

# Network Investment

## Session on Competition and Market Power in Electricity and Gas

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&

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**Gert Brunekreeft**

International University Bremen\* & Bremer Energie Institut

[g.brunekreeft@iu-bremen.de](mailto:g.brunekreeft@iu-bremen.de)

\*Jacobs University Bremen as from Spring 2007

# Research Project on Unbundling

## OWNERSHIP UNBUNDLING OF ENERGY COMPANIES - WILL IT BE WORTH IT?

### Joint Research Proposal



**Gert Brunekreeft**

**International University Bremen\* & Bremer Energie Institut**

**[g.brunekreeft@iu-bremen.de](mailto:g.brunekreeft@iu-bremen.de)**

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# Background: Network Investment

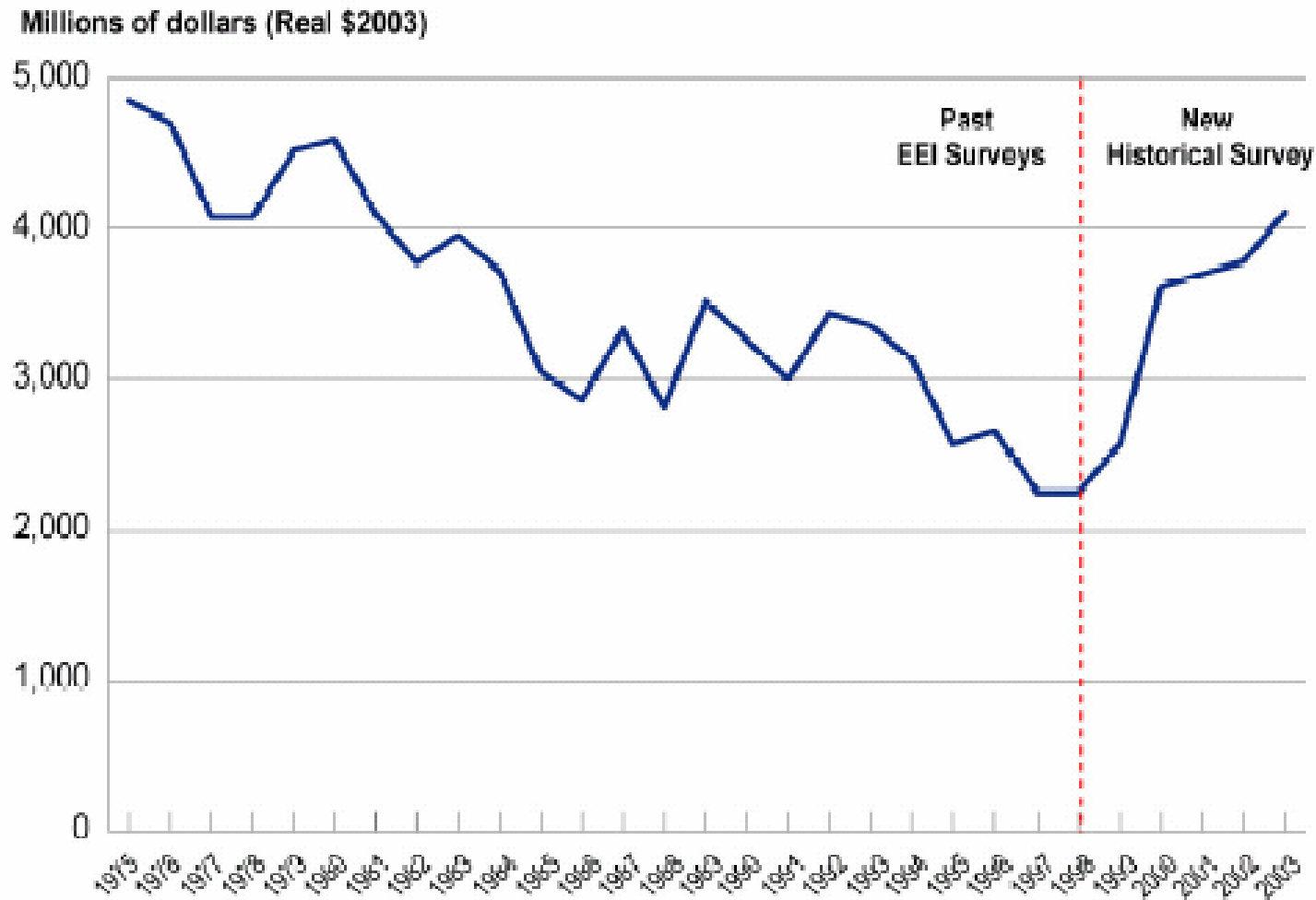
- **Supply security: possibility of shortage of capacity gets real**
  - **Generation & Network**
  - **Interconnector capacity is very short**
- **Sector Inquiry - 10 January 2007**
  - **Competition on European energy markets disappointing**
- **One of the major policy steps proposed by the commission:**
  - **Vertical unbundling of transmission network**
    - **Should improve competition**
    - **Should enhance network investment**
      - **Should improve competition**
      - **Should improve supply security**

