Special Report - Session 6
ELECTRICITY MARKET PLACE AND IMPACT OF REGULATION

Peter SÖDERSTRÖM
Chairman - Sweden
peter.soderstrom@vattenfall.com

Ronald LILJEGREN
Special Rapporteur - Sweden
ronald.liljegren@svenskenergi.se

Dag Eirik NORDGÅRD
Special Rapporteur - Norway
Dag.E.Nordgard@sintef.no

Introduction

The electricity market and regulation are currently undergoing a significant transformation, happening at a very high speed compared to the expected life-time of the systems' key generation and distribution assets. This transformation is mainly driven by society's demands implemented through national legislation, and requires completely new thinking with regards to market setup, roles & responsibility as well as innovative solutions.

Within this context Session 6 has selected to focus on the following four key blocks in the selection process for papers;

Block 1 Regulation and market development

Block 2 More challenging DSO business

Block 3 Activate the customer

Block 4 Smart grids projects

All of the blocks focus on key questions related to the DSO business in the era of Smart Grids. The first block investigates the development of markets and regulation; the very framework under which the whole system is working. The second block takes on the specific business challenges for the DSO related to the evolution of the DSO role. The third block targets the most important market player and the need for a completely new level of engagement from the customer in the development of the electrical system. Finally, the fourth block takes a look into results from ongoing smart grids projects.

In the review process Session 6 has accounted for several different stakeholders all the way from governments/regulators, through market players to academia. This variety of stakeholders is what makes Session 6 unique and highly interesting.

In total Session 6 has accepted 80 papers.

Block 1: Regulation and market development

Block 1 contains of 35 papers addressing different aspects of regulation and market development.

Paper **0004** describes guidelines for a voltage quality monitoring framework. The definition of the voltage quality objective follows from the perceived difference between current and desired levels of voltage quality. There are different controls that regulators could employ to achieve their voltage quality objectives. A distinction can be made between performance monitoring, minimum standards, and incentive schemes.

Figure 1 Classification of Voltage Quality - Paper 0004

Paper **0010** describes the development of gird codes for Rwanda.

Paper **0098** addresses an implementation of a deregulated pricing methodology for the electric distribution system, including distributed renewable generation. It also examines the economic and engineering implications of distributed renewable generation.

Paper **0102** describes results from a Norwegian study related to the perception of the electric power industry in society. It concludes that it is important that the sector is united and communicates an aligned message, and that the

sector needs to spread general information and understanding. The power industry needs to play a proactive role and invite stakeholders to dialogue.

Paper **0152** presents an Iranian solution for shaping electricity demand via controlling water consumption of agricultural customers. It shows that in the regions where pilot projects are implemented, electricity demand is decreased dramatically; in addition to that water usage efficiency is increased.

Papers **0245** and **0364** addresses aspects of Germany's transition towards a renewable energy supply. Paper **0245** reports on possible solutions for photovoltaic systems to participate in control reserve markets, giving an overview of how PV systems could deliver control reserve to the system. A new method for offering of control reserve provision is also presented. Paper **0364** presents a systems thinking approach to deal with Germans transition towards a renewable energy supply with an emphasis on households, and a model where the cause and effect relationships in the German residential electricity market are visualized and analyzed.

Balancing electricity supply with distribution network constraints is the topic of paper **0289**. This paper describes a scalable method by which electricity suppliers can shape demand from domestic and SME consumers, particularly demand arising from adoption of heat pumps and electric vehicles.

