DEVELOPING INCENTIVES FOR INNOVATION BY NETWORK COMPANIES: INSIGHTS FROM GERMANY

WEBINAR 28.02.2024

FflorENCE SCHOOL OF REGULATION

HTTPS://BREMEN-ENERGY-RESEARCH.DE/PUBLICATIONS/EXTERNAL/

GERT BRUNEKREEFT

CONSTRUCTOR UNIVERSITY BREMEN

GBRUNEKREEFT@CONSTRUCTOR.UNIVERSITY

Background

- Study for TenneT-TSO on the further development of incentive regulation (joint with Oxera)
- Research-project “ARegV3.0” funded by SEF-BW
- Study for TransnetBW on the further development of incentive regulation (joint with Oxera)
- Brunekreeft, G., 2023, “Improving regulatory incentives for electricity grid reinforcement”, Study for Autoriteit Consument en Markt (ACM), The Hague.
- In process: Research-project “whole-system-approach” funded by SEF-BW

Report for TransnetBW (2021); Jacobs University Bremen joint with Oxera

https://bremen-energy-research.de/wp-content/paper/211103%20Report%20TBW%20FINAL_english%20translation.pdf

JACOBS UNIVERSITY oxera

Further developing incentives for digitalisation and innovation in incentive regulation for TSOs

Client:
TransnetBW GmbH (Stuttgart)

Bremen, 03 November 2021

This is an unofficial translation, therefore no legal rights can be reserved based on this document. The authors cannot be held responsible for any erroneous translations and is presented as is. The original report in German is titled: “Weiterentwicklung der Anreize für Digitalisierung und Innovation in der Anreizregulierung der ÜNB”.

PROBLEM AREAS AND PROPOSED SOLUTIONS

Problem area	Example of use	Proposed solutions
digitalisation & innovation with predominantly **external** effects	Picasso	Market-facilitation incentive bonus with predetermined cost budget
digitalisation & innovation with predominantly **internal** effects	DA/RE	Digitalisation budget with sharing factors
Innovative regulation enabling "risk taking"	SINTEG-V	Experiment budget Regulatory innovation trial Pioneer bonus

PROBLEM AREAS

External: incentives for the future roles of grid operators

- New areas of responsibility for grid operators
- Not or not sufficiently covered by the Incentive Regulation Ordinance (ARegV)

Internal: distortions in regulation

- Base-year effects
- OPEX-CAPEX incentive bias

Risk-taking with innovations

- Uncertainty
- Freeriding problem
- Experimenting

Brunekreeft, G.; Kusznir, J. & Meyer, R. (2020). "**Output-oriented regulation** – an overview, *Bremen Energy Working Papers*. https://bremen-energy-research.de/wp-content/bewp/bewp35en.pdf

External means that costs and/or benefits are incurred by third parties (e.g. society or other system operators) and not by the decision maker.

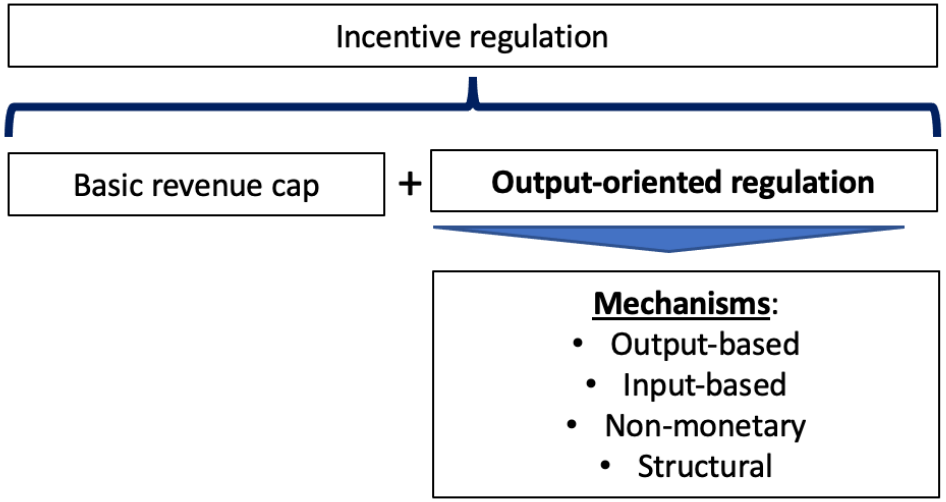
Internal means that costs and benefits are incurred mainly by the decision maker.

In principle incentivised under ARegV; however, distortions may occur.

