The EU Energy Market
a general introduction
The Content

- Short introduction
- The EU framework
- Tariff regulation
- The ENTSO’s and the Codes
- The market
- The new challenges
- Where are we now?
Short Introduction

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The Value Chains

Generation

Production  System operation

Transmission

Regional distribution

Supply
(billing, customer services)
Various models for competitive gas & power systems

Model 1: Monopoly
Model 2: Single buyer
Model 3: Wholesale competition
Model 4: Retail competition

Sector becomes more like any other commodity industry
But:
• More complexity, regulation, IT infrastructure, etc
• More structural change required
Discussion confused, mixed-up terminology

- Privatisation: Sale of public companies to private investors
- Restructuring: Changing utility structure to create competitors or to unbundle steps of the value chain
- Open, non-discriminatory access: Enable all companies to use the essential facilities of transmission and distribution
- Deregulation: Ceasing to regulate parts of the sector, such as opening up of supply franchises
- Liberalization: Allow “captive” customers to choose supplier
- Re-regulation: Develop rules required for customer choice in an effectively functioning competitive power industry
The EU framework

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Rethinking & re-inventing government ('80’s)  
[Reagan, Thatcher, Delors....]

- Why not for public services & utilities?
  - Telecom, airports, railroads
  - Gas & electricity
<table>
<thead>
<tr>
<th>Year</th>
<th>National Legislation</th>
<th>National Regulation</th>
<th>EU Directive etc.</th>
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<td>2007</td>
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<td>Third Energy Package (3rd Electricity and Gas Directives); Establishment of ACER</td>
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Directives 2009/72&73/EC, The Third Package:
- Mandatory market opening
- PSO & consumer protection
- TSO unbundling-options
- DSO legal unbundling
- RTPA for grids
- Independent NRA’s

National implementation:
- subsidiarity
- limited role EU Commission

Regulations:
- Cross border trade electricity
- Gas grids
- ACER

Note:
unbundling networks is key issue in order to secure non-discriminatory third party access
National / EU Interaction

EU Level

Council of European ministers

European Commission

Co-decision

European Parliament

National Implementation

NATIONAL LEVEL

1 . . . 27

National Regulatory Authorities

ACER

CEER
Unbundling TSO,

- Not sufficient in 2nd package:
- Choose between OU (ownership), ISO (independent system operator) and ITO (independent transmission operator)
- ITO:
  - Independent network operator, MS appoints
  - Full commercial and technical management TSO
  - Conformity programme & agent
  - Mgt-personnel not from commercial functions (3 years before, 4 after)
  - Reg. approval all contracts ITO-VIC

So: ITO= legal unbundling 2nd directive, specified and detailed
What are the options?

- Full OU of TSO
  - No incentives to discriminate
  - Externalities new power plant vs new network

- ISO
  - Split TO and SO
  - TO can stay at VIU
  - SO: ‘independent’

- ITO
  - “independent TSO”
  - Detailed & complex relation
Ongoing restructuring, incl. unbundling, cb-ownerships

More CB-cooperation (auctions-CASC, operational security-Coresco, TSC)

ENTSO-roles strengthening (?)

On the way towards an EU-ISO?

Joint cooperations:
- 17 TSO’s in gas, coordinated CB auctioning
- 7 e-TSO’s in CASC
- Coresco, TSC
Consumer rights

- Switching (<3 weeks)
- Compensation schemes
- Disputes/ombudsman
- Transparency
- Smart meters

Some messages on consumer issues

- Consumers must get the best choice, price and quality from energy suppliers. Competitive markets can deliver this.
- Customers should be empowered in the market rather than protected from the market.
- Protecting vulnerable customers is necessary in a competitive market.
- Protecting vulnerable customers should not be confused with regulated end-user prices.
- Artificially low regulated end-user prices are a big obstacle to supplier switching.
- Regulated end-user prices are distortionary and should be abolished or brought in line with market conditions.
- Everyone wins with energy efficiency.
- Energy consumers’ rights must be reinforced and implemented.
- Better information and more ease of switching empower consumers.
- Supplier switching process must be easy, fast and free.
- A sound EU energy framework with strong, independent national regulators and an EU Agency for the cooperation of regulators acts in the EU consumer’s interest.
The NRA’s

Designation of a single national regulatory authority
- Legally and functionally independent from any other public or private entity, budgetary autonomy…..
- Clear mandate to cooperate at European level
- Enhancing statutory duties and powers

Regulatory mandates & Mission

- Ensure non-discrimination, effective competition, efficient functioning, monitoring in particular…..
- Ex ante fixing/approving at least methodologies for network use, both technical and financial
- Statutory powers: binding decisions, imposing penalties etc.
- Handle consumer complaints & dispute resolution
- Assure well-functioning competitive energy market
- Guarantee efficient management regulated (network) activities