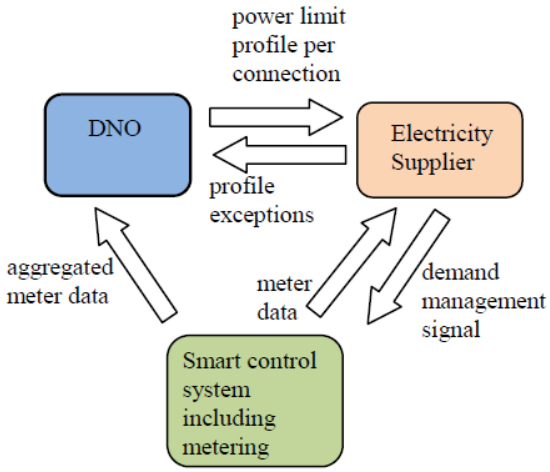

Figure 2 Proposed process for joint DNO/supplier demand management - Paper 0289

Paper **0290** reports from the Romanian process to eliminate the regulated electricity tariffs for end-users. The elimination of regulated electricity tariffs must be done transparently and non-discriminatory for end-users who do not want to use the eligibility right. To support the process, an information campaign for customers is developed. The end-users should have the possibility to compare the tariffs provided by each supplier, and to choose their power supplier accordingly.

Paper **0321** from Argentina describes how the value of lost load is used as a regulatory signal to guide investment into residential or industrial sectors.

Paper **0397** presents a study from Poland dealing with analysis on sustainability issues and operational effectiveness for electrical industries, stating that the threat of rising global competition, technological change, environmental policies and economical down turn makes the investors to insist the power companies to be more transparent with their operation.

Paper **0419** from the U.S. reports on the impact of regulations on electric distribution markets, providing a brief history of various U.S. laws and regulations at the wholesale and retail levels and their impact both on the U.S. and global electric markets.

Paper **0511** describes the updating of the security of supply level in the Finnish electricity distribution systems, showing the changing of the legislation from the viewpoint of the ministry. Two serious storms and the following wide spread and long lasting interruptions in 2011 were the starting point of amending the electricity network security of supply in the Finnish electricity distribution systems. From the beginning, there has been a strong political support for amending the current legislation and setting the time limits for the longest allowed interruptions in Finland.

The Council of European Energy Regulators (CEER) has been publishing benchmarking reports on the quality of electricity supply since 2001. Paper **0561** reports from the findings of the 5th edition of the benchmarking report, covering 29 member countries of CEER, 9 NRA's from the Energy Community and the NRA from Switzerland. The analysis clearly shows that in CEER member countries with advanced commercial quality regulation the use of overall standards has been decreasing while more guaranteed standards have come into force over time. This process is likely to continue in other countries in the near future.

Paper **0579** presents several Next Generation Marketplace aspects such as underlying rationale and pillars, a practical illustration through a detailed use case, and recommendations of corresponding IT infrastructure to support the use of distributed energy resources.

Paper **0586** from Sweden reports on regulatory aspects of energy storage, showing the possibilities and limitations of investing in energy storage for use at distribution level under the existing regulatory framework in Sweden. The paper gives a brief overview of possible applications and ownership models for energy storage in a distribution grid. It concludes that it is allowed for a network operator to own an energy-storage installation; there are however restrictions in the use of the installation for trade in electricity.

Figure 3 - The 75-kW battery storage in Falköping – Paper 0586

Paper **0600** reports from a EU project (IRENE-40) describing a pan-European capacity market prospect analysis based on scenarios.

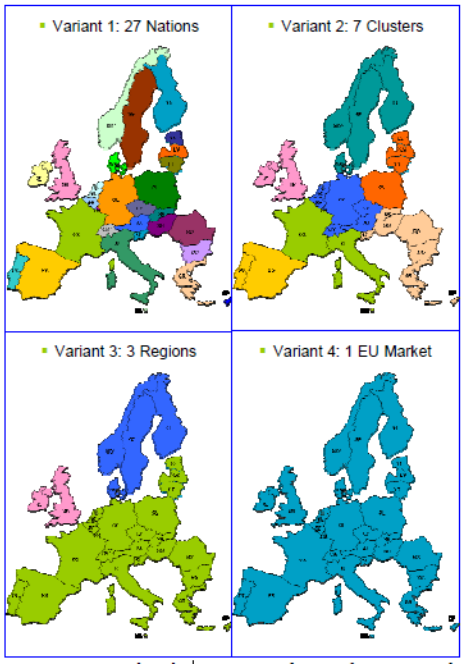

Figure 4 Considered Capacity Market Unification Levels – Paper 0600

Paper **0695** describes the challenges within the German electricity residential market based on an electricity price analysis. Three business models are introduced: Status Quo, Energy Contracting and Capacity Tariffs. A simulation environment named GENESIS is presented, in which the business models have been simulated and economic impacts of the individual actors of the German electricity supply have been analyzed.

