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# Energy Policies

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**Energy Technologies and Management**
**Short Training Course**
**Venice International University**
**June 30, 2008**

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- Policy Consulting
- Bonn / Germany
- Managing Director: Dietmar Dürr
- Areas of Expertise:
  - Directives, Energy Laws
  - Regulation, Unbundling
  - Emissions Trading
  - Impact Assessments
  - Political Communication

Centre for European Energy Strategy
C.E.R.E.S. sprl

- „Think Tank“
- Brussels / “Heart of the EU”
- President: Dr. Rolf Linkohr MEP
- Areas of Concern:
  - European Energy Strategies
  - European Energy Mix
  - Climate Policy & Poverty
- *„Bringing together decision makers all over Europe“*

## Course Organisation

1. A Brief History of European Energy Policy I:
   From Humble Beginnings to a Shaky Mandate ("thank you Irish")
2. Blackouts & beyond I: Geopolitics of Supply
3. A Brief History of European Energy Policy II:
   Liberalisation Directives 1996, 2003, 2009
4. Unbundling & beyond:
   Forming the Internal Energy Market
   Electricity Regional Initiatives
   Regulation and Regulators
5. Blackouts & beyond II: Capacity & Blackout Prevention
6. Kyoto & beyond: Emissions Trading & Renewable Energies

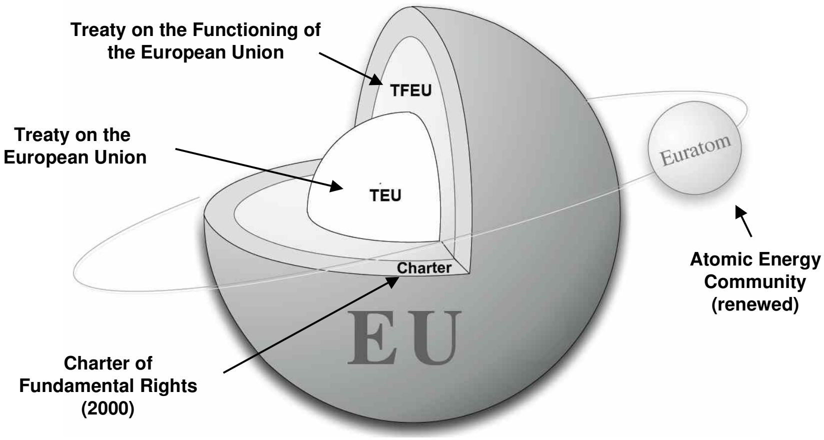
# A Brief History of European Energy Policy I

## From Humble Beginnings to a Shaky Mandate

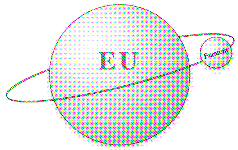
## A Brief History of European Energy Policy

- European Community for Coal and Steel (1952), EURATOM (1957)
- EEC Treaty (Roman Treaties) (1957)
- Treaty of Maastricht (1993): No Energy chapter (!)
- Competencies derived from competition / Internal Market


## The Treaty of Lisbon (Reform Treaty) 200x



# The Treaty of Lisbon (Reform Treaty) 200x

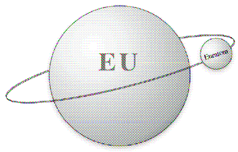



| | |
|---|---|
| **Part 3:** | **Internal Union Policies** |
| Title I | The internal market |
| Title XV: | Trans-European networks |
| Title XIX: | Environment |
| **Part 4:** | **External Union Policies** |
| Title V: | International agreements |
| Title VI: | The Union's relations |

**Energy & Environment:** Shared Competence: Union action supersedes MS competence (if not yet exerted)

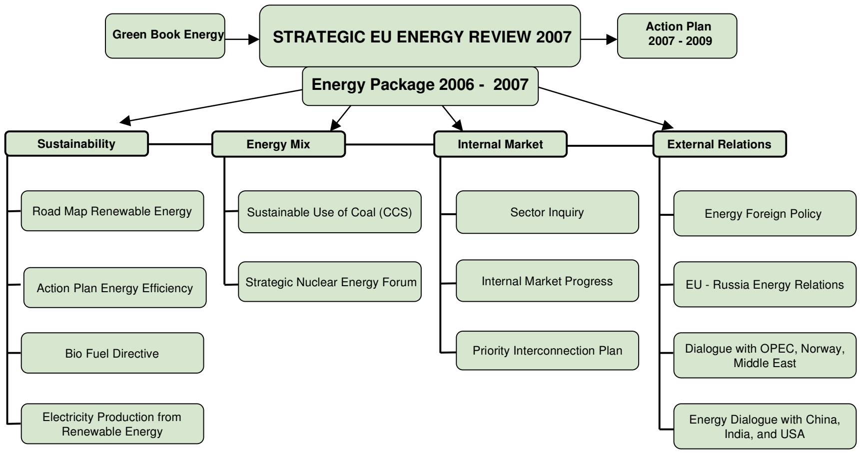
**But:** Rules necessary for the Functioning of the Internal market fall under Union competence (Deregulation et. al.)

# The Treaty of Lisbon: Council Competence




- **Urgent action:** Appropriate measures ... if severe difficulties arise in ... the area of energy;
- **Energy:**
  - Functioning of the energy market;
  - Security of energy supply in the Union;
  - Energy efficiency & saving;
  - Development of new and renewable forms of energy;
  - Interconnection of energy networks.
- **Environment:**
  - Climate Change combat, measures, international negotiations
- **"Service Public":** Mandatory Infrastructure (Energy, Water, Health)

# Strategic Energy Review 2007




# Energy Package of the Commission (2008)

- José Manuel Barroso: *„Milestone in the Energy Policy of the European Union“*, Andris Piebalgs: *„a new industrial revolution“*
- Integrated Energy and Climate Package for the 21st Century

- Energy Package:
  - 3rd Energy Directive: OU / ISO (Third Way, Fourth Option)
  - Joint Energy foreign policy
- Green Package:
  - Renewable Energies (20 percent by 2020)
  - Energy Efficiency Plan (20 percent reduction by 2020)
  - Green Paper Market Mechanisms
- Emissions Trading Directive 2012ff
- CCS Directive

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# Blackouts & beyond I

## Geopolitics of Supply

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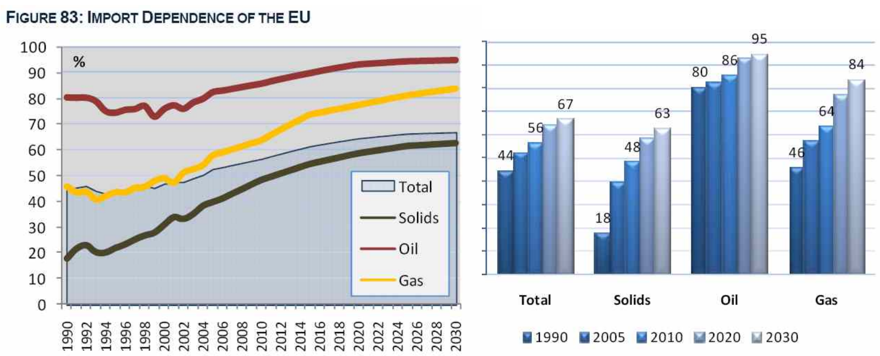
## Import Dependency of the EU

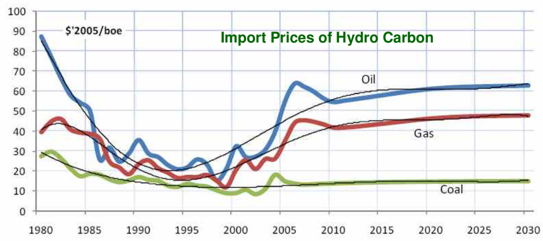



Source: EU Trends

# Import Dependency of the EU

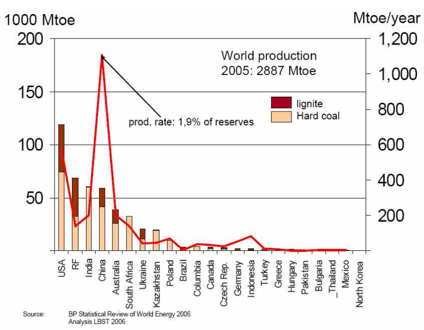
**Annex:** EU gas and oil consumption in 2004 by source

