Member States' responses to the EU Electricity Directive

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Transitions in the electricity industry

From	To
vertically integrated monopoly	unbundled competitive systems
public investment	private investment
central control	decentralised markets
least costs	least risk
controlled prices	market prices
economies of scale	modular technologies

Review of electricity industry reforms

- 1978 PURPA: introduction of competition as unintended consequence
- 1990 England and Wales pool
- 1991 Norway competitive pool
- 1996 Norway pool extended to Sweden (Nordpool, which now also includes Finland and Denmark)
- 1997 National electricity market of Australia:
  merger of Victoria Pool (1994) and New South Wales Pool (1996)
- 1996 New Zealand (voluntary) wholesale electricity market
- 1998 Competitive power exchanges in Spain, California and PJM
- 1999 Amsterdam Power Exchange
- 2001 New Electricity Arrangements (NETA) in England and Wales

Driving forces in the electricity industry

- Governance
  - Ownership (public/private)
  - Market structure – introduction of competition
    PURPA 1978: introduction of competition as unintended consequence
- Technological development
  - Shift from large scale central station plants to smaller scale technologies (CCGT, distributed generation)
  - Multi functionality of networks
  - Controllability of electricity transport
  - Enhanced possibility for DSM / interfuel substitution
- Electricity price differentials – industrial competitiveness
- Electricity demand growth – investment requirements, FDI in developing countries

Technological developments in the electricity industry

- Decentralised heat and power production (distributed generation)
- Controllability of electricity transport
- Multi functionality of networks
- Enhanced possibilities for DSM / interfuel substitution

- Public good characteristics of electricity networks is threatened
- Scope of potentially competitive segments increases
  - Electricity / natural gas, via CCGT, micro (co)generation
  - Electricity / electricity, via micro grids
- Transmission could cease to be a natural monopoly
- Transition to bilateral networks, with positive network externalities.

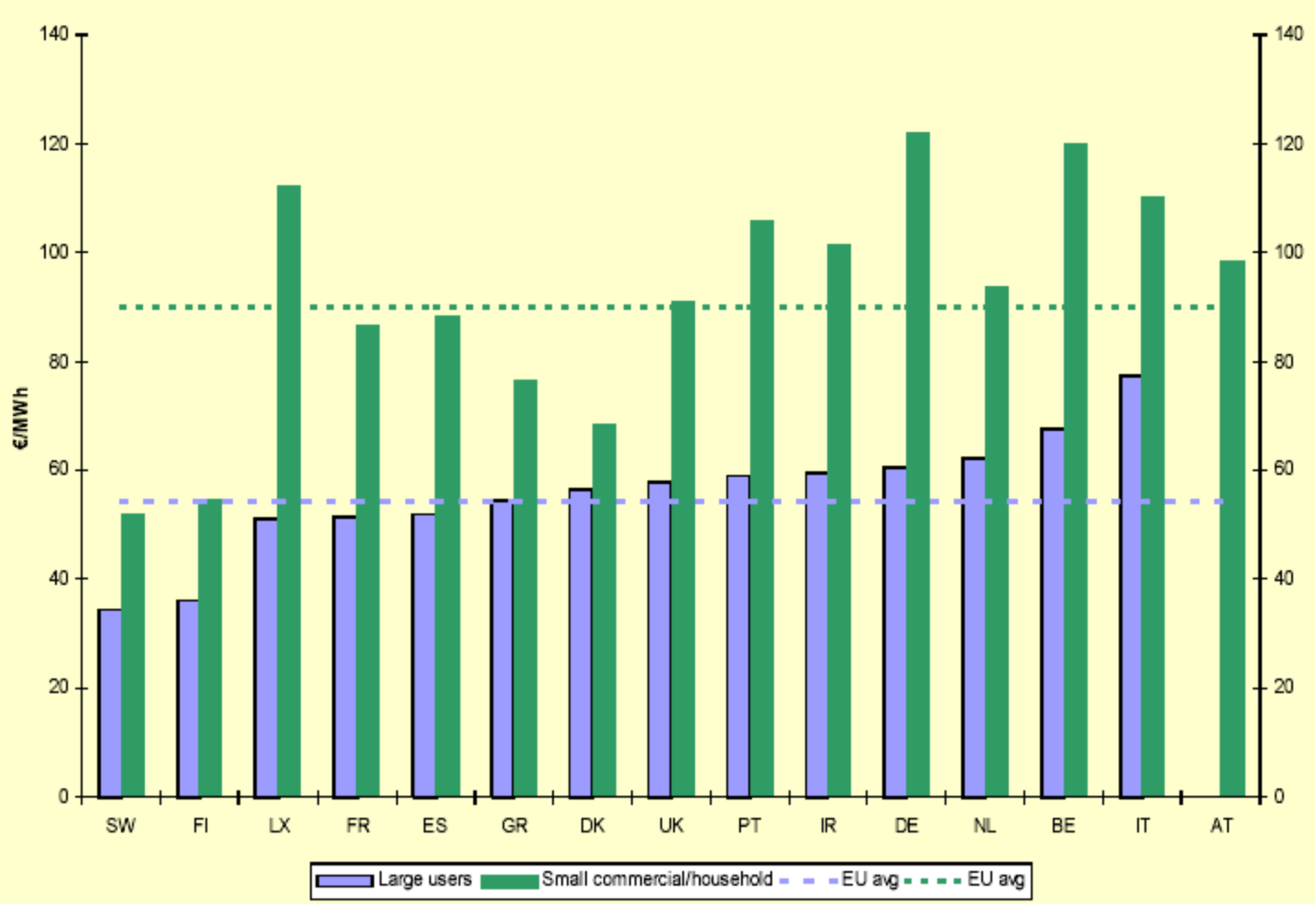
Key aspects of the EU Electricity Directive *96/92/EC*

