SEERMAP

South-East Europe Electricity Roadmap

Electricity market design – market opening

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Podgorica RES training

15-17 November 2016

REKK FOUNDATION

Overview

SEERMAP
South-East Europe Electricity Roadmap

- SEERMAP project introduction
- Agenda of the RES training
- Electricity value chain and the vertically integrated market structure
- Promises of competitive electricity markets
- Policy cook-book for electricity markets
- Market design alternatives

Basic SEERMAP project data

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South-East Europe Electricity Roadmap

Project title	South East European Electricity Roadmap	
Country/region of implementation	Albania, Bosnia and Herzegovina, Kosovo*, Montenegro, Macedonia, Serbia, Romania, Bulgaria, Greece	
Project cycle:	July 2016	June 2017
Donors:	Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management	MINISTERIUM FÜR EIN LEBENSWERTES ÖSTERREICH
	European Climate Foundation	European Climate Foundation
Web:	www.seermap.rekk.hu	

Goals of the project

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Modelling

- Analyse the impact of the transition to a low carbon and energy secure pathway the electricity sector until 2050 in line with EU 2050 Roadmap (*Long Term Electricity Roadmap for the SEE region*) that highlights the potential synergies beyond the limited confines of national assessments
- Application of state of the art energy sector models of the participating consortia partners (electricity and gas sector market models of REKK, Green-X of Technical University of Vienna and the regional electricity network model of EKC)

Dialogue and capacity building

- Effectively distribute the findings of this roadmap to the high level decision-makers in the energy administration of the countries
- Build up capacities – in the form of training courses - amongst policy makers, TSO members, energy regulators and local think tanks in the field of renewable energy deployment and transmission network planning issues
- Build up a network of regional think tanks capable of contributing to the debate on the long term decarbonisation pathways in the SEE region
- Trigger discussions on electricity scenarios at a national level

Consortia and Local Partners

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Consortium partners	Task
Regional Centre for Energy Policy Research (REKK) Budapest, Hungary	Overall coordination, electricity and gas sector modelling
Technical University (TU Wien) Vienna, Austria	Renewable deployment modelling with GREEN-X model
Electricity Coordinating Centre (EKC) Belgrade, Serbia	Network modelling
OG Research (Czech Republic)	Macroeconomic assessment
Energy Regulators Regional Association (ERRA)	Trainings

Country	Local partner organisation
Serbia	RES Foundation
Albania	POLIS University
Macedonia	MACEF – Macedonian Center for Energy Efficiency
Montenegro	IPER - Institute for Entrepreneurship and Economic Development
Kosovo*	INDEP – Institute for Development Policy
Bosnia	Enova
Romania	Energy Policy Group
Bulgaria	Center for Democracy
Greece	FACETS

Agenda of the course

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	Day 1: Support schemes		Day 2: RES integration		Day 3: System wide impact of higher RES deployment
9.00-10.30	Introduction to the operation of electricity markets (L.Szabó - REKK)	**9.00-10.30**	RES Integration - Connection, Congestion and Balancing needs (L. Szabó REKK)	**8.30-10.00**	Benefits of RES market integration German PV tendering schemes (Christian Redl, Agora))
	Coffee break		Coffee break		Coffee break
11.00-12.30	Introduction to RES regulation (G.Resch- TUV)	**11.00-12.30**	RES HOT topics: country introduction (Serbia, Macedonia, Albania)	**10.30-12.00**	Electricity market modelling in SEERMAP: EEEM and GREEN-X modelling (A.Mezősi–REKK, G Resch TUV)
	Lunch break		Lunch break		Lunch break
13.30-15.00	Good and 'avoidable' RES support practices New EU support policy (Zs.Pató -REKK)	**13.30-15.00**	RES HOT topics: country introduction (3 countries: BiH, Kosovo*, Montenegro)	**12.45-14.15**	Romania case study on RES (A. Soare, ANRE) Discussion on country Hot topics (L.Szabó – REKK)
	Coffee break		Coffee break		Coffee break
15.30-17.00	**Investment Exercise 1** (P.Kotek- REKK)	**15.30-17.00**	**LCOE calculation Exercise 2** (P.Kotek - REKK)	**14.30-16.00**	**POWER Exchange Exercise 3:** (P. Kotek- REKK)
19.00	Joint dinner				

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Traditional electricity market structure: vertical integration

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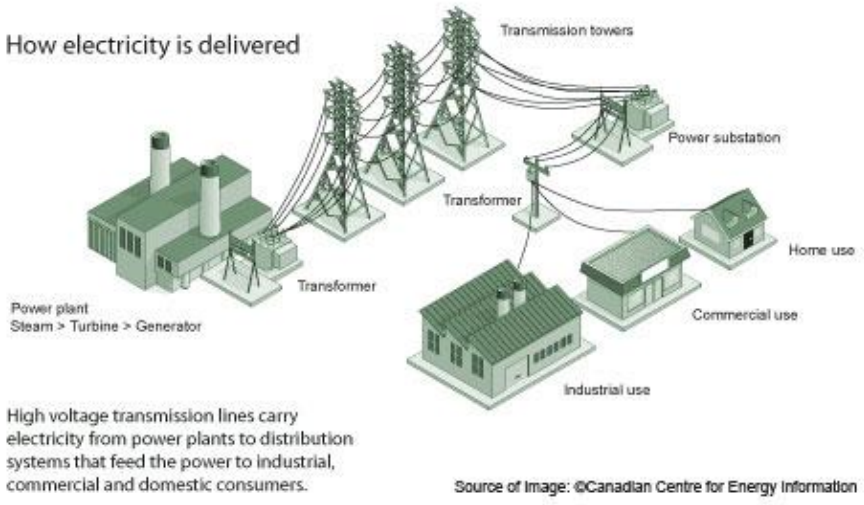
- Vertically integrated, privately / publicly owned, regulated monopolies

  - Generation
  - Transmission
  - Distribution
  - Supply
  - System operation

  } Within one regulated company



- Self-sufficient national systems
- Supply obligation

- Regulated end-customer price: cost of generation + cost of transmission + cost of distribution & SO + taxes