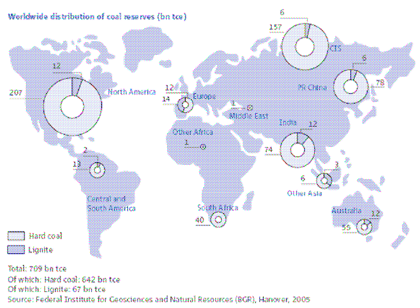
| | GAS | OIL |
|---|---|---|
| Import from **Russia** | 24% | 27% |
| Import from **Norway** | 13% | 16% |
| Import from the **Middle East** | | 19% |
| Import from **Algeria** | 10% | |
| Import from **North Africa** | | 12% |
| Indigenous production | 46% | 21% |
| Other Regions | 7% | 5% |




**Source: EU Commission**

# Coal Reserves & Production



## External Energy Policy

- A clear policy on securing and diversifying energy supplies
- Dialogue with major energy producers/suppliers/transit countries:
  - OPEC and the Gulf Cooperation Council
  - Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan
  - EU-Russia Energy Dialogue (2008)
  - EU-Norway energy dialogue
- Developing a pan-European Energy Community
  - Caspian and Black Sea region
  - South-East European Energy Community
- Dialogue with major energy consumers (USA, China, India)
- Other Initiatives: Libya, Algeria, Syria, Moldavia, Arctic, Nigeria, Africa-Europe Energy Partnership
- [Control of 3rd country investments in the EU critical infrastructure]

## Diversification of Gas Imports

- Diversification of Countries
- Diversification of Pipelines (Interruptions etc.)
- Extension of LNG Terminals
- Intent to bundle EU Demand
- Extension of Gas Storage
- Solidarity on Gas Extension during interruptions [Gas Directive].

# A Brief History of European Energy Policy II

**Energy Market Deregulation & Directives (1996-2009)**

## History of Energy Liberalisation

- Debate ca. 1988/1989
- UK Market Liberalisation 1989ff.
- EU Debate stalled 1995/1996

➲ Cut of the Gordian Knot 20.06.1996

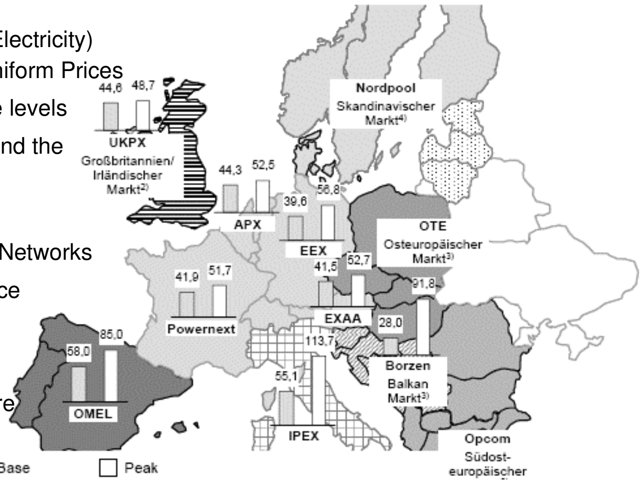
1st Energy Directives: 19 Feb 1997
„Internal Market in Electricity and Gas“

Woes: Different Speeds

Instant Opening: UK, FIN, SWE, DE
Slow Movers: AT, ESP, NL
Late Adopters: FRA, GR, IT

# 1st Energy Directives (19. Feb. 1997)

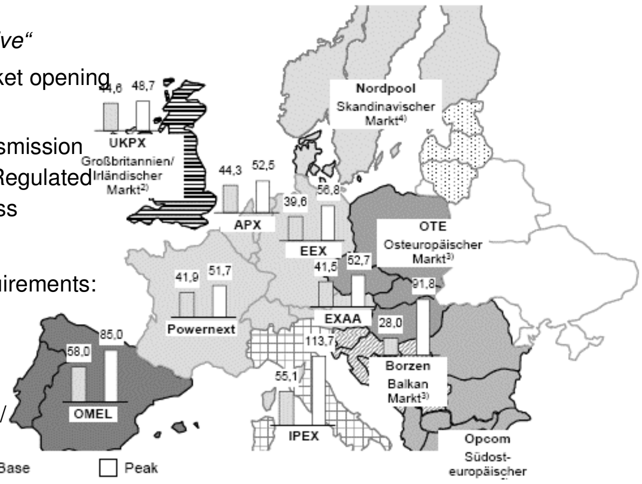
- „Copper Plate“ (Electricity) „Basin“ (Gas): Uniform Prices
- 5 European Price levels
- Price Peaks around the Meditarranean
- <u>Instruments:</u>
- Trans-European Networks
- Freedom of Choice
- <u>Problems:</u>
- Different Speeds
- Market foreclosure (grid access)
- Systems




# 2nd Energy Directives (26. June 2003)

*„Accelaration Directive“*

- 100 percent market opening by June 2007
- Harmonized transmission access system: Regulated Third Party Access
- ERGEG
- Unbundling Requirements:
  - Informational
  - Operational
  - Legal
  - by 2004(TSO)/ 2007(DSO)
- Energy Sources



# 3rd Energy Directives (in progress)

- EU Council: Full Ownership Unbundling / Independent System Op.
- Morgan Report (18-06-2008):
  - Mandatory Full Ownership Unbundling (NO ISO, NO 3rd Way)
  - Energy Consumers Charta
  - National Action Plans on Energy Poverty
  - Harmonised Customer Switching across MS (less than 2 weeks)
  - Price Setting Formulas / Peak Load Reduction
  - Independent Energy Regulators / European Regulator (CEER)
    - Grid Integration / Grid Codes
    - Forming of a European Transmission Grid
    - Cross Border Integration
    - Investment Plans for Grid Infrastructure (Monitoring & Order)
    - Monitoring of Cross Border Trade / Energy Prices
  - Control of 3rd Country Investments

# Energy Directives: System Changes

| | Pre-1996 | 1996 Directive | 2003 Directive | 2008 Directive |
|---|---|---|---|---|
| **Generation** | Monopoly | Authorisation<br>Tendering | Authorisation | Authorisation<br>(Requirement) |
| **Transmission & Distribution** | Monopoly | Regulated TPA<br>Negotiated TPA<br>Single Buyer | Regulated TPA | Regulated TPA |
| **Supply** | Monopoly | Account seperation | Legal Seperation | Ownership (TSO)<br>Legal (DSO)<br>De-minimis-Clause? |
| **Customers** | No choice | Eligible Customers | Industrial (2004)<br>All (2007) | Charta of Energy Users<br>(Energy Poverty) |
| **Unbundling** | None | Accounts | Legal | Ownership (TSO) |
| **Cross-Border** | Monopoly | Negotiated | Regulated | EU Transmission Grid<br>ERI Initiatives (Implicit) |
| **Regulation** | Government Department | Not specified | Regulatory Authority | Independent Regulator<br>& European Regulator |

**Source: Vasconcelos (2004), Update: Dürr (2008). The 2008 (or 2009?) Directive is a work in progress.**

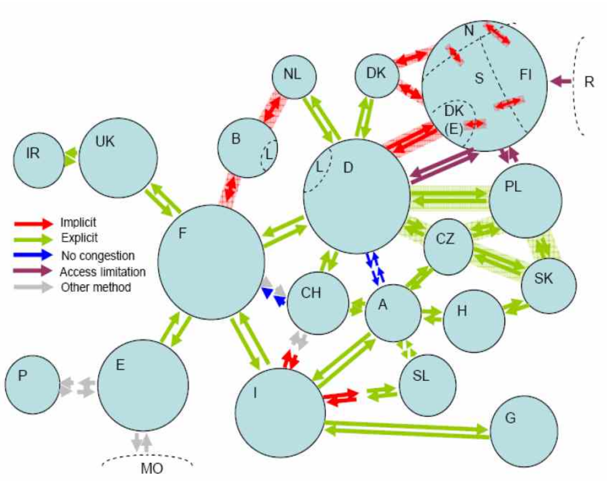
# Unbundling & beyond

## Forming the Internal European Energy Market

## Policy Goals vs. physical constraints

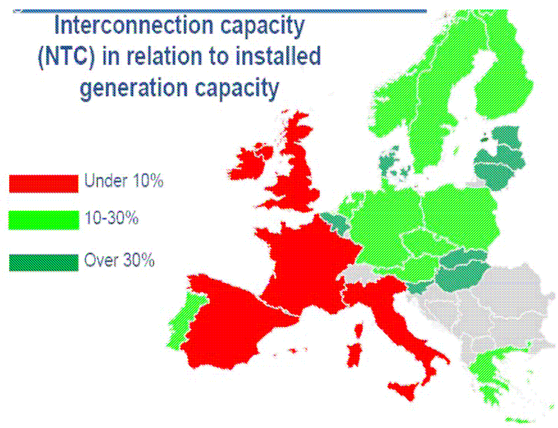
# Day Ahead TM Capacity

- Implicit Auctions
- Bilateral Initiatives:
  F-BE-NL
  D-DK
- Pentalateral Forum
- ERI




