Network Investment and Network Regulation

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BACKGROUND

Regulation in the face of investment

- Massive investment in electricity network
  - Germany: ca. €27-42 billion for DNO expansion (to 2030)
  - Germany: ca. €20 billion for TSO expansion (to 2022)
  - More to come for replacement
  - Europe: ca. €104 billion for TSO expansion (to 2022)
  - Europe: ca. €140 billion for cross-border E-transmission (incl. offshore) alone (to 2020)

- How does the regulatory framework deal with this?
  - Do we need more investment-friendly regulation?

EU-commission

Roland Berger (2011), „The structuring and financing of energy infrastructure projects, financing gaps and recommendations regarding the new TEN-E financial instrument", Report for European Commission, July 31, 2011

- **Cross-border expansion requirement massive and it is too slow**
  - Among other things: Regulatory issues
    - Regulatory returns are too low to provide investment incentives
      - Delays
    - Late recognition of pre-operational costs
      - „t-2" Problem
- **What to do?**
  - Make investment more attractive by introducing „priority premiums": ▸ „to speed up investments"

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DENA-DNO Study (2012)

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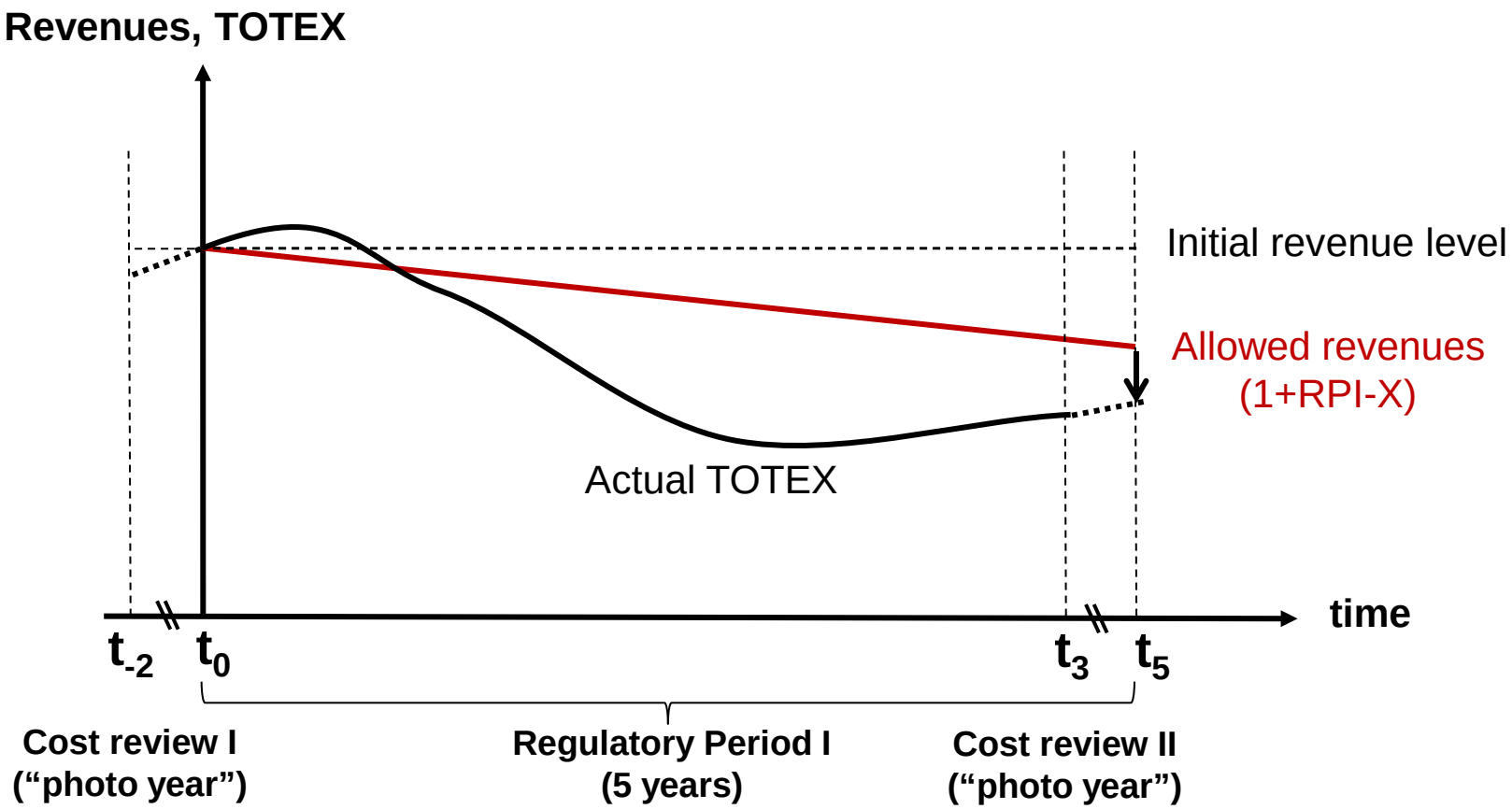
- **„DENA-Verteilnetzstudie 2012“: (Brunekreeft, Rehtanz, et.al., 2012)**