- Introduction of competition into the potentially competitive segment of the industry, regulation of the network
  - Competition in generation and supply
  - Gradual market opening for large customers (2/2003: 33%)
  - Network access – tariffs / conditions
  - Vertical unbundling
- Public service obligations (Article 3 of Directive)
  - Security of supply
  - Renewable energy / cogeneration / domestic fuels (dispatch priority, Article 8(3))

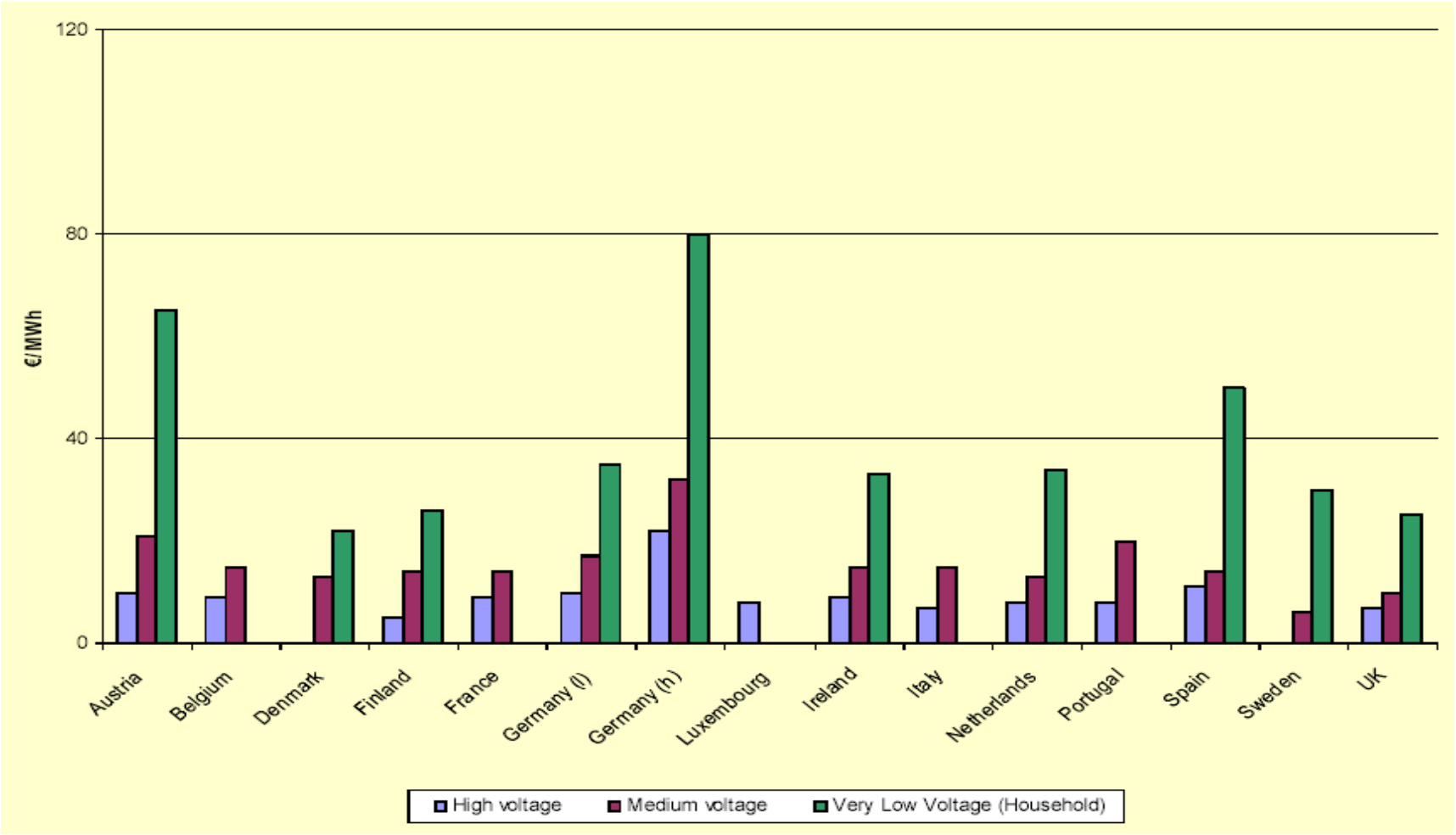
The new Electricity Directive

- Creation of an effective internal market instead of 15 individual markets
  - Full market opening by 2003/2005
  - Non-discriminatory access to T&D grid
- Adoption of rules on cross-border tariff-setting and congestion management for electricity
  - Rules based on simplicity, non-discrimination and cost reflection
- Development of a European infrastructure plan for electricity and gas
  - Remove network bottlenecks
- Negotiation of reciprocal electricity market opening agreements with the EU's neighbours (including environmental and safety standards).
- It is not sufficient to fully liberalise demand but create effective market structures