**Source:** COM (2007) 250, 15.05.2007

# Bottlenecks



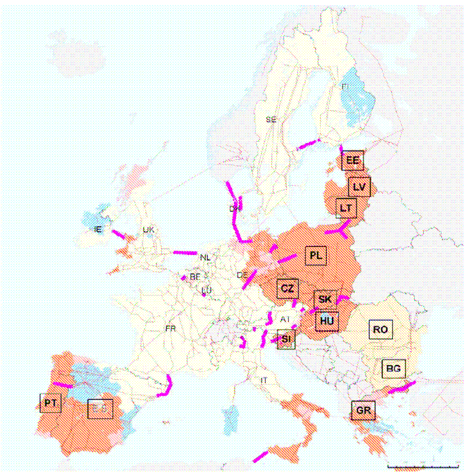

**Source:** ERGEG (2007)

# Interconnection & Market Structure

| | Installed generation capacity (GW)[36] a | Import capacity NTC[37] (GW) b | Import capacity as % of installed capacity b ÷ a | | Installed generation capacity (GW) a | Import capacity NTC (GW) b | Import capacity as % of installed capacity b ÷ a |
|---|---|---|---|---|---|---|---|
| Belgium | 16 | 4.6 | 29% | Estonia | 3 | 2.0 | 66% |
| France | 112 | 14.0 | 13% | Latvia | 3 | 3.6 | 100% |
| Germany | 109 | 12.2 | 11% | Lithuania | 6 | 3.1 | 50% |
| Lux | 1 | 1.0 | 90% | | | | |
| Neth | 20 | 4.7 | 17% | Poland | 34 | 3.5 | 10% |
| Austria | 18 | 4.3 | 24% | Czech R | 16 | 3.5 | 23% |
| Italy | 80 | 6.0 | 8% | Slovakia | 8 | 3.0 | 37% |
| | | | | Hungary | 8 | 3.1 | 38% |
| Portugal | 12 | 1.0 | 8% | Slovenia | 3 | 2.1 | 68% |
| Spain | 56 | 2.2 | 4% | | | | |
| | | | | Greece | 13 | 1.5 | 12% |
| UK | 80 | 2.3 | 3% | Romania | 22 | 3.5 | 16% |
| Ireland | 5 | 0.3 | 6% | Bulgaria | 10 | 2.0 | 20% |
| | | | | Turkey | 28 | 1.9 | 7% |
| Norway | 23 | 4.2 | 18% | Croatia | 4 | 2.3 | 55% |
| Sweden | 27 | 7.8 | 29% | Bosnia | 2 | 0.9 | 45% |
| Denmark | 8 | 4.0 | 50% | Serbia\Mon | 15 | 4.2 | 28% |
| Finland | 14 | 1.9 | 14% | FYROM | | | |

# Priority Interconnection Plan (2007)

- Identification of Bottlenecks
- Prioritisation
- Incentives for extending interconnectors?
- Regional System Operators
- ETSO+/ERGEG+




Projects of European Interest

**Convergence and Competitiveness Objectives 2007-2013**

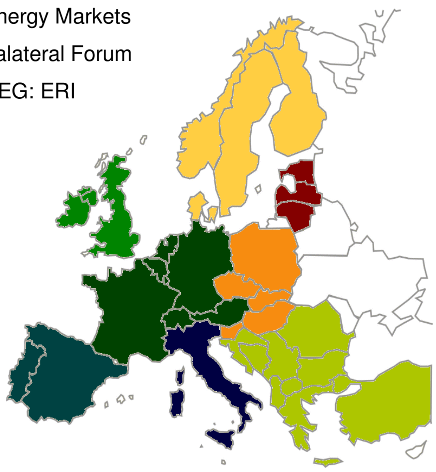
- Convergence Regions
- Convergence Regions (Phasing-out)
- Competitiveness and Employment Regions (Phasing-in)
- PT Cohesion Fund - beneficiary countries
- Cohesion Fund (phasing out)

# Unbundling & beyond

## Intermediate Steps: Regional Energy Markets

## Electricity Regional Initiatives (ERI)

- 2005: XII Florence Forum: Regional Energy Markets
- 2005: Pentalateral Forum
- 2006: ERGEG: ERI



# ERI: Baltic Market

- Estonia
- Latvia
- Lithuania

# ERI: UK & Ireland

- United Kingdom
- Ireland
- France

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## ERI: South-West

- Spain
- Portugal
- France

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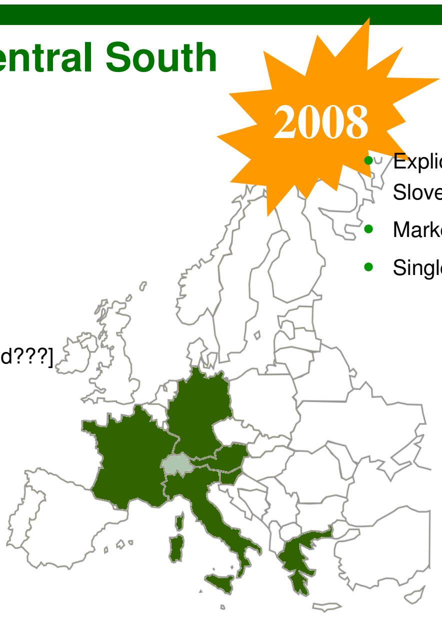
## ERI: Central East

- **Germany**
- Austria
- Czech Republic
- Hungary
- Poland
- Slovakia
- Slovenia

# ERI: Central South

- **Germany**
- France
- Italy
- Austria
- Greece
- Slovenia
- [Switzerland???]



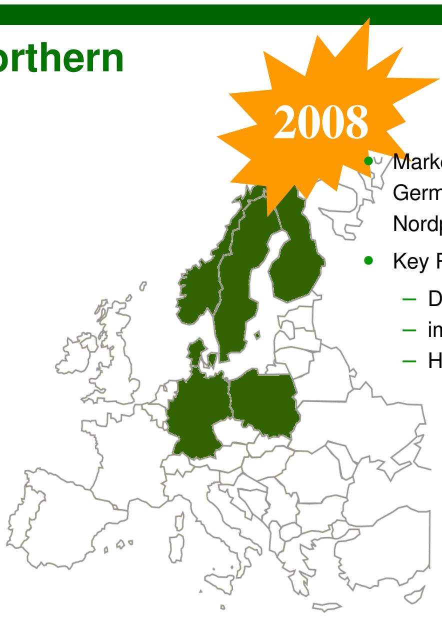

**2007 / 2008**

- Explicit auctions implemented Italy-Slovenia, Italy-Switzerland
- Market coupling “in focus”
- Single auction office considered.



