

EVb Energy Solutions Report nr. 4 - Summary potential savings due to procurement optimisation with variable tariff structures. Reporting challenges and recommendations for utilities.



This report examines for utilities the requirements for a sustainable power supply and possible optimisation measurements.

Investigation, based on analysis of realistic metering data:

- The potential savings due to procurement optimisation, using variable tariff models, possible thanks to Smart Metering.
- The challenge of procurement optimisation integrated in all relevant processes.

In the recommendations for utilities, procedures how to get access to these potential savings due to procurement optimisation will be included.

The key conclusions:

- The procurement is facing great challenges from the overall market development and competition for economically strong customers, who will be supported with smart metering products.
- In order to address these challenges successfully, the procurement process in general will become more complex and will need detail planning, which requires a strong integration and feedback of the processes and IT support.
- The successful implementation of procurement optimisation will allow utilities to offer their services to a bigger and economically more attractive market.
- The key challenge will be the development and implementation of incentive products for the targeted consumer groups.
- Product development must be based on micro-segmentation and customer perception analysis, therefore it is a precondition that realistic data is available, to be analysed in a clustering method.
- Control procedures need to be implemented to minimise the risk in these processes.

The proceedings:

For this report the following steps have been undertaken:

- Assessing the market situation for "Smart Metering" and "Procurement".
- Describing the main structure of the affected processes.
- Analysing the challenges and options in the development of the Market beyond for the optimisation of the procurement.
- Defining the conditions for the use of variable tariffs in terms of tariff design, for procurement optimisation and load-profile procedures.
- Analysing the challenges and opportunities for procurement optimisation; using variable tariffs.
- Deriving the challenges in sub-processes and IT along the process chain: from sales to procurement, load profiling, and billing.
- Determining quantitatively the procurement potential savings, with variable tariff structure based on the evaluation of series of load profile.
- Developing options for Utilities to implement one of the recommendations

Market assessment for "Procurement" and "Smart Metering"

From 30/12/2010 onwards utilities are obliged, in accordance to § 40 paragraph 3 of the EnWG, to offer an electricity tariff in which "incentives for energy saving or energy management" are included. These incentives mainly refer to time- or load-dependent tariffs.

In general, the developments of Smart Metering solutions and tariff-scheduling models are still very moderate. Most of the current offers are limited to simple two-or three-stage tariffs with web portal and energy-saving tips.

For Utilities, variable tariffs can only be of direct economic advantage (which they can offer, partly or completely to their clients in the form of incentives and tariff differentiation), if they have adapted their procurement - and their load-profiling, accordingly to these time and load-dependent products.

To move to this situation the utility will need internally a differentiated portfolio management and procurement, while externally the load-profiling and legal metrology rules need to be changed.

In particular the standard load-profile procedure (SLP) for households and commercial customers need to be modified in such a way that it takes into account the consumption profiles of individual customers or customer segments. In its 2010 monitoring report the German Federal Network Agency (Bundesnetzagentur) outlined such a procedure already. It is likely that in the next regulatory period the described or a similar procedure will be implemented.

In this regulatory period and in competition with each other, the utilities will develop differentiated Smart Metering products and variable tariff structures:

- To attract existing and to attract new volume and economically attractive customers
- To realise additional margins due to the procurement optimisation.

Challenges and possibilities for the procurement optimisation in existing systems

For the analysis all relevant processes in sales, procurement and load-profiling areas are taken under consideration. Even the general market trends in production, sales and distribution create new challenges for utilities that have an impact on almost all sub-processes:

- Network integration of distributed and renewable energy,
- Increased volatility of wholesale prices,
- Uncertainty in the development of market prices,
- Micro-segmentation and stronger competition for more profitable consumer segments.

As a consequence, the price, volume and structural risks will increase the procurement procedure, which will be reflected in the end users price. In the existing load-profiling system are already limited optimisation possibilities. Small adjustments are allowed to the previously used standard load-profile or to the optimisation of the existing procurement strategy. However, in the SLP field there is no possibility to implement procurement risk in relation to tariff differentiation and related consumer behaviour.

Opportunities and challenges using variable tariffs

A wide range of variable pricing models can be designed; from static two-stage tariffs on intra-year levels adjustments or events, to dynamic tariff change according to current market prices. The tariffs can be used as a tool to absorb future risks in procurement and to develop savings positive. On the other hand, they also create more complexities in the whole process, so new risks in procurement.

These possibilities only develop a substantial effect when a substantial group of consumers in a targeted load-profiling group, at least the consumers of these targeted consumer segments, is equipped with electronic instrumentation including remote reading. Therefore it makes sense to a grid-covered rollout of this measurement technology.

Key factors economic benefits for Utilities:

	Reduction volume risk by improvement of the forecast accuracy	Transfer short-term price risk	Procurement cost-saving due to load shift
Variable tariffs with static price levels	X		X
Variable tariffs with event-driven price levels	X		X
Variable tariffs with dynamic price levels	X	X	X
Load variable tariffs with alternative price levels	X		X
Direct load control	X	(X)	X

Table 1: Generating economic benefits from variable tariffs

These challenges will have implications on the entire process chain and supporting IT:

Process step	Scale of the challenge	Description of the challenge
1. Product development	Strongly increasing	- Customer segmentation and development of more complex tariffs structures and products in combination with targeted incentives - Structured IT integration of all parameters
2. Strategic portfolio and risk management	Increasing	- More complex risk planning with additional sub-portfolios
3. Long-and medium-term forecast	Increasing	- More complex planning of the sub-portfolios - Optimisation of the forecast, based on realistic meter data and IT visualisation
4. Procurement Strategy	Increasing	- Diversification of the strategy and risk optimisation in line with the tariffs structure and incentives
5. Long-and medium-term procurement	Increasing	- Procurement with a higher number of sub-portfolios, each one with their own strategy
6. Short-term prognosis	Strongly increasing	- More complex planning of the sub-portfolios - Using data of the data management and own specialised IT for the analysis and optimisation of the forecast
7. Short-term procurement	Strongly increasing	- Higher risks due to tariff incentives - More comprehensive short-term procurement according dynamic load schedules
8. Controlling procurement	Increasing	- More complex control of the actual values and incentives, IT support is a must
9. Schedule Management	Increasing	- Increasing complexity of related commercial transactions
10. Load-profile	Strongly increasing	- Implementation of new load profiling with variable tariffs and IT visualisation
11. Billing	Strongly increasing	- Differentiated and more frequent billing and IT visualisation

Table 2: Challenges for procurement optimisation in the various process steps, using variable tariffs

The implementation of procurement optimisation with variable tariffs creates new challenges, especially in:

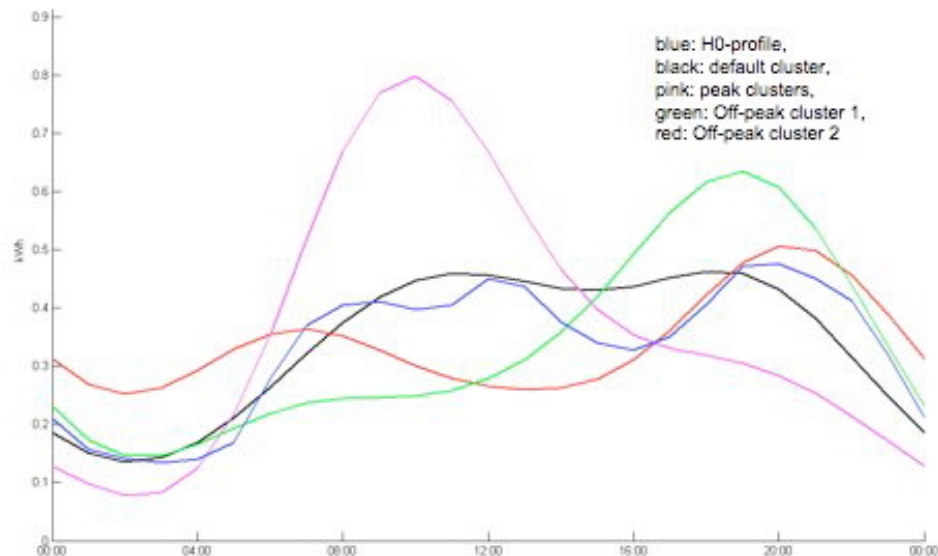
- Product development with effective incentives for load shifting.
- Particularly in the introductory phase; Integration and process feedback in sales, procurement and load profiling, needed for verification and for further development of the planned response.
- Effective and efficient process support by specialised IT systems for sales, procurement and metrology.

Procurement optimisation, determination results of the undertaken actions

For this report, anonymous load profile data from various pilot and research projects were made available for further analysis. Using proprietary software for clustering load profile data, the authors have carried out several potential saving calculations:

1. Savings due to the optimisation of the standard load profile.
2. Savings in off-peak load-based customer segments in comparison with other segments.
3. Savings due to load-shifting with time-variable tariffs.
4. Relationship between the price level and the savings.

We analysed average monthly load profiles. The following clusters of customers with similar consumption patterns could be created and analysed:



For assessing the potential savings the price scenario used is based on the wholesale price level (EEX) of 2010 (Base: 50 € / MWh, Peak: 62,50 € / MWh). This was at a historic low, so that the potential savings calculated are conservative tending estimates.

If we compare these potential savings with the very high wholesale prices of 2008, the results will be tripled.

	Consumer participation	Potential savings per MWh	Potential savings for a total of 50,000 utility customers (each 3 MWh / year)	Potential savings related to 2008 prices
Optimisation of the standard load-profile	100%	1,05 €/MWh	157.500 €/year	291.000 €/year
Off-peak load customer segments	31%	2,98 €/MWh	139.600 €/year	351.000 €/year
Tariffs for active load-shift (10% displacement)	10%	0,86 €/MWh	12.900 €/year	47.300 €/year
Reduction in load tariff due to load-shift	100%	0,26 €/MWh	16.100 €/year	16.100 €/year

Table 3: Summary of the identified potential savings due to procurement optimisation

On the other side of these potential savings we have the cost of modifying processes and the implementation of IT, as well as the risk the new requirements may be out of control. The identified challenges are at the same time the success factors of the implementation.

Conclusion and recommendations

This report identified, by using Smart Metering solutions, substantial savings in the optimisation of the procurement, which can be generated by adjusting the load-profile and targeted use of variable tariff structures. The supplier will directly benefit from these potential savings, a part of these savings need to be invested in the creation of incentives for those customers who participate in the creation of these savings.

The implementations of processes mentioned, as well as the IT requirements, are very ambitious. The emerging risks need to be minimised or even avoided. The basic process steps: "Production", "Co-operation" and "Purchase" are only suitable for those utilities who have the competence and the capacity in house to meet these new requirements. Particularly small and medium sized utilities without their own procurement or utilities who do not want or are not able to invest in the necessary new skills and capacities should at least consider, in which process step and on what performance-level they need appropriate support.

As a first step the authors recommend, to focus primarily on product development. Based on consumer value analysis or consumer segmentation appealing products and tariffs structures need to be developed, to attract these consumers apart from their contribution in the procurement optimisation process. The implementation of adequate tariff models can be used to minimize risks when the targeted consumer segment will receive intensive support and advice. The outcome of this support will be input for product development.

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