Learning from Experiences of the prior Swedish Electrical Distribution System Regulation – Reference Material when Developing the Future Regulatory Incentives

Carl Johan Wallnerström, Royal Institute of Technology – KTH, Stockholm, Sweden

Lina Bertling, Chalmers University of Technology, Göteborg, Sweden
Agenda

- Introduction
  - Objectives
  - Background
- Description of the prior Swedish regulatory model
- Future Swedish tariff regulation
- Additional laws which give important incentives to the DSOs
- Concluding remarks
Introduction

Main question:
Who pays for infrastructure investments to achieve a “smarter” grid?
(natural monopoly)
Objectives

- Highlight the regulatory aspect of the “smart grid concept”
- Description of the prior Swedish regulatory model including hitherto unpublished material
  - Reference material: learning from its novelties as well as from its drawbacks.
- Shortly describe:
  - The upcoming regulation
  - Additional laws
Background

- In the 90s, the Swedish regulator identified a problem with increased tariff levels
- No satisfactory solution was found and no existing model was considered suitable enough
- A new performance-based tariff regulation with customer focus:
  - The Network Performance Assessment Model (NPAM)
The NPAM

- The model built up fictive reference networks, based on annual reported data from DSOs.
- The cost of operating the fictive network, possible decreased by a reliability function, (NPA) was estimated and then compared with the revenue:

\[ \text{Debiting Rate} = \frac{\text{Revenue}}{\text{NPA}} \]
The NPAM

- The model was advanced and innovative, but criticized, which resulted in a complicated legal process.
- 2008 the parties made an agreement and in January 2009 the model was formally abandoned although it could have been used (slightly modified) in an ex-ante regulation.
Future regulation

• From 2012: Historical data from the DSOs gives a preliminary revenue framework for a period of four years

• The regulation aims to give a stable revenue and facilitate investment planning

• Changed conditions compared with the forecast can be later adjusted
Future regulation

• A quality function based on mean customer reliability can affect the revenue framework

• The regulator has the ability to integrate more quality aspects, but these will probably not be included in the first phase, e.g.:
  – Administrative deficiencies
  – Voltage quality
  – Very short interruptions (< 0.05 hours)
Additional laws

- From 2006 every DSO must annually perform a risk- and vulnerability analysis regarding the reliability, including an action plan of future improvements if needed.

- From 2008, information about extensive outages has to be reported within 14 days.
Additional laws

- Individual compensation for outages $>12$ hours, which increasing with time
  - $\text{min } \sim 100 \text{ Euro } / \text{ customer, outage}$
  - $12.5-300 \%$ of the annual tariff

- Functional requirement of 24 hours from 2011, which could lead to consequences in addition to the customer compensation
Concluding remarks

- The regulator has the rule to provide incentives of cost efficient operation with acceptable reliability and reasonable tariff levels
- New incentives with smart grid!? 
- Several natural monopolies, with different operators demand an objective and fair regulation, i.e. not favors some DSOs
Concluding remarks

• The experiences from Sweden show on the importance of having a constructive dialogue between the regulator and the DSOs

• Another difficult task for the regulator is to settle the complexity, i.e. the balance between consider many details and the manageableness
Thank you for your attention!

cjw@kth.se,
www.ee.kth.se/rcam