Paper **0736** reports on the effect of plug-in hybrid electric vehicles will have on the behavior of power network. Simulation results show that aggregators of vehicle-to-grid can improve system performance seen from a social welfare point of view, reducing load not supplied and also improving line loading.

Paper **0762** from France presents the role of DSOs in future energy, capacity and balancing markets, stating that DSOs will have a role of as market facilitator for decentralized generation and demand response, and enable local optimization while fulfilling its traditional mission of safety of distribution networks.

From Iran, paper **0770** describes an optimal pricing strategy for energy packages in the Iranian power exchange, concluding that the proposed method considers various regimes of demand load and additionally account for inflation rates when long term trades are considered.

Paper **0842** presents models from Brazil to make forecasts of demand and electricity consumption for the horizons from 1 to 6 months (short term) and from 1 to 5 years (long term). The results will be used to formulate various scenarios, inputs necessary for strategic planning of the DSOs.

Paper **0843** from Iran proposes a method to determine the minimum guaranteed price of DG's energy considering their impacts on loss reduction. These prices are related to the wholesale market price and the impact of DGs on loss reduction.

Paper **0947** presents a case concerning energy contracting for large consumers in Brazil, proposing a model to assist large consumers to take decisions concerning the type of contract and its parameters.

Paper **0988** from China discusses how to introduce reliability into the optimization of time-of-use pricing. The objective function is to minimize the difference between peak and low load, while the interests of the power supply company and consumers will not decrease given that network constraints are met.

Paper **1016** describes the process of establishing EU-wide network codes, including the role of DSOs. The paper analyses the development of the network codes from a DSO perspective, with a focus on the draft technical codes.

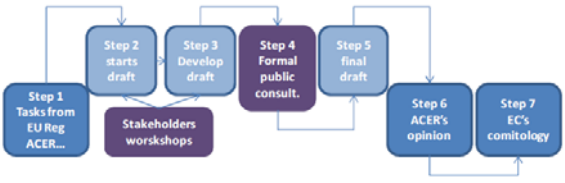

Figure 5 Network code development according to the 3rd Package (ENTSO-E) – paper 1016.

Paper **1030** evaluates power outage costs for industrial sectors in Finland, presenting the results of a customer survey on power outage costs. In addition, the problem of strategic responses has been investigated and an elimination

method for the zero and extreme responses is proposed.
Paper **1113** from Iran presents a practical method to estimate customer interruption costs and a customer damage function (CDF) for domestic customers. The proposed method has been applied to estimate CDF in a distribution network.
Paper **1223** from France addresses the question of how to develop additional renewable energy in island areas. The paper concludes that there is a range of solutions, both technical and economical, which strongly reduce the negative impacts of the integration of renewable energies in the grid, and that smart grids projects are currently evaluating these solutions.
From Greece, paper **1267** describes the opportunity of LV / MV consumers to be integrated in the Emissions Trading Scheme. It presents a review of literature and current standards and regulations, and concludes that there are many barriers, technical and non-technical, that need to be overcome.
Paper **1382** explains the regulatory situation in Sweden today seen from the DSO perspective. The Swedish electricity network industry has historically had an ex-post regulation, which was seen inadequate due to its complexity and unpredictability. To avoid these uncertainties, and to be in-line with EU directives, the Swedish Regulator decided to introduce a new ex-ante regulatory model. The implementation of the new model has however not gone smoothly.

Paper **1406** from Poland addresses various aspects of ICT in a smart grid based energy services development, highlighting risks related to fast paced ICT systems implementation in the power sector. This risk should be mitigated by development and implementation of technical standards, methods, best practices and principles of good cooperation between the actors.