# ERI: Northern

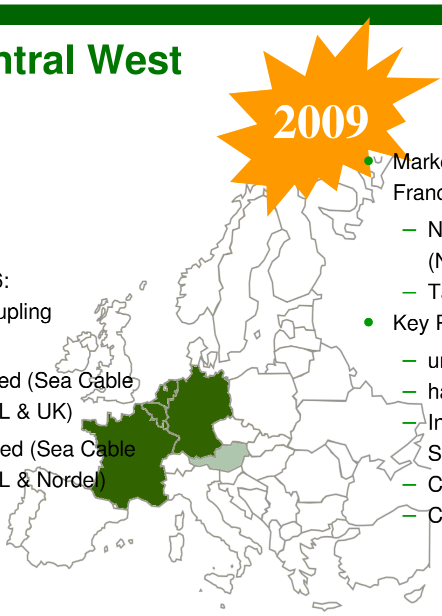
- Germany
- Norway
- Sweden
- Finland
- Denmark
- Poland




**Target 29 SEPT 2008**

- Market Coupling between Germany and Denmark (Link to Nordpool
- Key Provisions:
  - Day ahead market coupling
  - implicit auctions (daily)
  - Harmonised IT systems

## ERI Central West




- Germany
- France
- Benelux

- 21.11.2006: Market Coupling Benelux
- 2009 BritNed (Sea Cable between NL & UK)
- 2010 NorNed (Sea Cable between NL & Nordel)

**MoU (06.06.2007)**

- Market Coupling of Germany, France, Benelux (Austria)
  - Northwest European Platform (NWE MPP)
  - Target: 1. January 2009
- Key Provisions:
  - uniform auction
  - harmonised trade
  - Introduction of a Regional System Operator (RSO)
  - Capacity Management
  - Cross border regulation



# Unbundling & beyond

## Regulation & Regulators

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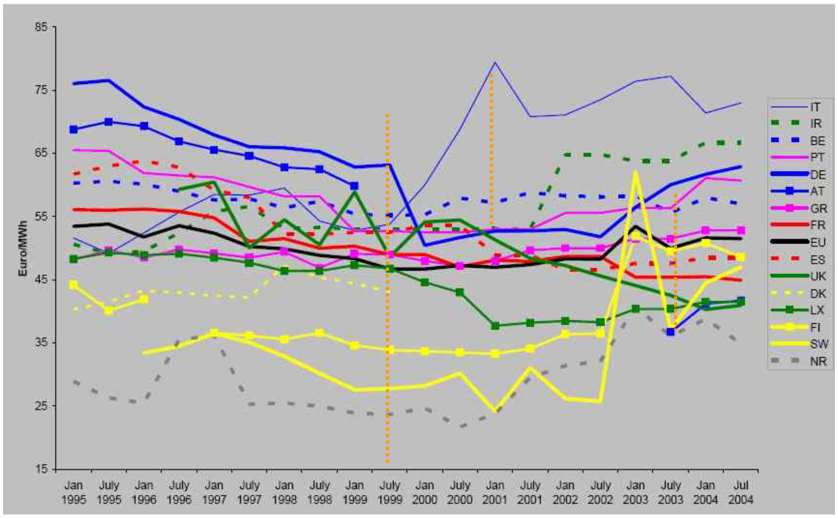
# Electricity Prices Large Industrial (24GWh)

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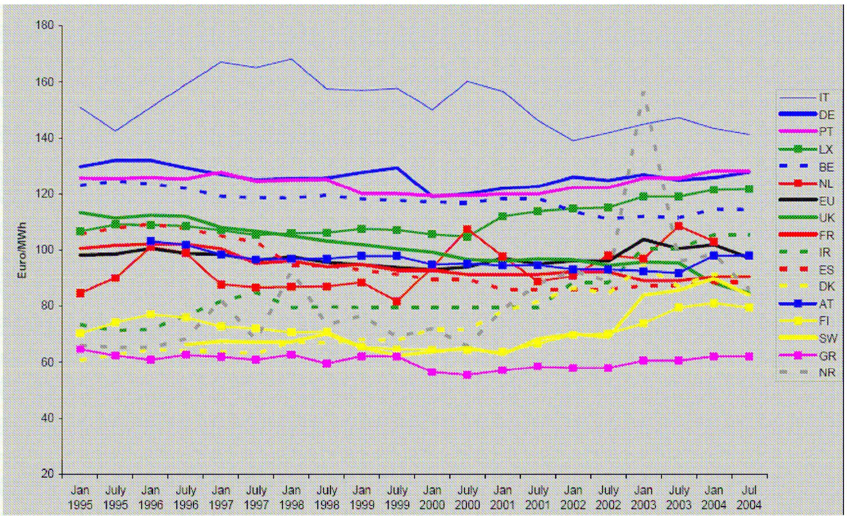
# Electricity Prices Households (3.500 kWh)



# Presence of international companies

| Company | Electricity: LARGEST | Electricity: OTHER SIGNIFICANT | Gas: largest | Gas: OTHER SIGNIFICANT |
|---|---|---|---|---|
| Austria | VERBUND | RWE, EON, EDF | OMV | GDF, RWE |
| Belgium | E-BEL | EDF, ESSENT, NUON, CENTRICA | DISTRIGAS | ESSENT, NUON, CENTRICA |
| Denmark | ELSAM | E2, VF, EON | DONG | |
| Finland | FORTUM | VF, EON | GASUM | |
| France | EDF | E-BEL, ENDESA | GDF | TOTAL |
| Germany | RWE | EON, VF, EDF | EON | WINGAS, RWE, EXXON, SHELL |
| Greece | PPC | | DEPA | |
| Ireland | ESB | NIE (Viridian) | BGE | RWE |
| Italy | ENEL | E-BEL, ENDESA, EDISON, VERBUND | ENI | EDISON |
| Netherlands | E-BEL | ESSENT, NUON, EON | SHELL | EXXON |
| Portugal | EDP | ENDESA | GDP | |
| Spain | ENDESA | IBERDROLA, EDP, ENEL, UNION FENOSA | GAS. NAT | BP , IBERDROLA, CEPSA |
| Sweden | VF | EON, FORTUM | EON | DONG, |
| UK | | EDF , EON, RWE, CENTRICA | CENTRICA | SHELL, EXXON, BP, EON, EDF, RWE |
| Poland | BOT | PKE, PAK, E-BEL, EDF | PGNIG | |
| Czech R | CEZ | RWE, EON | RWE | EON |
| Slovakia | ENEL | TEKO, RWE, EDF, EON | SPP (GDF, EON) | |
| Hungary | MVM | EDF, EON, RWE | MOL | GDF, RWE, EON, ENI |
| Slovenia | HSE | | GEOPLIN | |

source: DG TREN estimates

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# Incentive Regulation in Europe

| | System | Bench-mark | Tariffs | Ex-ante / Ex-post | Regulator | # |
|---|---|---|---|---|---|---|
| DE | Revenue Cap | DEA et al | 5 yr | Ex-ante | BNetzA | 380 |
| UK | Revenue Cap RPI-X | DEA et al | 5 yr | Ex-ante | Ofgem | 302 |
| NL | Price Cap | DEA et al | 5 yr | Ex-ante | DTe | 55 |
| NOR | Revenue Cap | DEA et al | 5 yr | Ex-ante | NVE | 33 |
| A | Price Cap | DEA et al | 3 yr | Ex-ante | E-Control | 60 |
| S | Cost Plus | Model Net | annual | Ex-post | Energiemyn-digheten | 42 |

Source: DG TREN 3rd Benchmarking Report, 2004

# Quality Regulation in Europe

| Land | Quality Compound | Bonus / Malus | Generation Capacity |
|---|---|---|---|
| **FR** | Minimum Level | Compensation Payments | Tenders (by CRE) |
| **UK** | Name or Shame / guaranteed Standard | Malus / Bonus | |
| **NL** | Name or Shame / Integration in Price Formula | Revenue Adjustments | TSO |
| **NOR** | Name or Shame / Interruption Costs | Revenue Adjustments | TSO |
| **AT** | Bericht (E-Control) | Q Component (planned) | Capacity Payments |
| **SW** | Bericht | Q Component (Revenue Adjustments) | TSO |