# Transmission Investment by Integrated and Stand Alone Transmission Companies (1975–2003)

Data are for  
USA

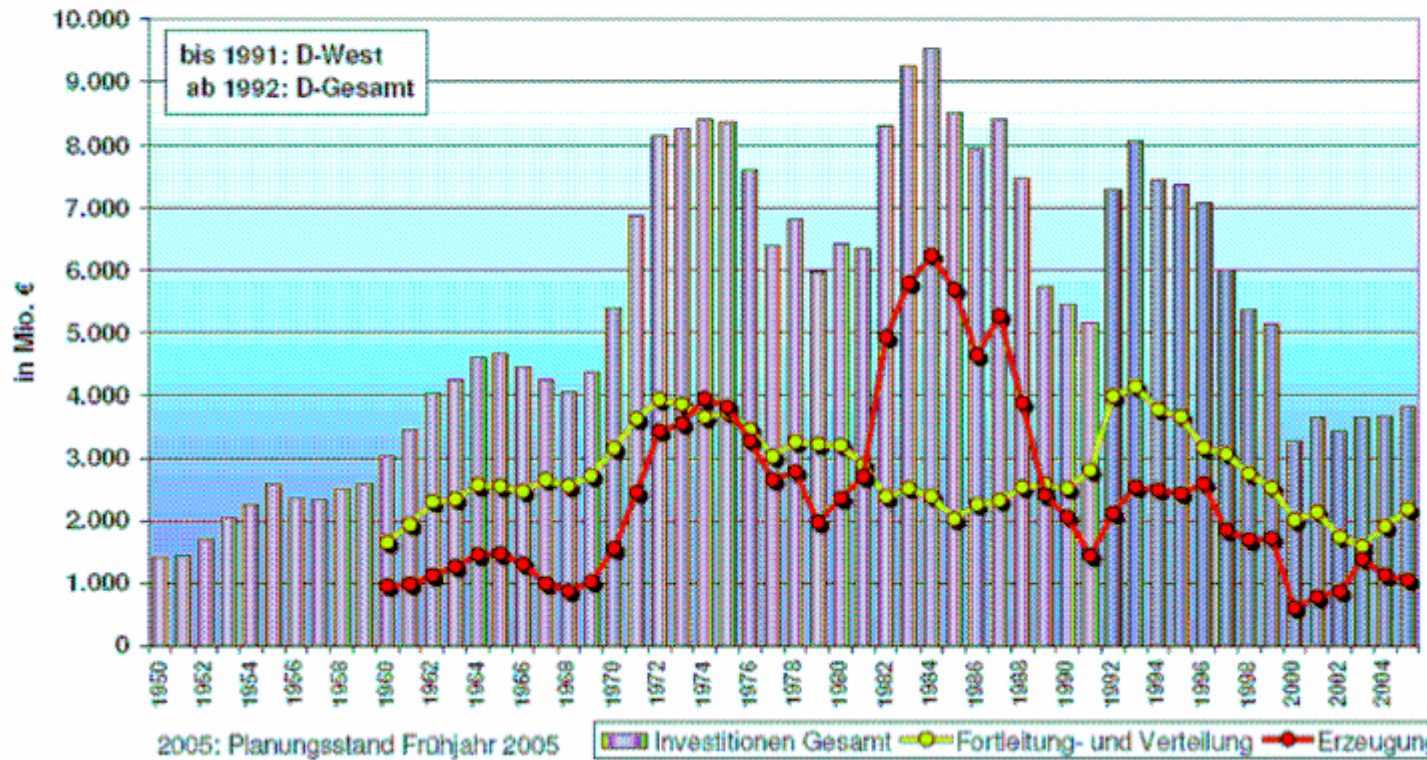
The increase  
is not  
sufficient

Source: Edison  
Electric Institute,  
brought in a  
presentation by T.P.  
Lyon