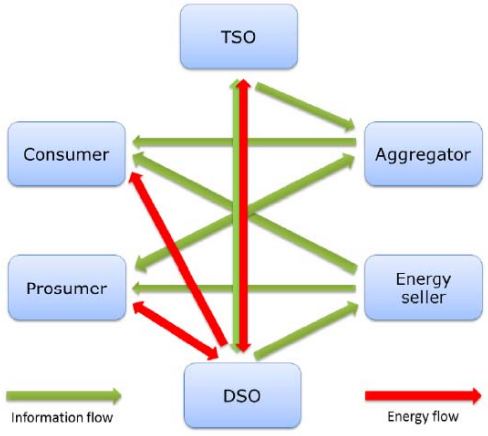

Figure 6 Flow of information and energy between market players in Smart Grid networks – paper 1406.

From Norway, Paper **1451** describes a market-based approach for optimal operation of customer-owned DG units in smart grids, proposing a methodology to purchase power from customer-owned DG units based on a multi-objective decision making approach.

Paper **1487** reports on aggregator development for demand response in Sweden, concluding that household demand side management holds a potentially good position among the low voltage demand response solutions.

Paper **1512** addresses the effects of the introduction of electricity market regulation on the reliability of the electricity system in Europe. The implemented regulatory schemes in the EU are analyzed with regards to their effects on annual power outage durations for the period from 1999 to 2010. In general, the trend of electricity supply security in these years has been positive (decreasing annual interruption durations) with less improvements in recent years.

Table 1: Papers of Block 1 – Session 6

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
0004 Regulatory guidelines in setting up a voltage quality monitoring framework				
0010 A grid code for Rwanda				X*
0098 Performance study of deregulated power system networks supported by renewable energy resources				
0102 The power industry on the road to 2020, threats and opportunities				X
0152 A novel solution for shaping electricity demand via controlling water consumption of agricultural customers				
0245 Participation of photovoltaic systems in control reserve markets	X			X
0289 Balancing electricity supply with distribution network constraints				X
0290 Eliminating the regulated electricity tariffs at end-users	X			X
0321 Impact of regulation on asset management: the value of lost load in Argentina as a regulatory signal to guide investment into residential or industrial sectors				X
0364 Germans transition towards renewable energy supply - a systems thinking approach				X
0397 Analysis on sustainability issues and operational effectiveness for electrical industries				X
0419 Impact Of Regulations On Electric Distribution Market	X			X
0511 Updating the security of supply level in the Finnish electricity distribution systems - a real life case of changing the legislation from the viewpoint of the ministry	X			
0561 Commercial quality regulation in European countries	X			
0579 Flexibility marketplace to foster use of distributed energy resources				
0586 Regulatory aspects of energy storage in Sweden				X
0600 A pan-European capacity market prospect analysis based on IRENE-40 scenarios				X
0695 Simulation of innovative business cases for household customers in the German electricity supply				X
0736 A New Approach to Apply Aggregators for PHEVs in a Smart City				
0762 How DSO could facilitate system optimisation in new market mechanisms for distributed resources				X
0770 Providing optimal pricing strategy for buyers' energy packages in Iran power exchange				
0842 Using VEC Formulation For Energy Demand And Consumption Forecasts For Short And Long Term Considering The Impact Of Price-Elasticity And External Shocks				X
0843 Determination of minimum guaranteed price for energy produced by DGs in distribution network				
0947 Energy contracting for large consumers in Brazil: A real case study				X
0988 The Optimization of Time-of-use Pricing Considering Reliability				X
1016 EU-wide network codes: process, role of DSOs and possible impacts				X*
1030 Evaluation of power outage costs for industrial sectors in Finland				X
1113 Estimation of customers damage function by questionnaire method				

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
1223 How to develop additional renewable energy in island areas?				X
1267 Inclusion of LV/MV consumers in emission trading scheme				X
1382 The regulatory situation in Sweden today - from a Swedish dso perspective				X
1406 ICT in a smart grid based energy services development				
1451 A market-based approach for optimal operation of customer-owned DG units in smart grids				X
1487 Household aggregators development for demand response in Europe				X
1512 The interdependencies of electricity market regulation and electricity supply security				X

Block 2: More challenging DSO business

Block 2 contains 26 papers addressing different aspects of the more challenging DSO business.