Short run supply of electricity

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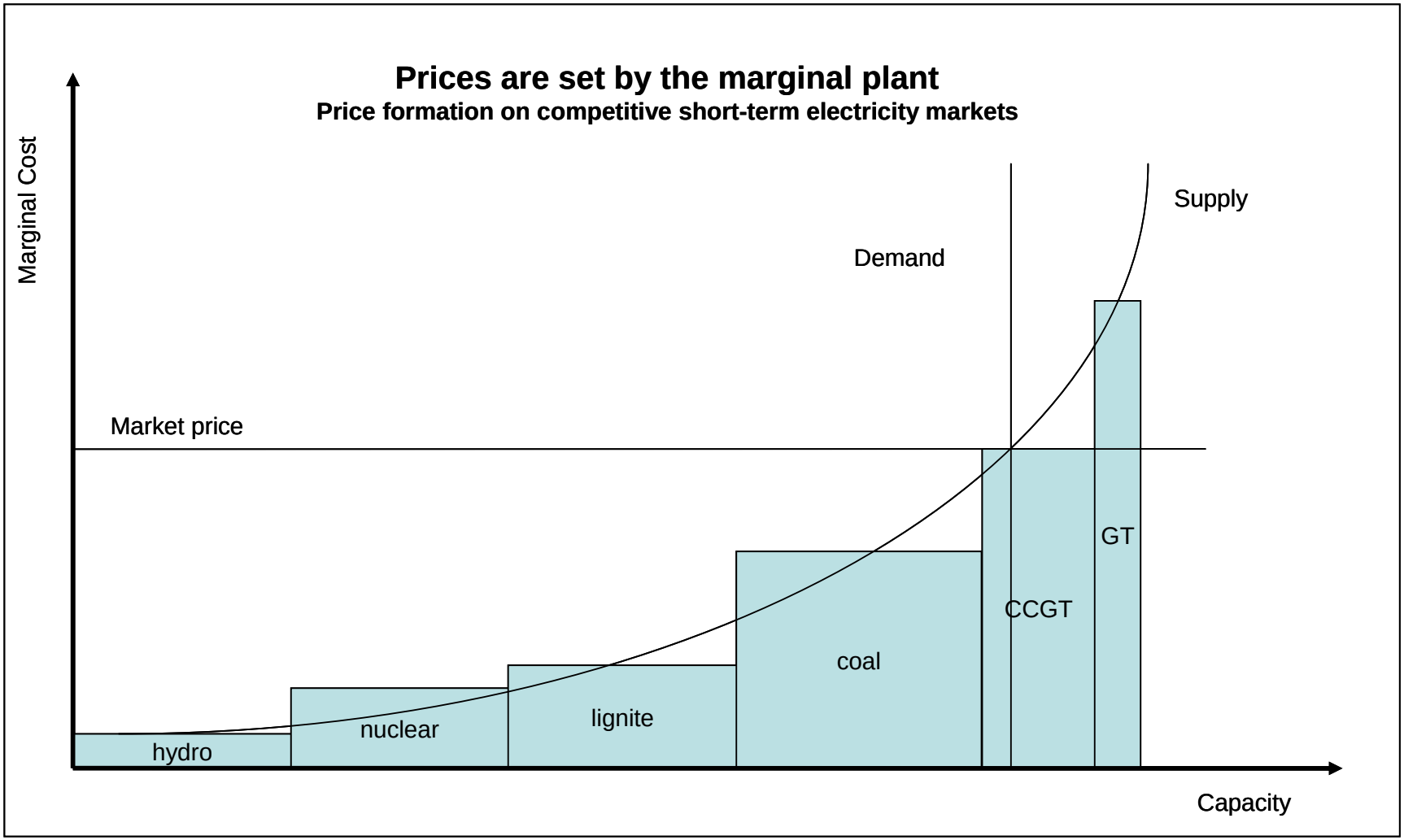
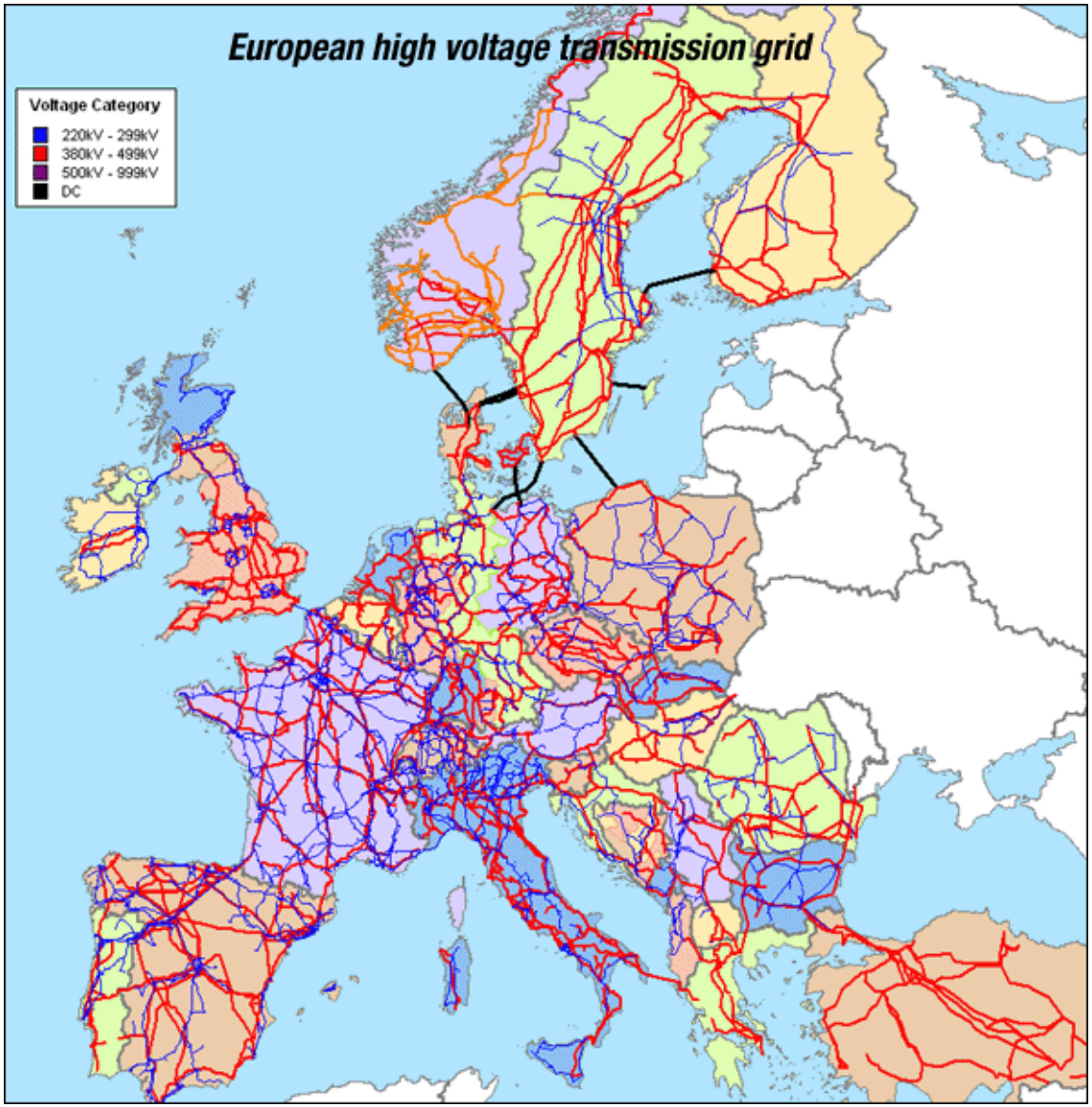


Transmission services



Traditionally owned and operated by vertically integrated companies (private or state-owned) within national boundaries

Cross border electricity transactions served reliability purposes

Complication 1: costly storage, supply-demand balance in each second

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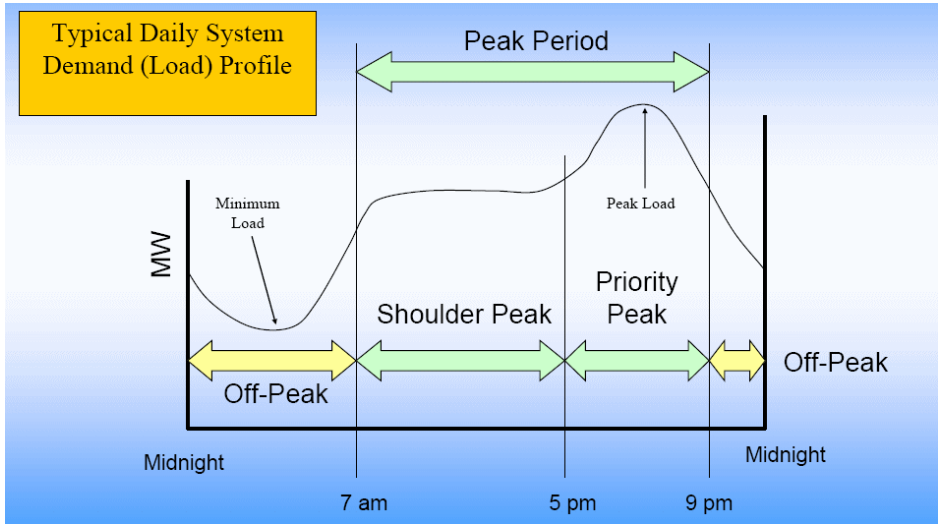
- How to manage daily load variation?
- Scarce and expensive storage options…



Complication 2: commercial transactions and physical flows are decoupled

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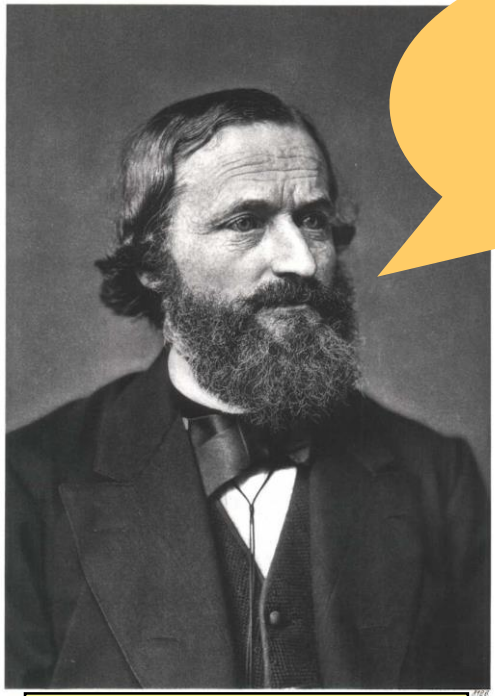
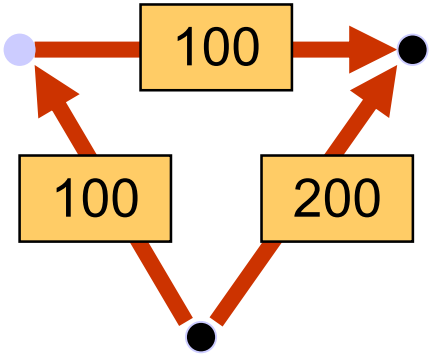


G.R. Kirchhoff
1824-1887

Electricity flow is inversely related to the current!

Smaller current (shorter line) will receive more electricity flow!



Central player: transmission system operator!