Source: DG TREN 4th Benchmarking Report, Dürr

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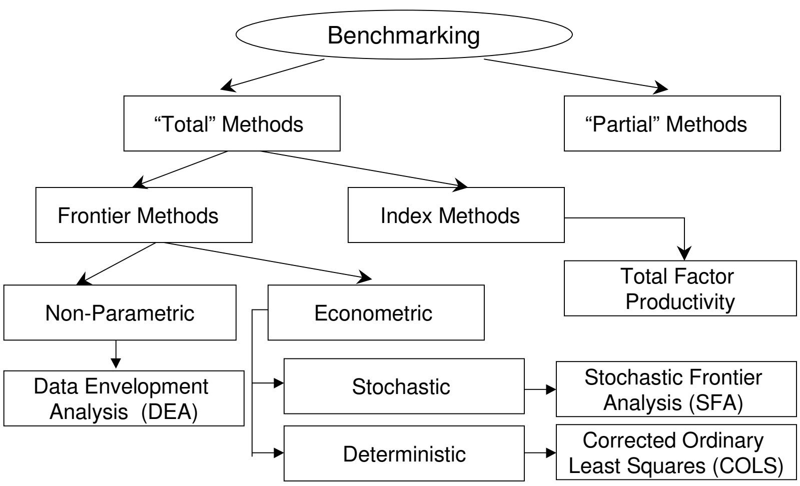
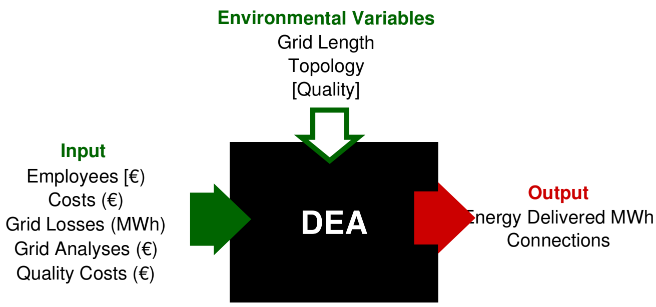
# Regulatory Benchmarking Methods



# Black Box: Data Envelopment Analysis

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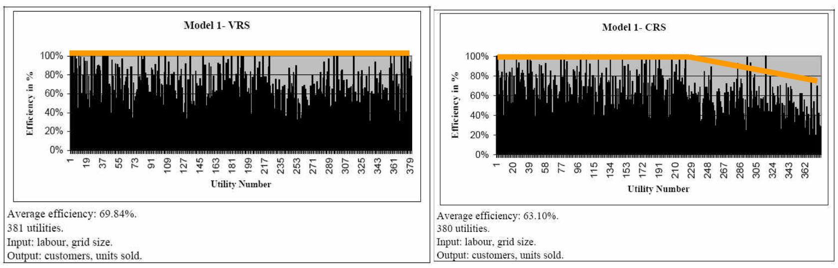
# DEA Functioning




Source: Hirschhausen/Kappeler (2004)

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# Unbundling & beyond

## The battle for full unbundling of TSOs

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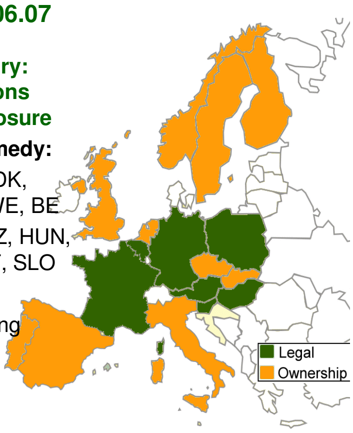
# Ownership Unbundling (TSO)

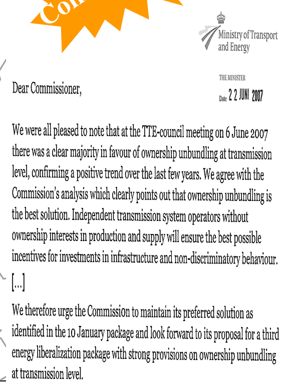
Confrontation

### Energy Council, 06.06.07

- **DG TREN: Sector Inquiry: Competitional Distortions through Market Foreclosure**
- **But: OU no general remedy:**
- In Favour: UK (strong), DK, FIN, NL, ROM, ESP, SWE, BE
- Opposed : F, DE, AT, CZ, HUN, GR, LUX, EST, LIT, LET, SLO

- 1st option: Full Unbundling
- 2nd option: Independent System Operator (ISO)
- 3rd Way: ISO with TSO shareholders



Ministry of Transport and Energy

THE MINISTER

Date 22 JUNI 2007

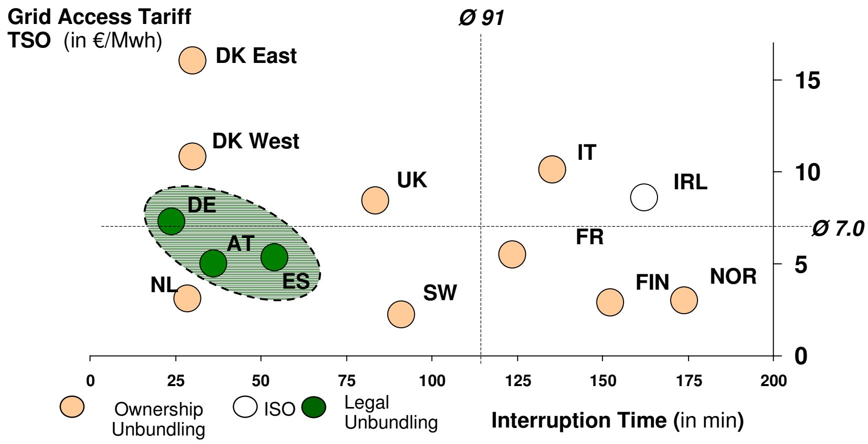
Dear Commissioner,

We were all pleased to note that at the TTE-council meeting on 6 June 2007 there was a clear majority in favour of ownership unbundling at transmission level, confirming a positive trend over the last few years. We agree with the Commission's analysis which clearly points out that ownership unbundling is the best solution. Independent transmission system operators without ownership interests in production and supply will ensure the best possible incentives for investments in infrastructure and non-discriminatory behaviour.

[...]

We therefore urge the Commission to maintain its preferred solution as identified in the 10 January package and look forward to its proposal for a third energy liberalization package with strong provisions on ownership unbundling at transmission level.

## Unplanned Interruptions vs. Tariffs




Source: E-Control, Fingrid, VDN, TenneT, CEER, EU Commission, ETSO, A.T. Kearney

## Impact Assessment (EU COM)

- „However, making the more conservative assumption that the price margin in Germany could be €15/MWh lower than currently, ... potential savings for German customers would be €7.5 billion...
- But: Methodologically flawed: Where are the costs?

**Cumulative and aggregated electricity price changes in EU-27 for the period 1998-2006**

| | Electricity prices | | | |
|---|---|---|---|---|
| | Industry | | Households | |
| | MS with ownership unbundling | MS with integrated TSOs | MS with ownership unbundling | MS with integrated TSOs |
| Cumulative and aggregated price changes 1998 - 2006 | -3.01% | 6.01% | 5.91% | 29.46% |

**LARGE INDUSTRY ELECTRICITY PRICES**

| Euro/MWh | DE | NL | UK |
|---|---|---|---|
| Industry end user prices (Eurostat) 2006 | 77 | 61 | 68 |
| Average wholesale market price 2006 | 53 | 65 | 57 |
| Price margin | 24 | -4 | 11 |

- Commission seems not be so self-convinced either
  *„In any event, the objective of ownership unbundling is not necessarily to bring prices down but to achieve a price setting which reflects the real costs of efficient operation.“*

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## Judgement

- EU Parliament requires “full unbundling” (18-06-2008)
- EU Council in favour of alternative ISO Structure
- Ownership Unbundling is no fact-driven but a political debate
- EU discusses instruments, rather than targets
- **French Presidency solution to political battle (2nd half 2008)?**

- **It would be naive to believe that OU stops at TSO level:**
  - Sector Inquiry: competition problems in generation & supply
  - Most competition problems in customer switching
  - DSO Unbundling in the Netherlands (blue print)
  - *“benefits from further unbundling are not overwhelmingly higher than costs **at this stage**”*

