

# Generation Investment and Electricity Market Design

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# Electricity Restructuring :

## *Mixed success of deregulation*

- Where do we stand ?
- Rules in Turmoil : complexity and difficulties of implementations
- Key role of effective wholesale markets
- Increased awareness of further challenges

# European Power Market:

## *Lessons learned*

- The power system moves away from “command and control” planning solutions to price-based solutions
- Markets play a key role in creating signals and are good at optimising the usage of the available generation assets
- Wholesale market prices have significantly decreased until recently
- Open questions for debate :
  - Do deregulated markets provide enough incentives to invest in new generation facilities ?
  - How to manage the new sources of risks ?

# European Power Markets :

## *Learning by doing*

- Two key drivers : wholesale markets and cross-border trading
- New approaches and challenges for risk management :
  - high volatility of electricity prices, transmission congestion, role of “ancillary services”, new capacity investment, ...
- Emergent concerns for regulators :
  - abuse of market power, support of public policy initiatives, incentives to invest

# Wholesale Electricity Markets :

*Fragmented and still immature*

- A single European market remains a very long way off
  - continental perspective (France, Germany, Switzerland, Belgium, The Netherlands)
  - Peninsula and regional perspective (Italy, Spain, Portugal, Scandinavia, UK)
- A growing awareness of remaining challenges around market design, availability of network infrastructure balance between supply and demand, and behaviour of market participants

# A continental perspective

Snapshot of Day  
Ahead power prices  
(beg. July 2002)



# A continental perspective (cont'd)

Snapshot of Day  
Ahead power prices  
(end Nov. 2002)



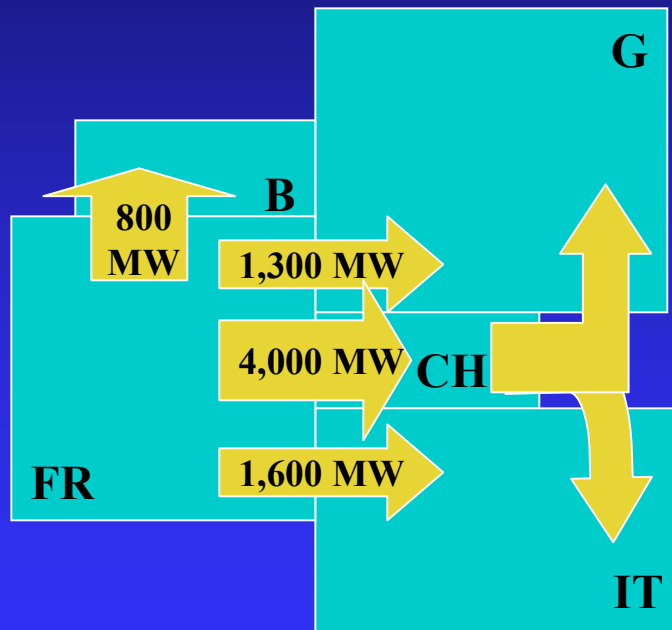
# A continental perspective (cont'd)

- Wholesale markets are still very fragmented across Europe
- Issues around the interconnections (commercial flows differ from physical flows => constraints)
- Retail markets will be completely opened to competition within a few years