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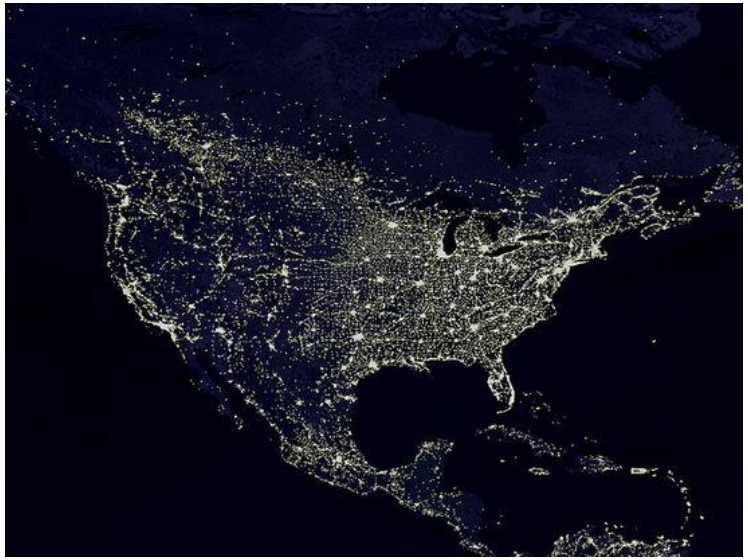
Takes care over system security and balance, otherwise…



Efficiency problems with traditional regulated monopolies

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Regulated private monopoly:

- No motivation to reduce operating cost
- Motivation to over-invest – ‚gold plating'
- Increasing costs, increasing end-customer prices
- Loss of competitiveness for manufacturing

Regulated state owned monopoly:

- **Often depressed prices and loss-making**
- Lack of operating efficiency
- **Lack of investment**

Policy response: introduction of competition

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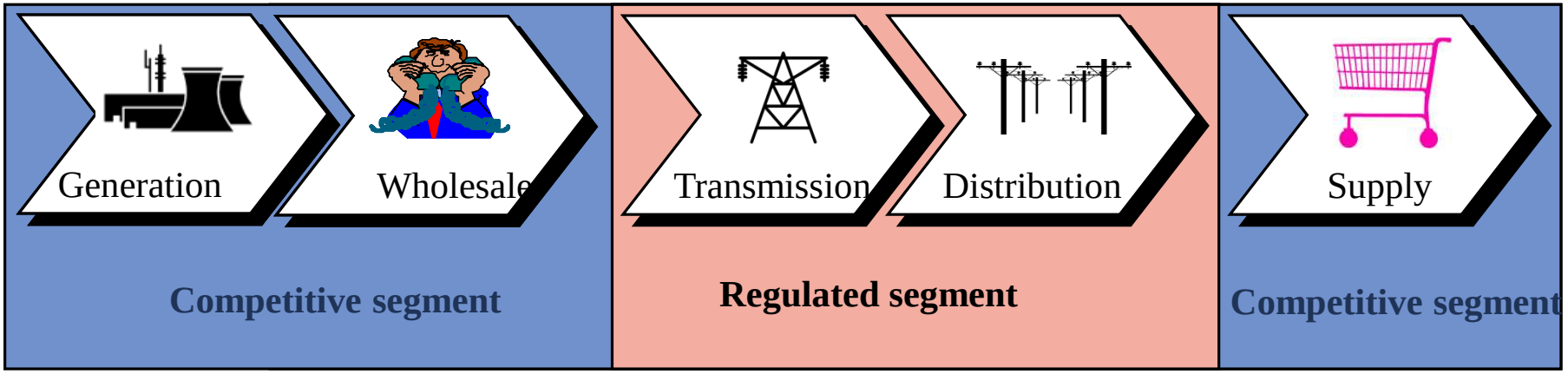
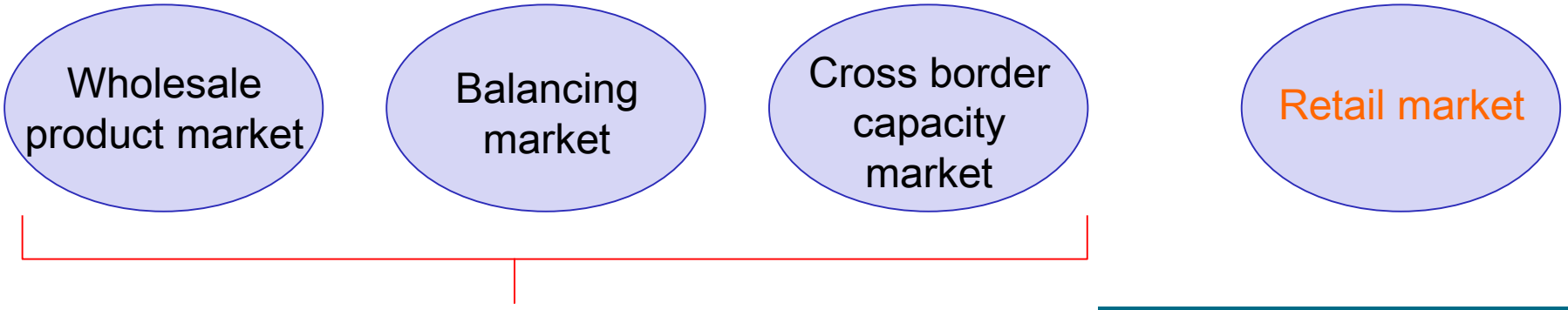
The principal idea: unbundling



Resulting market segmentation



Electricity market reform a'la EU

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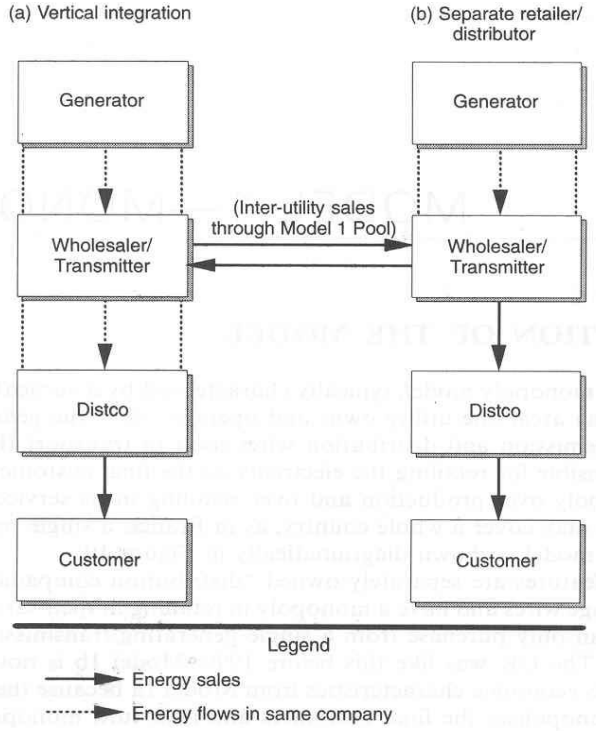

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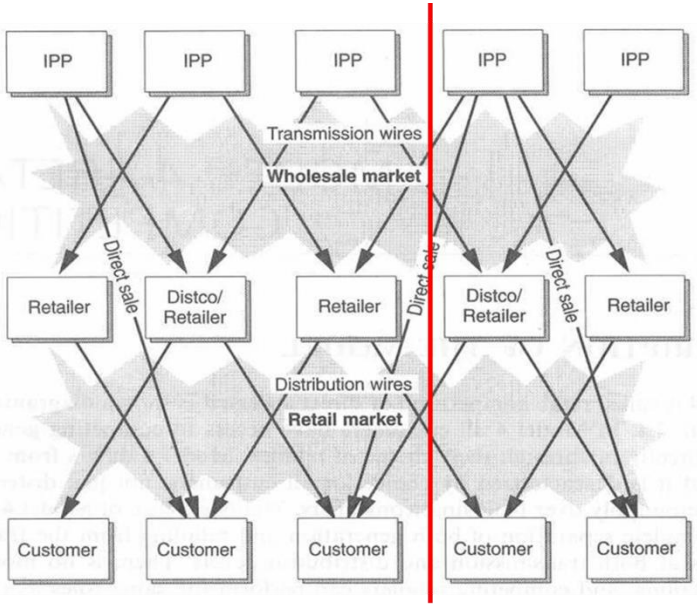

Competing generators

TPA to transmission

Competing traders, suppliers

TPA to distribution network

Free choice of supplier

From vertical integration...

… retail competition

Promises of competitive, integrated electricity markets

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- Improving operating efficiency in generation (short run)
- Improving investment efficiency in generation (long run)
- Cost reflective, transparent market prices for consumers
- Least-cost supply security
- Technology and product innovation
- Integrated fuel, electricity and environmental markets

Efficient electricity market: the cook-book receipt

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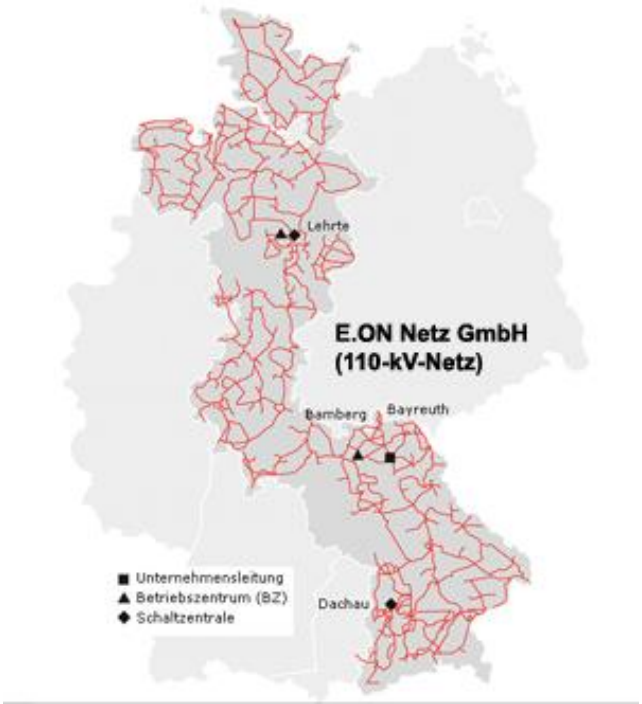
1. Unbundling of monopoly activities (network and system operation) from competitive activities (generation, trading, supply)
2. Regulated Third Party Access to the network
3. Free choice of supplier (demand side liberalization)
4. Free sale of electricity (supply side liberalization)
5. Removal of generation and end-customer price regulation (price liberalization)
6. Independent sector regulator
7. Cross-country market integration (= sufficiently low market concentration in generation)

