

Incentive Regulation: A Precondition for Fueling the LCP Process in Northrhine Westfalia (Germany)

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1. SYNOPSIS

This paper reviews the shape and role of the current and planned incentive regulation in motivating least-cost planning activities in the state of Northrhine-Westfalia, Germany.

2. ABSTRACT

Northrhine-Westfalia (NRW) is the largest state in Germany with approximately one fourth of the total population. About 100 vertical integrated utilities are controlled by the electricity price authority (Strompreisaufsicht) within the Ministry of Economics and Technology. Among those the RWE Energie is the largest German utility with one quarter of the total German generation capacities. Since 1991 NRW has adopted several key elements of an incentive regulation which intend to help utilities on their way to fully integrated planning processes and to a sustainable energy path. Especially the municipalities have responded to these offers with all kinds of activities, including rebate programs for appliances and lighting devices. The RWE Energie was the first utility that conducted a detailed evaluation study on behalf of the electricity price authority to gather experience for improving LCP/DSM programs in the future.

The paper focuses on the traditional practice of the German electricity price regulation system, the experience with key factors of an incentive regulation in NRW and additional elements of a "carrot and stick regulation" for the future to speed up the LCP process both in NRW and in Germany.

3. INTRODUCTION

The German utilities are controlled by three different authorities on the state level: the electricity price authority which controls the prices (tariffs) of the residential, small commercial and agricultural customers (see above); the anti-competition control authority (Kartellaufsicht) which controls the price conditions of the large commercial and industrial customers according to an "As-if-Competition" concept; and the investment control authority (Investitionsaufsicht) which controls the investments of the utilities according to a "public interest" concept. All three authorities usually work together within one ministry, but the three concepts do not necessarily fit together, and therefore the control body altogether is not as successful as it could be if there were only one concept.

3.1 Electricity Price Regulation in Germany

The regulation of electricity prices in Germany can be characterized as a comparatively weak rate-of-return regulation. It is conducted by the electricity price authorities on the state level within the ministries of economics (1). The staff body usually consists of 2-4 members who mainly examine the costs and revenues of all utilities (incl. public utilities and municipalities) within their states periodically and analyze the forecasts. In Northrhine-Westfalia 4 persons control the electricity prices of about 100 utilities. In this state all large utilities have to fill out a data collection sheet with all relevant cost and revenue data ("K-Bogen") every year, all other utilities every two years (Schulte Janson 1991).

The regulation of the prices is restricted to residential, small commercial and agricultural customers of the utilities (tariff customers). These groups use about 40 % of all publicly generated electricity, this corresponds to 50 % of the turnover of the public utilities (2). The industrial sector which needs the other part of electricity supply is subject to the "Kartellgesetz" (antitrust law/competition law). Thus the rigid rules of electricity price regulation are applicable to only 50 % of the electric utilities revenues.

These rules are based on the "Energiewirtschaftsgesetz" (energy law) and subsequent orders, namely the

"Bundestarifordnung Elektrizität" (electricity tariff-rules) with detailed and specific rules. The latter contains the goals of environmental and resource protection. This enables the price authorities to foster LCP as a means for these goals. Electricity prices have to be fixed mainly in order to give security to electricity supply as cheap as possible while observing environmental and resource protection goals. Although LCP/DSM will finally be delivered by the utilities voluntarily, the electricity price authority can theoretically force them towards it. On the other hand, an incentive may be the better means to a good end. So at least the price authority of NRW uses much more carrots than sticks, which under the current circumstances in Germany can be recommended to every price regulating authority.

3.2 Incentive Problems for the Implementation of LCP/DSM because of the Existing Regulatory Practice and the Actual Situation

There are a lot of reasons why the German utilities are usually not interested in promoting the LCP process aggressively. The two main reasons are the following:

1. Under the current regulatory practice the utilities always have a positive incentive to boost their rate bases without any considerable risk because they have a guaranteed rate of return on it ("Averch-Johnson Thesis"). On the other hand they have no incentive at all to shrink their rate bases by their own activities.
2. The utilities have an extraordinarily high incentive to exceed their sales forecast after the electricity price authority has approved it. This is because the authorities in Germany do not compare the real with the forecasted sales at the end of the tariff authorization period and make a cost adjustment (e.g. in the form of a balancing account) although this would be possible within the existing laws and rules.
Besides this the following aspects are also negative incentives for significant LCP/DSM activities within an unchanged regulatory context:

