INTRODUCTION

The success of the liberalised electricity market is to a large extent linked with the efficiency of the information flow between grid operators and suppliers. The regulatory tools to ensure a fair and transparent market operation include the grid code and the access contract. Key performance indicators, can provide an additional tool with right incentives for the network operator, who can be considered as a service supplier for the commodity suppliers. In this paper the issues mentioned above are investigated from the viewpoint of the recently opened residential market in Flanders.

A CHANGE OF PARADIGM

In a vertically integrated and monopolistic utility model, all the relevant business information circulated internally within a limited number of applications with restricted data transfer. Ultimately, a single application could fulfil different functionalities including asset management, consumption data management, network exploitation and billing.

Unbundling implies a major adaptation of the information flow. Network operation and energy sales are separated, and new market players, the suppliers, appear on the market with their specific customer oriented approach. From then on a timely and correct information transfer is crucial for an efficient market operation. The issues raised by the information requirements of market parties are often overseen or at least underestimated in the early stages of liberalisation.

From an engineering point of view, the need to exchange information may at first seem inefficient since inevitably it brings about higher IT-costs. Especially in an environment with low profit margins, the added cost of information transfer and the uncertainty caused by dependence on other market actors with different interests, the macro-economical benefit is not evident. The engineering challenge then consists in optimising the information flow in order to reduce the supplementary costs. This has to lead to a twofold goal in combining the advantages of a customer oriented market model on the one hand, with efficient network operation on the other hand.

The path to this situation is far from straightforward. Initially, in the eyes of the network operators, the role of the suppliers is often seen as an outsourced billing and complaints division. Breaking with old paradigms, the new market model should include the necessary regulation in order to encourage newcomers on the market and to reinforce customers' faith in the market.

Ideally, the market parties could determine the necessary standards among themselves in an international context in order to streamline the entrance to the electricity market. Since increasingly more parties appear on different national marketplaces, coherence in business models and processes are undoubtedly beneficial to the creation of a Pan-European electricity market.

Practically however, the interests at stake are divergent and make good and efficient regulation a prerequisite. Given the existing different national legislations that make up the framework in which regulators operate, a stepwise approach towards a European marketplace is appropriate.

UNBUNDLING

In Flanders, the legislator has chosen for a rigid unbundling between market operation and infrastructure exploitation (fig.1).

Fig.1: Unbundling in Flanders

In no way, distribution grid operators can rely on commercial market parties to perform tasks considered to be strategic or confidential. Only executive tasks under the final responsibility of the DGO can be outsourced to production/supply companies, or companies associated with those.

In this respect, the level of unbundling goes beyond the requirements of the IEM directive 2003/54/EG, the major driving force being the concern for a level playing field in a market with a dominant incumbent party.

Since almost all organisational links between grid operators and commercial market parties are broken, the respective companies can reorganise themselves independently and adjust their operations in order to comply with the legal and regulatory prescriptions. Quality and efficiency of service remain issues for both grid operators as wells as suppliers, albeit in different environment (regulated monopoly vs. competitive market).
MARKET MODEL

The issue of the market model consists in allocating the different tasks to the market parties. These tasks include:

- System operation: frequency and voltage regulation, capacity allocation, congestion management;
- Grid connection and asset management;
- Metering: collection, aggregation and distribution of consumption data;
- Settlement: energy allocation including synthetic load profiling, and reconciliation;
- Grid access and grid fee billing;
- Consumer information and billing;
- Public service obligations: security of supply, energy efficiency requirements, social service obligations.

These tasks have to be assigned to the respective market parties. Beside the transmission system operator(s), the distribution grid operators, the balance responsible parties, the suppliers and the grid users, other parties may be involved in some of these activities, such as settlement agencies, meter collectors and/or aggregators,…

The market model chosen depends for a large part on the existing national or regional legislation, since the European directive only sketches the contours, but leaves the practical arrangements to the member states. A variety of alternatives in market organisation can therefore co-exist, albeit with mostly minor differences. These different alternative market models should be evaluated, and when needed changes in the national legislation should be proposed for efficiency sake and to the benefit of the internal market. Ultimately, a more detailed market model embedded in the EU directive should be considered.

The market model in Flanders (fig.2) is based on the classical market parties. For access to the grid the principles of the so called “supplier model” are implemented [1-2]: this means that the customer has a contract only with the supplier and doesn’t need a separate contract with the DGO for access to the distribution grid.

