ASSET MANAGEMENT - THE RIGHT DECISIONS FOCUSSED ON THE FUTURE: THE DEVELOPMENT OF SUSTAINABLE LONG-TERM ASSET-STRATEGIES WITH FOCUS ON CHANGES AND NEW CHALLENGES

Dr. Armin J. GAUL
RWE Rheinland Westfalen Netz AG – Germany
armin.gaul@rwe.com

Esko NOCKMANN
RWE Rheinland Westfalen Netz AG – Germany
esko.nockmann@rwe.com

ABSTRACT

Since the beginning of deregulation, the asset management capability has reached a new level. The main challenge for the asset manager is to balance conflicting targets over time. Due to changing parameters, distribution-grid operators have had to re-evaluate their maintenance and replacement strategies. Unlike the "Cost Plus" scenario in a stable environment, today's investments must be measured in terms of diverse requirements and their long-term effects. Investments in electrical- and gas grids are amortized over the long term in the regulated grid business. While weighing the economic requirements in investment decisions, it is important to ensure that no unacceptable declines in quality of supply result over either the short- or long term. In modeling the technical- with the economic- and regulatory aspects in the grid business, it is important to adjust the organization and processes within the firm and to integrate the tools of the individual business sectors. We would like to examine these issues in some detail and explain the tools and strategies we use in order to optimize our asset management processes. Here we will focus on long-term planning and the interconnection of the different business units and their tools.

NEW CHALLENGES IN THE GRID BUSINESS

The main challenge for the asset manager is to balance conflicting targets over time. The German distribution grid operators are in the middle of a major change process. This process is primarily driven by politically desired reductions in grid charges.

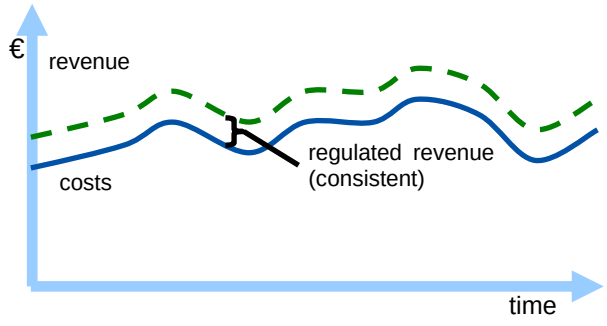

Figure 1 Regulates revenue

The grid operators must confront the challenges of this significant cost pressure. Due to changing parameters, distribution-grid operators have had to re-evaluate their maintenance and replacement strategies. Unlike the "Cost-Plus" regulatory scenario (Figure 1 Regulates revenue) in a stable environment, today's investments must be measured in terms of diverse requirements and their long-term effects. Investments in electrical- and gas grids are amortized over the long term in the regulated grid business. During times of „regulated revenue" the grid operators' profit margins were set by a Cost-Plus system, but the regulating authorities have since decided that this did not provide enough incentives for cost reduction on the part of the grid operators. For this reason, the system was changed. The new system of Incentive-based Regulation offers opportunities as well as risks for the grid operator.