- A rise in electricity prices (households, commercial and industrial sector) is politically and economically controversial, especially if the prices of the neighbouring utilities are already lower.
- Higher electricity prices bear the risk of self-generation especially within the electricity-intensive industries.
- Higher electricity prices for the industry and for the commercial sector are hard to push through in the current situation because of the competitive forces of the European internal market, no matter whether the electricity bills fall at the same time or not.
- LCP/DSM activities inevitably lead to a fall in the amount of concession fees ("Konzessionsabgabe") that the communities get from the utilities for the allowance to use their public ways (for the grid).
- LCP/DSM activities are very new activities for most of the utilities. They fear the risks associated with them, they lack the know how and reliable data for successful programs, and they do not have enough qualified staff for carrying out the programs. So why be an LCP entrepreneur without any obligation?
- A lot of utilities do not have a very close relationship to the price authority, and they fear that with LCP/DSM activities this relationship would become closer and that the authorities would have a closer look at their costs and revenues not associated with LCP/DSM. This could end a very comfortable profit situation for some utilities.

The following elements of an incentive regulation do not claim to solve all the problems mentioned above. Nevertheless, they offer environmentally concerned utilities in particular the opportunity to use LCP within a rudimentary regulatory system with very limited staff and financial supply with the result that their voluntary LCP/DSM activities would not harm their substance and maybe even increase their profits.

4. INCENTIVE REGULATION

4.1 Key Factors

The phrase "incentive regulation" contains, according to our terminology all new elements of a regulatory practice that supports the LCP/DSM activities of utilities. Three different elements can be identified:

1. Approval of the costs of LCP/DSM activities as costs of a rational and efficient management of electric utilities.
2. Mechanisms to neutralize the incentive to exceed the sales forecast and to recover those fixed costs in the case of falling short of the sales forecast which the utility cannot avoid in the short and middle run ("Decoupling Sales and Profits").
3. Positive incentives that are able to motivate the utilities for LCP/DSM activities.

While the first two elements are supposed to eliminate the most important negative incentives for LCP activities, the third element is supposed to give an additional positive signal.

The following table shows a proposal for a differentiated approval procedure of LCP/DSM costs in the tariff sector (households, small commercial customers, agricultural customers). This proposal tries to combine the overall cost minimizing incentive with the incentive to conduct cost effective LCP/DSM programs and to build up an "efficiency infrastructure" within the utility continuously (Leprich 1994).

Table 1: Proposal for a Differentiated Approval Procedure of LCP/DSM Costs in the Tariff Sector

| LCP/DSM Program Costs | Approval Procedure | Analysis of the Cost-Effectiveness | Expensing or Ratebasing |
|--|--|------------------------------------|----------------------------------|
| Resource Programs - participant dependent costs | retrospective approval of the actual costs | ex ante | Expensing |
| - participant independent costs | approval of the forecasted costs | | Ratebasing |
| Non-Resource Programs | retrospective approval of the actual costs | omitted | Utility Assessment or Ratebasing |

The single most important element of an effective incentive regulation is the neutralization of the incentive to exceed the sales forecast (Moskovitz and Swofford 1991). A mechanism that could achieve this has also to take into consideration those fixed costs that the utility cannot avoid in the short and middle run in the case of falling short of the sales forecast, e.g. the grid costs.

A mechanism that is used in the United States and that could also be used in the German regulatory system is a balancing account. This balancing account keeps the difference between actual and forecasted sales and multiplies it with the difference of marginal revenues and short run marginal costs. In case of falling short of the sales forecast the corresponding amount of money will be considered as an additional cost factor in the next tariff approval, in case of exceeding the sales forecast the amount will be considered as an extraordinary revenue and will be subtracted from the overall cost. The balancing account tries to eliminate the margin within the forecast ("gaming"); it will however keep the incentive of cost minimization because the cost forecasts and the regulatory lag remain untouched.

Serving as a positive incentive to motivate the utilities for LCP/DSM activities - the third element of an incentive regulation - several different mechanisms are conceivable. Three of them are:

- Ratebasing of LCP/DSM costs and the allowance of a higher rate of return for these costs than for the rest of the rate base.
- Approval of a "bonus" factor to the utility that is calculated on the basis of conserved kWh or kW; this factor will add to the costs and will therefore be part of the approved tariff.
- Shared-Savings Arrangement between the utility and its customers on the basis of the societal benefit of the LCP/DSM activities.

Which of these motivation mechanisms should be implemented depends on the know how and the data situation of the price authority, its experience with the utilities and the preference of the utilities. A straightforward recommendation for the actual situation in Germany is neither possible nor necessary.

4.2 Elements of an Incentive Regulation in Northrhine-Westfalia

Within the electricity price regulation system in Northrhine-Westfalia a few simple incentive elements have been introduced.

The first element is that all costs which are caused by cost effective LCP/DSM programs could become part of the annual operating expenses. These expenses will be divided by the forecasted amount of supplied kWh to result in the proper base rate as part of the tariff.