Best practice summary: CEER website
ACER, focus on CB-issues:

- Assess & advise on proposed network codes
- Idem on Infrastructure-plans
- Supervise regional TSO-cooperation, new interconnectors
- Ensure compatibility bordering regulatory frameworks
- Settle conflicts in cross-border access-issues

But:

- No clear mandate in setting the codes: EU-Commission
- No clear mandates in regulating regional markets
- Governance via a 27 member Regulatory Board

CEER:

- Council of European Energy regulators
- 27 EU-members + Norway, Iceland
- NRA-initiative
- Develop best practices
EU Regulation & Competition

- Ex post
- General oversight
- Prohibition of cartels and abuse of dominant position
- Merger control
- Rest: freedom for companies

- Ex ante
- Sector specific
- Monopoly tariffs based on efficient cost
- Licenses, monitoring, ...
- Frequent interaction with sector
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### Tariffs:
- Regulated, NRA:
  - Network tariffs, efficiency = key
    - RPI-X
- HH-Consumers:
  - Setting?
  - Monitoring?
  - EU-Directives assume no regulation, but market-based pricing; however.....

### Prices:
- Market-based, competition
- Power
  - Spot-based, merit order
  - PPA’s......
- Gas
- Oil price indexation
  - Spot pricing

### Consumers are paying:
- Energy component, leading in gas (80/20)
- Network component, strong in power (30-40%)
- Taxes, many national differences (energy, VAT)
Energy Price Breakdown

Residential Electricity

Source: Energie Control Austria and VaasaETT (Prices as of August 1st, 2012)
Transmission electricity, many differences in the MS’s, downward trends?

Downward trends in costs...... note some major regulatory charges
Variability of gas prices has risen

Variability of electricity prices has fallen

Source: Eurostat
De-indexation in Germany 2002-2011

...and gas market designs

Hub prices are converging

Thanks to P Noel
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European Network Transmission System Operators

- GTE becomes ENTSO-G: formalised institution
- ETSO becomes ENTSO-E: formalised institution
- Develop binding network codes (interoperability, operational procedures, emergencies)
- Develop 10-yr infrastructure plan, incl. cross-borders

A pan-European vision on the future of the grid, non-binding, complementing regional and national Plans. Coordinate investment, harmonise planning, resource optimisation. Input from national plans. ACER to give opinion and to monitor implementation with ENTSO. Financing of investments: mainly national
Network Codes for CB-flows in Gas & Electricity
Entso’s to draft, guided by Framework Guidelines.

FG’s:
- cover main lines, technical/operational, market, Infrastructures and tariffs
- ACER to draft the FG’s, after stakeholder consultation

Commission to request ENTSO’s to draft the codes.
ACER to verify compliance with FG’s, Commission to decide via comitology
Codes become binding.....
The market

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Wholesale markets
Retail markets
Market integration etc.

Many markets still concentrated:
10 countries showed an increase in 2008

Market opening brought new opportunities

Number of EU Member States in which the largest power utilities operate, 2010

Source: Platts 'TOP 250 Global Energy Companies, company websites
Market & price coupling in electricity: efficient competitive wholesale markets

- PCR becomes the rule of the game
- Bringing (spot) price convergence
- Enhancing effective cross-border trades

- The coupling of the CWE day-ahead market since November 2010 saw mostly smooth sailing, with prices converging 66% of the time, on average, over the year, according to APX-Endex.
- “We’ve seen a general upward drift in volumes, pricing is generally less volatile and we’re seeing quite high degrees of price convergence,” says Andrew Claxton from APX-Endex.
The gas market issue is more complicated, partly due to the introduction of E/E zones (?)
Impressive growth of hub-traded gas volumes.....
…lessening domination of oil-indexed price contracts

![Bar chart showing wholesale gas price formation mechanisms in Europe (as share of consumption)]

Source: 2009 International Gas Union Survey.
...and contributing to lower average wholesale gas prices

But some say, it is not enough
Room for more competition in retail power markets?