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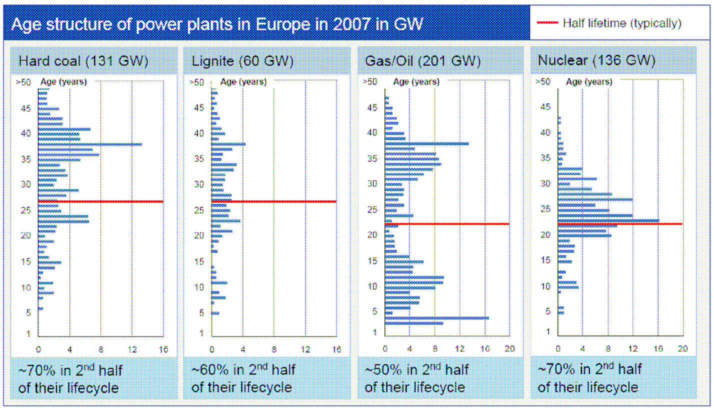
# Blackouts & beyond II

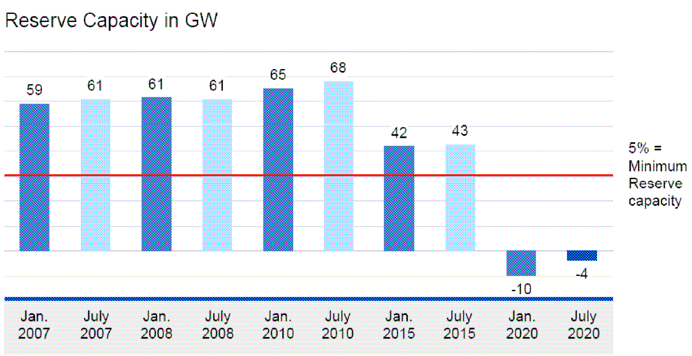
**Securing Capacity & Blackout Prevention**

## Age Structure of EU Power Plants




**Source:** BCG, RWE 2007

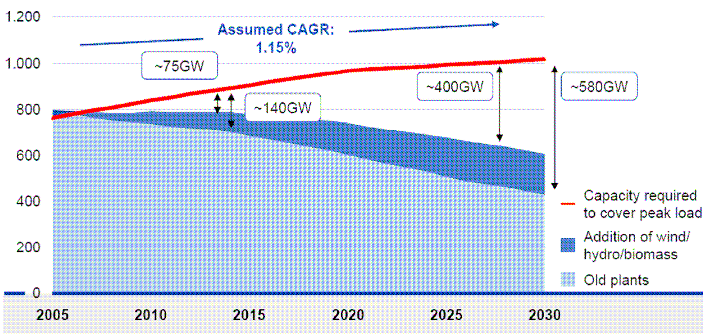
## Waning Reserve Capacity




**Source:** UCTE, RWE 2007

## EU Generation Capacity: Solutions

GW




1. Capacity Payments;
2. Reflective Metering (and lowering of peak demand);
3. Stronger Grid Integration (RES capacity / Capacity Sharing
3. Re-Unbundling (TSOs responsible for backup capacity)

**Source:** BCG, RWE 2007

## EU Generation Capacity: Blackouts?

- Italy 2003
- London 2003
- Muensterland 2005 (RWE)
- Elmsland 2006 (E.ON)

| | Limit values | E.ON (Landesbergen) | RWE (Wehrendorf) |
|---|---|---|---|
| 1 | Thermal capacity | 2000 A | 2000 A |
| 2 | Security limit value, warning (alarm) value | 2000 A | 1795 A (90% of 3) |
| 3 | Tripping current | 2550 A (85% of 4 for max. 1h) | 1995 A (95% of 4) |
| 4 | Tripping current | 3000 A | 2100 A |

Table 1: protection settings in Landesbergen und Wehrendorf

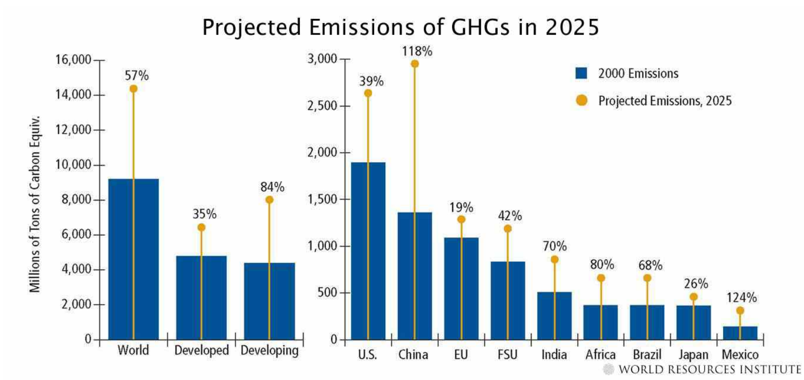
Source: UCTE Final Report

- No capacity problems (save for reconnection of wind energy)
- But: Capacity problem reminds of 1998 California Blackout Situation

# Kyoto & beyond

## The EU Emission Trading System

## Cumulative global $CO_2$ emissions (2025)



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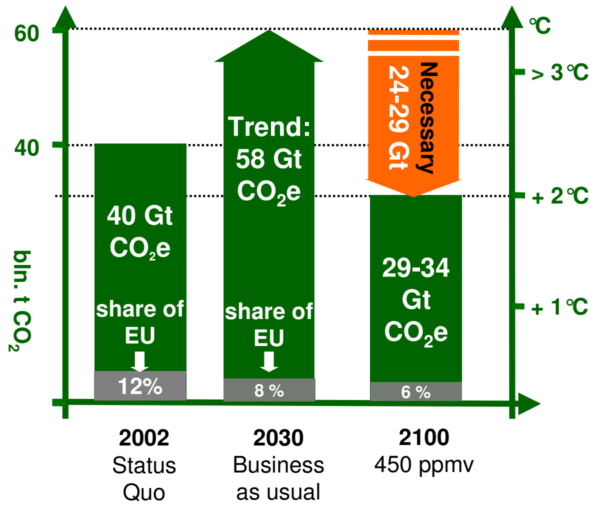
## 2 degree Celsius stabilisation target

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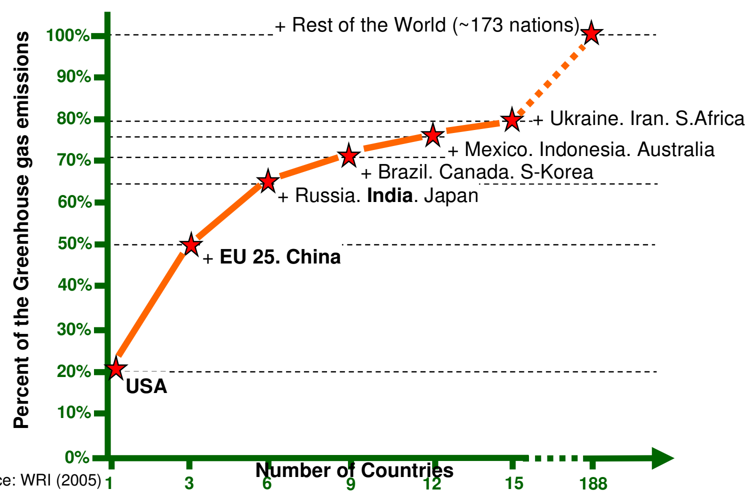
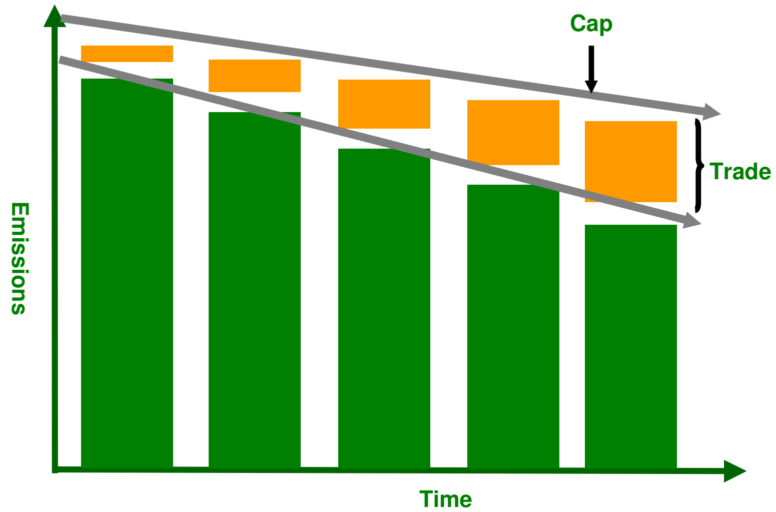
## Cumulative global $CO_2$ emissions