In a second step the price authority gives an extra incentive. It is allowed that an electric utility which carries out an LCP/DSM program, fictively puts the expenses for this program into its working capital (rate base). The working capital is the base on which the price authority grants a rate of return as the profit margin of the utility. In the price regulation process the equation price = cost + profit is valid. Usually only the recent stock of the capital goods, that is the original amount of them minus the annual depreciation is in the working capital. As an extra incentive the LCP/DSM amount gets an interest rate of + 2 % in excess to the normally used rate, which currently is around 6,2 %. The calculation for the profit margin granted by the price authority is:

| | |
|-------------------------|-------------|
| <i>without LCP/DSM</i> | |
| working capital | 1200 |
| interest | 6,5 % |
| profit | 78 |
| | |
| <i>with LCP/DSM</i> | |
| working capital | 1200 |
| interest | 6,5 % |
| profit | 78 |
| | |
| fictive LCP/DSM capital | 50 |
| interest | 6,5 % + 2 % |
| extra profit incentive | 4,25 |
| | |
| profit all in all | 82,25 |
| incentive increase | + 5 % |

As all expenses are recovered by earnings, the profit not only remains the same but increases when LCP/DSM projects are carried out (see an example for this in enclosure 1) (3).

A sensitive factor in the earnings forecast of a utility is the exact amount of kWh produced and sold. The price authority usually calculates with constant sales or constant increases in sales, so the utility will have a higher profit if it sells more kWh. The kWh sales in the last years showed no or only an incremental increase. So forecasted and real numbers were pretty much the same. With LCP/DSM programs the electricity demand is expected to decrease (with the exception of the so called "Öko-Watts" which means that from an environmental standpoint of view even worse energy sources are substituted by electricity).

So the impact of kWh saved in the course of an LCP/DSM project has to be estimated as exactly as possible to cut down the forecast of the kWh demand for the planning period. This is the third element of an incentive regulation in Northrhine-Westfalia. If the estimation can be done properly, a sensitivity analysis and an adjustment is possible for the forecast. Knowledge from other, possibly similar, LCP/DSM projects are very helpful for these estimates. Because the knowledge and the understanding of the idea and the logic of DSM/LCP cannot be taken for given, the price authority of the Ministry of Economics has established a round table "LCP"; the meetings are attended by the RWE Energy, the association of ratepayer-owned utilities, the consumer agency of NRW, the Wuppertal Institute, the central association of electric appliance manufacturers, and the price authority itself. The round table acts as a filter for misunderstandings, opposition and even hostility against DSM/LCP projects. Whenever one group feels that specific issues have to be discussed, it is free to do so. A similar effort has been undertaken in California on a much broader scale: the statewide "Collaborative Process" culminating in the legendary California "Blueprint". The round table of Northrhine-Westfalia also plans to edit a report about its function on the progress of DSM/LCP in NRW.

4.3 Preliminary Results of the Incentive Approach

The LCP/DSM situation in Northrhine-Westfalia is very promising (MWMT 1992). A survey recently worked out by the Ministry of Economics (see in detail enclosure 2) provides an overview of the present situation. 84 of 91 electric utilities responded to this questionnaire. At least three messages can be drawn from it:

- * Nearly all of the NRW-utilities give qualitative superior advice to their customers in all aspects of electricity demand and use. They explain tariff structures and give advice on how to save electricity in everyday life.
- * 50 % of all utilities in NRW give advice and counseling on renewable energies for electric power generation.
- * Nearly 25 % of all utilities are currently conducting LCP/DSM programs which include programs with rebates on the purchase of appliances with subaverage electricity consumption; gifts of energy saving lighting devices (compact fluorescent bulbs, halogen lamps, etc.); customized rebates for kWh-saving.

The more programs there are and the more financial expenses are made for them, the more important it becomes that the effectiveness of the programs is proved to be positive.

The biggest current LCP/DSM program in absolute program expenses is the RWE Energie KesS Program. On behalf of the Ministry of Economics in NRW this program was scientifically monitored and evaluated by the Wuppertal Institute for Climate, Environment and Energy. The RWE Energie KesS-Program has been equipped with 100 Mio. DM (50 Mio. ECU). It consists of the elements: advice, low-interest loans for efficient electric appliances and rebates for appliances in the categories: dishwashers, washing machines, refrigerators and freezers. These four types of household appliances get a 100 DM (50 ECU) rebate if they meet a certain standard of electricity consumption, which is well below the average of all machines in the applicable market segment. These standards of electricity consumption are renewed from time to time, according to the technical progress of the appliances. For instance, the standard for electric washing machines was recently lowered from 0,40 kWh/kg load to 0,38 kWh/kg load. Up to now approximately 80 Mio. DM (40 Mio. ECU) have been spent on rebates by RWE Energie since the program started in October 1992.