Output-oriented regulation (OOR)

1. New and changing roles and responsibilities of network operators
   - Basic revenue cap focusses on internal efficiency
   - External effects mostly not incentivized
2. Arguments for OOR:
   - Value creation (Spence, 1975)
   - Risk

Output-oriented regulation supplements efficiency-oriented price-cap/revenue-cap regulation with revenue elements that reflect the achievement of specific regulatory output targets, rather than just pursuing cost minimization.



Brunekreeft, G.; Kusznir, J. & Meyer, R. (2020). "**Output-oriented regulation** – an overview, *Bremen Energy Working Papers*. https://bremen-energy-research.de/wp-content/bewp/bewp35en.pdf

Brunekreeft, G.; Kusznir, J. & Meyer, R. (2020). „The Emergence of Output-Oriented Network Regulation", *Oxford Energy Forum,* Issue 124, September 2020, S. 34-38.

DIGI EXTERNAL (1/2) – THE PROBLEM

Digitalisation & innovation with predominantly **external** effects

Background

- New (statutory) TSOs' tasks create welfare for society (value creation) but are profit-neutral for the TSOs
- Cost-side base-year problem

Example

PICASSO

- Enables pan-European trade of aFRR
- Pan-European collaboration project

Challenges

Incentive distortions under ARegV

- *Value creation* (external effect) basically not incentivised by the Incentive Regulation Ordinance (ARegV)
- Costs are not or not sufficiently incentivised
  - Partially non-controllable costs, e.g. via voluntary self-commitments
  - Partially ARegV

    → Base-year problem

Quantification

Quantification using the PICASSO example shows considerable welfare gain compared with costs

- Depending on the incentive factor, the incentive bonus could be significant for the grid operators

DIGI EXTERNAL (2/2) – PROPOSED SOLUTION

Digitalisation & innovation with predominantly **external** effects

Market-facilitation incentive bonus with predetermined cost budget

Administration costs | **External value creation**

Incentive bonus = costs + α * (welfare – reference)

Description

- Incentive bonus is based on the difference between welfare gain and a reference value.
  - In the example: production costs in pan-European trading that are saved through PICASSO.
- Collaborations: "total-α" across system operators; this is divided among all participating TSOs.

Benefits

- Incentives for system operators are based on welfare gain for society. → If TSOs act to maximise profits, welfare increases

Challenges

- Definition of project scope
- Across grid operators for collaboration projects
  - Compatibility with other regulatory systems
- Indicators:
  - Welfare gain
  - Reference value
- Who determines the incentive parameter α?
- Who pays?

DIGI INTERNAL (1/3) – THE PROBLEM

Digitalisation & innovation with predominantly **internal** effects

Background

Costs primarily have an effect internally, on the efficiency of grid operations

- The real objective of symmetrical and optimised incentive regulation
- Does not exist in practice

  → Incentive distortions

Example

DA/RE

- Data exchange for improved redispatch for congestion management
- Cloud solution (OPEX) is more efficient than data centre (CAPEX)

Challenges

Incentive distortions under ARegV

- Underrecovery of costs due to base-year problem (in particular with initial expenses)
  - Example: transition to Redispatch2.0
- Increasing OPEX may lead to CAPEX-OPEX bias
- Limited duration of regulatory period reduces the total amount of retained efficiency gains

Quantification

Quantification shows the CAPEX-OPEX bias

- An OPEX-based cloud solution may be more cost efficient, but due to regulatory distortions more costly for TSOs than a CAPEX-based data centre
- Primary base-year effect

DIGI INTERNAL (2/3) – PROPOSED SOLUTIONS

Digitalisation & innovation with predominantly **internal** effects

Digitalisation budget, applying sharing factors

Description: budget approach

- Project-specific digi-budget defined in advance; can be specified annually
- OPEX- und CAPEX-specific sharing factors
- Across TSOs for joint projects

Primary benefit

- Base-year effects are eliminated since the start year is the project start.