Paper **0043** presents a new dynamic model for using thermal and electrical storage systems to manage the operation cost of a micro-grid in face of uncertainties in real-time. The paper suggests that the developed EMS model for the micro-grid could reduce the operation cost variance (or risk) considerably.

Paper **0191** mathematically formulates an energy hub as a super node at distribution level that has potential to receive energy through various carriers and to convert and store this, to satisfy the demands required by the hub. Results suggest what technologies that could be satisfying the hub demands to achieve minimum operation cost based on grid prices and varying wind days.

Paper **0235** describes a process that combines load and condition based risk. The output from the combined model is a measure of risk now and in the future, reflecting both the changing condition of the assets and changes in load.

Paper **0287** proposes a method for a utility to evaluate all investments in new technology related to their operational and business aspects. The paper discusses the definition of criteria and shows how it has been applied by Skagerak Nett AS in Norway.

Paper **0314** describes a set of future scenarios for smart grids reflecting the Norwegian situation. The scenarios are based on a series of workshops held in a national project, the DeVID project (Demonstration and Verification of Intelligent Distribution networks). As a result the paper outlines a number of recommendations for the development of the distribution network sector.

Paper **0475** presents a combination of reliability calculation and simulation of network operator organizations to evaluate CAPEX- and OPEX-related activities of network operators. The presented model provides additional operational performance indicators to evaluate the grade of safe operation of the network and investigate the influence of modified organizational structures.

Paper **0484** presents the effort done and experiences gained by SwedEnergy in order to change the public attitude towards electricity. The results cover the first year of the project.

Paper **0489** emphasizes the need to assess and monitor the progression towards a smarter grid so that limited funding is well aligned with public goals in energy efficiency. The paper highlights how regional differences in geography, demographics and public policy are reflected in smart grid solutions. These differences contribute to a unique set of barriers to implementation and a unique set of opportunities for progression.

Paper **0501** describes the coordination of strategic and operational asset management at ENERVIE AssetNetWork. The results describe how two software tools are used to foster the discussions between Asset Management and Asset Service.

Paper **0503** describes the smart meter roll-out by EPCG operating in the southeast Europe. The paper focuses especially on the challenges with power line communication.

Paper **0613** describes the achieved benefits, both financial and non-financial, from the Smart Meter rollout in Sweden. The result describes and quantifies the original and additional benefit gained.

Business case
Original - Implemented
Monthly billing
Move in/out
Supplier change
Customer support
Non-technical network losses
Extended - Implemented
0-faults
Power outage - competsation to customers
Remote switch off/on
Presentation of daily/hourly values to customers
Extended - Evaluation/Pilot
Detect wrong fuse size
Optimize network losses - hourly values
Power outage - identify proactively
Power outage - remaining faults and restoration
Power quality
Network planning

Figure 7 Business case parts for Smart Meters – paper 0613.

Paper **0660** proposes an operational planning model of a micro grid which considers multiple demand response programs. The results show that minimizing emission levels may increase operational cost and vice versa.

Paper **0686** looks on medium voltage grids, and tries to explain the differences in length that can be observed in European countries, since the electricity supply disturbances and costs are supposed to be related to those lengths. The results show that it is impossible to have a proper idea of the performance and capacity of a grid if you consider only MV grid length. It also shows that structuring the grid increases its total length, but also gives the grid its capacity and its quality.

Paper **0710** gives information on power systems applications that can be used to provide significant return on investments from Smart Grid expenditures. The paper concludes that power systems automation should be considered a prudent investment versus a significant expenditure.

Paper **0748** describes a simulation of cost and impact due to a roll out of smart meters preformed based on market values in Brazil. The results show a significant increase in the rates to pay for the necessary investments which can be reduced to a certain degree by reducing the functionalities. This is an interesting approach where *less is more* is investigated.

Paper **0756** analyses the future penetration of electrical vehicles and the related increase of electrical energy demand that may impose new requirements on the power system and affect network operation. The paper concludes that very little will happen in the short term perspective, however in the longer time perspective more active measures by the DSOs and TSOs as well as the involvement of aggregators will be necessary.

