environmental regulation supports replacement of environmentally sub-standard facilities, which provide a “push” factor for developing RES.
- The past several years have seen significant swings in government policy. Predictability of regulation and related FIT pricing has not been very high or long term, leading to considerable uncertainty among potential investors. Where investment has been strong in recent years, it has often been driven by a rush to benefit from incentives that the market expects to be short-lived (fostering a “gold-rush” mentality). Incentive structures should be “designed for success”.
- Particularly damaging to investors’ confidence are retroactive changes in the regulatory

framework. Such moves by governments can make investment in certain markets “out of bounds” for investors for a long time. This phenomena has been experienced across Europe.

- Efforts by government to support RES-E focus on generation related projects. However, as noted above, the real bottlenecks are in transmission and distribution. Furthermore, incentives to invest are mostly aimed at investors in the latter stages of the cycle of development. RES-investments are often initiated by players who are smaller, and more local. These may not have access to the incentives, or may respond to different stimuli than bigger owners of the installed capacity.

Administrative Issues, Sector Knowledge & Skills:

- Licensing regimes for RES-E are cumbersome, timely and expensive in the four countries. A significant streamlining of licensing procedures could significantly improve the investment climate for these projects. This would enhance the ability of investors to respond swiftly to market conditions.
- The time required to permit and install RES-E generation units is often significantly shorter than that for network expansion and upgrade necessitated by massive new RES-E connections. It is also common that regulators first put effective incentives in place (e.g. in the form of generous feed in tariff systems) to encourage new RES-E generation, but neglect similarly effective remuneration schemes for transmission and distribution companies for their grid development.
- Lack of interest may correspond with a lack of skills to manage RES investment and related support schemes. This may contribute to longer approval procedures and, potentially, suboptimal policy initiatives and lack of coordination.

FINANCIAL ASPECTS

- A key element in the development of RES-E in CEE is the availability of sufficient and appropriate capital, at the right cost. At present, the cost of capital for RES-E projects in CEE in RES is high. This cannot be delinked from the general situation in the credit markets, associated with the financial crisis and sovereign debt problems. Many projects, in developed and emerging countries, are underfunded and struggling to come off the ground at present. This is not specific to RES-E, or CEE. Timing, however, is particularly unfortunate for the region as many opportunities driven by trends listed above are coming to the fore in the next few years. Lower credit ratings of governments and state-owned operators increase the cost to consumers, or lead to later investment.

- Investors comment that investment in the Central European region is often negatively perceived, combining “(low) OECD-level returns with (high) emerging market type risks”. This relates to uncertainty in the investment climate, stability of legal structures and currency risk. Markets are perceived as relatively “closed”, with small-scale (and unconnected) opportunities. As a result, investment in other emerging regions – perhaps even riskier, but with commensurate returns, is attracting more attention.
- Everywhere the cost of capital is affected by uncertainty in the RES-E investment climate. As noted above, investors and financiers are faced with swings in the regulatory framework, and the unpredictability regarding the longevity of incentive schemes. Given the long development lead times and complex licensing procedures, and the long life spans of the investments, even minor changes in tariff structures (or high uncertainty around them) can have a highly negative impact on the appetite to invest. This uncertainty drives up the (perception of) risk to investors, and hence, the return they will demand. Therefore, from a funding perspective, the predictability of regulation and tariff structures is paramount: without it, cost of capital and its availability will remain an impediment to development of the sector.
- Sources of public stimulus for RES-E in Central and Eastern Europe are decreasing. The ability and appetite of consumers to absorb higher tariffs is facing downward pressure, and tax incentives become less affordable as governments face budget squeezes. As a result of all this, in a “post-stimuli” environment, the mix of funding sources will have to broaden, and more will need to come from the private sector.
- The ability of operators to take the financing of feed-in tariffs on their balance sheets has declined, as has utilities’ ability to use their own balance sheets. This is due to the drop in credit ratings across the board for utilities over the past few years; furthermore, the fact that many electricity transmission companies in the region are state-owned means they do not have their own credit rating, blocking their access to the corporate bond market.
- Bank debt and project finance funding are likely to continue to play a significant role, for mature and proven technologies. Here, too, credit challenges exist. As repayment and interest schedules depend highly on the dependability and predictability of future prices, uncertainty around incentives also impacts on investor appetite.
- More equity will be required. This is particularly the case for newer technologies, without proven track record and higher inherent risk. Equity funding is particularly relevant for earlier stage funding. These investments are often undertaken for smaller, local players, for whom debt financing is not a viable option.
- Furthermore, pension funds and sovereign wealth funds are likely to continue their advance as