http://www.dena.de/projekte/energiesysteme/verteilnetzstudie.html

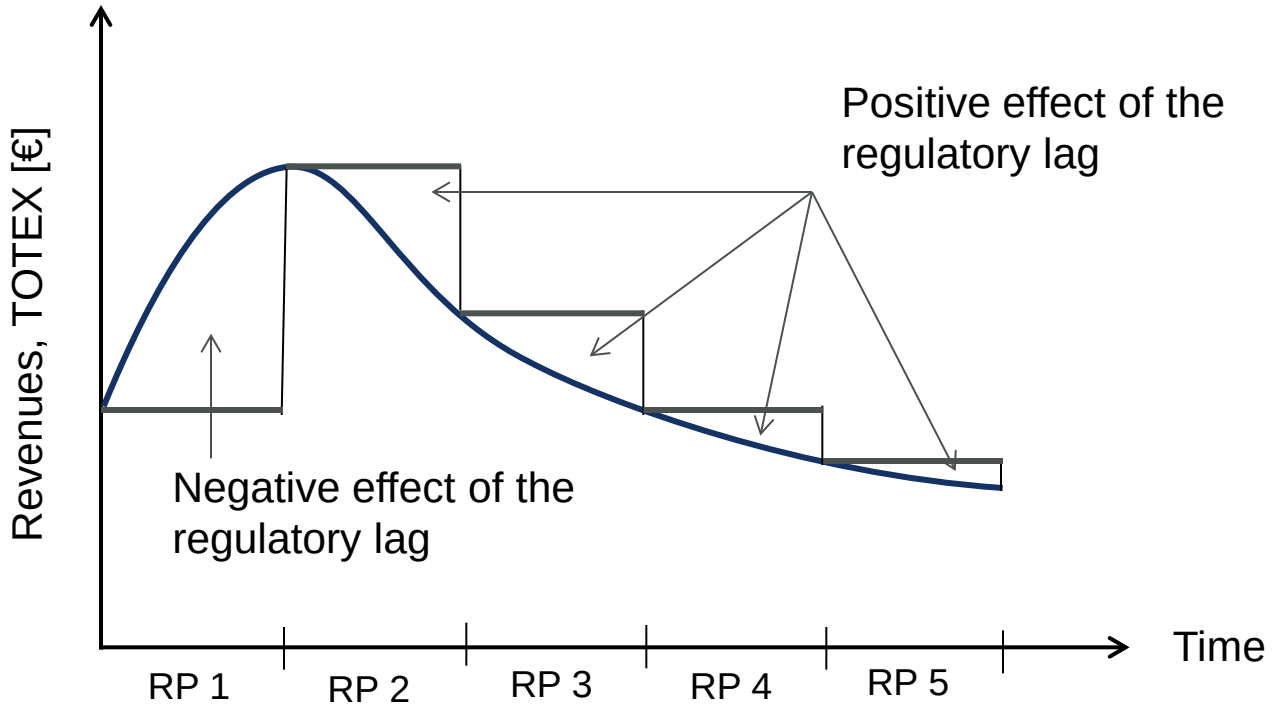
- **Background:**
  - What is the need for DNO-expansion up to 2030 for energy transition (wind and solar)?
  - Does network regulation (ARegV) facilitate this?