Paper **0768** reviews the rules under which generators can have their output controlled and curtailed. The paper outlines four commercial alternatives to provide certainty to developers on their generation investment. It is part of the 'Flexible Plug and Play Low Carbon Networks' (FPP) project.

Paper **0774** analyses the trend of daily electricity demand in Iran. It forecasts the electricity daily demand for next 10 days in forms of step to step models of ARIMA. Results show that the proposed model has had high accuracy in forecasting the daily electricity demand in terms of all evaluation criteria when compared with other models.

Paper **0782** presents methodology for estimating effects of energy efficiency on electricity distribution. It is concluded that energy efficiency will have effects on transmitted electrical energy and power. Effects on revenue will be about -9 % by 2050 compared with the current situation. Those effects may differ between regions.

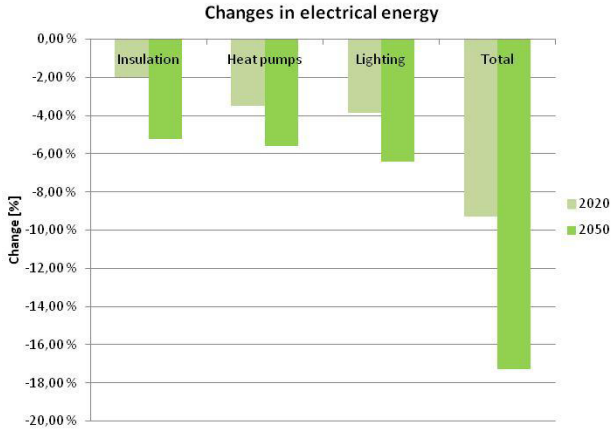

Figure 8 Changes in electricity energy – paper 0782.

Paper **1204** presents two major non-technical challenges for the distribution companies when managing the growth of distributed generation; lack of incentives to ensure a holistic planning of the grid and the communication challenge between the DG owner and the Distribution System Operator (DSO).

Paper **1207** illustrates the phenomenon of electric space heating load control and its impact on the distribution network. One of the conclusions is the impact of market-based load control depends on the feeder topology and its ability to endure the peak power.

Paper **1218** illustrates how grid operators can profit from hourly metering by using hourly meter data to analyze various aspects of their business. The results points at the need for the DSO to handle large amounts of data and the associated tools as well as have a good interaction with the other market participants.

Paper **1465** proposes a short term load forecasting model based on the relevance vector machine (RVM). Simulation results show that the dimensions of the input variables can be effectively reduced and the predicting accuracy can be greatly improved.

Paper **1506** analyses the current business market situation of PV technology under certain assumptions, taking as a driver of the study the PV technology in the residential market segment in Italy. The results conclude that the grid parity of PV technology would be reached in Italy around 2013, starting from southern regions.

Paper **1510** reports on the experience gained in the E-DeMa project considering the interfaces of the aggregator system. The results show that there are two big issues to resolve within the next few years; necessity of standardization of the communication between control centers and the peripheral devices and the enormous impact of the dramatically increasing volume and rate of data.

Table 2: Papers of Block 2 – Session 6

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
0043 Real-time risk and cost management of a grid connected micro-grid				
0191 Market Based Short Term Scheduling in Energy Hub in Presence of Responsive Loads and Renewable Resources				
0235 Combining load and condition based risk models for integrated investment planning				X
0287 Smart compact secondary substations – method for evaluation of functionality for utilities				X
0314 Scenarios describing smart grids technologies applied to electricity distribution systems		X		X*
0475 A model to optimise CAPEX and OPEX for a given quality level		X		X
0484 Changing the attitudes about electricity				X
0489 Electric grid modernization: measuring progress and monitoring the under-recognized areas of the electricity infrastructure required to realize the smart grid concept				
0501 Integration of strategic and operational asset management				X
0503 South East Europe Style Smart Metering: the cost effective solution for an ageing network				
0613 Benefits from smart meter investments		X		
0660 Energy and reserve scheduling of microgrid using multi-objective optimization				
0686 Impact of load dispersion on grid length				X
0710 Paying for the smart grid				X*
0748 A Brazilian business case: smart meters, the market and regulation				X
0756 E-car and economic impact: enhancing the smart grids II				X
0768 Flexible Plug and Play Low Carbon Networks: Commercial Solutions for Active Network Management		X		
0774 Designing an optimized model to forecast short-term electricity demand based on ARIMA and wavelet decomposition neural network: composition of linear and non-linear model (a case study in Iran)				
0782 Effects of residential customers' energy efficiency on electricity distribution business				X*
1204 Challenges in the distribution grid development regime for DG integration - the need for predictable plans and arenas for communication				X
1207 Impact of market-based residential load control on the distribution network business		X		X
1218 The strength of hourly data metering - revenue assurance for two different cases				X
1465 A new short-term load forecasting model based on relevance vector machine				
1506 Reaching PV grid parity: LCOE analysis for the Italian framework				X
1510 Efficient infrastructure for aggregation and marketing of distributed small-scale energy resources				X