1. Transmission unbundling



Ownership change

Legal or ownership unbundling

2. Regulated third party access to the network

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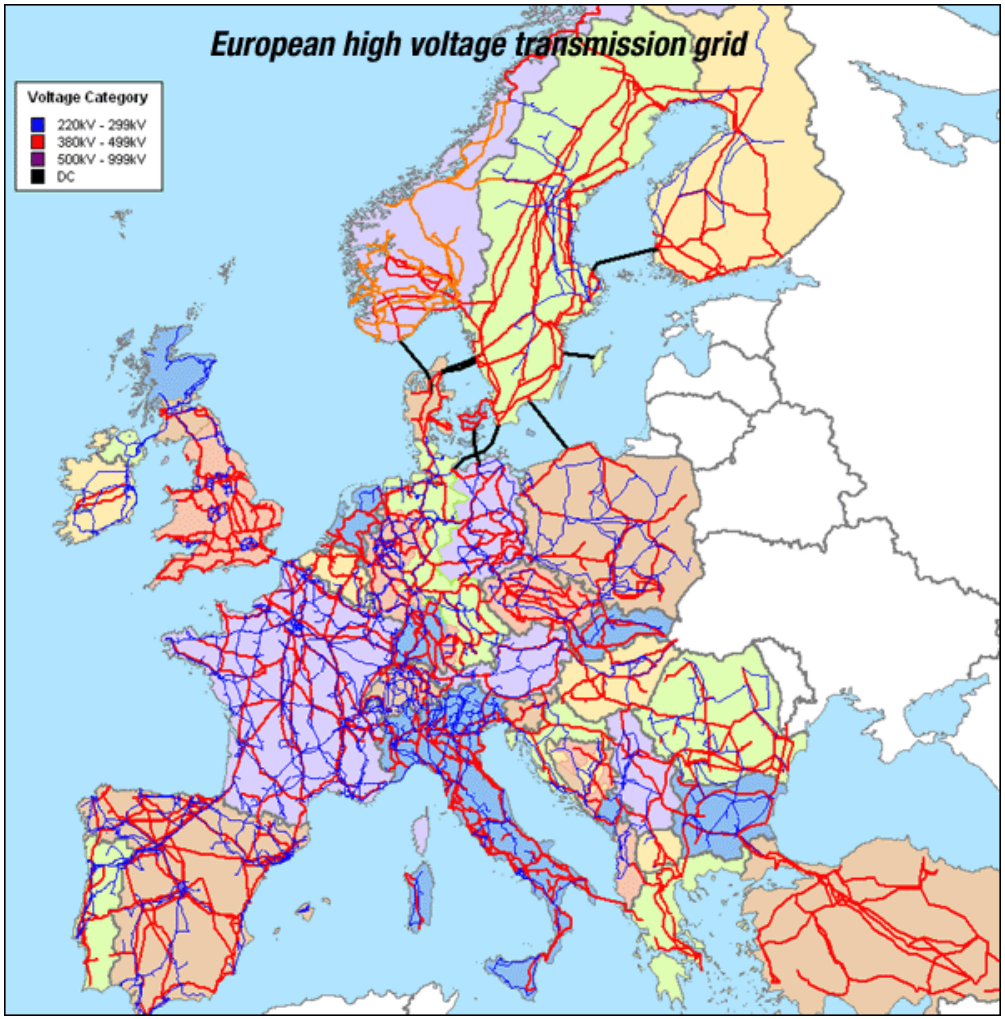
- Transmission grid serves as a neutral ‚electricity highway' to implement transactions
- Non-discriminatory and regulated access (including regulated access tariffs) is key
- Transmission capacity might be scarce: congestion
  - How to manage?
- Europe: congestion is typical at national borders
  - Main issue: cross-border trade and capacity allocation
- RTPA to the distribution grid



3. Free choice of supplier

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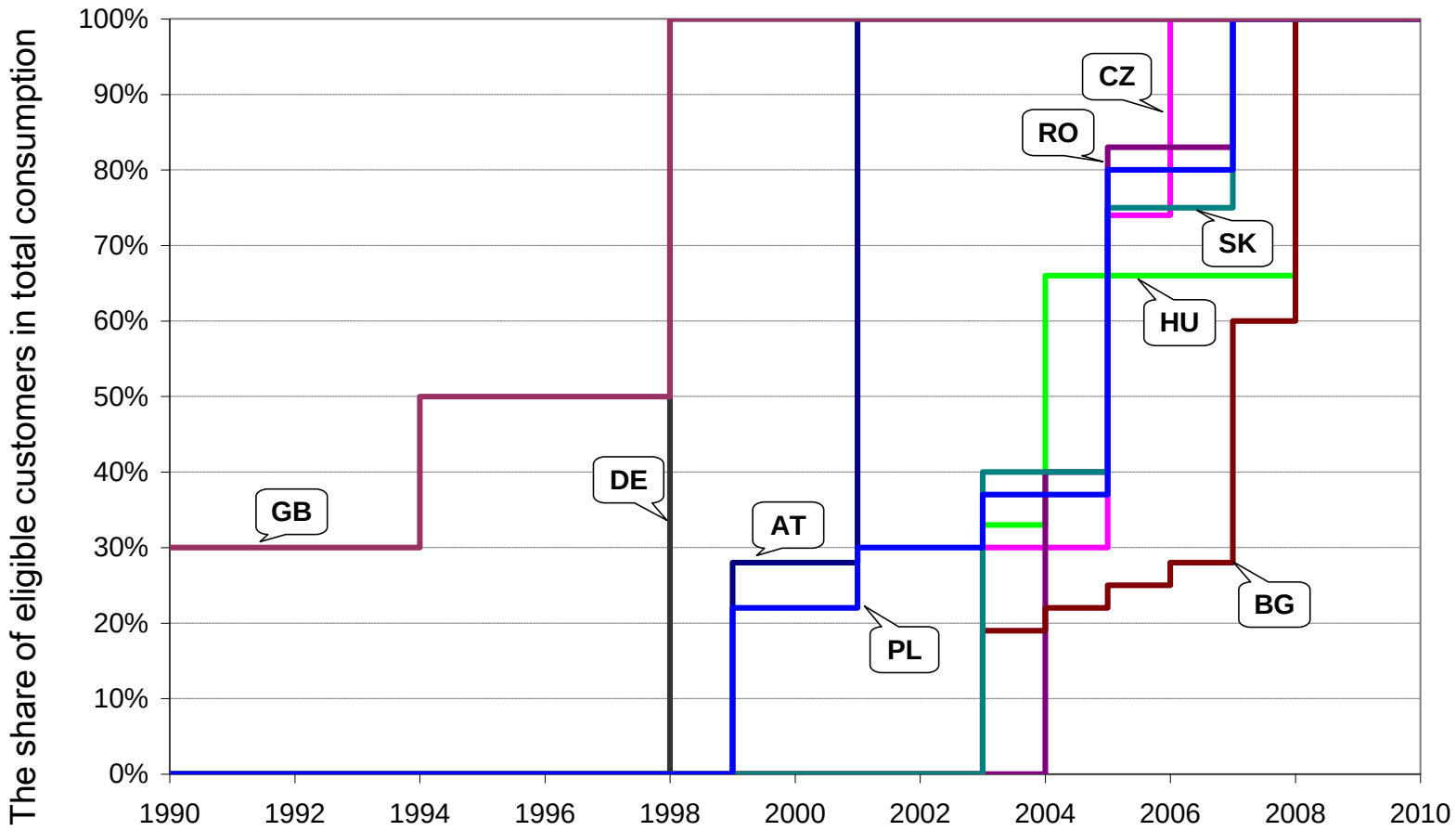
Gradual market opening in Europe



Source: ERGEG National Reports

Intensity of competition is reflected by customer switching rates (EU)