- **Main conclusions:**
  - Expansion investment requirement (to 2030) ca. €27 - €42 billion.
  - Regulation does not allow full cost-recovery for DNO with high investment (replacement and expansion) requirement
    - Effect of „regulatory lag“ („t-5“, „t-2“) is too strong

Incentive regulation and efficiency



The effect of the regulatory lag



REGULATION AND THE TIMING OF INVESTMENT:

PRICE-BASED REGULATION IMPROVES COST-REDUCING EFFICIENCY, BUT HINDERS COST-INCREASING INVESTMENT

Brunekreeft G. & Borrmann, J., 2011, „The Effect of Monopoly Regulation on the Timing of Investment“, Bremen Energy Working Papers, No. 9 Feb. 2011, Jacobs University Bremen

A model of regulation and timing

- **Three key assumptions**
  - **Sufficiently large projects**
    - Sufficiently high investment outlay, *I*
    - Scale economies in construction: lumpy
    - ▸ New investment is one-off event; no repeating investment
  - **Sufficiently strong dynamics**
    - Variable cost increase in time: "wear and tear" - "α > 0"
      - ▸ *Replacement* investment
    - Demand growth - "g > 0"
      - ▸ *Expansion* investment
  - **Investments cause "cost"-increase:** $p_1 < p_2$