# Investment in Germany

Investitionen der deutschen Stromversorger 1950 bis 2005 (real)  
-in Preisen von 2000 auf Basis des Index der Erzeugerpreise gewerblicher Produkte-



**Investment in  
power plant  
and networks  
in Germany**

**Start of new  
investment  
wave.**

# What are the issues and what can be done?

- „History matters“
- Institutional obstacles
  - Siting
  - Winners and losers
  - Lack of transparency in pricing
- Industry structure
  - Does vertical integration impede network investment?
  - Does the creation of ISO's help?
- Regulation of network revenues
  - What to do with congestion revenues?
  - Effect of price-based regulation: regulation adds
  - The role of merchants

# „History matters“

- **Both USA and Europe**
  - Network constraints „within“ networks low
  - Network constraints „between“ networks high
- **Networks were not developed for cross-border trade**
  - Liberalization stimulated cross-border trade
- **Two key questions:**
  - **Is network developments path-dependent?**
    - How much adjustment do we need, given that we are where we are?
    - New T-capacity is not for free
  - **Do we need a nodal pricing system?**
    - Would endogenous market coupling suffice?

- **Lack of investment in new interconnectors in USA**
    - **Siting may be biggest obstacle**
  - **US approaches:**
    - **„Corridors of national interest“**
      - **Gives FERC more authority**
    - **Use of sea-cables (eg. merchants)**
  - **Siting is a major obstacle in Europe as well**
    - **In many cases, real constraint not on border but somewhere in a network**
    - **Takes much time**
- } **We may be observing just this delay in practice**

# Winners and losers

- **New transmission capacity may not be a win-win situation**
    - **Suppose country A has low prices and exports power**
    - **And country B has high prices and imports power**
      - **Depending on circumstances:**
      - **prices will decrease in B**
      - **and increase in A**
    - **Would country A gain (short term)?**
      - **Producers gain from exporting**
      - **Electricity consumers lose**
      - **Competition in country A may go down (RSI and pivotal firm)**
- } **If you were a politician in country A, would you approve such a line?**

# Lack of transparency in pricing

- **Network pricing does not sufficiently reflect scarcity**
    - **Within networks hardly network pricing**
    - **Between networks, some exceptions:**
      - **spot price differences**
      - **quite significant congestion revenues**
  - **Alternatives**
    - **UK: administered locational pricing**
    - **Scandinavia: zonal pricing by market splitting**
    - **USA: nodal spot pricing plus FTRs or ARRAs**
      - **In the US this also serves to facilitate new investment**
- } **If nothing else, refined locational pricing signals investment requirements**

# Industry structure: The VIU-argument

- Are incentives of vertically integrated utilities (VIU's) to invest in new transmission capacity low?
- The argument
  - Building new and larger interconnector capacity creates stronger competition for the competitive businesses
  - Hence, integrated utility will hesitate to invest in new T
  - The same may hold for new connections of power plants
- Argument is basically correct
  - Important in the USA as well
  - One of the drivers behind ISO's and RTO's
- However, there are limits to the VIU-argument

# Three limits to the VIU argument

- **VIU's may be short on generation side and long on purchase side**
  - Additional T-capacity allows more purchase options and thereby increases competitiveness
- **VIU's may have low-cost, excess generation capacity**
  - Additional T-capacity allows larger market
- **Exporting VIU's can actually decrease competitiveness on own market**
  - For instance: residual supply index
  - If demand D goes up, RSI goes down

$$RSI_j = \frac{\sum_{i \neq j} Q_i}{D}$$

# Vertical unbundling?

- **What are the options?**
  - **Full ownership unbundling of TSO**
    - Takes away incentives to discriminate
    - But: externalities between new power plant and new network
  - **Independent System Operators (ISO's)**
    - Split of transmission owner (TO) and system operator (SO)
    - TO can stay at VIU
    - SO: ‚independent‘
- **ISO's address part of the problems but not all**
  - **Key questions:**
    - who is ISO?
    - who decides on investment?