The installation, ownership, technical accountability, maintenance and repair of connections to the electricity-grid, are arranged between the customer and the DGO through a connection contract or, in case of LV-customers, through a connection code. Network services are arranged in an access-contract between the DGO and supplier. This cascade of access is in Flanders extended to the relationship between the DGO’s and the TSO. DGO’s and TSO cooperate together through collaboration-agreements arranging the access of the suppliers active in their respective distribution areas. Apart from accountability for nomination and imbalance directly or through collaboration with a balance responsible (also called an access-responsible-party on the TSO grid) a supplier doesn’t need a separate contract with the TSO for access to the transmission grid. In the end, the customer only receives one bill for his consumption from his supplier, including the costs for distribution and transmission of the supplied electricity.

The metering tasks (collection, aggregation and distribution of consumption data) still resort under the activities of the DGO’s, meaning that these are subject to a regulatory regime. In the UK and The Netherlands, collection, aggregation and distribution of consumption data is considered as a separate activity, that can be assigned to private companies, so called meter-reading companies (MRCo’s), resulting in a competitive market for collecting and handling meter reading data. Third party responsibility is therefore automatically arranged in commercial contracts between suppliers and these MRCo’s, resulting in the right incentives for these companies to timely and correctly deliver the requested data. If metering tasks resort under a regulatory framework, as is the case in Flanders, these performance considerations are less obvious. DGO’s, as monopolists, can easily avoid or reject accountability for bad data quality or untimely delivery of the demanded meter readings. Suppliers, depending on these meter readings for billing and nomination, have no effective and instant means to enforce an immediate correction or intervention by the DGO in order to receive the right consumption data in time.

The calculations of reconciliation volumes are assigned to the distribution grid operators; however, a clearing party has not officially been appointed yet.

GRID CODE

In the early stages of liberalisation the influence of grid operators on the establishment of the grid code is predominant. Without active participation on the supply side (if it wasn’t for the historical suppliers, who, depending on the level of unbundling in national legislation, still have stronger or weaker ties to the network companies), the grid code emanates as an offspring of the internal operating guidelines with adaptations for the tasks explicitly assigned to the suppliers and balance responsibilities, and the new tasks for the grid operators in the context of a competitive market. Even when the final responsibility of the grid code generally doesn’t reside in the hands of grid operators, the return on experience from other market actors, legislators or regulators initially is rather poor,
leading to unbalanced, or at least suboptimal, legislation or regulation. In the sense that these grid guidelines were not always explicit or concise, the exercise of structuring them into a text and including the new assignments certainly creates transparency internally and to the market, and normally leads to a higher internal quality standard.

On distribution level, process automation is key for a proper market functioning because of the vast amounts of information to be transferred. The principles of the grid code therefore need further elaboration in documents, describing in detail the sequence and content of the messages to be communicated. These sequences deal with routine processes, such as move-outs, supplier and/or customer switches, drops (caused by failure of payment) and end-of-contract. Even if only the subset of messages to be processed due to home moves is considered, a huge information flow results. In Flanders, for instance, nearly ten percent of the population moves during a year, necessitating changes in the access and client registers with corresponding information transfer. Moreover, most sequences involve at least two parties (in most cases even more) and the corresponding changes in the databases should be made simultaneously in order to avoid erroneous data.

For the information flow between market parties, different possible solutions can be envisaged. In Flanders, the chosen solution starts from a central access register (fig.3) kept up to date by the distribution grid operator (actually, 16 DGO’s obtain a distribution license). The access points (sometimes called Points of Delivery, POD) are uniquely characterised by 18-digit EAN-GSRN codes (European Article Number-Global Service Related Number).

A low level internet based communication system with restricted functionalities was initially conceived as a step-up solution for newcomers, but will gradually phase out.

The distribution grid operators developed a protocol based on the EDIEL (Electronic Data Interchange for the Electric Utilities) syntax, a subset of the international UN Edifact standard. The messages are completely described in a document called UMIG (Utility Market Implementation Guide). UTILMD-messages (Master Data) contain access point specific characteristics, such as synthetic load profile, estimated yearly or monthly volumes, meter configuration and other connection characteristics. This type of messages is also used for initiating, cancelling and approving changes in the access register (the so-called structuring process). UTILTS-messages contain series of consumption values (for instance the quarterhourly energy consumption values of remotely metered access points).