5. FURTHER DEVELOPMENTS

5.1 Results and Consequences of the KesS Program of RWE Energie

The results of the evaluation of the KesS-Programm are positive. Some results are presented here to give a general survey. A detailed report of the KesS-Program and its evaluation will be given in Panel II by Mr. Thomas from the Wuppertal Institute.

Market research was done by the research agency "Energie + Marketing". It included a test-group of 2.500 participants who were questioned in written form. 7 group discussions with chosen participants took place. 35 specific talks with wholesalers and retailers of electric appliances were held. A questionnaire with 3 producers and expert discussions in 11 energy advice shops (bureaus) of RWE Energie finished the market research. These talks revealed the acceptance of the KesS-Program by all groups who were concerned with it.

The participant test (PCT) and the cost-benefit tests for the economy (TRCT) and the RWE Energie Corporation (UCT) were diligently devised and conducted. In general, a positive result was achieved (Leprich and Schulte Janson 1993). The price authority welcomes these results because they show that even a program being devised as a pilot-program can be efficient. For ongoing projects in the LCP/DSM field the evaluation proves to be very helpful as it gives valuable hints for program modifications which will boost positive results of cost-benefit-analyses (see enclosure 3).

5.2 Additional Factors of an Effective Incentive Regulation

The wide range of disincentives for an aggressive promotion of the LCP process through utilities suggests that incentives from the electricity price authority alone might not be enough in order to motivate the utilities. Therefore competition forces and the raising of regulatory risk on the investment side should also be used to fuel the LCP process. These factors are not only the other side of a well-balanced "carrot and stick regulation", but they could play an important role in preventing governments from micro-managing the utilities and in preventing utilities from overinvesting in powerplants or efficiency programs with too high costs and bad performance.

There is a close connection between the price and the investment control which is conducted by separate authorities within the same ministries at the state level in Germany. Two proposals might be worth considering if one tries to flank the incentives of the price authorities (Leprich 1994):

1. Introduction of disallowances for overcapacities and misinvestments

So far there has hardly been any regulatory risk for the investments of utilities in Germany. Although there are a lot of overcapacities and too expensive plants, one cannot find any example of a disallowance of the associated costs through the investment and the price authorities. The practice in the United States has proven that disallowances according to a "used and useful" standard do not - in general - jeopardize the substance of the utility if they are applied properly and carefully. For LCP/DSM activities it would be very helpful if it were no longer possible to invest on the supply side without any considerable risk.

2. Introduction of obligatory bidding procedures for new investments on the supply side

Until now the utilities have decided on their own whether they want to make an investment on the supply side or whether the investment is to be carried out by a third party. In both cases the utility is sure that it cannot be bypassed by competitors and that it decides by itself whether it wants to ratebase the investment or not. With the introduction of obligatory bidding procedures competition decides whether the utility can make the investment or a third party. Thus there will always be a risk for the utility concerning investments on the supply side to lose part of its business to third parties. This risk could be lowered if a part of the necessary investment is avoided by LCP activities of the utility which in some cases even could be used to stabilize the rate base (see above).

Precondition of a real competition bidding process, however, is the introduction of a third party access (TPA) to the transportation and the distribution grid. Whether TPA will be a directive in the European Internal Energy Market or on the national level cannot be foreseen at this moment.

6. CONCLUSION AND OUTLOOK

LCP/DSM programs have a significant impact on the environment and the resources, but they must be conducted professionally and/or accompanied by an evaluation process. The electricity price authority cannot deliver LCP/DSM itself, however it can foster LCP/DSM by means of its regulatory rules.

The recent modifications of the EU-commission guideline proposals concerning the way competition and open markets for electricity will be treated in the future do not - at first sight - seem to spark much hope for the future of LCP in Europe. But concentration on the competition side of the business does not mean that the price of the unit (kWh) will forever be the all-important factor at which everybody keeps on staring. The electric utilities will under competition environment have to learn to behave as "energy/electric" service salesmen. The price of the unit (DM/kWh) is not at all significant, it is the whole energy service parcel and its price which decides if the offer is accepted by the customers. If that message can be delivered, the future of LCP/DSM will be bright.

ENDNOTES

1. Sometimes the authorities are established in other ministries, f.e. in the ministry of the environment.
2. The term "Public Utilities" in Germany does not mean that all these utilities are in public hands; it only means that these utilities serve the public, not just their own companies. They can be either private or public or mixed.
3. This statement only holds true if the sales forecast of the utility has already anticipated the effects of all LCP/DSM projects exactly or in favor of the utility.

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