investors in the area of RES, as will potentially an increase in investment funds targeting sustainable and impact investing opportunities. Pension funds typically come into the picture at the final stages of investment, when risks are largely mitigated and the returns are of a long-term, stable nature. An interesting development is where developers and utilities work together directly with pensions funds. Whilst this is not yet the case in CEE, it has led to interesting results elsewhere in the EU. For example, in Denmark, Dong Energy has developed creative new partnerships with the State Pension Fund in the area of wind.

- For new and emerging technologies, there is scope to increase EU funding mechanisms. For instance, the European Energy Efficiency Fund (EEEF) supports the goals of the European Union to promote a sustainable energy market through a layered risk/return structure to foster energy savings, energy efficiency and renewable energy in the form of a targeted private public partnership, primarily through the provision of dedicated financing via direct finance and partnering with financial institutions.
- Traditional methods of evaluating the attractiveness of long term investments, through discounted cash flow analysis (DCF) based on net present value (NPV) calculations, may underestimate the value inherent in funding new low-carbon technology. Option value can include the potential upside that may result from improving prices as technologies mature, or regulatory environments become more favourable. Current practice may lead to unwarranted short termism in assessing the true attractiveness of new technologies. Exploring this type of thinking could help unlock funding from traditional sources, such as project financing and bank debt, by developing methods to take the optionality into consideration in valuing future income streams. The Cambridge Programme for Sustainability Leadership's (CPSL) Banking Environment Initiative (BEI) is involved in this type of work, looking at "Real Option Analysis" as an alternative or complementary methodology.

V. RECOMMENDATIONS: THE INVESTMENT PERSPECTIVE:

From the studies on RES-E in Bulgaria, the Czech Republic, Hungary and Romania, summarized above, a significant opportunity emerges for investment. Demand, replacement of existing capacity, decreasing cost and public pressure point towards an increasing momentum for the sector in Central European Region. At the same time, a number of challenges to development exist, of a political, structural, administrative and financial nature. The question is how can these challenges be addressed, to unlock the true potential of RES-E in the region?

From an investors' perspective, the following initiatives can be undertaken to improve the attractiveness of RES-E to investors:

BUILDING CAPACITY IN THE RES-E SECTOR

Building Capacity:

- Knowledge and skills in the public and private sectors, could be strengthened to ensure that there is sufficient professional competence in the region to manage and profit from the employment and investment opportunities created by the RES-E sector. This entails putting in place an employment transition plan for the non RES energy sector to the RES sector in the area of electricity generation and could include training of government staff, personnel in large, state-owned enterprises, university students etc.
- Research and Development capacity building is absolutely essential to ensure that RES-E technologies become competitive and cheaper in electricity production but also to create greater buy in and local entrepreneurship. This entails the establishment of Centers of Excellence linking existing academic institutions and leading companies' in CEE countries. Assistance to R&D capacity building can be given by international organisations and partner universities already undertaking similar work.

Broadening Stakeholder Engagement:

- Market structures still tend to support the dominance of one or two major players in the countries studied making it difficult for independent power producers to conclude long-term Power Purchase Agreements and arrange commercial finance. By broadening stakeholder engagement to include a wider range of partners such as local government, academic

institutions, different sectors of industry, finance, and small entrepreneurs etc. countries will enable more producers to enter the market.

- Associations and interest groups, involving all relevant players in the sector, can be supported so that an industry voice is created and the industries' interests can be heard by government under one renewable energy banner.

IMPROVE GRID & TRANSMISSION INFRASTRUCTURE

Grid Infrastructure Development:

- One of the main obstacles to be surmounted is without a doubt the lack of grid capacity and infrastructure thus making the transition to a high tech "smart" power grid urgent. Investment in the up-grading and interconnection of transmission grids at national and regional levels is fundamental to improving the connectivity and distribution of electricity generated by RES. Grid infrastructure improvements should therefore be a priority for the region. Increasing grid capacity and addressing grid infrastructure could act to scale up investment across the whole region by giving a clear signal to investors that there is potential for a much larger customer base than might be available within each country's own borders. Private investment in new hydropower R&D centres (in India, China and Brazil) has been undertaken in areas where large potential regional rather than national markets are foreseen.
- Harmonised EU legislation regulating grid operation and the internal electricity market should be promoted.