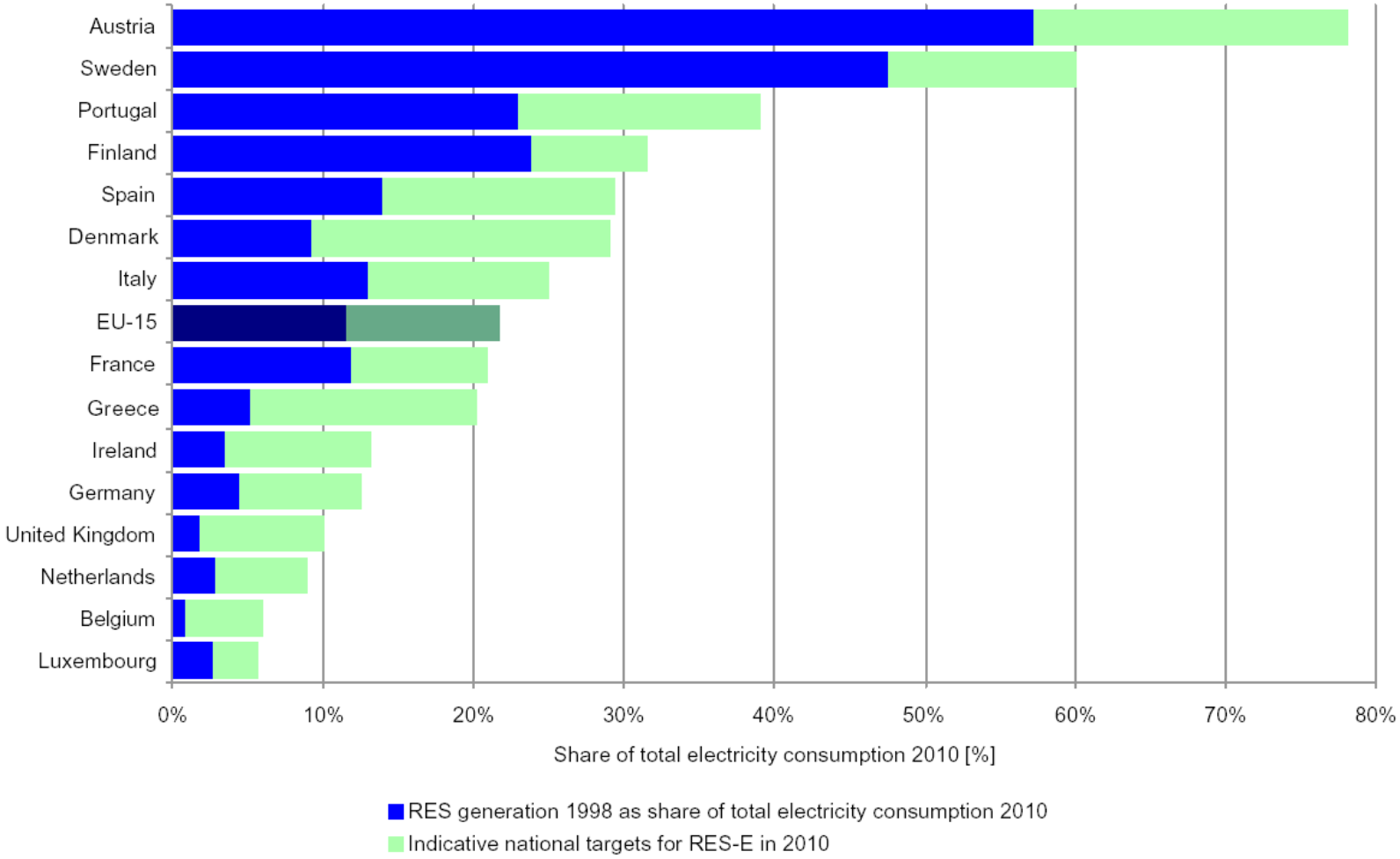
Electricity prices