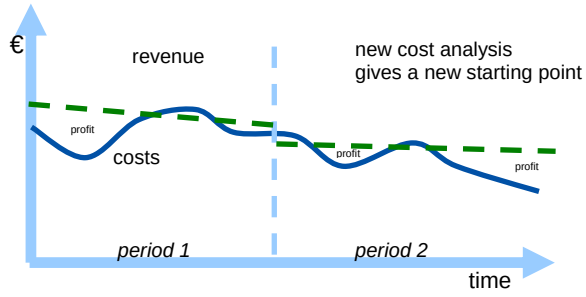

Figure 2 Incentive-based Regulation

In Incentive-based Regulation, the grid operator has the possibility to increase profits if he finds ways to work more efficiently and thus reduce costs. This is possible because, in Incentive-based Regulation (Figure 2 Incentive-based Regulation), the costs are decoupled from revenues for a certain time e.g. 5 years. The grid operators are faced with the challenge of continually reducing costs because the grid revenues can be reduced from year to year within a regulatory period. Furthermore, the starting point for the revenue limit can shift between regulatory periods based on the regulator's new cost analysis. Therefore, the realizations of efficiency potentials must be the goal of all grid operators. In order to take advantage of these efficiency potentials, the grid operator must know and be able to control the cost- and value drivers in his business. Aside from the regulatory challenges, the grid operators have to face many other future changes. Because of structural changes, the growing amount of decentralized generation, and a change in long-term demographic effects, every investment must be checked according to its future viability and sustainability. The demands the grid operator faces from all of these changes an challenges nevertheless remain the same (Figure 3 Current and future challenges in the grid business are met via clear goal-setting). A secure return on investment with a market-driven quality of supply and transmission- and maintenance-efficient grids is what one expects from

today's grid operator.

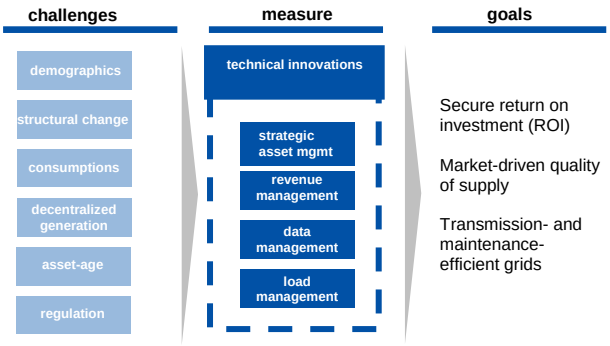

Figure 3 Current and future challenges in the grid business are met via clear goal-setting

With these goals in mind, it is no longer enough, with regard to finding the right decision (focused on the future), to use only the economic- or technical perspective. It is vital that these divisions, which may have been separated in the past, work together to find common solutions.

NEW DEMANDS FOR ASSET MANAGEMENT

In addition to the traditional tasks of Asset Management, such as the determination of repair- and maintenance budgets as well as planning for replacement investments and the related action planning, new demands in the grid business have brought a new and somewhat more strategically orientated remit. Many companies, therefore, have separated Operative- and Strategic Asset Management functions. Operative Asset Management works on, in this case, more or less traditional tasks. Strategic Asset Management, on the other hand, is very close to economic and regulatory issues. The focus here is primarily on separating the budgets between Capex and Opex, carrying out risk evaluations, and preparing and applying for planning permissions. Strategic Asset Management can, in this regard, be seen as the connecting link in the grid business.

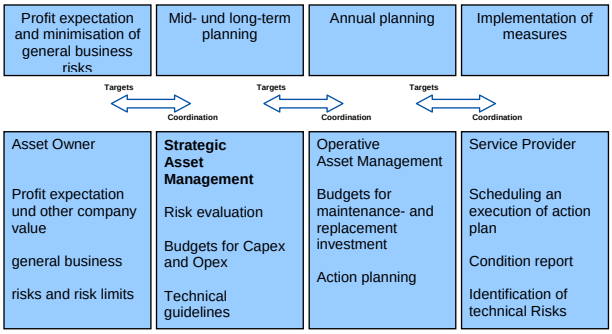

Figure 5 Interaction between business units and technical units

This sort of secure connection between the various business areas is a prerequisite for success and the evaluation of ever-more complex investment decisions. In order to carry out the evaluation and determination of maintenance and replacement strategies, it is necessary to chose a period of review which is, from the technical perspective, orientated to the lifetime of the equipment. Investments in electrical and gas grids in the regulated grid business are amortized over a long period. The