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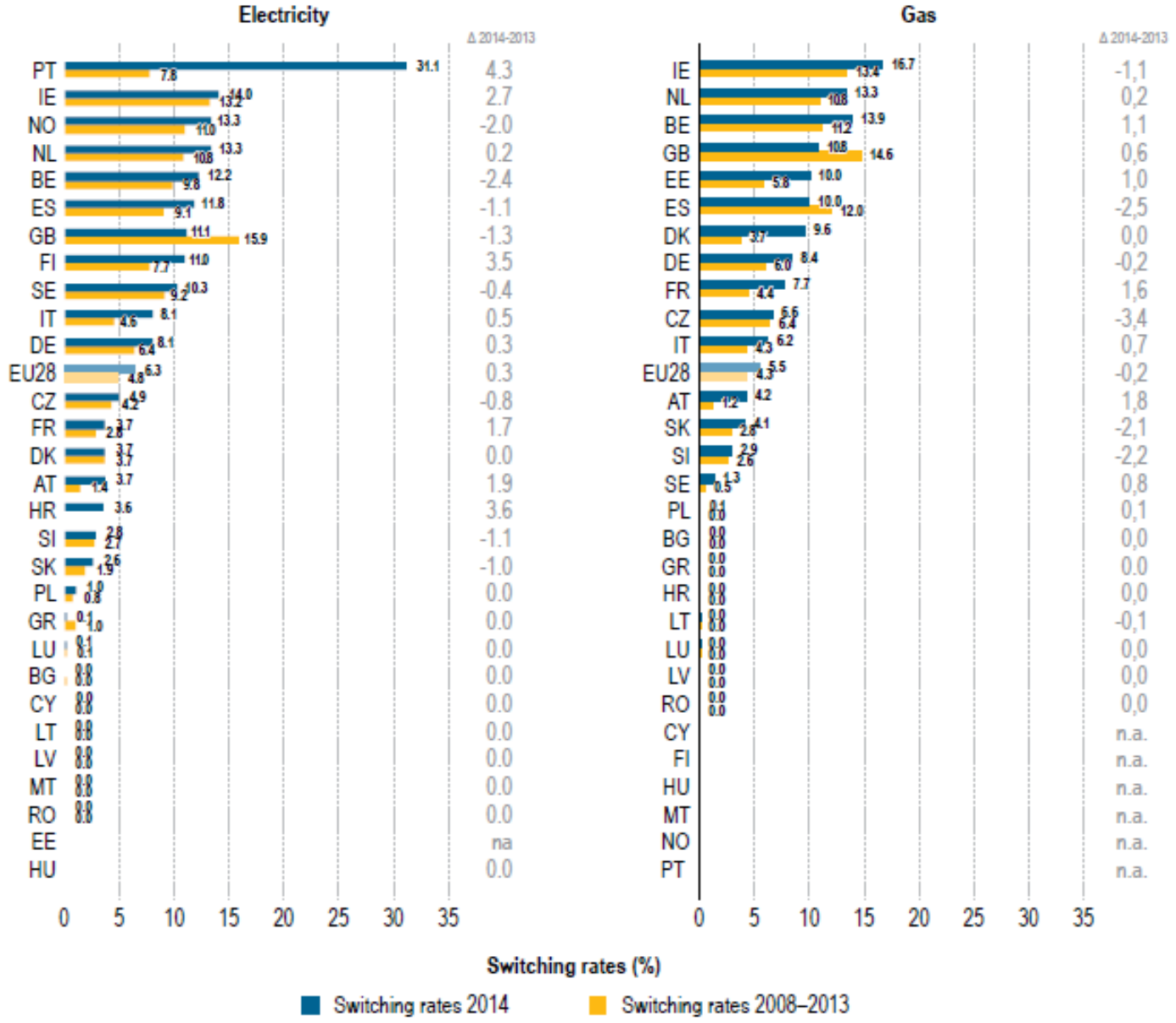


Good and bad examples from the region :

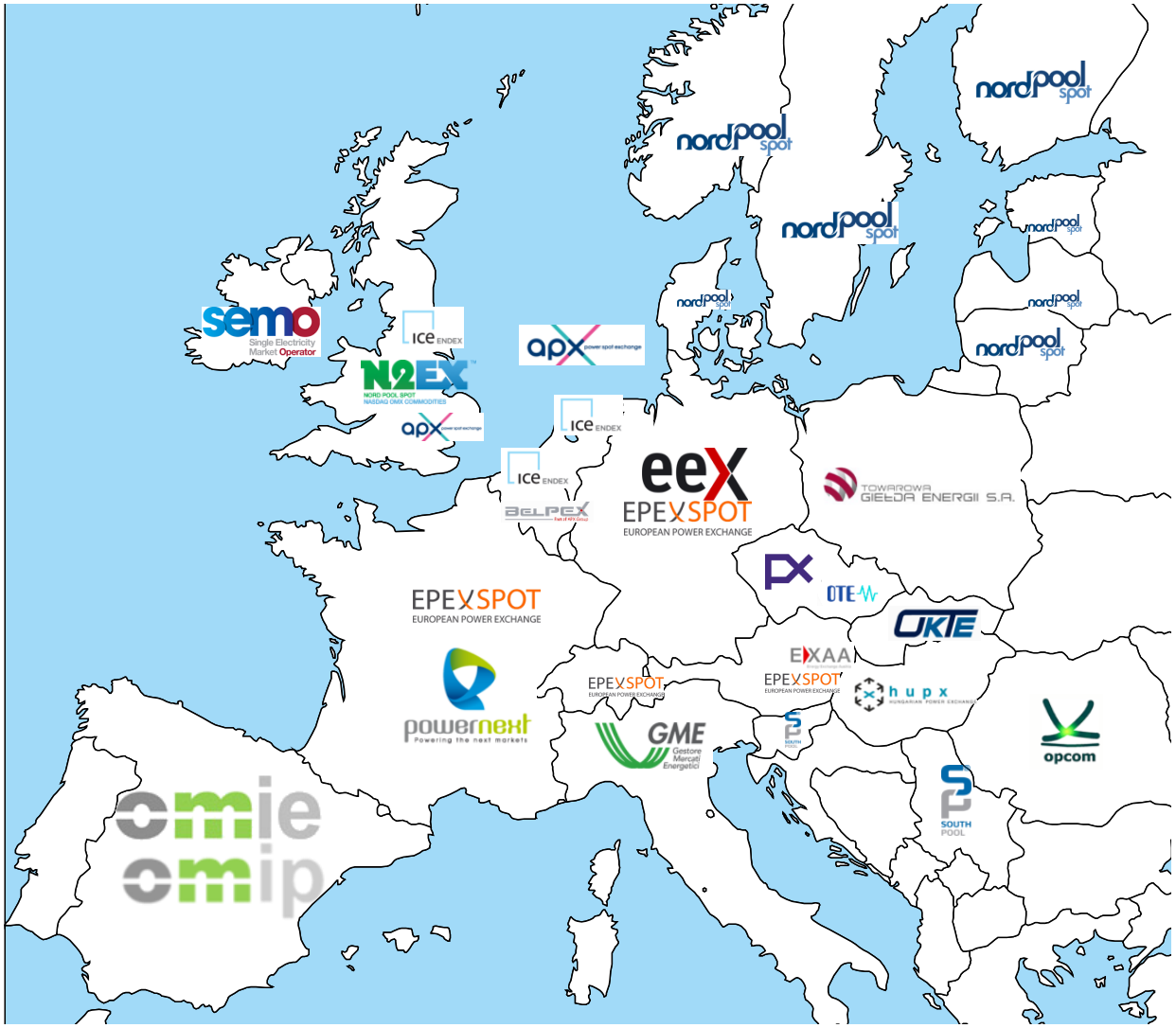
BG, RO, HU

– vs -

HR

Source: ACER MMR report 2015

4. Free sale of electricity



Power exchanges in Europe

Generators can sell on bilateral contracts (OTC market) or at organised markets (power exchanges)

5. Gradual removal of generation and end-customer price regulation

The Hungarian single buyer model in electricity, 1994 - 2003

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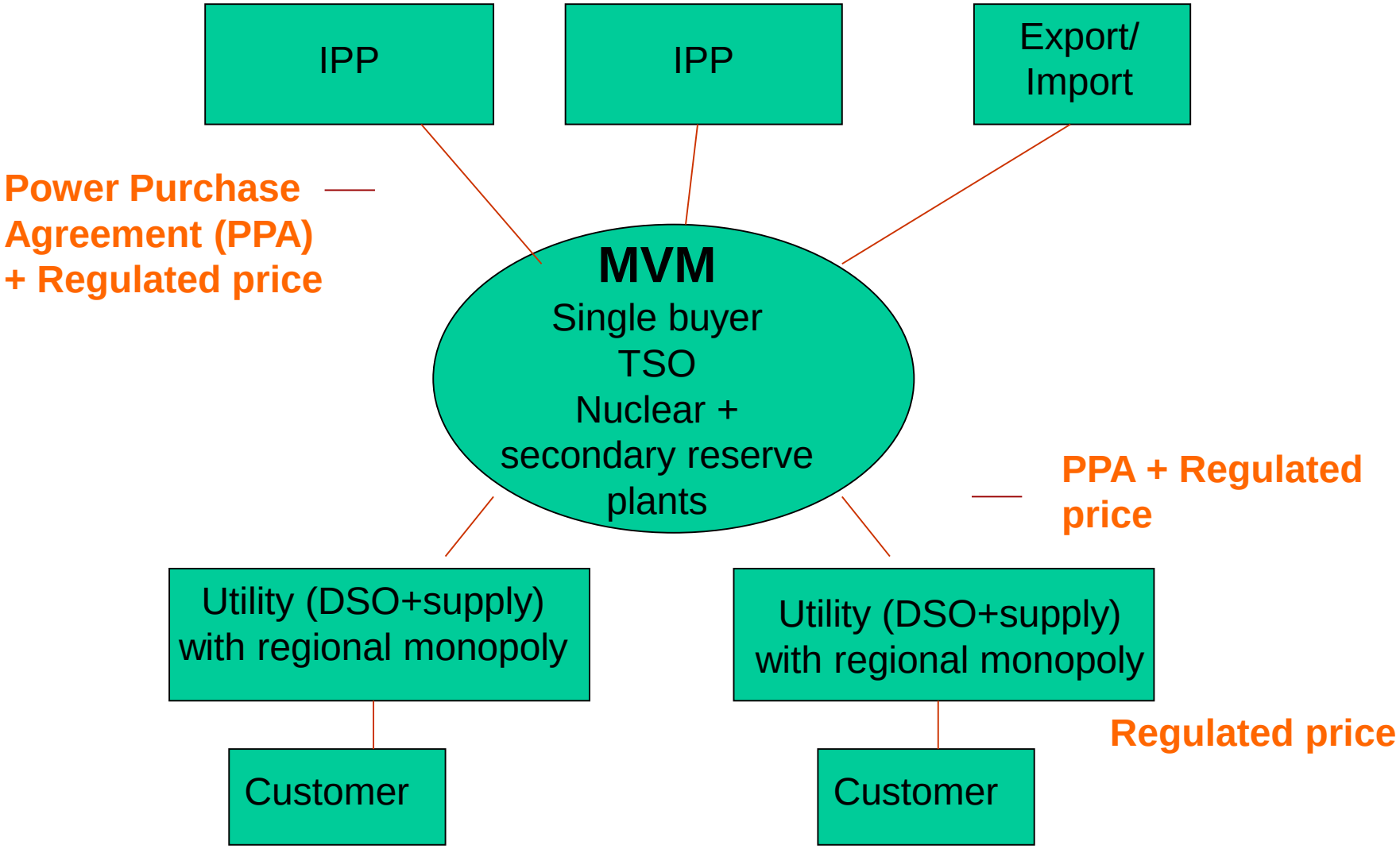