Source: WRI (2005)

## Emissions Trading: Cap & Trade System

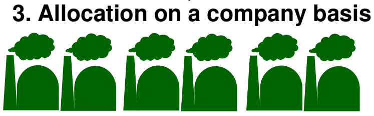



## Principles of Emission Trading

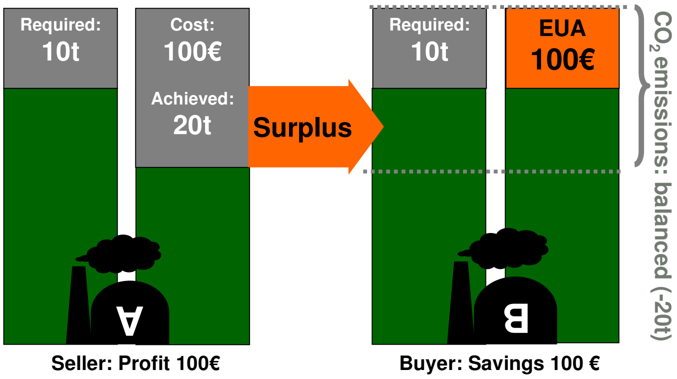
1. Burden Sharing Agreement: Total Emission Budget

2. Breakdown by sector (Makro Allocation)

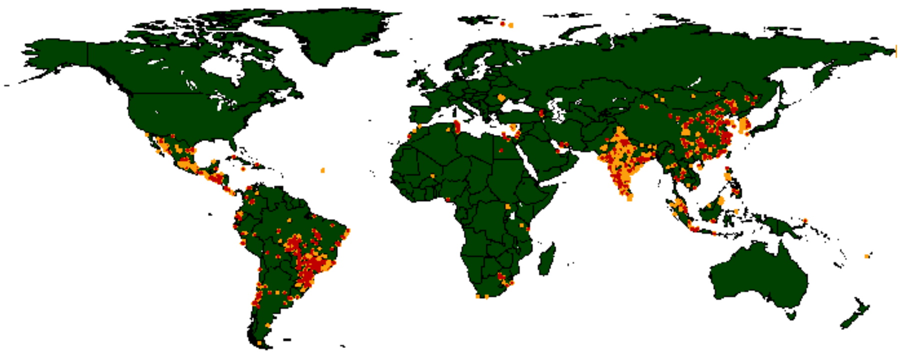
| Emission Trading Sectors: Energy & Industry | No participation in ETS: Trade. households. transport |
|---|---|
| 3. Allocation on a company basis | Other (legal) measures |



## Emissions Trading: Between Companies




## CDM & JI



- Clean Development Mechanism (Least & Less Developed World)
- Joint Implementation (among Kyoto Annex I States)

# Burden Sharing Agreement 1998

| | | | |
|---|---|---|---|
| Belgium | -7.5% | Netherlands | -6.0% |
| Denmark | -21.0% | Portugal | +27.0% |
| Finland | 0.0% | Sweden | +4.0% |
| France | 0.0% | Spain | +15.0% |
| Germany | -21.0% | UK -12.5% | |
| Greece | +25.0% | | |
| Ireland | +13.0% | Accession States: | -8.0% |
| Italy+13.0% | | (Hungary, Poland) | -6.0% |
| Luxembourg | -28.0% | (Malta, Cyprus) | 0.0% |

## EU Joint Target: 8 percent below 1990

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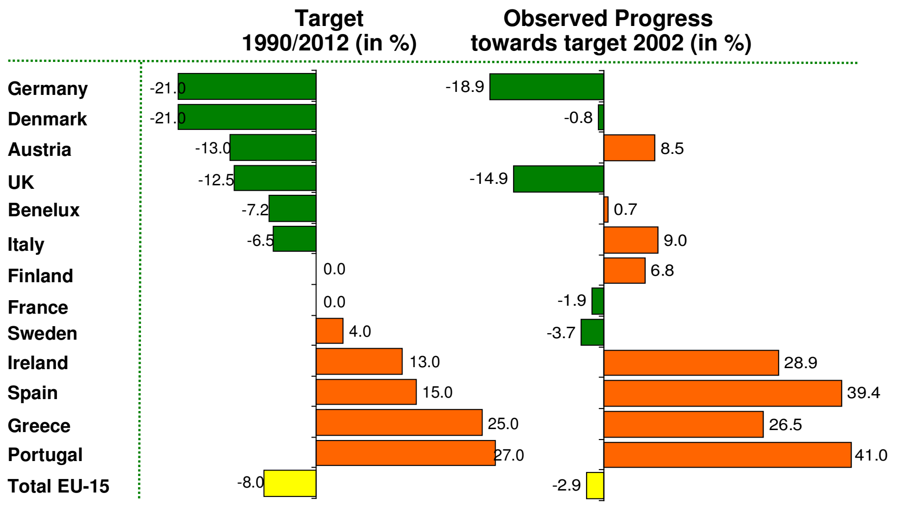
# Burden Sharing: Target vs. Reductions

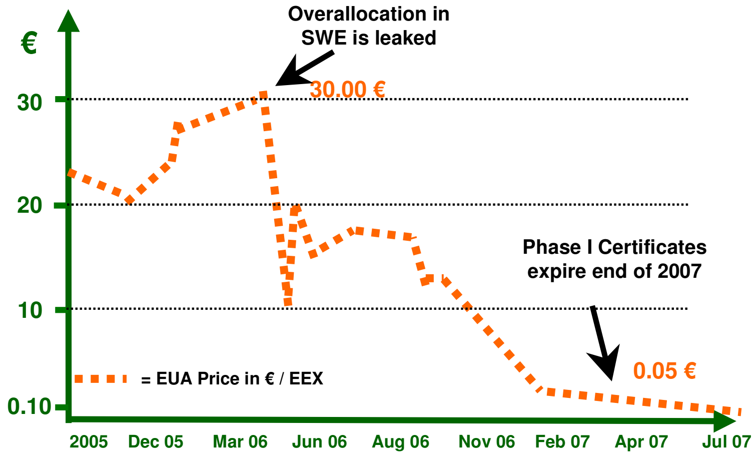


## Emissions Trading: A New Game

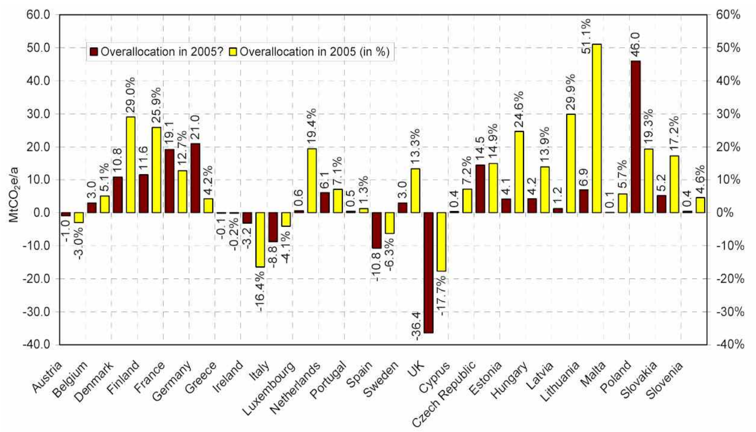

- Emissions Trading Directive 2003: Mandatory ETS
- Trading Period: 3 yrs (to gather eperience with the ETS)
- Inclusion of CDM from 2005 / JI with 1st Kyoto Period
- Slow Start: 10,000 installations in 23 MS
- Lack of Transparency in Start Phase
- Volatility of Carbon Prices / Windfall Profit Effects