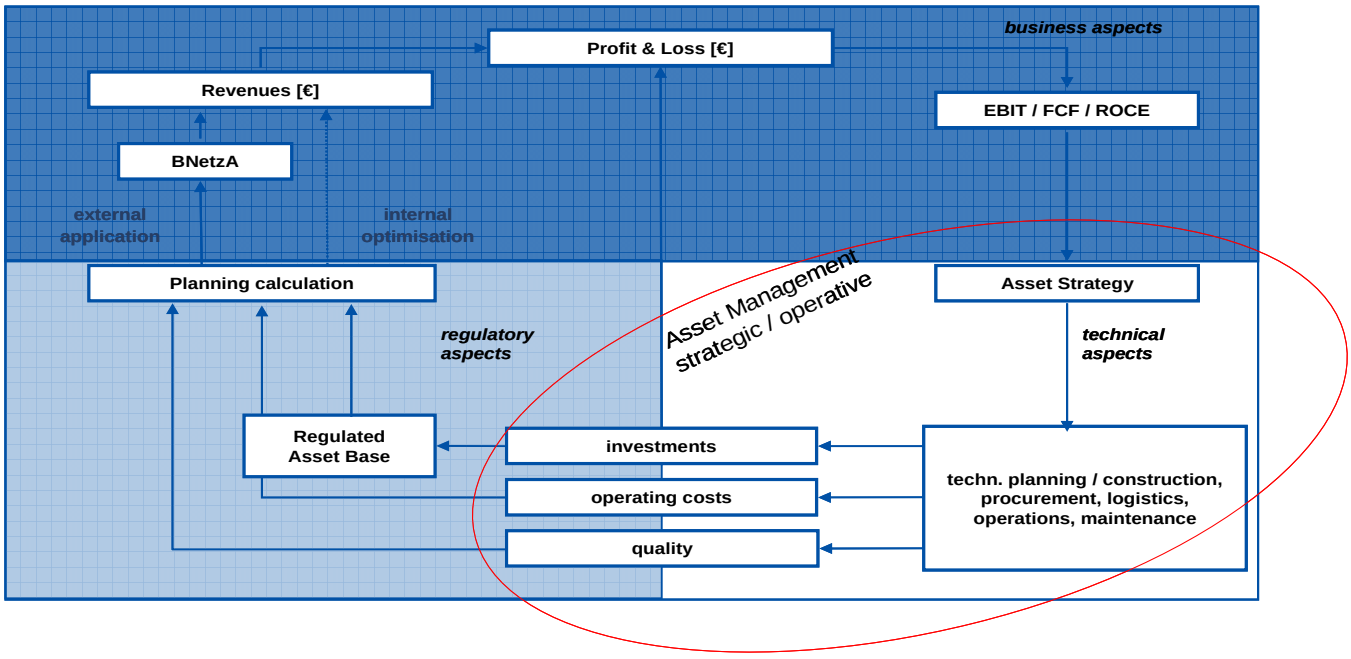

Figure 4 Interaction between business units and technical units

technical life cycle of equipment, such as cables, can be over 60 years. As a result, decisions regarding investments in the grid must be considered carefully in terms of their regulatory, economic, and technical implications. In this regard, it is important to define a period of review which accurately reveals these regulatory, economic, and technical implications. The period of review favored by regulators and shareholders is generally significantly shorter than the technical life cycle and amortization of the equipment. In this connection, it is important to identify the parameters, value drivers, and possible courses of action in the regulated grid business as well as be able to model the related effects. It is necessary that the company's organization and processes be adapted and that the planning tools of the individual business areas be connected to one another in order to depict the technical- and economic / regulatory perspectives in the grid business. In order to establish optimal planning, it makes sense to go through this planning process – which is made up of the individual linked planning tools – repeatedly. As seen in this iterative process is able to cover all demands resulting from the various business units. For example, when strategy concepts are generated by a technical department, these become the basis for the technical planning process. Planning budgets resulting from this planning process are then appropriated as investment and operating costs. Their sizes form the foundation of the regulated asset base and profit-and-loss calculations for the company. Furthermore, the technical planning budgets serve as the bases for regulatory assessment and calculation. The revenues, which contribute to the profit-and-loss calculation, result from this. The company's Ebit is derived from this profit-and-loss calculation. Optimal business planning results from going through this process repeatedly. The starting point for this process is not normally the technical strategy but rather Ebit expectations which are already put in place in company strategy.

