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INCENTIVES FOR INVESTMENTS IN PRICE- OR REVENUE-CAP REGULATION

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Overview

In the course of liberalisation of the European energy markets an increasing number of countries is introducing incentive regulation schemes for electricity and gas distribution utilities. In Great Britain, Norway, the Netherlands and Austria incentive regulation is already in place, whereas in Germany discussions revolve around how to design an appropriate mechanism for the large number of distributors. In a system of incentive regulation the firms receive a cap on the revenues or prices for the duration of a regulation period. This upper limit requires the network operators to achieve certain efficiency gains by cost containment. The cap usually includes a correction for inflation, a factor accounting for the increase in productivity in the entire industry (general x-factor) and an individual goal for efficiency gains (individual x-factor). The latter is derived by benchmarking methods that capture the individual efficiency of each network operator.

To fulfil the imposed efficiency gains, namely cost reductions, firms have an incentive to reduce investments in their network´s infrastructure. Omitted maintenance and replacement investments lead to a lower reliability of energy supply. Due to long life cycles of assets an increase in the number of interruptions as a result of deferred investments becomes evident only in the long run and with delay. This so called “hysteresis problem” (see Figure 1) results in investment restraints. Firms that do not invest can on the one hand undercut the price or revenue cap more easily. On the other hand they can realise a higher efficiency score in the benchmarking if their asset base and thus their capital costs are lower.

Most recently discussions on quality of supply and measures for quality regulation have emerged and underline the importance of the issue of appropriate incentives for investments in incentive regulation schemes. In some regulatory systems first experiences have been made with a regulation based on quality indicators such as the SAIDI (system average interruption duration index). However, such an ex-post regulation based on realised quality levels might not be sufficient for setting incentives for investment decisions prior to a deterioration of reliability.

Methods

First, the main elements of an incentive regulation and their consequences on the investment activity of network operators are analysed theoretically. Second, international examples are drawn to show how countries with experiences in incentive regulation try encountering the problem of delayed investments. Under consideration of these attempts general conditions for investment incentives are derived, resulting in a proposal of measures on how to set up an investment-compatible regulatory framework.

Results

An incentive regulation like price- or revenue-cap regulation sets efficiency goals for network operators. If efficiency gains are realised by cost cutting firms may keep these profits. However, one problem of incentive regulation is the reduced investment activity. Due to the long longevity of network assets a lack of maintenance and replacement investments does not immediately translate into lower reliability. Quality effects are

revealed with a delay calling for measures that stimulate investment activity today and that consider the long horizon of investment decisions in the energy industry.

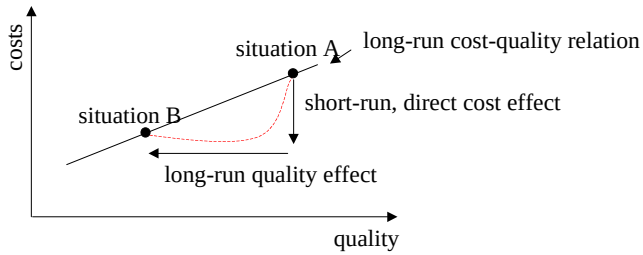

Figure 1 - The "Hysteresis-Problem"

Besides a long-term regulatory framework that establishes a legal security it is essential – as in every industry – that the return on investments is appropriate. Firms that engage in maintenance measures and reinvest at a sufficient level should not be "punished" by being confronted with demanding requirements and high cost cutting obligations. To set an investment-friendly framework under incentive regulation several measures must be in place. To account for cost increases due to investments an adjustment of the price- or revenue-cap within the regulatory period needs to be discussed. Additionally, if a benchmarking is part of the regulatory scheme, the quality of network operators must be included in the analysis. Firms with a higher reliability are allowed to have higher costs than firms with a less reliable network.
An ex-post regulation on the basis of quality indicators can be used as a complementary measure to assure that the optimal level of quality is supplied. A bonus-malus-mechanism (q-factor), changing the price- or revenue-cap, can set marginal incentives for increases in quality if the marginal utility exceeds the marginal cost of an additional unit of quality.

Conclusions
In the light of the liberalisation of the energy sector incentive regulation schemes become more common in Europe´s electricity and gas distribution industries. With the first experiences being made in Great Britain, the Netherlands or Norway, questions on securing the reliability of networks arise. In this context measures of maintenance and reinvestment play an important role. Due to the delayed consequences of omitted investment activity on quality of supply, the overall framework of incentive regulation needs to be appropriately designed in order to set incentives for investment. The following elements need to be considered and implemented:

- a guaranteed adequate return on investments and a stable regulatory framework (regulatory commitment),
- adjustment of the price-or revenue-cap within a regulatory period in the case of investment activities,
- a robust benchmarking with respect to the underlying cost basis (comparable capital costs) and the
- quality of supply (included as an additional output variable or as a cost component "cost of interruptions", based on consumer evaluations)

If these measures are taken incentive regulation should not lead to disadvantages for firms with maintenance and reinvestment activities and result in fair and achievable efficiency goals. However, in order to secure a certain level of investments and thus an optimal level

of reliability, a complementary quality-index based regulation scheme can be introduced. The required data on the reliability of networks and the "price" consumers attach to a certain quality level can be derived from surveys (willingness-to-pay studies) and needs to be robust in order to set adequate incentives in a bonus-malus-mechanism. A stand-alone ex-post quality regulation, however, can not set enough incentives for a sustainable investment activity of network operators.

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