Retail-market competition lagging behind.....
Customer switching, large differences across the EU

Consumers to blame, or the suppliers....?
The new challenges

- 10YNDP’s
- EU Infra Package
- SoS, System adequacy
- Road Map 2050

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New investments in Infrastructure

Needed:
• for meeting bold RES-objectives
• for enhancing further interconnections, for gas-imports, for system adequacy, security of supply
• But:
  • Unbundling barriers?
  • Regulatory risks, Low ROI’s
  • Lack of international (regulatory?) coordination

Energy Infrastructure Package

- Identification of PCIs – general criteria
- Permit granting - measures
- Measures to facilitate the implementation of projects of common interest
- Regulatory framework - measures

Regulation on guidelines for trans-European energy infrastructure
The ENTSO’s 10YNDP’s

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<th>Pipes</th>
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<td>10^6 €</td>
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<tr>
<td>10^6 €</td>
<td>3 570</td>
<td>6 614*</td>
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</table>

(*): some project sponsors have not submitted costs

Some € 200 bn in investments

> 100 projects, 51 500 km, approx. €104 bn of investments

1.3% per year grid length development despite a major upcoming shift in generation mix to accommodate wider, stronger, more volatile power flows

The incentivisation of TSOs to deliver valued investments on time needs a European re-think

The ENTSO’s 10YNDP’s
Security of Gas Supply

Securing Gas Supplies in 2050: how much is needed?

EU Regulation 994/2010 complements 3rd internal energy market package

- Functioning IEM - best tool to secure supplies
- Investments/interconnections - opening of markets/diversification
- Cross-border co-operation - coherence at Union level, regional co-operation and solidarity
- Transparency - informed decisions by gas undertakings and crisis-response at national/Union level
80% domestic reduction in 2050 is feasible
- with currently available technologies,
- with behavioural change only induced through prices
- if all economic sectors contribute to a varying degree & pace.

Efficient pathway:
- 25% in 2020
- 40% in 2030
- 60% in 2040

Almost doubling its share in final energy demand to 36-39% in 2050
Energy intensity (=primary energy/GDP) drops by up to 2.7% p.a.
Achieving at least 55% in gross final energy consumption in 2050, up 45 percentage points from today's level at around 10%
Large investments needed - cumulative grid investment costs alone could be 1.5 to 2.2 trillion Euros between 2011 and 2050

The Energy Roadmap 2050
Figure 18: Illustration of the key components of an offshore grid: In the Deep [left] and Grand Design [right] [source: Huertas Hernandez et al., 2011]
Our Success?

What needs more to be done
Our successes

- **The legal case:**
  - Market opening went fast
  - Standardisation of industry structures and rules
  - Strong support EU Commission (directives, sector enquiry)

- **The market case:**
  - Increased (CB-) trading
  - Impressive labor productivity gains
  - Some price falls, price convergencies

Challenges to reform

- **The market**
  - (Gas) price divergencies
  - Continuing/increasing market power

- **Social cost/benefit?**
  - Consumers expecting lower prices all over?
  - Profits energy firms continuing
  - Unclear political impacts.....

- **Remaining issues**
  - Retail competition per se
  - Competition in the gas market
  - Security of supply agenda
  - Climate change policy; triple 20’s impacts
  - Vulnerable consumers
EU Commission Communication

“Making the Internal Energy Market work” (oct. 2012)

three basic messages:

● Enforcement:
  ● Infringements 3rd package, focus on unbundling
  ● Only 25 TSO’s in 11 MS’s are certified

Where to go now?

● Concentrated generation markets; investments too much driven by subsidies
● Focus on competition (i.e. Gazprom case)
● Best practice exchange (vulnerable) consumer protection

● Consumer disengagements
  ● Increase awareness, switching, savings, energy services, market pricing, smart metering……
  ● Quit regulated HH-consumer pricing

● Flexible & smart energy system
  ● Market based, rewarding supply/demand flexibility
  ● Warning word on capacity markets; coordinate at EU-levels!!
www.clingendael.nl/ciep
The Internal Energy Market: Back-ups
GAS: From field to end user:

- a complicated political and economic process to fit the value chain pieces together

- Gas value chain in Europe and Asia covers more than one jurisdiction
- At every step both companies and governments must come to an agreement
- Management of risks and benefits has changed dramatically in the past decade
- Security of transit a joint interest between supplier and consumer
- Pipeline supplies create long term relationships along the value chain
- Investments are large
Model 4: Retail competition

- IPP
- Wholesale marketplace
- Transmission wires
- Retail marketplace
- Distribution wires
- Customer
- Choice of supplier for all customers

Energy sales
- Energy flows in same company
Two options

- Ownership unbundling of TSO
  - Network operators cannot be affiliated or be part of a group which is active in supply, generation and production.
  - Minority stakes in both supply and network companies are allowed

- Independent system operator (ISO)
  - Second best approach: MS allowed to derogate OU if ISO is designated
  - Transmission assets may stay in vertically integrated company
  - Technical and commercial operation ISO
  - ISO has say on investment decision
  - ISO fully independent from supply or production.
What is an ISO?