Challenges

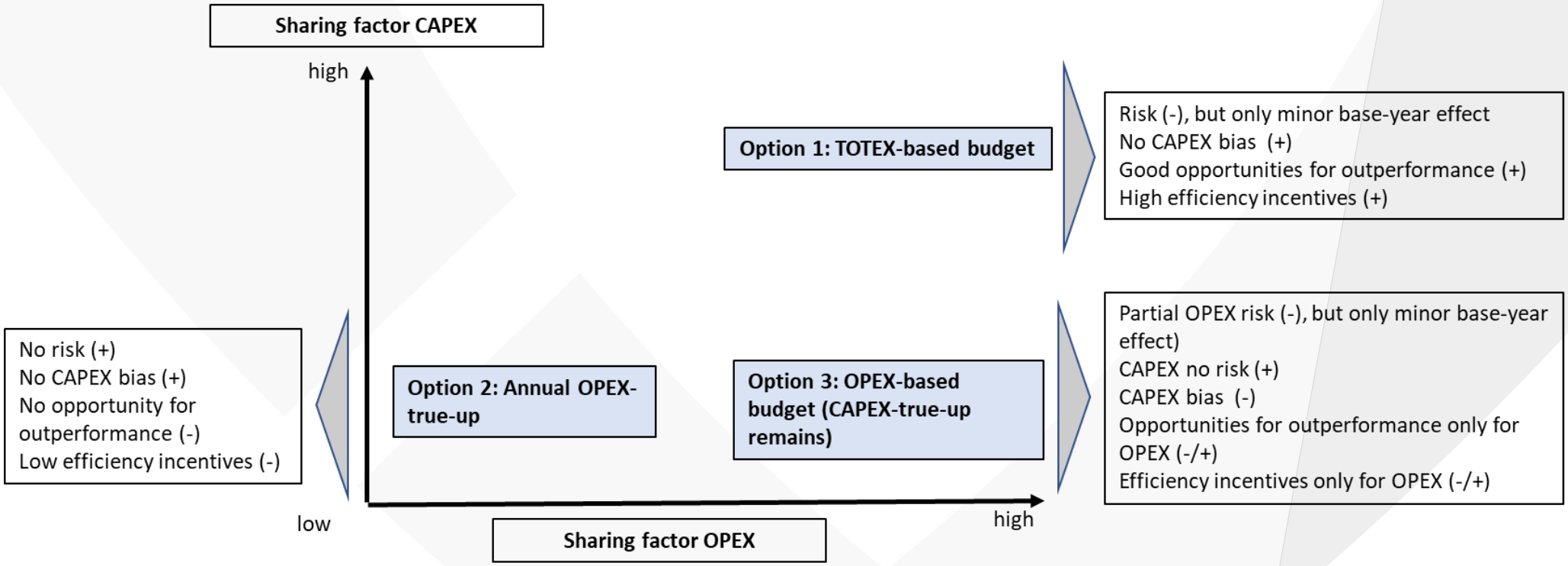
- The budget must be agreed with the regulator
- Risk of overestimating the submitted budget

Three extreme versions depending on participation factors:

- Option 1: TOTEX budget approach
- Option 2: OPEX true up
- Option 3: OPEX budget approach

DIGI INTERNAL (3/3) – PROPOSED SOLUTIONS

Digitalisation budget with participatory aspects



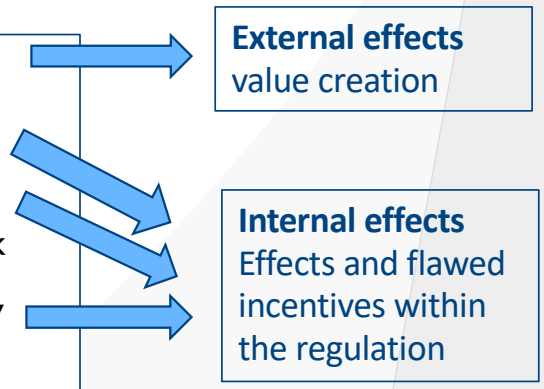
INCENTIVES FOR INNOVATION

Haffner et al. (2019). Do current regulatory frameworks in the EU support innovation and security of supply in electricity and gas infrastructure?, Report for the European Commission

- The study Haffner et al (2019) examines the regulation of gas and electricity TSOs in 26 Member States in relation to investment incentives, with a focus on security of supply and innovation.
- General conclusion (Haffner et al., 2019, p. 10): Insufficient incentives for innovation under the regulation

Identified challenges for efficient innovation

A. Socially beneficial but (for the TSO) not viable projects are not sufficiently incentivised;
B. Bias towards capital expenditure (CAPEX) based solutions instead of operational expenditures (OPEX-solutions);
C. No specific provision related to innovation (e.g. allowances, duties, etc.);
D. TSOs are deterred from risky investments due to perceived high project risk and strict penalties for not meeting deadlines;
E. Smart grid technologies reducing need for physical investments lower TSOs' financial return, creating a disincentive to invest for TSOs; and
F. Lack of clarity of mandate for TSOs in certain innovative fields.



Haffner et al., 2019, p. 10.

INCENTIVES FOR INNOVATION

ENTSOE (2021) European Electricity Transmission Grids and the Energy Transition Why remuneration frameworks need to evolve

- Adequate remuneration for investments, such as:
  - determination of a lower bound (floor) of risk-free-rates or WACC/RoE
  - enlargement of the Regulatory Asset Base (RAB) for sustainability and decarbonisation measures
  - Remuneration for certain operational activities (e. g. market facilitation tasks), not just focusing on efficiency targets on operational expenditures (OPEX)

- Adequate setting of incentives for innovation and performance, such as:
  - budgets for innovation exempted from cost incentives
  - WACC adder for selected, well-defined projects considered of outstanding importance

Proposals for such adjustments and potential solutions have already been initiated by certain TSOs ("Better Projects" by Amprion or "FOCS" by TenneT) and should be further discussed with European regulators.