# ISO's: examples

- **Switzerland**
  - **Swissgrid**
    - Formally a TSO
    - The VIUs own Swissgrid
    - Is this really independent?
- **BETTA in UK**
  - **ISO in Scotland**
  - **TOs decide on investment**
- **Italy**
  - **A move from ISO to TSO**
    - Is this a move back or forwards?
    - What happened?

# ISO examples: PJM in the US

- **USA:**
  - **Mostly privately owned utilities**
  - **Largely vertically integrated (at least G and T)**
  - **Fragmented networks**
  - **Relatively weak interconnectors**
  - **Sometimes poor coordination between TSOs**
  - **Many state regulators & one federal regulator (FERC)**
- **FERC policy:**
  - **Independent System Operators (ISOs)**
    - **Similar to Regional Transmission Organizations (RTOs)**
      - **TO – SO split**
      - **Large-scale horizontal integration of SOs**

# ISO's: examples: PJM in the US

- **PJM**
  - **Large ISO/RTO at east-coast of US**
  - **PJM is owned and governed by its members**
  - **Members are:**
    - **Generators**
    - **Transmission owners**
    - **Suppliers and traders**
    - **Distributors**
    - **Large end-users**
  - **Members determine a board of independent executives**
- **Note: the utilities are part of the ISO!**

# ISO's: examples: PJM in the US

- **Transmission Investment**
  - **Regional Transmission Expansion Plan**
    - ISO develops RTEP
    - Utilities and TOs are heavily involved
  - **The ISO identifies necessary enforcements**
  - **Actual investment:**
    - **First the market**
      - Window of opportunity for merchants
      - Paid by FTRs or ARRs
    - **Then handed over to TO**
    - **In last instance, TO is ordered by ISO**
      - Assets included in regulatory asset base
- **Note: ultimately ISO decides on investment!**

- **Is the PJM approach a model for Europe?**
  - **Have large cross-border ISOs**
  - **ISO as a club**
    - Stakeholders are members
    - Covering all sides of the market
  - **ISO takes responsibility for dispatch and thus interconnectors**
    - Large-scale market coupling
  - **Investment should be continuous process between stakeholders**
    - ISO serves as platform
  - **Ultimate investment decision for ISO**
- **Revenues of investment are of key importance**

# Regulation: Congestion Revenues

- **Scarce interconnector capacity**
  - Auctions give substantial congestion revenue
- **What to do with these?**
  - **Art. 6.6 of EU Regulation on Cross-border Exchange**
    - Cost of redispatch
    - Lower network charges
    - Re-invest to mitigate congestion
- **Policy option: Why not restrict to reinvestment obligation?**
  - Up to some limit
    - otherwise line capacity too big
  - Except for shown inefficient cases
  - Question: What about reinvestment in power plant?

# Regulation: price-based regulation

- **Topical research:**
  - Price-based regulation is good for short-term efficiency, but seems be detrimental for long-term investment
- **Some reasons:**
  - Market risk and regulatory uncertainty
  - Low incentives to maintain quality
  - Price-based regulation can delay significant new investment vis-a-vis cost-based regulation (Borrmann & Brunekreeft, 2007)
- **What to do?**
  - Price-based regulation plus cost-based „adders“
  - In some cases: allow (unregulated) merchants

# Regulation: Merchants (MTI)

- **Art. 7 of the EU Regulation on Cross-Border Exchange**
  - **Merchants can be inefficient if relying on competition effect**
  - **Merchants can be inefficient compared to optimum, but perhaps better than no outcome**
- **Three major advantages of merchants:**
  - **„Race for investment“ accelerates investment**
  - **No regulation accelerates investment**
  - **Investment criterion is commercial**
    - **not „public interest on both sides of the line“**
    - **mitigates political opposition on losing side**
- **Merchants will not solve our problem but may help**

# Conclusions

- **Investment activity in new transmission has been low.**
  - **Unclear why**
- **Institutional obstacles?**
  - **Siting appears strong cause of delays**
- **Vertically integrated utilities may have low incentives to increase T-capacity**
  - **ISO with authority to order investment may address the problem adequately**
- **Price-based regulation in strict form may impede investment**
  - **Cost-based “adders” in addition to price-based regulation**

## Network Investment

- Thank you for your attention! -

**Gert Brunekreeft**

**International University Bremen\* & Bremer Energie Institut**

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