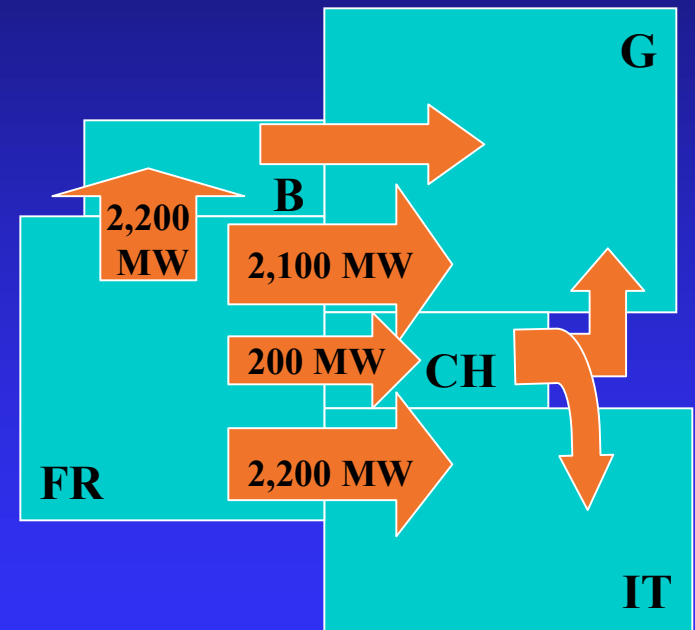


# A continental perspective (cont'd)

Transmission issues : an illustration (Summer 01)



Commercial flows



Physical flows

# Wholesale Electricity Markets and Cross-Border Trading

- A lack of appropriate instruments and rules for cross-border trading and interconnecting capacity allocation increases financial risks

# The Challenge of Risk Management in Electricity Markets

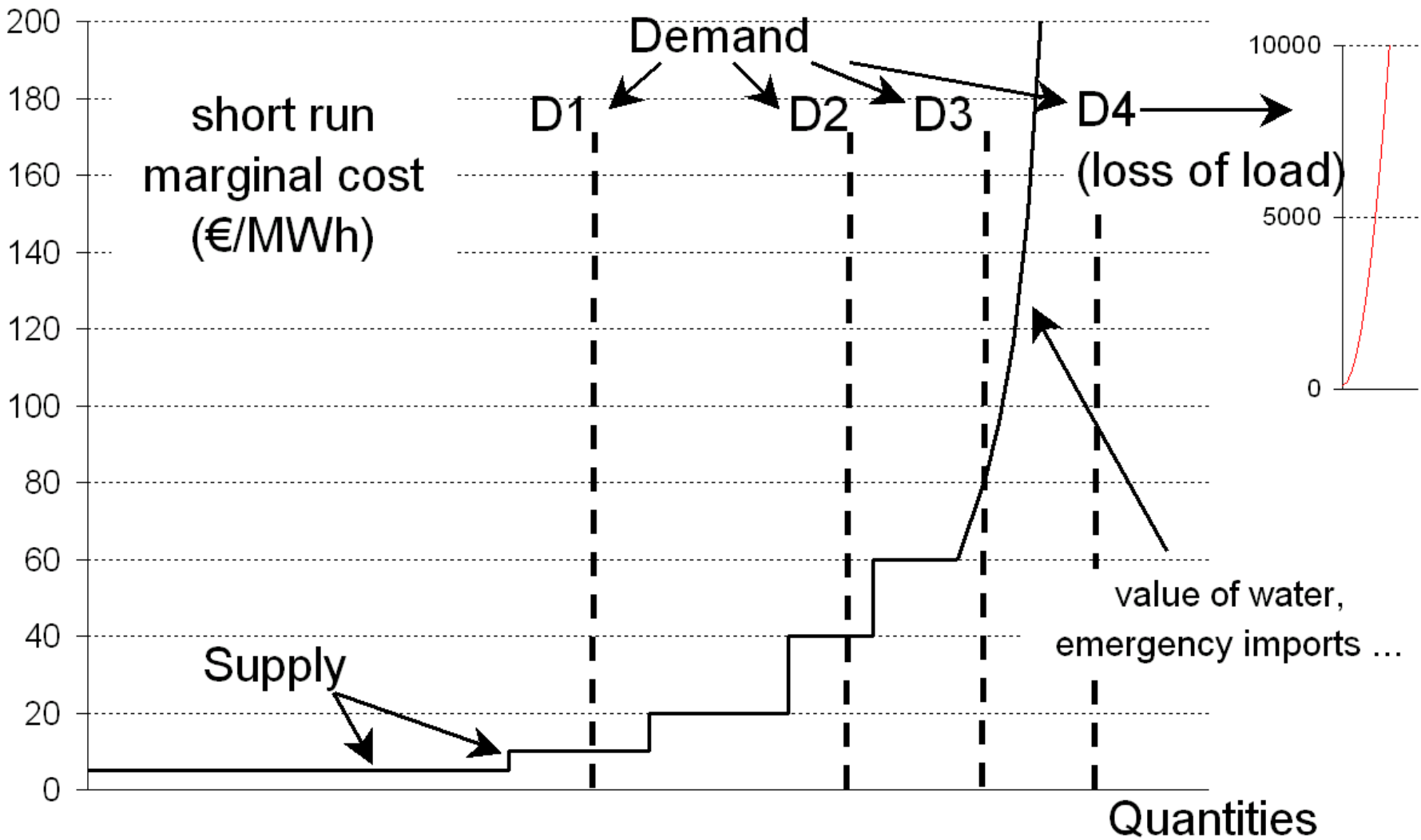
- Adjusting risks to market situation at all times
  - Market risks  
(price, demand & supply uncertainty)
  - Regulatory risks (environment, taxation, ...)
  - Congestion risks (transmission capacities, ...)
  - Credit risks
  - Other (technological, weather, ...)
- Additional experience is needed for dealing with the complexity of electricity markets (risk hedging contracts, auctions, ...)