- **Core task of an ISO**
  - System management:
    - Operational studies
    - Procurement analysis
    - Balancing call-off
    - AS Procurement
    - Real-time dispatch
  - Commercial:
    - Revenue collection
    - Agreements
    - Capital plan management
    - Long term statement
    - Customer contracts
    - Demand forecasting
  - Asset ops.:
    - Operational ISO
      - Operational planning
        - Maintenance strategy & asset health analysis
        - Work scheduling
        - Maintenance
        - Physical network ops.
    - Balancing ISO
  - Network development / investment:
    - Deep ISO
      - Strategy & planning
      - Scheme development
      - Procurement / contract management
      - Building mgt, testing, etc.

- **PJM is a „deep ISO“**

Source: the figure relies on Frontier Economics, 2007
Agency for Regulatory Cooperation

- Based on the standard rules and practices for EC Regulatory Agencies
- Headed by an Agency Director
- Separate Board of Regulators
  - To ensure independence of regulators at European level
  - Solely responsible for all regulatory matters and decisions
- own Board of Appeal
- staff of around 40-50 people

- Individual decision making powers for specific cross-border issues ("Article 22" exemptions > 2 MS)
- The advisory role to the Commission
Abuse
- LT import contracts
- Inspections (Eon, GdF, RWE)
- Market sharing gas
- Eon settlement?

Mergers
- GdF-Suez
- Eon-Ruhrgas
- Endesa
- ....

Impacts:
- Eon partly OU electricity grid
- RWE partly OU gas grid
- the EdF-case??
- the Suez/GdF case?
- the ENI-initiatives...?
Electricity price breakdowns

2008 figures (EU)
Source: EPRG-group

Many differences, not only taxes
Transmission tariff evolution
European Electricity Rules

1. Electricity directive 2009/72/EC
2. Electricity Regulation EC/714/2009
3. Agency Regulation EC/713/2009

Technical and Operational rules
- System Operation Framework Guideline
- Network Access Framework Guideline
- Connection Framework Guideline
- Balancing Framework Guideline

Market Rules
- Congestion management guideline
- Wholesale market governance guideline
- Forward market network code
- Day-ahead and intraday market code
- Capacity calculation code
- Fundamental data transparency guideline
- Reporting and record keeping guideline
- Tariff harmonisation code
- Investment incentive guideline
- ITC guideline

Investment and tariff rules
- Load-frequency control and reserve power code
- Operational principles code
- Operational planning and scheduling code
- Requirements and operating procedures code
- Communication infrastructure code
- Data exchange standards code
- Access code
- Connection code
- Balancing code
- Capacity allocation and congestion management Framework Guideline
- European Tariff Framework Guideline
Florence and Madrid Fora

Public & private participants:
- EU Commission & presidency
- governments & regulators (CEER/ERGEG)
- TSO’s (ETSO), producers, traders, suppliers, consumers

No formal status consensus & voluntarity based
Focus on cross border issues, gas, power

The regional markets

The seven ERIs

The three GRIs
Thousands of possible situations and overall social economic welfare assessed via market studies

- 5% of generating costs saved by new interconnection
- Direct connection for 125 GW RES
- -170 Mt/y CO₂ emissions savings
Towards the Internal Electricity Market

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* MIBEL, Hungary, Slovakia, and the Czech Republic are willing and committed to join EPC by end of 2012.
Market opening has favoured investments in new generation capacity
Solar: making the right choices?

The deserts of the earth offer excellent irradiation conditions for large scale solar power generation.
Going offshore…

Wind Power Potential in the EU Regions

Wind Power Potential (m/s * km²)

- 0 - 79160
- 79.181 - 204.546
- 204.647 - 487.852
- 487.853 - 1.031.076
- 1.031.077 - 1.705.408
- No Data

This map does not necessarily reflect the opinion of the ESPON Monitoring Committee.
Evidence on Performance Effects (see Pollitt, 2009a)

  - Strong evidence of productivity improvements
  - Weaker evidence of price benefits
  - Some evidence of price convergence
- These cross-country econometric studies suffer from inability to satisfactorily measure reform as a package.
- Other evidence (e.g. Copenhagen Economics, 2005) shows stronger improvements in leading reform countries at the micro and macro-economic level.
- Comparison to other sectors, esp. telecoms, implies some way to go (Wölfel et al., 2009).
● From regional markets to a single energy market; Mercados study 2010

● Unbundling of EU Gas and Electricity Transmission system operators; 2006 study for the EU Commission

● The effects of liberalisation on employment; study for the EU Commission

● Electricity liberalisation indicators; report by Oxera to the EU Commission, 2001

● EU Commission website on the internal energy market
  http://ec.europa.eu/energy/gas_electricity/index_en.htm

● Liberalising Dutch energy markets, CIEP 2006

● The third energy market package; are we singing the right song? CIEP 2008

● Crossing Borders in EU gas networks; the missing links; CIEP 2009

● A smart EU energy policy, CIEP 2010

● A new EU Gas security of supply architecture; FSR policy brief, 2012