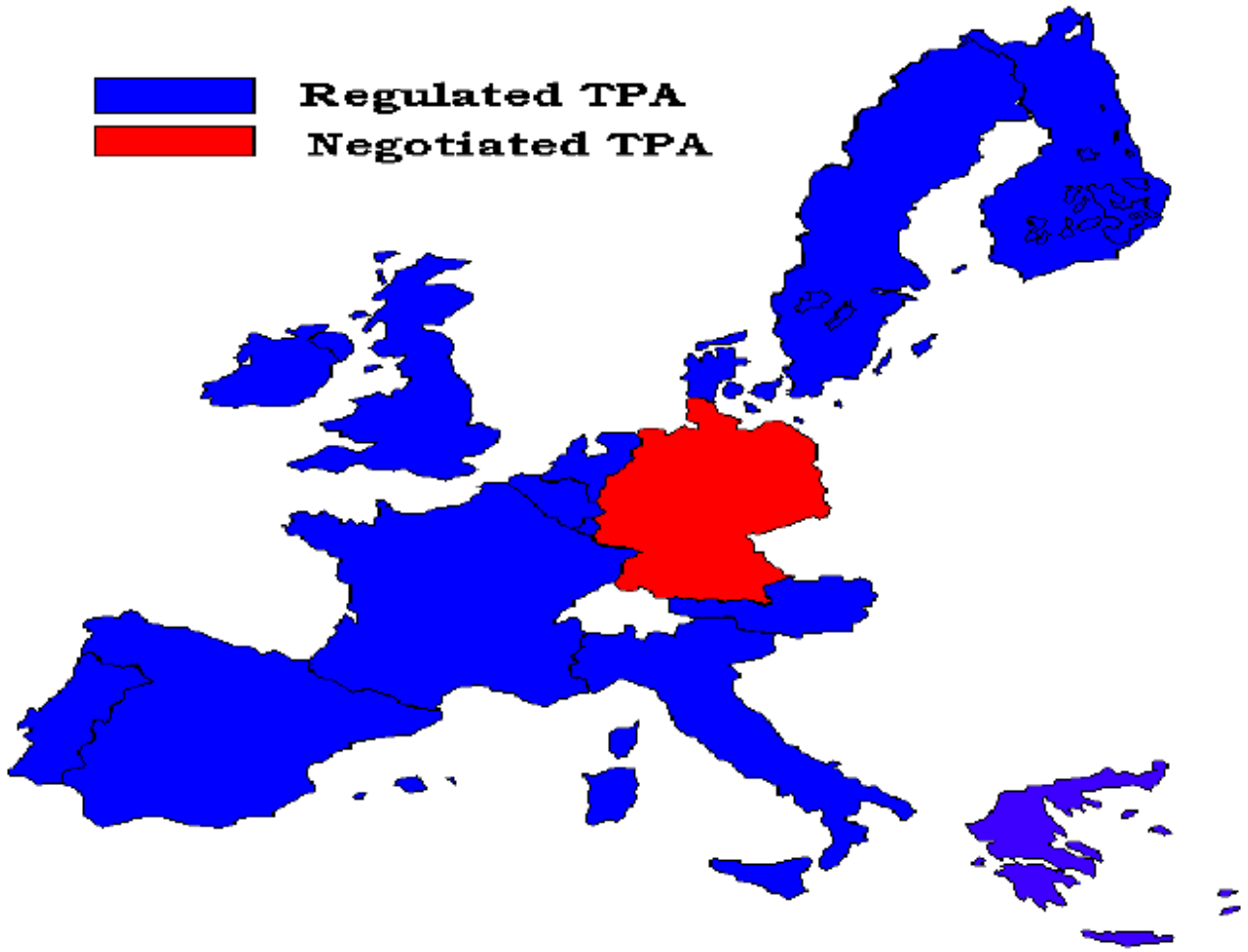
Network tariffs



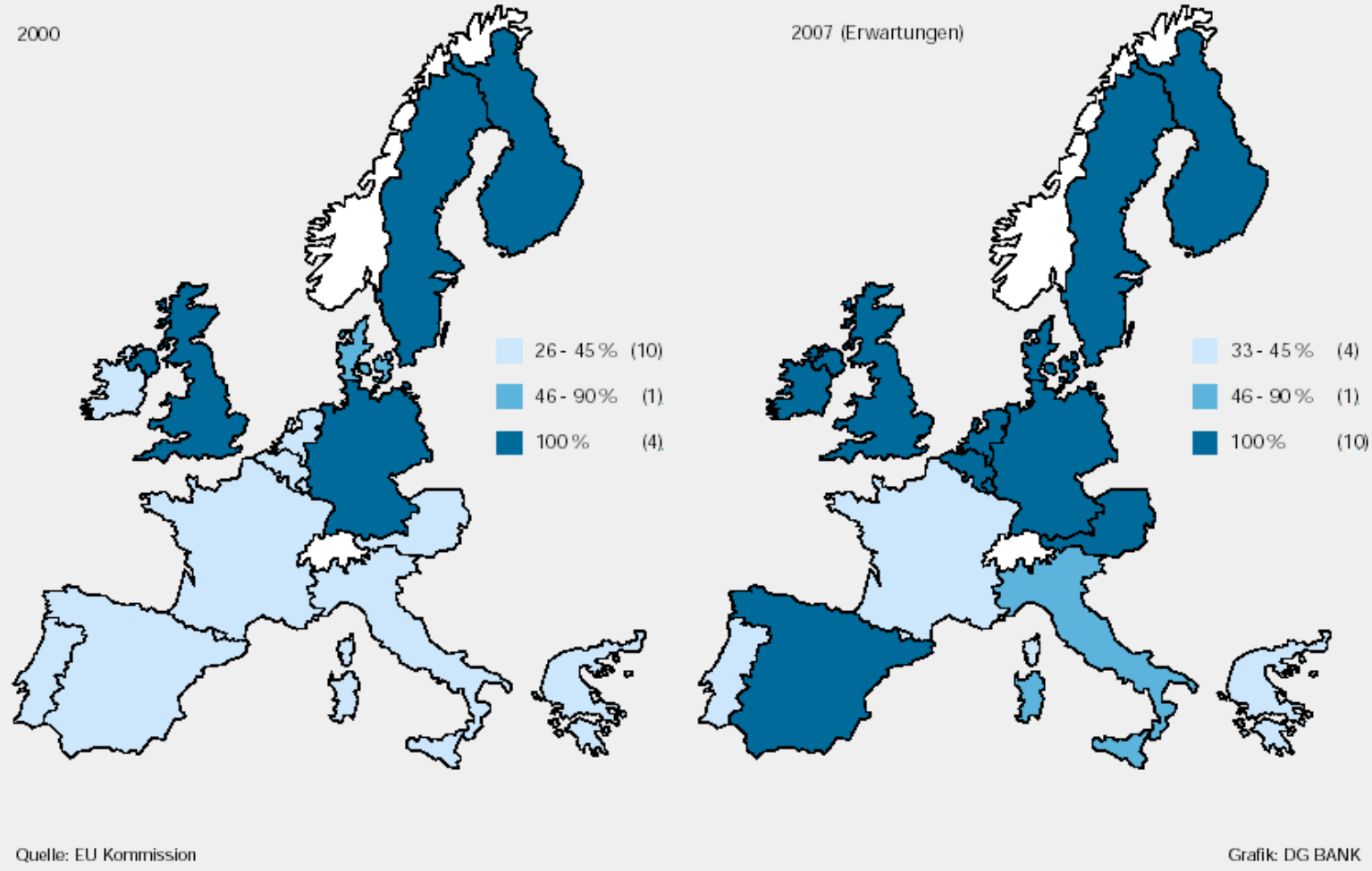
Renewable energy shares in EU electricity generation, 2010