No need for regulated access tariffs to the network!

The first phase of liberalization: the hybrid model in Hungary , 2003 - 2008

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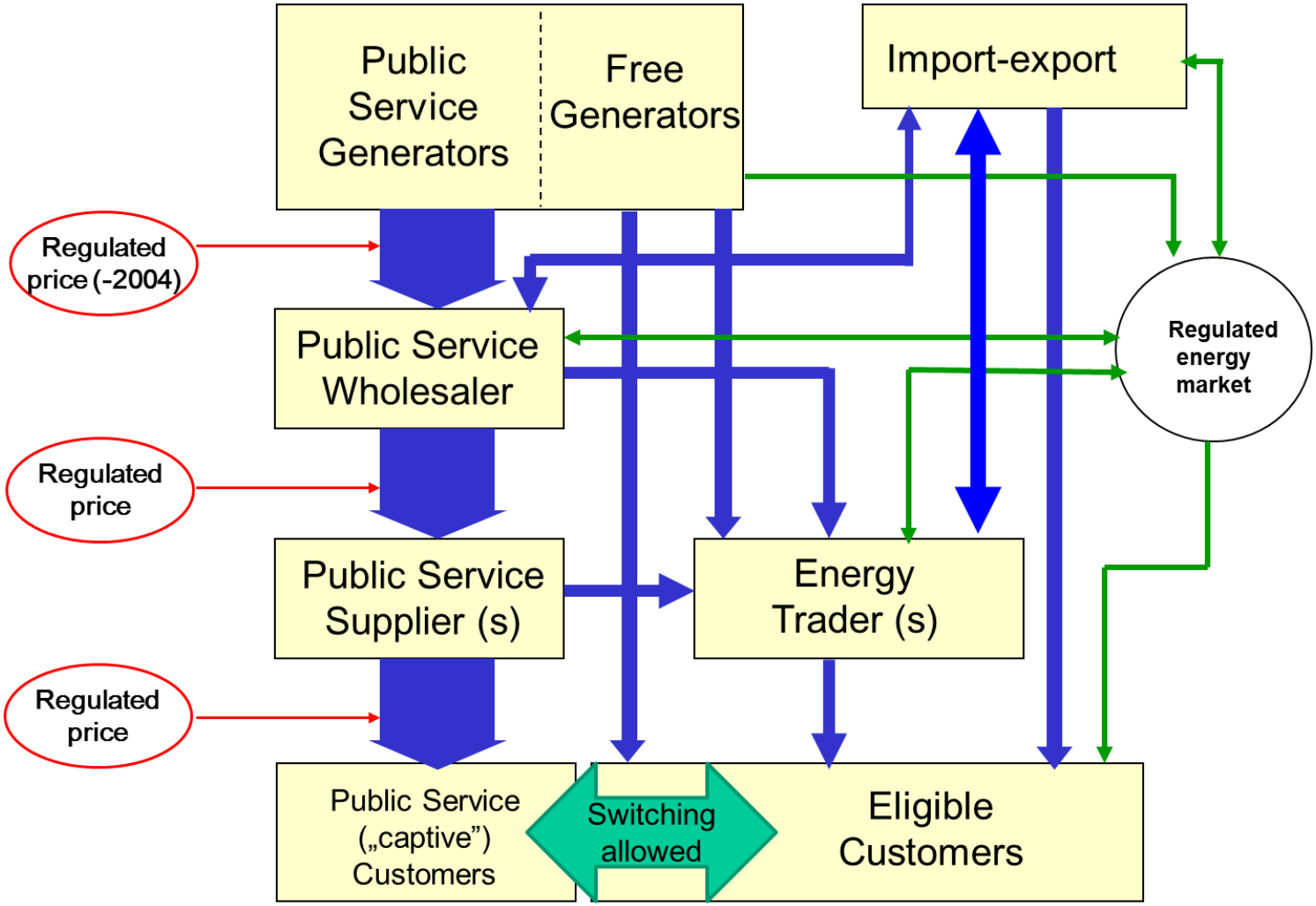

+ Regulated access tariffs to the network!

Hybrid models – the Serbian example 2014

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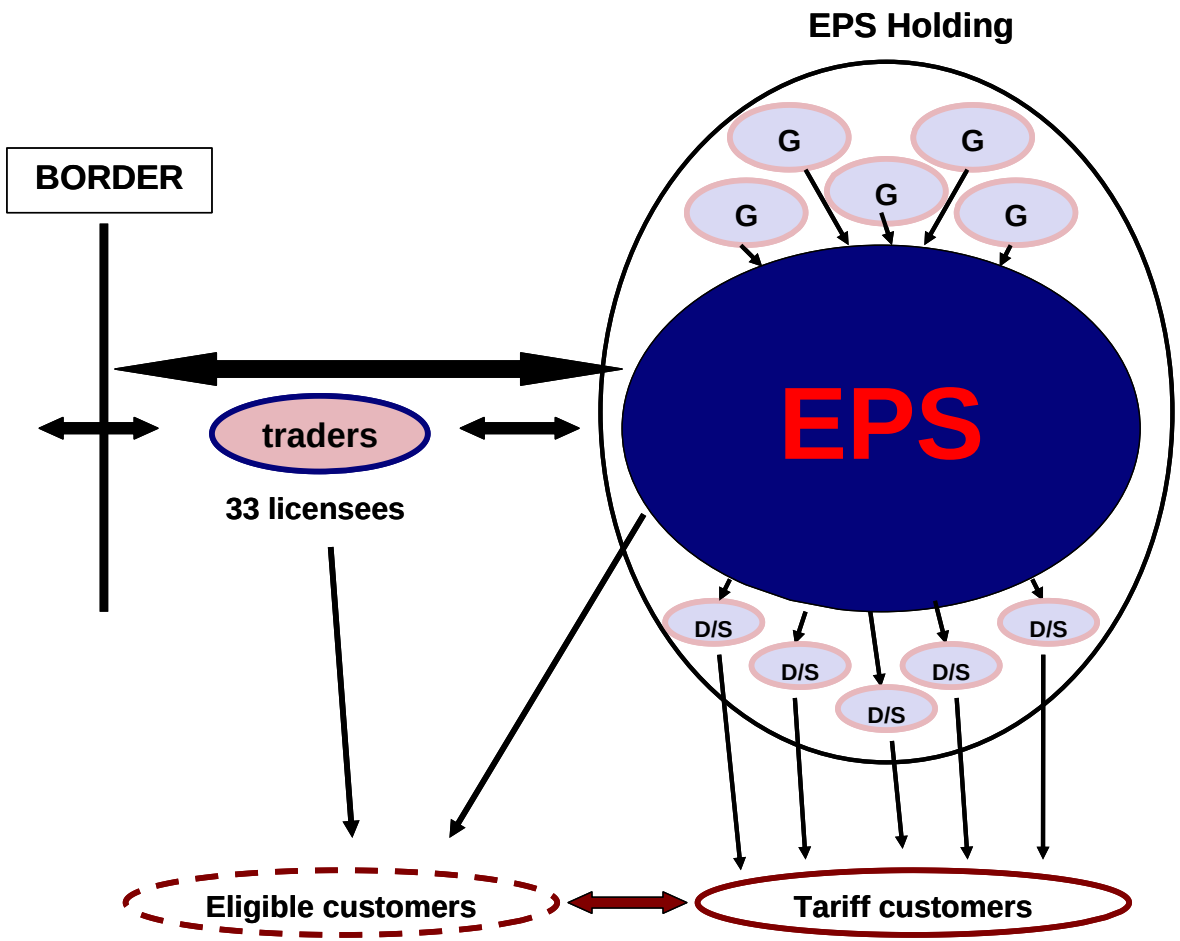

Dominant producer / wholesaler

TPA to transmission

Competing traders, suppliers

TPA to distribution network

Regulated and free priced markets, low cost switching

The present competitive electricity market model in Hungary (since 2008)