▸ **Note: the focus is regulatory design; this model is without uncertainty**

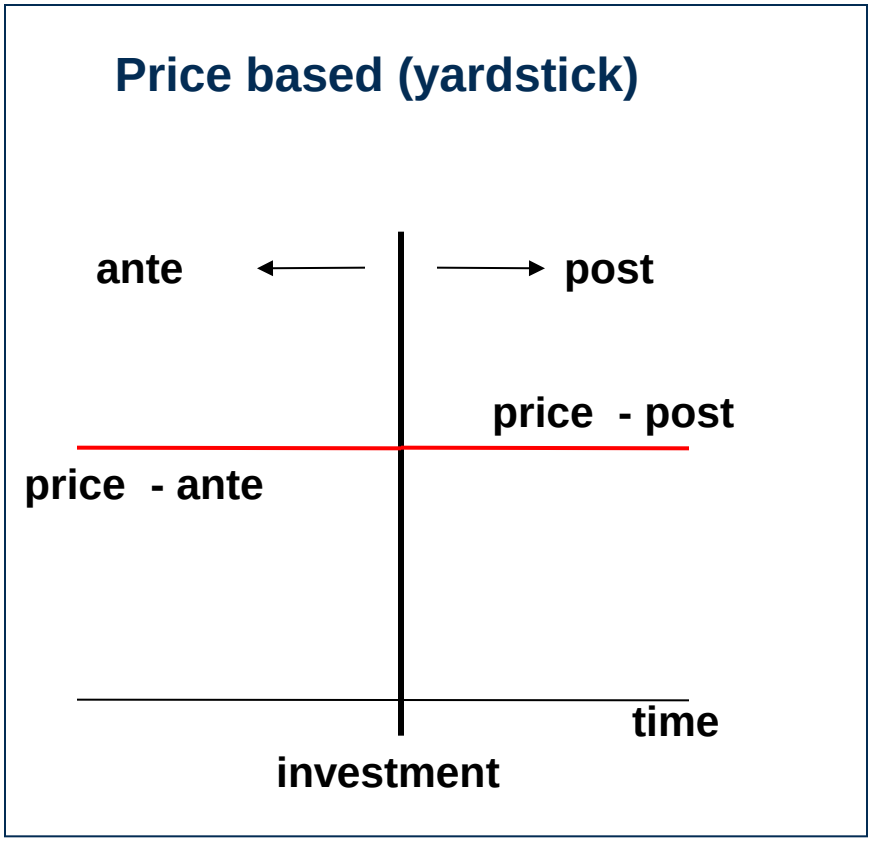
The comparison

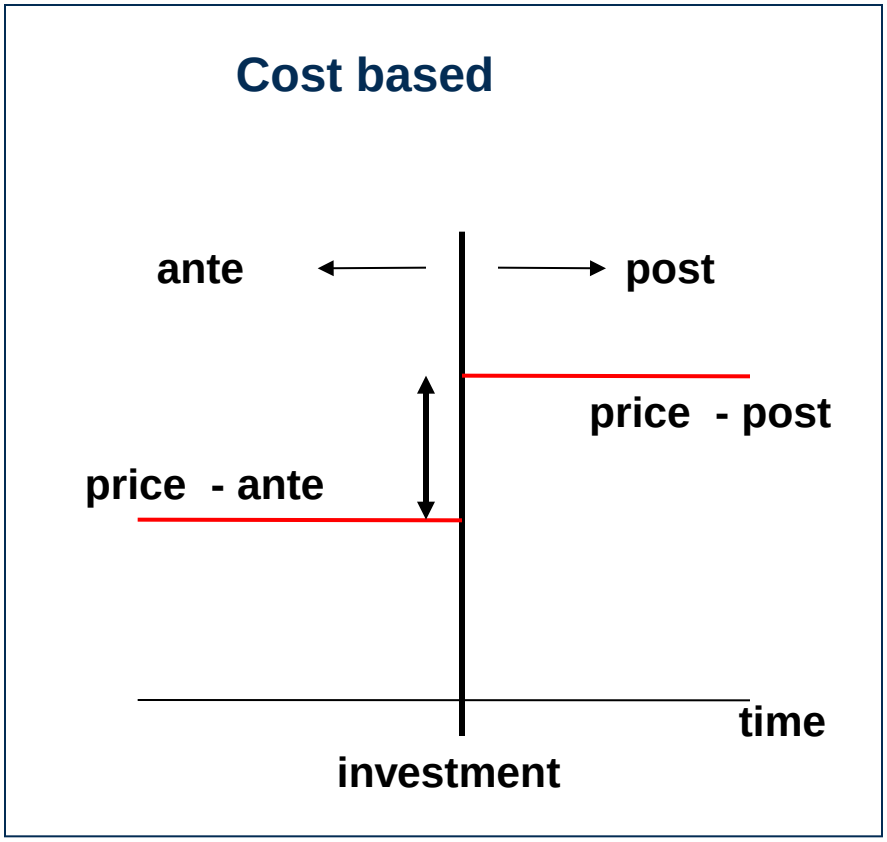
- **In all cases we assume a monopoly (no race for investment)**
- **The maximization problem is the optimal investment *timing***

- **We compare four types:**
  - Social welfare maximizer (SW)
  - Unregulated monopolist (Π)
  - Price-based regulated monopolist (YR) - Yardstick
  - Cost-based regulated monopolist (CB)

- **Cost-based versus Yardstick:**
  - Cost-based: (own) investment triggers (own) price change
  - Price-based/Yardstick: (own) investment does not affect own regulated prices

Price-based v. Cost-based





Yardstick is defined to be a weighted average of the ante and post cost-based price:

$$p^{YR} = \gamma p_1 + (1-\gamma)p_2,$$

Main results (Brunekreeft & Borrmann 2011)

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"**Proposition 1:** For the case of wear and tear, and assuming $p_2 > p_1$, cost-based regulation accelerates the investment date, compared to price-based regulation …"

"**Proposition 2:** For the case of demand growth, assuming $p_2 > p_1$, cost-based regulation accelerates the investment date for $K > 0$ compared to price- based regulation, .."

"Proposition 3: …

In words, if we assume that there is no capacity before investment (green field), then a higher allowed price unambiguously accelerates the investment date."

- priority premium

What next?

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- **How to close the regulatory gap?**

- **Different approaches:**
  - UK-style: ex-ante investment allowances
  - Austria / Norway: allow immediate and autonomous pass-through of investment cost into revenue cap
  - Top-ups (priority premiums) to compensate for reduction in rate-of-return

- **Difficulty in Germany:**
  - Very diverse background among (900) DNO
  - Is „optionality“ a way forward?

Thank you!

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