SIMULATION AS THE BASIS FOR COMPREHENSIVE DECISIONS

As previously discussed, a large amount of data must be collected and processed for the optimal controlling of the regulated grid business. Extremely complex planning for a successful grid business results from interactions among economic and regulatory considerations which also must be dealt with. An assessment and planning process which focuses on technical demands in isolation cannot reflect the challenges which result from incentive regulation and the related revenue-path management. It is, furthermore, of increasing importance that such assessments continue throughout the regulatory period. An assessment which ends with the mid-term planning phase (normally 3 years) does not reflect the consequence of today's decisions.
For this one also needs special tools which can handle a large number of parameters, can display variants in comparison, and can manage the results of the analyses understandably. With traditional tools, such as MS Excel, such analyses are only manageable with great effort.
It is important in integrated planning to able to adjust the parameters quickly and flexible in order to be able to serve an iterative planning process and implement successful business planning. In makes sense to use a dynamic simulation tool in order to make the complexity of Strategic Asset Management manageable. We call this Asset Simulation - a comprehensible method our company has tested and implemented, that does this and which helps us to derive and develop durable and sound asset strategies. In this connection it is necessary to bring together the target figures, pertinent parameters, and possible measures of Asset Management as well as the resulting dependant factors and relationships in a cause–and-effect diagram. Finally, deterioration chains are defined using diagrams for the individual equipment groups which describe the life cycles. Each continuance diagram is divided into single condition categories, which characterize the state of the equipment. The consequences of the measures taken by Asset Management are described in relation to the condition class of the equipment. The diverse feedback, delays, and non-linear connections among the various start- and target sizes can be, in this way, made transparent. Our company's experience suggests that only the setting of parameters in Asset Simulation leads to collaborative thinking in the business and technical decisions. For example, discussion emerged regarding asset definition and the feasibility and limits of implementation of measures in the determination of cost apportionment for investment- or operating expenditures. The first value drivers were determined and the limits and feasibility of controlling them were collaboratively characterized through these discussions.

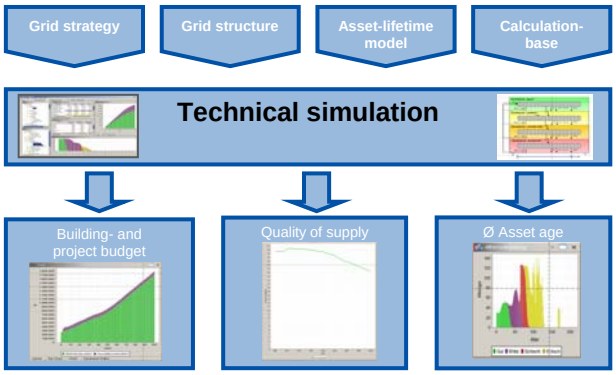

Figure 6 Asset Simulation - Technical Simulation

The results of Asset Simulation – which flowed from the starting size of a maintenance and replacement strategy, grid structure, lifetime models, and the calculation basis – seem rather simple at first sight despite their complex development process. These target sizes – separated according to Capex and Opex, quality of supply, and the development oft the age structure of the grid – are sufficient to meet the demands faced by Strategic Asset Management. No planning for equipment-specific

measures are, in this sense, necessary. These target sizes are sufficient, in the context of connecting links to other business areas, for the execution of coordinated planning, for revenue-path management, and for showing the effects and consequences of possible decisions for the other business areas. It is possible to have confidence that the demands of a continuous improvement in efficiency can be met while maintaining security off supply and long term investment feasibility.

IMPORTANCE OF LONG-TERM PLANNING

Today's grid operator must confront many challenges. First, it must successfully execute its planning in an instable regulatory environment. This means that today's decisions may no longer be optimal tomorrow. Tools which can be quickly and flexibly applied in new contexts must therefore be available. Furthermore, the grid operator faces the challenge of looking beyond technical perspectives when making investment decisions.

