Regulatory contributions to smarter electricity networks

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Main topics

1. Presentation of CEER Smart Grids Conclusions Paper
2. Implementation of 3rd Package concerning R&D
3. Specific NRA examples
• The **CEER Smart Grids Conclusions Paper** is based on a questionnaire responded to by 24 NRAs, 14 of which indentified roadmaps or implementation plans.

• Salient features of the paper:
  • Performance-based regulatory approaches focussed on **network outputs**:
    • Continuity of Supply (CoS) indicators and incentive regulation
    • Review of other potential performance indicators
  • Regulatory approaches to **encourage an adequate level of innovation**

Results from the Public Consultation and Paper available at CEER Web Page:
http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/Smart%20Grids
Typical example of performance-based regulation of network outputs: **Continuity of Supply** (CoS)

Initial results (from the 5th CEER Benchmarking Report):
- 15 CEER countries use CoS indicators as a revenue driver for distribution. 11 countries use CoS indicators or system availability indicators as a revenue driver for transmission.
- 6 other countries are introducing CoS incentive schemes.
- The continuity of supply **improvement** tends to become **stable**: around half of the countries show a decreasing duration of interruptions; in the other countries (characterised by good continuity levels) the duration is almost on the same value.
The CEER status review on smart electricity grids analyses 9 other potential performance indicators:

- Hosting capacity for distributed energy resources
- Allowable maximum injection of power without congestion
- Energy not withdrawn from renewable sources
- Measured satisfaction of grid users for the services they receive
- Level of losses in networks (revenue driver in 12 countries)
- Actual availability of network capacity with respect to its value
- Ratio between interconnection capacity and electricity demand
- Exploitation of interconnection capacity
- Time for licensing/authorisation of a new infrastructure
• A significant number of countries use some of the 34 **performance indicators** proposed in the Smart Grids Conclusions Paper, either:
  • for **monitoring purposes**
  • as a **minimum requirement**, or
  • as a **revenue driver**

• The experience of CEER members shows **differences in the calculation** of performance indicators and the way they are (or can be) used as a revenue driver
• Various approaches to **encouraging innovation** in electricity networks through different regulatory regimes:
  • Different incentive mechanisms to encourage network companies to pursue innovation/demonstration projects are already in place or planned (2+4 countries)
  • Some countries rely on current approaches, which do not preclude innovative solutions

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<th>Approach 1 in place:</th>
<th>Approach 2 in place:</th>
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<td>7 years of innovation incentives</td>
<td>Competitive selection process of demonstration projects in distribution medium voltage (1-35 kV) networks</td>
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<td>Recent funding of projects sponsored by distribution network operators through a Tier for small scale projects and a Second Tier on a competition-like basis for a small number of projects</td>
<td>Tariff incentive through 2% - 12 years extra-remuneration of capital expenditures</td>
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<td>Requirements for dissemination</td>
<td>Selection ranking based on benefit/cost</td>
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<td>Requirements for dissemination</td>
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• Regarding **dissemination** of the results and lessons learned from the demonstration projects:
  • 9 countries with no guarantees in place
  • 7 countries said there are guarantees and generally there are **clear rules to ensure dissemination**

• CEER recommends **ensuring dissemination of the results and lessons learned** from the demonstration projects
The InovGrid Project

- InovGrid is a smart grid demonstration project developed by EDP Distribuição, the main Portuguese DNO.
- Évora InovCity is a living lab for the InovGrid project, with different dimensions, including smart metering, public lighting, EV, energy efficiency and client interaction.
The InovGrid Project

- The InovGrid Project extends the “intelligence” on the grid to the low voltage network using new equipments and technologies.

- During the regulatory period 2009-2011, ERSE accepted the estimated costs (15 million euro) for the 1st demonstration phase of the InovGrid project, accepting 85% of OPEX costs and 100% of CAPEX costs related to the project.
Range of regulatory incentives

Performance enhancement regulatory tools

- Incentive to optimal replacement
  - Different accounting and economic life
  - Expected avoided CAPEX outweighs effect on allowed revenues
  - It’s importance and application depends on RAB determination rules and procedures
  - In PT applicable to TSO

- Losses reduction incentives
  - A target for losses for the regulatory period
  - Penalty/premium on the basis of performance
  - Difficulties in determining what depends on DSO behavior

- Cost allowance for Environmental performance
  - Complementary to legal obligations
  - Cost reduction effect on environmental responsibilities of the DSO company should be mitigated

- Performance of assets (availability) incentives
  - Only for some assets clearly identifiable and effectively monitored
  - In PT applicable to TSO
  - Investment standard costs (TSO)
Quality of service incentives must assure that cost reduction is not at the expense of quality.

- **END<sub>Ref</sub>:** Energy not distributed of reference (target) (kWh)
- **ΔV:** Variation of END<sub>Ref</sub> (kWh).
- **VEND:** Valuation of the Energy Not Distributed (€/kWh)
- **RQS<sub>max</sub>:** Maximum amount of the reward (€)
- **RQS<sub>min</sub>:** Maximum amount of the penalty (€)
Regulation considering efficiency and innovation

Investment in smart grids follow clearly defined criteria ex-ante, with specific reporting and audit ex-post

- Smart RAB in total RAB and smart investment accepted for the regulatory period 2012-2014

Innovation CAPEX incorporates an RoR premium as part of the incentive scheme

- Composition of smart CAPEX revenue to be included in tariffs according with investment plans
- Risk of technological failure is borne by the regulated company

IPC-X, price cap regulation is (IPC-(x+xinov)); and xinov is linked with the roll-out of smart CAPEX

- Efficiency targets in DSO OPEX according to smart investment approved plans

- Consumers willingness to pay for more advanced technology increases when there is an explicit link with cost reduction;

- DSO benefits from smarter grids to achieve performance targets set in various incentive schemes;
Innovation related OPEX and CAPEX will have separate treatment

- Conceptual features of the regulatory scheme, including incentive to innovation

![Graph showing the relationship between OPEX, CAPEX, and Total Revenue]
Cost benefit analysis: DSO perspective

There is a trade off between the loss of revenues in OPEX and the extra revenues in CAPEX given the regulatory model

Actual data for 2012-2014 regulatory period (distribution grid, including INOVGRID project) of increase in CAPEX revenue and decrease in OPEX revenue (based on DSO estimates and NRA defined regulatory parameters)
When avoided investment is considered, cost benefit analysis shows favorable results for consumers…even in short term

Revenue decrease (cost saving, including NPV of future avoided capex in traditional infrastructure, relative to BaU scenario) and incentive expected to be paid by consumers for the regulatory period
Thank you for your attention!

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