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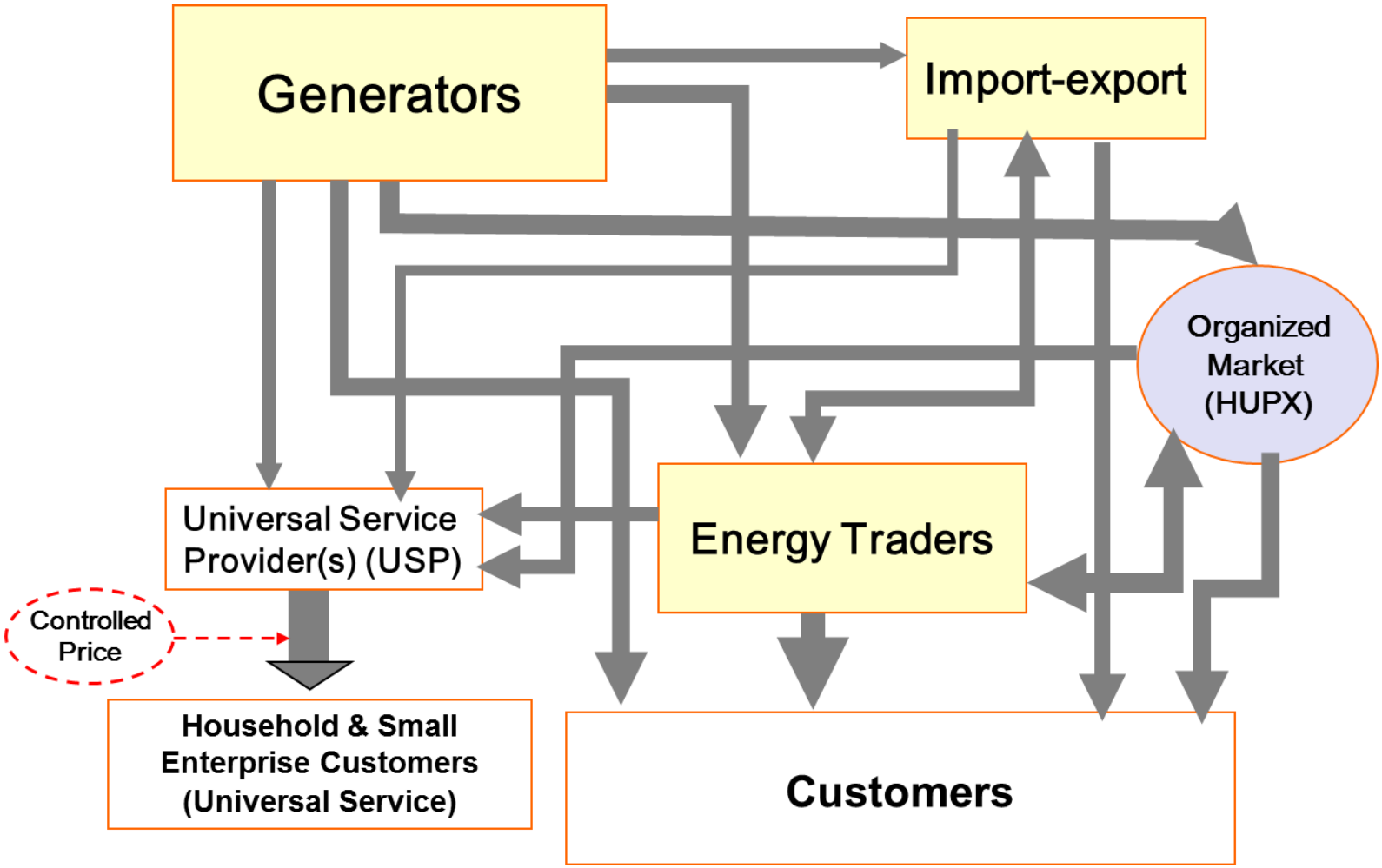

+ Regulated access tariffs to the network!

End-customer price formation under full retail competition

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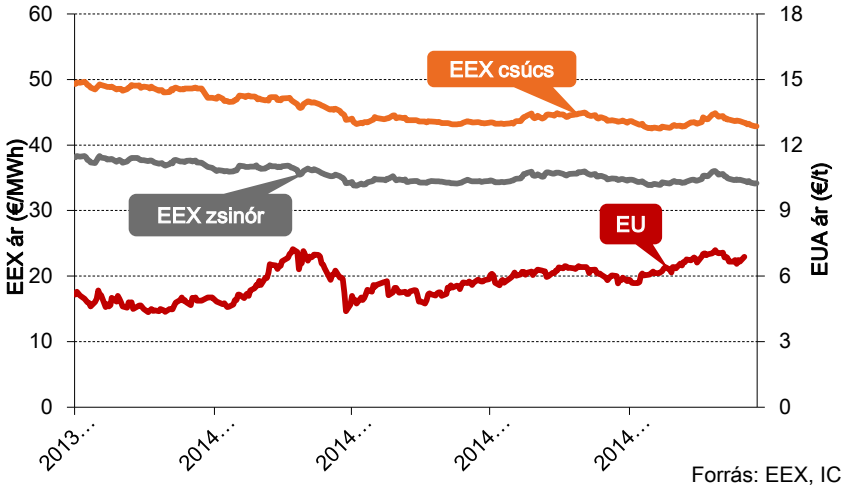
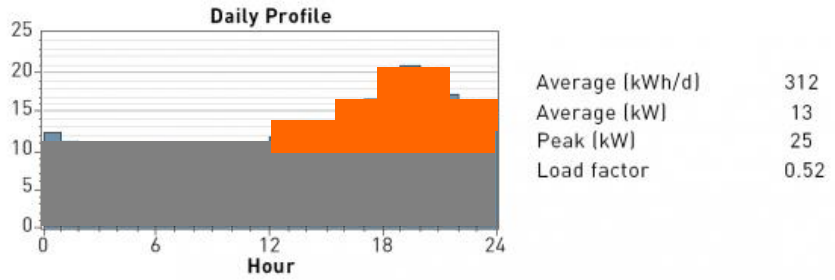
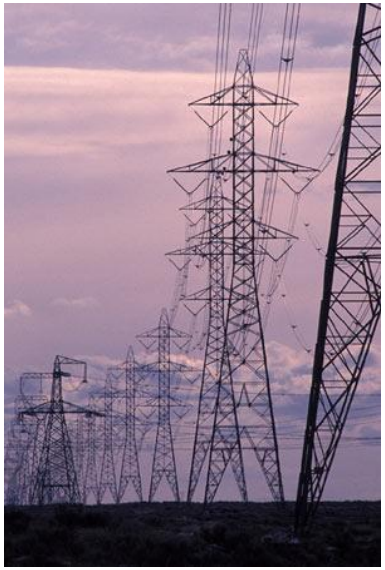


Forrás: EEX, IC



product (market determined)

+



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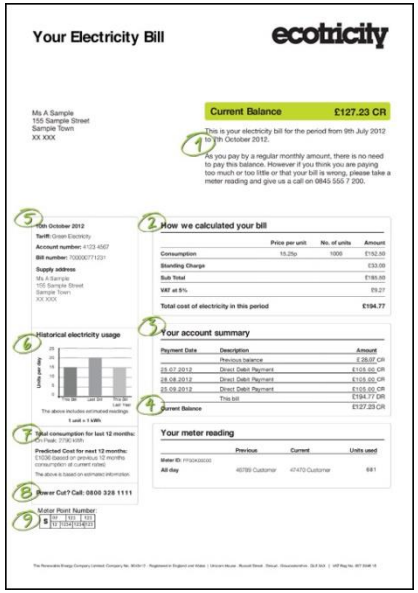

system use charges (regulated)

Variations in retail electricity tariffs (EU)