IMPROVE THE PREDICTABILITY OF INCENTIVE SCHEMES AND REGULATION

Increase the Lifespan and Reliability of Incentive Structures:

- Increasing the lifespan of incentive structures will help fund longer term investments and provide dependable incentives, lowering the cost of capital and hence, prices for consumers. Designing incentive structures in a sustainable fashion will help countries avoid becoming "victims of their own success" if the uptake is so large, that the incentives become unaffordable, and hence have to be revoked.

Increase Integration and Better Allocation of EU Funds:

- Efforts should be made at the EU level to promote better integration and use of existing and proposed EU funds as well as the EU budget. This is not necessarily the creation of new funds but the better allocation of existing funds under Cohesion Policy as well as under the EU's new Multi-annual Financial Framework for 2014-2020. Such finance could be targeted at increasing electricity transmission/distribution network capacity; increasing electricity interconnection capacity and implementing "Smart Grid Connection" and back-up electricity generation capacities for RES projects.

DEVELOP A PAN-REGIONAL VIEW

Look at Potential Regional Investments:

- Investments that are sub-scale from a national perspective may well be feasible if viewed regionally as long as incentive schemes are properly coordinated between different countries.

Consider the Role of Pathfinder Projects:

- Though these countries are EU members, first-of-a-kind projects for a technology may face similar barriers here as those they would face in emerging or developing countries. Promoting "pathfinder" projects that help to establish a track record for a technology in a market helps financiers and developers understand how to allocate risk between project partners, and promotes projects that find it difficult (and expensive) to access financing.

FOSTER A DOMESTIC RES INDUSTRY BY SUPPORTING ENTREPRENEURISM

Recognize the Role of Entrepreneurs:

- The RES-E sector provides opportunities for new entrants. RES development is not just about large scale, capital intensive investment schemes but also about small, entrepreneurial players who (particularly in the earlier stages of development) play a pivotal role in identifying opportunities, taking the first steps in licensing, land-use etc. These entrepreneurs can be helped in various ways, including the creation of a favourable investment climate, tax breaks, etc. Important in this respect is facilitating the sell-back of energy to the state by (small) private players, something that is often blocked by structural and energy company interests.

Work with the Banking Sector:

- The banking sector in the countries of Central and Eastern Europe, are themselves significant potential investors in the RES-E sector in their region.

SUPPORTING PUBLIC-PRIVATE RISKS SHARING FOR RES-E

Consider Ways of Risk Sharing:

- With the cost (and availability) of capital at its present levels, and subsidies and incentive schemes under pressure, other avenues should be looked into. Supporting alternative financing structures, and augmenting the risk capacity through public-private partnering, will help mitigate and/or reallocate risks and allow for a higher availability of funding resources and financiers.
- Incentive schemes should be aimed at reducing and mitigating investors/financiers risks (lowering the need for higher return), rather than compensating for the risks taken by investors/financiers by providing higher return for their investments, in equity or debt. Examples of this could include inflation linked incentives, export credit type guarantees, minimum guaranteed payment provided that the capacity is installed (security of supply payment), and payments in Euro rather than in local currency (avoiding exchange rate risk). These types of incentives have a proven track record in shadow-toll infrastructure sectors and can also be applied to RES-E projects.

Consider How Risks Are Evaluated:

- Banks and other investors could be supported in developing alternatives to discounted cash flow analysis (DCF) based on net present value (NPV). Real Options Analysis could better take into account the impact of price and regulatory changes in assessing the attractiveness of new renewable technologies.

Review Legal Frameworks:

- The development of an investor/financier friendly environment from the legal and tax angles will help to reduce capital cost. The development of a legal framework able to provide certainty, in particular in relation to the security on assets linked to project finance structures, will be key in the development of the RES sector.

Stimulate Targeted Equity Funds:

- As markets recover, the creation of targeted equity funds could be stimulated, possibly building on grant money and guarantees from the (semi-) public sector, or by providing tax breaks. The sector could also work on increasing the number of investible propositions attractive to impact investors, pension funds and sovereign wealth funds.