# Emergent concerns for Regulators

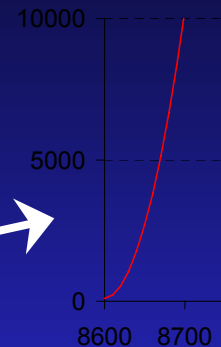
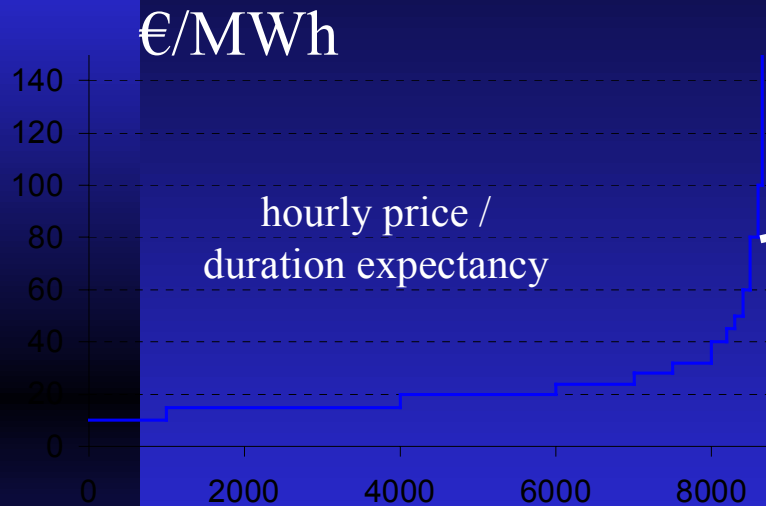
- Abuse of market power market will specifically monitor peak prices
- Promotion of a generation mix (e.g. fostering renewable energy)
- Provision of adequate incentives to invest (short sighted markets versus medium / long term returns on investments)

# Incentives from an investor's perspective

- Incentives (“Market”, “Command and Control”)
  - ◆ Possibility to enter into long term contracts
  - ◆ Capacity payments (Resource Adequacy Requirement)
  - ◆ Specific incentives to promote certain types of generation (Green Certificates, ...)



# Assessing the rentability of a Gas Turbine from the investor's point of view



## GT data

- annual fixed cost : 40 € per kW guaranteed
- variable cost (gas fuel) : 80 €/MWh

assessing the peaking period (price > var.cost)	scenario 1	scenario 2	scenario 3
conditional expectancy	150 €/MWh	1000 €/MWh	10000 €/MWh
duration expectancy (number of hours)	100 h	30 h	5 h
duration expectancy in % of annual duration	0,9%	0,3%	0,05%
annual margin on variable cost per kW	7 €/kW	28 €/kW	50 €/kW

not high enough to invest (< 40 €/kW)



# As a conclusion ...

The most attractive project is likely to be:

- A competitive plant
- With a reduced exposure to market price risks (baseload plant)
- Developed by a vertically integrated company (market and credit risks mitigation)