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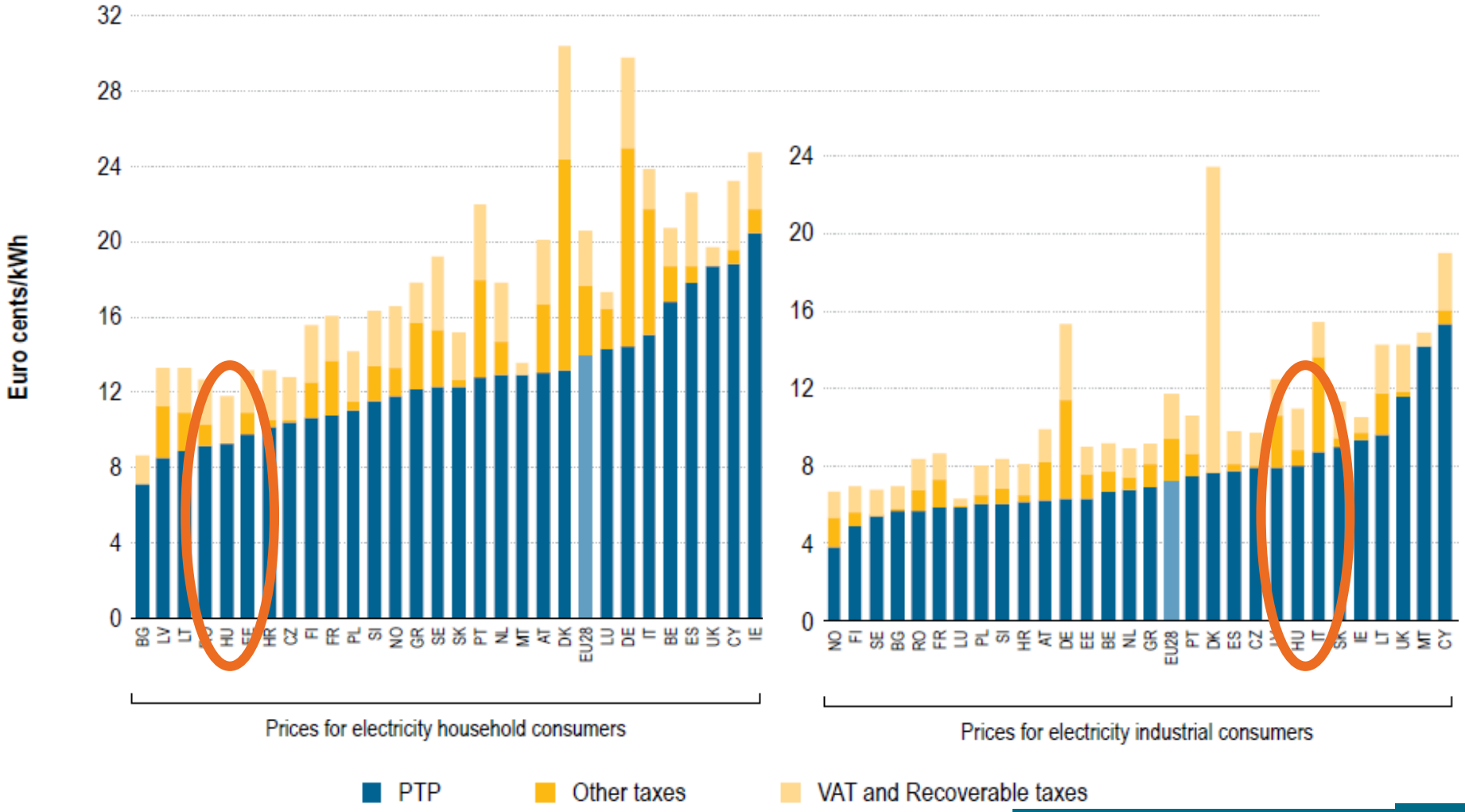

Source : ACER MMR 2015

Structure of retail electricity tariffs in the EU

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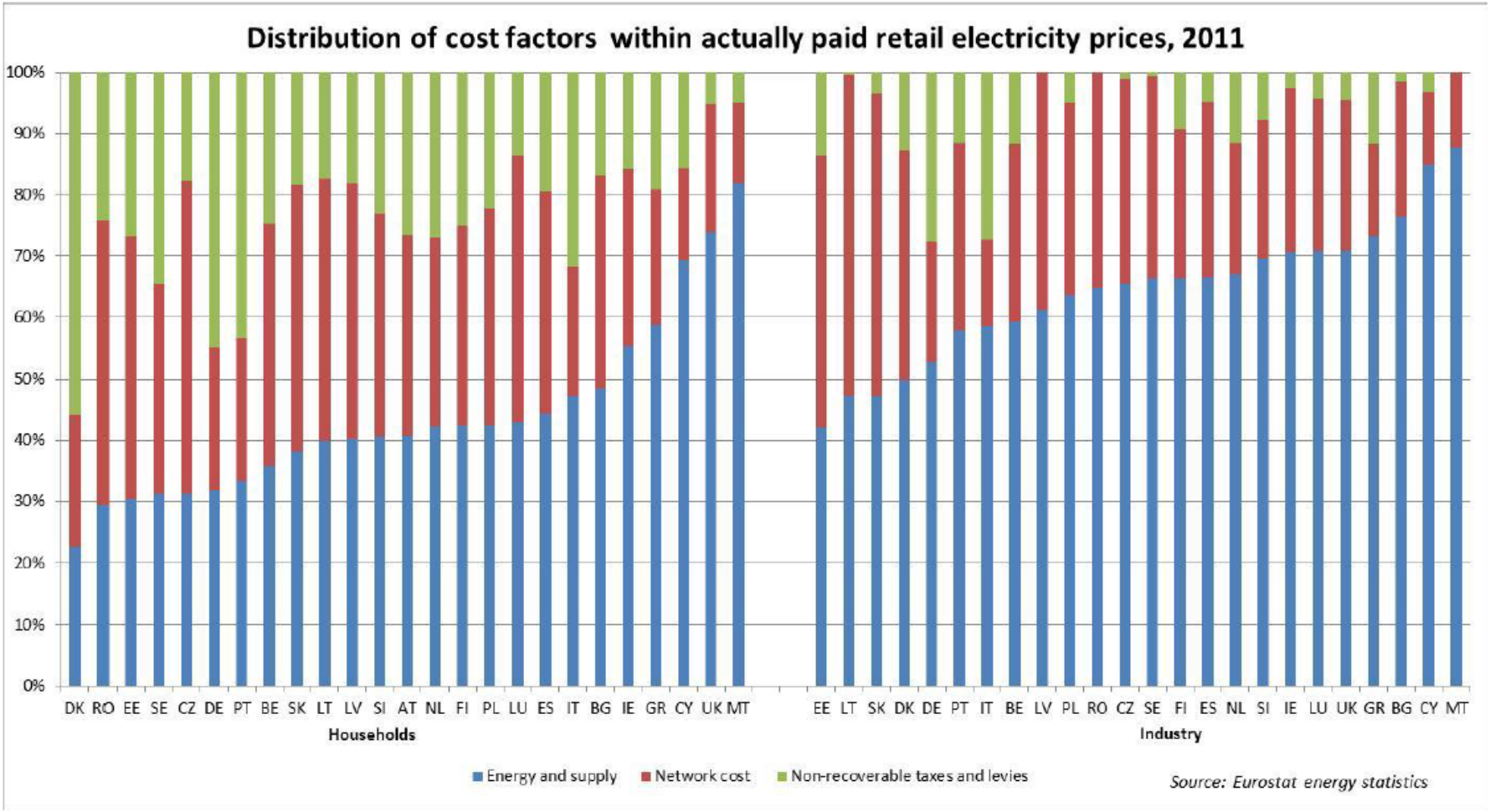
Figure 33: Distribution of cost factors within actually paid retail electricity prices, 2011



Major impacts of competition and regulation on retail tariffs

6. Independent sector regulator: like a good referee

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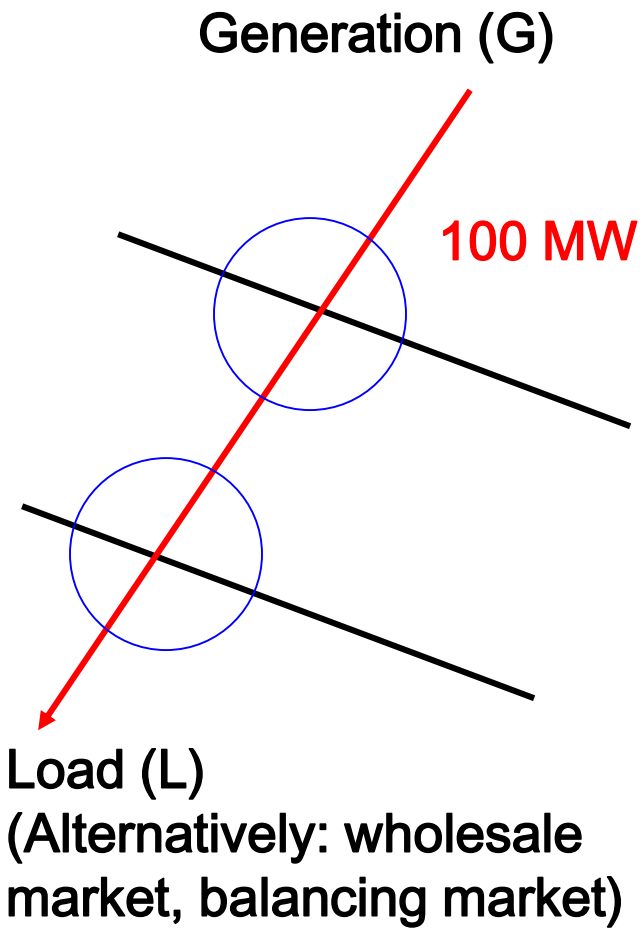
- Knows the rules
- Main tasks are regulating network access, price setting and market monitoring
- Independent, responsible and credible decision making
- Transparent operation
- http://www.iern.net

IERN
INTERNATIONAL ENERGY REGULATION NETWORK

„The transparent and predictable behaviour of a regulator is a precondition of a sustainable energy market under privatized, unbundled and liberalized industry conditions" (1st WFER, Rome)

7. Cross-country market integration – the idea



PRECONDITIONS:

- G free to schedule
- Access to local grid
- Access to interconnection
- Trading service available
- L is free to contract
- Access to balancing
- No foreclosure on target market
- One-stop shop

Issues to consider

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- The region is undergoing the market opening process and at the same time tries to increase RES deployment to meet its targets – a double challenge.
- Prices are kept low for end consumers – bringing further challenges to the region.
- The low price environment in Europe gives opportunities to the sector, but financing projects in generation and transmission remains difficult.

Thank you for your attention!

WWW.SEERMAP.REKK.HU