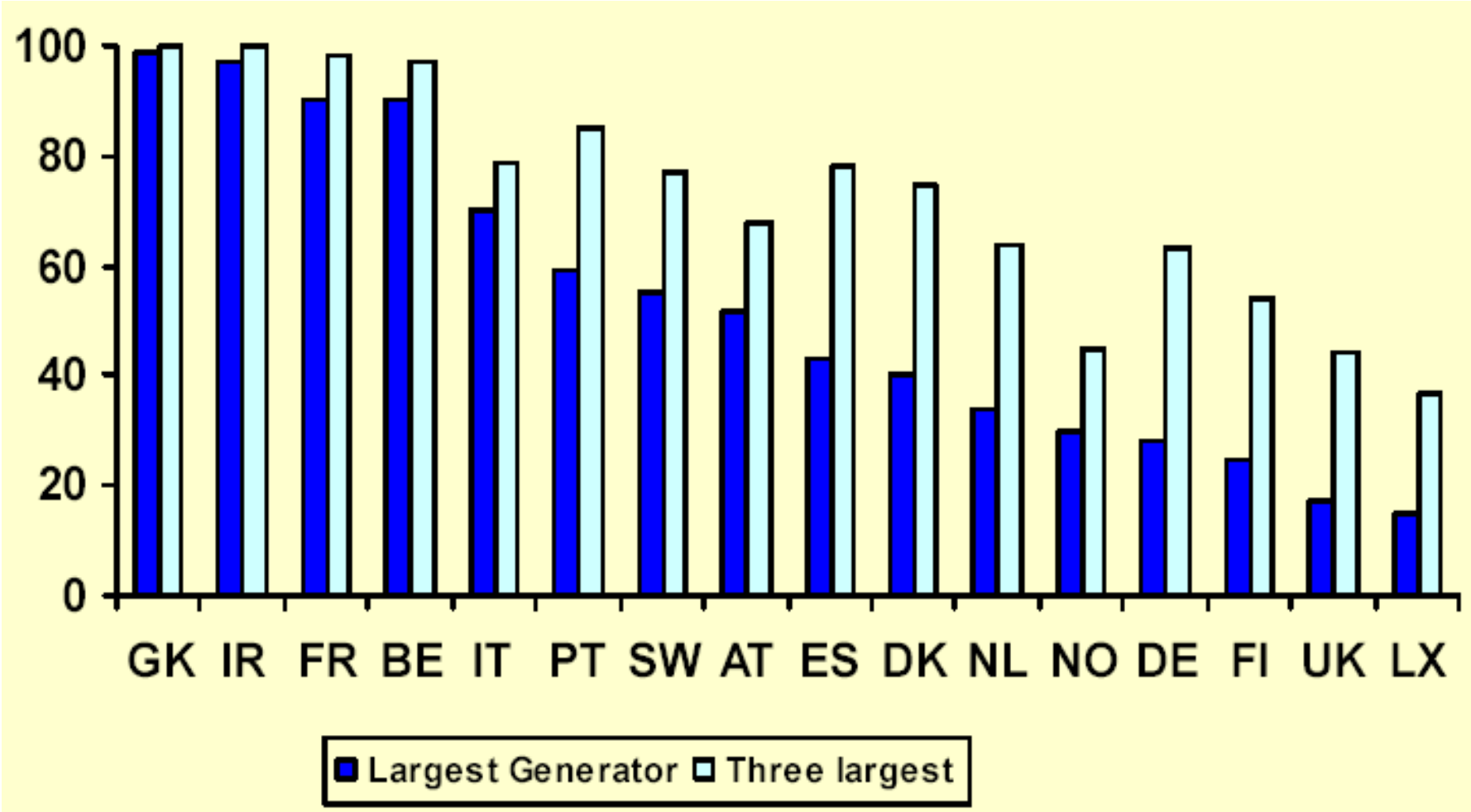
Network access



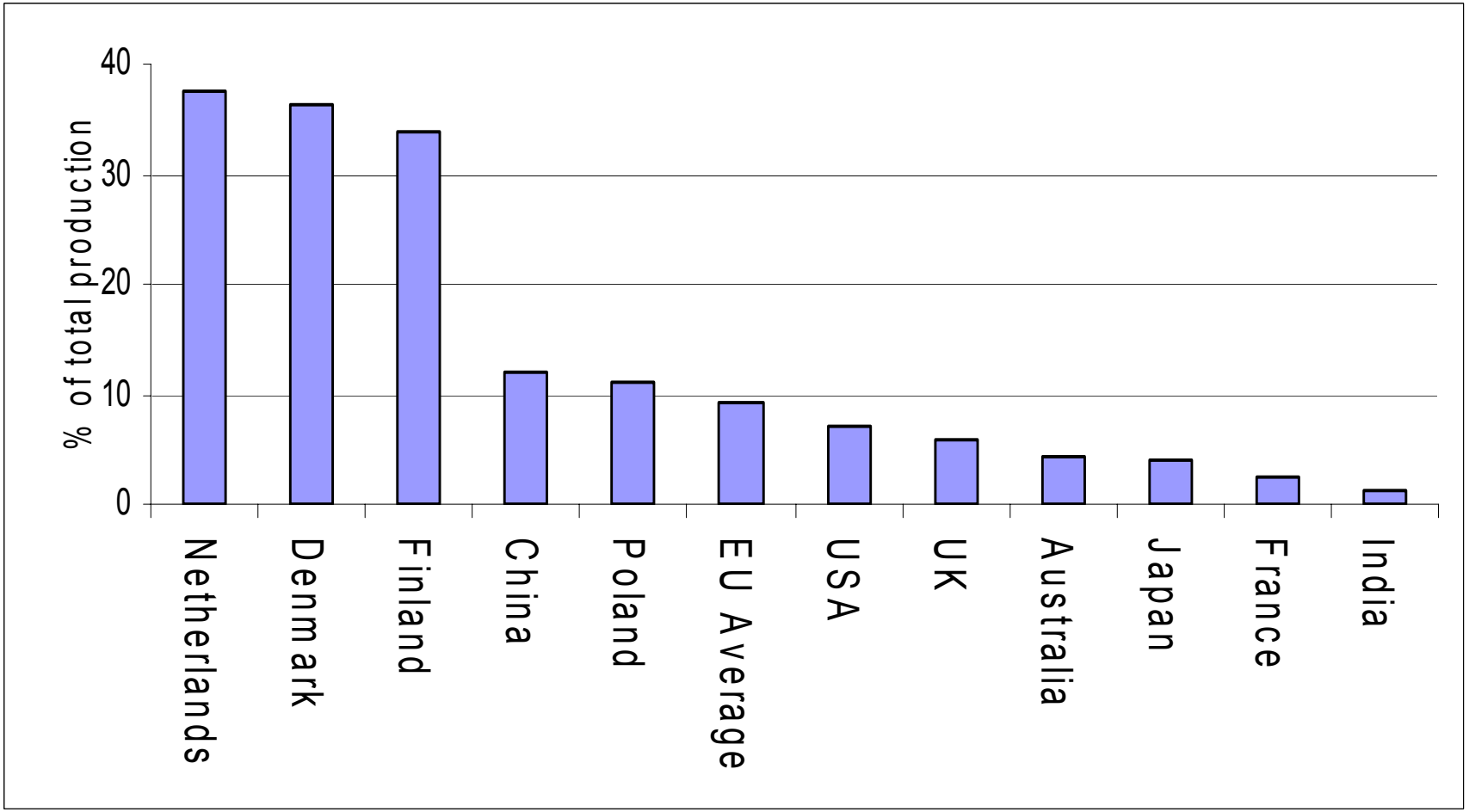
Degree of market opening



Market share in generation output



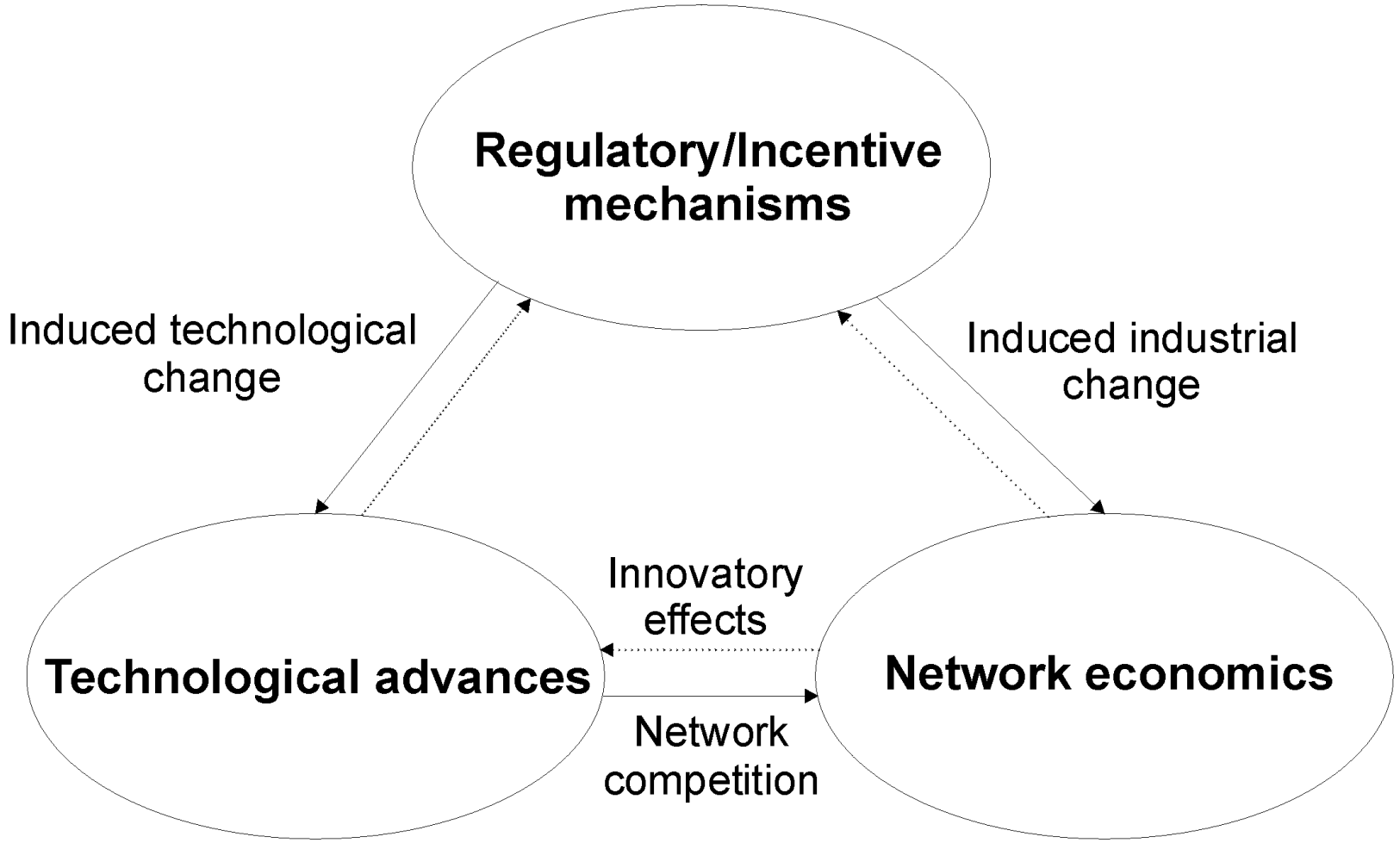
Electricity production based on cogeneration, % of total production



EU electricity market

- Domestic electricity markets are far from being uniform
- The EU electricity market remains segmented due to geographical and technical constraints
- EU Member States have varying attitudes towards deregulation
  - Current positions of unequal market opening not satisfactory, creates distortions
  - Different regulatory frameworks make network access difficult in practice
- Too little market contestability

PSR and sustainable development



General methods for speeding innovation (in energy technologies)

Create the market and let the capital flow to it

- RPS
- Standard offer contracts
- Electricity feed laws
- Efficiency standards
- Green market certificates
- Wind development concessions
- Fuel price risk avoidance standards