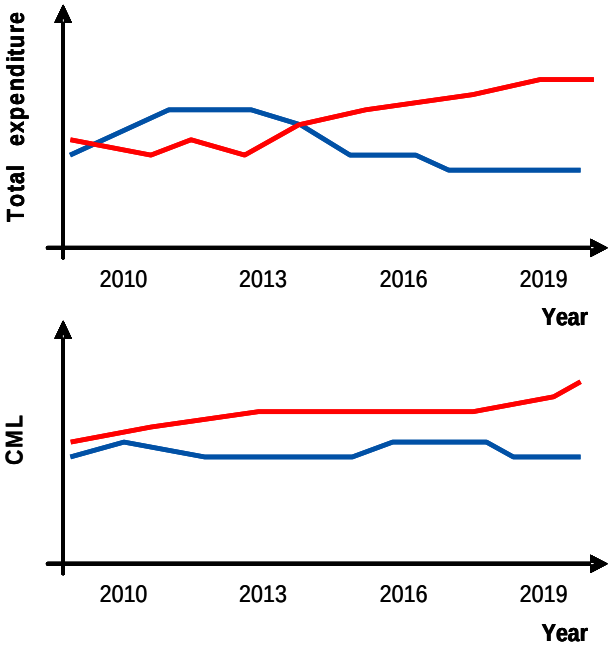

Figure 7 Long term effects

In the past, maintenance and replacement strategies often were based simply on upkeep and 1:1 replacement. Replacement and maintenance strategies and the related regulatory parameters must be re-examined and re-evaluated in light of the growing amount of decentralized generation, structural change in many regions, and changes resulting from demographic effects. A focus on the future is vital for all of these analyses.

It is normal that certain effects resulting from the parameters appear only after long-term assessment periods. Figure 7 shows two different asset strategies. Total expenditures and customer minutes lost (cml) are shown over a period of 10 years. In this case, an investment decision which seemed profitable at the start reveals itself to be a poor decision over the longer term...In all of these changes and the related parameters and possible value drivers, a focus on the future is always worth it. This is particularly true of decisions which, for other business areas, appear to be transparent and reasonable. It is not important in this case whether these results are expected to be 100 % met. It is much more important to show which developments are connected with the effected (or to-be-effected) decisions. We have described a process which makes it possible to evaluate and control a short-, middle- and long-term effects of asset strategies. This helps us to make the right decisions for the future.

REFERENCES

[1] Joachim Schneider, Armin Gaul, Claus Neumann, Jürgen Hogräfer, Wolfram Wellßow, Michael Schwan, Armin Schnettler: „Asset Management Techniques", *International Journal of Electrical Power & Energy Systems, Volume 28, Issue 9 , November 2006, Pages 643-654, Selection of Papers from 15th Power Systems Computation Conference, 2005 - PSCC'05*

[2] Meijden, M. v.d.; Janssen, A.; Ford, G.; Rijks, E.; Balzer, G; Gaul, A. ;et. al.: „Asset Management of Transmission Systems and Associated CIGRE Activities." *Cigre Brochure No.: 309, WG C1.1, December 2006*

[3] A. J. Gaul, H. Spitzer, 2007, „Asset Simulation – an approach to predict the long term monetary consequences of maintenance and renewal strategies for electrical grids", *C I R E D, 19th International Conference on Electricity Distribution*, Vienna, Paper 0668.

[4] G. Balzer, C.Neumann, A. Gaul, C. Schorn: „The General Asset Management Process of Power Systems" *Cigre Symposium, Osaka 2007*

[5] Leyla Asgarieh, Gerd Balzer, Armin J. Gaul: „Condition Assessment for Optimal Planning and Operation of Power Systems with the Aid of Ageing Models", *28 June - 2 July 2009, Bucharest, Romania*