Source: ENTSOE, 2021, p. 6

- The ENTSOE study (2021) identifies, above all, that TSOs are not sufficiently incentivized for tasks beyond the core area
- Regulation should be expanded

→ Incentivize OPEX

→ Incentivize innovations

→ Performance-based regulation

→ FOCS: fixed OPEX CAPEX share

INNOVATIVE REGULATION ENABLING “RISK TAKING” (1/2) – THE PROBLEM

Background

Dealing with experimental innovations

- Innovations must be tested, under technical *and* regulatory aspects

Example

SINTEG-V

- Allows “Experimentation clause” (section 12)
- Balances out economic disadvantages for **third parties** (grid users) if they are affected by the SINTEG project

Challenges

Experiments can quickly reach the limits of the regulatory framework

- The experiments cannot or not fully be carried out
- Minimal learning effects
- Technologically incomplete
- Experiments must adhere to the applicable regulatory framework so that the regulatory framework itself is not tested

Practical experience

Interview-based experience with section 12 SINTEG-V are discouraging; it has hardly been applied for

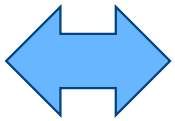
- Legal uncertainty
- Economical risk
- Administration costs
- Limited scope for application

DEFINITION

Bauknecht, D. et al. (2020) Experimenting with policies: Regulatory Innovation Zones as a tool for sustainability transitions, Oeko-Institut Working Paper 4/2020.

Regulatory sandboxes (experimentation clause). Bauknecht et al., 2020, p. 16:

„The starting point for this type of experiment is technical or social innovation. Regulatory exemptions are derived from an analysis of what changes in regulation is needed to test these innovations“



Regulatory innovationstrial (RIT). Bauknecht et al., 2020, p. 16:

„The starting point is societal goals and the question of which regulatory options can be used to achieve them. The evaluation of regulatory options is at the core of these projects, regarding such criteria as effectiveness, efficiency, justice implications, acceptance and unintended side-effects.“

SINTEG-VO (SECTION 12)

- Within the framework of the five SINTEG projects, the SINTEG Regulation creates an experimentation clause:
  - Compensation of economic disadvantages for third parties (network users) insofar as they are affected by the network operator's procurement of flexibility within the framework of the SINGTEG project

Key features:

- Scope of application for a period with:
  - grid congestion, or,
  - Negative prices on the stock market
- Burden of proof on the part of the applicant
  - Proof from the auditor
- Cost-neutral
  - No additional financial incentives
- Settlement lies with the network operator
  - Regulation Account (ARegV)

Insights from expert-interviews

Experimentiation clause (regulatory sandbox) in the SINTEG-VO was hardly applied

Legal uncertainty	• **Problem:** Ex-post regulation - application of the rules uncertain after experimentation • **Proposal:** Project-specific exemptions through individual administrative acts instead of a general regulation
Economic risk	• **Problem:** Ex-post mechanism for reimbursement and lack of incentives (monetary/non-monetary) for participation of other stakeholders • **Proposal:** Introduction of actor-specific incentives
Administrative effort	• **Problem:** Bureaucratic verification procedure and lack of legal and administrative advice/support from public authorities • **Proposal:** Simplified procedure (de minimis limit) and active support from the BNetzA/BMWi
Narrow scope of application	• **Problem:** Narrow scope and limited participation in the project • **Proposal:** Definition of flexible, project-oriented rules

INNOVATIVE REGULATION ENABLING "RISK TAKING" (2/2) – PROPOSED SOLUTIONS

1. Experiment budget

Description

- Aims at integrating third parties through an "experimentation clause"
- Across grid operators for collaboration projects

Benefits

- Reduces administrative effort
- Strengthens incentives

Challenges

- Determining the budget
- Setting suitable KPIs

2. Regulatory innovation trial

Description

- Recommendations for actions could be trialled as RIT
- Collaboration between system operators possible

Benefits

- Regulatory flexibility; ARegV does not need to be amended constantly
- Testing regulatory alternatives

Challenges

- Regulatory uncertainty, since details are frequently not specified

3. Pioneer bonus

Description

- A group of collaborating system operators participate in an innovation
- Funded by the other system operators or by all system operators
- The costs go into the regulatory cost base of the contributing system operators

Benefits

- Project collaborations can be initialised quickly and tailored for energy networks

CONTACT DETAILS

Prof Gert Brunekreeft

gbrunekreeft@constructor.university
www.bremen-energy-research.de