The development and efficient operation of such a system of information transfer between grid operators and suppliers (and other market parties) is crucial. The feasibility of implementing new rules in the business processes of both grid operator and supplier is always a major point of concern. In some cases, a period of stability with evaluation and correction of procedures may turn out to be more valuable than the implementation of a new set of syntax rules.

Essential elements involving the liability of either party were consequently integrated in the Grid Code in order to increase the enforceability. The editorial processes of Grid Code and Implementation Guide have therefore more or less converged into a single process, with consistency between regulatory rules and implementation issues.

As for the Grid Code, return on experience from either market party results in a more qualitative market framework. Suppliers and grid operators therefore cooperate in workgroups on specific issues such as structuring, grid fee billing, rectification and settlement, with feedback to the regulator.
ACCESS CONTRACT

The access contract determines the conditions under which suppliers have access to the grid and the practical modalities of the data transfer. Beside typical contractual elements such as the necessary financial guarantees to be delivered by access holders, the invoicing procedure and the liabilities, the access contract can also be an additional tool to set the right incentives for the grid operator with respect to his information transfer duties.

As a matter of fact, the individual elements of the information sets to be delivered by the grid operator (in his function as consumption data validator and expeditor) to the supplier, as well as the corresponding timings are specified in the Grid Code. The value of a single missing piece of information, is hard to evaluate, and even more difficult for an out-of-time message. Nonetheless, this information is key for the supplier since this is the primary source of information on which the contractual relation with his client is based.

To avoid frequent appeals to court with unjustifiable solicitor costs, a system of key performance indicators has been worked out. This can be considered as a system of service level agreements, setting the standard for the service level the supplier is entitled to in his position as client of the grid operator. Logically, this service level agreement is added as annexe to the access contract.

KEY PERFORMANCE INDICATORS

A global KPI is determined on a monthly basis for every supplier active in the geographical area operated by a DGO. The figure is expressed as a percentage, and takes into account the quality and the timeliness of the transferred data.

In a first stage, only consumption data is taken into account. All relevant consumption data is included in the definition of the KPI (1), according to a certain weight. The determination of the correctness of the data is based upon the rectification process, which has to be initiated by the supplier. The determination of the timeliness of the data is based upon the measurement of the units of metering data that are supplied within the time limits as specified in the grid code.

\[
\text{KPI}(Y) = \sum \left( \frac{Q_i \times N_i \times W_i}{100} \right)
\]

\[Q = \text{Quality of the delivered (validated) metering data (depending on the number of afterwards corrected data)}
\]
\[N = \text{Quantity of timely delivered metering data}
\]
\[i = \text{Specific type of metering data (not-validated data, validated data, aggregated data)}
\]
\[W = \text{Weight of the specific type of metering data}
\]
\[Y = \text{Group of specific type of customer (continuously metered, yearly read, monthly read)}
\]

To every supplier the KPI of the month before the previous month (M-2) is presented for evaluation. If the supplier agrees with the presented KPI, a compensation proportional to this KPI is paid by the DGO to the supplier (2).

\[
\text{CP} = \sum (100 - \text{KPI}(Y)) \times C_{\text{max}}(Y)
\]

In case of non-agreement, the regulator has the authority to take a motivated decision. The system can be extended to other necessary supplier information, such as master data in a later stage.

The indemnification per supplier is limited to a fixed sum \(C_{\text{max}}\) corresponding to the total metering cost for the customers of the supplier involved, as determined by the regulator. Above a level of 95% no indemnification is due. This level will gradually be raised to 97.5%.

In order to be able to calculate the KPI’s, a DGO has to monitor and control not only the collection and handling of his metering data, but also the transfer of this data to the suppliers. A system of performance indicators per supplier, enables the DGO to optimise his processes for handling and transferring the metering data. This is an aspect that usually is forgotten when the different business processes are implemented.

CONCLUSIONS

Gradually, the market for residential customers is opening in Europe. This retail market definitely has different characteristics as the wholesale market. More processes have to be elaborated and tested, and the amount of information to be exchanged is much higher.

Every member state is implementing the directive according to its own viewpoints, and the risk of having separate retail markets instead of one internal market is imminent. Therefore, there is a definitely a need to evaluate the different market organisation models and to draw the lessons in a European context.

An essential element for the correct functioning of the retail market is the quality of service of the information flow. Depending on the market organisation, different market actors are involved, and a proper incentive system is needed for efficient market operation.

REFERENCES