## $CO_2$ Forwards 1st Trading Period (2007)



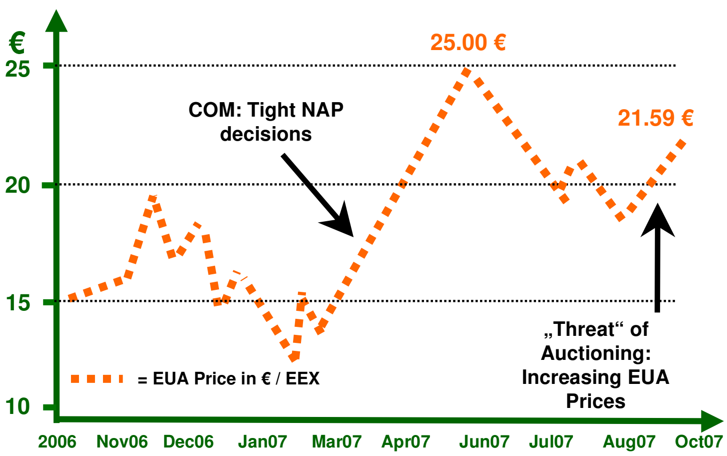
## Overallocation in 1st Trading Period




Source: Fraunhofer ISI



## $CO_2$ Forwards 2nd Trading Period (2008)



## Emissions Trading Directive

- Problem: Cap Setting:
- In the NAP II, the Commission made severe cuts to the NAP II of MS:
  - Baltic countries (-47-55%)
  - Bulgaria (-38.4%)
  - Poland (-76 million tonnes)
  - Germany (-29 million tonnes)
  - Bulgaria (-25 million tonnes)
  - Romania (-20 million tonnes)
  - Czech Republic (-15 million tonnes)
  - Italy (-13 million tonnes)
- Hungary, Poland, Czech Republic, Latvia, Lithuania and Malta appealed to the European High Court to challenge the Commission's cuts.



## Emissions Trading Directive (23.01.2008)

- Uniform Target 2020 (20 percent / 30 percent):

| Year | Mio t $CO_2$ |
|---|---|
| 2013 | 1974 |
| 2014 | 1937 |
| 2015 | 1901 |
| 2016 | 1865 |
| 2017 | 1829 |
| 2018 | 1792 |
| 2019 | 1756 |
| 2020 | 1720 |

- Trading Period: 2013-2020 (8 years)
- No National Allocation Plans: Central Cap Setting
  - Formula from emissions trends & economic development
  - Burden Sharing between Countries

# Emissions Trading Directive (23.01.2008)

- Inclusion of additional sectors and gases:
  - Aviation, Shipping (?), Aluminium, Ammonium, [Waste]
  - CO2, $N_2O$, Perfluorcarbons [?]
- Auctioning:
  - Energy Industry 100%, Industry 60% (100% by 2020)
  - Reusing Auction Returns (COM: 20% / Doyle Report: 50%):
    - EU Strategic Energy Technology Plan
    - Foster Renewable Energies
    - Capture and Storage (CCS)
    - Forestation Projects in least developed countries
    - Combatting energy poverty
    - Administrative Expenses
- Leakage Effects: International Competition Effects
- Cap on international mechanisms (CDM/JI)



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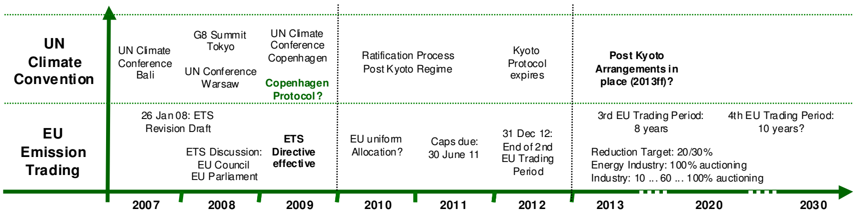
# Linkage: Climate Dialogue & EU Emission Trading




- Closely linked to RES, EE, and CCS Directive:
- ETS will not suffice

  Commission less low key on national Energy Mix
  - Requires a joint European energy foreign policy
  - Encourages a new nuclear programme
  - Asserts that Europe will be dependent on coal for a long time
  - CCS directive: CCS Requirement for new coal fired plants
  - Trends in Energy Efficiency

# Kyoto & beyond

## Renewable Energies

# Electricity Generation (RES)

| | main RES support mechanism | Net addition to generation 2003 (MW) net new coal/oil | net new gas | net new RES/CHP | other |
|---|---|---|---|---|---|
| Austria | feed in tariff | 0 | 0 | +340 | 0 |
| Belgium | green certs. and fiscal incentives | 0 | 0 | +80 | 0 |
| Denmark | feed in tariff | 0 | 0 | +350 | 0 |
| Finland | fiscal investment subsidies | 0 | 0 | +20 | +55 |
| France | obligation (tender) | -500 | -10 | +285 | 0 |
| Germany | feed in tariff | 0 | 0 | +2900 | 0 |
| Greece | feed in tariff plus subsidies | +380 | 0 | +110 | 0 |
| Ireland | obligation (tender) | - | - | - | - |
| Italy | green certificates | -350 | +1740 | +450 | +240 |
| Lux | feed in tariff | - | - | - | - |
| Neth | obligation (green certs) | +800 | 0 | - | 0 |
| Portugal | feed in tariff | 0 | +392 | - | 0 |
| Spain | feed in tariff | 0 | +1600 | +1300 | +117 |
| Sweden | obligation (green certs) | 0 | 0 | +250 | + |
| UK | obligation (green certs) | 0 | -250 | +750 | 0 |
| Norway | direct grants | 0 | 0 | +50 | 0 |
| Estonia | obligation | 0 | 0 | +4 | 0 |
| Latvia | feed in tariffs | 0 | 0 | +10 | 0 |
| Lithuania | fixed price purchase | - | - | - | - |
| Poland | obligation | 0 | 0 | +50 | 0 |
| Czech R | feed in tariff | 0 | 0 | 0 | +1000 |
| Slovakia | obligation to purchase | 0 | 0 | +6 | 0 |
| Hungary | feed in tariff | 0 | 0 | +130 | 0 |
| Slovenia | feed in tariff | 0 | 0 | +4 | 0 |
| Cyprus | obligation to purchase | - | - | - | - |
| Malta | no information available | | | | |
| **Total (approx.)** | | **+330** | **+3450** | **+7000** | **+1450** |
| **Candidate Countries** | | | | | |
| Romania | certificates | - | - | - | - |
| Bulgaria | feed in tariff | 0 | 0 | +13 | 0 |

## Renewable Energies Package

- Breakdown of 20 percent target between MS
- France & Austria demand lower targets due their contribution to climate protection (nuclear, water).
- Spain and Germany are reluctant to give up on their feed-in laws
- Commission favors „Green Certificates“ system
- „White Certificates“ (Energy Efficiency)

- 20 percent target renewable energy leaves 80 percent fossil fuels
- 20 percent target energy efficiency very ambitious (12 yrs til 2020)
- Question of Grid integration of intermitting Renewables not yet tackled (ie. DK has 25 percent intermitting influx of wind power)

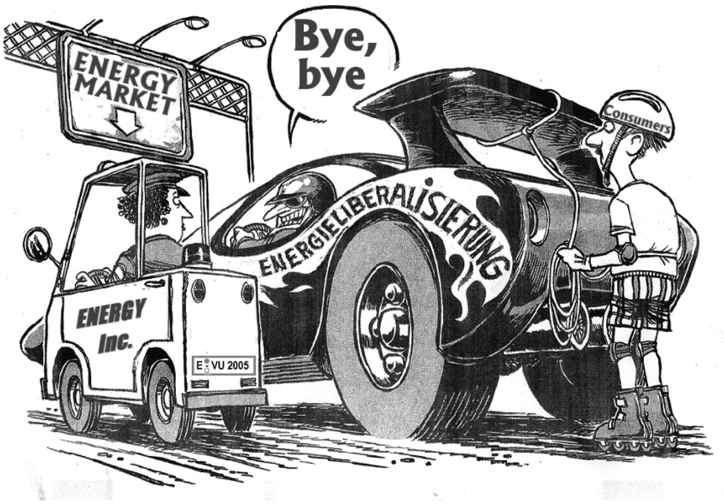
## EU Strategic Energy Technology Plan

- 2020
  - 20 percent Renewable Target
  - “Lower Cost” Renewables (Off-Shore / 2nd generation bio fuels)

- 2030
  - Electricity & Heat from low carbon sources
  - Near zero emission fossil fuel power plants (CCS)
  - 2nd generation bio fuels & Hydrogen fuel cells in transport

- 2050
  - Large share of renewables
  - sustainable coal & gas
  - Generation IV fission power and fusion energy

## And the future?

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