Create the capital and buy from the market

- NFFO
- Cost buydowns
- Production credits
- Tax policies
- Climate change levies
- Energy efficient mortages
- SBC

Policy mechanisms for promoting renewables-based electricity

A. Power Purchase Agreements

B. Investment Incentives

Investment Subsidies, Investment Tax Credits, Preferential Finance

C. Production Incentives

Per-kWh Production Subsidies, Per-kWh Production Tax Credit

D. Renewables Set-Aside (NFFO, RPS)

E. Externality Adders

F. Environmental Taxation

G. Research, Development, and Demonstration (RD&D) Grants

H. Government-Assisted Business Development

I. Green Marketing / Green Pricing

J. Kyoto Mechanisms

Environmental impacts of PSR

- Negative impacts
  - PSR is undermining the funding of R&D investment in clean technologies
  - Lower electricity prices make clean technologies less attractive
  - …
- Positive impacts
  - Competition stimulates R&D and modernisation of capital stock
  - Green electricity
  - Electricity trade stimulates efficient market based approaches of meeting emissions caps
  - Private investors are better at introducing new (clean) technologies
  - …

Sustainable development challenges in network industries

- Design of innovative regulatory mechanisms
  - to promote competition, technological innovation, productivity, structural adjustment and market contestability
  - Promotion of non-economic objectives
  - Compatibility with increasing reliance on market forces
  - Rapid technological developments
- Scope for and the funding of non-economic objectives
  - Environmental protection, social objectives
  - Compatibility with competition if mechanisms competitively neutral
- Technological advances and technology transfer
  - How to induce technological change? Declining private and public energy R&D
  - How to overcome barriers of new technologies (fuel cell, advanced biomass technologies)
- Energy pricing and subsidies
- Security of supply (is it a public good?)
- Financing mechanisms for clean technologies, including CDM

Electricity industry scenarios