Block 3: Activate the customer

Block 3 presents 11 papers dealing with activating the customer – addressing various aspects concerning the transition from the passive customer to the future active customer participating in the grid operation.

Paper **0320** reports on a project in Italy testing the impact of a mandatory time-of-use tariff compared to conventional flat tariffs. The results of the analysis show that, even if there has been a limited shift of consumption from peak hours to off-peak hours, the change in the behavior of the users is not negligible.

In paper **0377** the authors report of the potential benefits from Demand side management (DMS), as seen from a Norwegian DSO and TSO perspective.

Paper **0662** reports of power-saving benefits from DMS in China. The evaluation of energy saving shows that the implementation of DSM can raise energy efficiency, and be useful from a societal point of view - especially in situations of power shortage.

Paper **0588** addresses the transition from *consumer* to *prosumer*, concluding that a big gap remains between customers' current awareness of new technologies and their expected future commitment and ownership of smart grids. Significant communication and clarification efforts need to be done in order to make customers understand the value added by smart grids technologies and increase their interest in new products and services.

Papers **0668** and **1333** all addresses the aspects of interaction between utility and customer, but from different angles. Paper **0668** gives a description of the drivers behind the need of a Data Flow Interface - a new interface for direct data exchange with Smart Homes, highlighting some of the potential benefits for the customer.

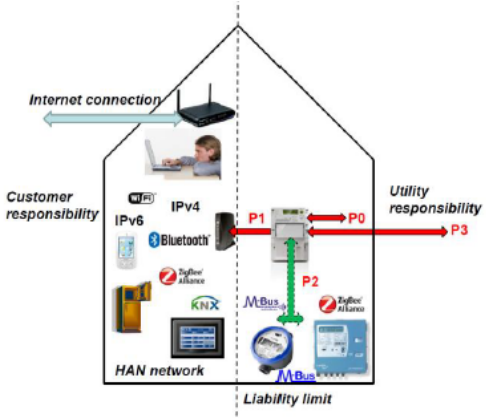

Figure 7 - The Data Flow Interface - Paper 0668

Paper **1333** reports of improved knowledge about electricity consumption which can come from the *Linky* meters in France, stating it is possible to benefit quite quickly from a good level of accuracy for reports.

Paper **0800** investigates how demand response pilot projects for the residential sector can be evaluated. A simplified framework for how to design demand response pilot projects carried out for the residential sector has been developed. The paper reports on a review of 135 international pilot projects, showing that bill savings is the most common reason for participating and that customers tend to respond to blocks of prices instead of sudden increase in a certain hour.

Paper **1164** reports on applying fuzzy techniques to model customer comfort. The paper classifies different appliances in different clusters and presents control strategies for illuminating, thermal and multi periods devices. Numerical results show that implementing the proposed method can result in consumer payment reduction and satisfying consumers' preferences.

In paper **1259** from Italy technical solutions which enables energy operational efficiency across different energy sectors (electricity and gas), empowering consumers to optimize energy use and enabling value added services are described.

Finally paper **1282** reports from a Swedish study of actual customers' interest in more advanced consumption services accessible through the Internet. Approximately 2500 private customers in Sweden participated in the 12-month test, giving them the opportunity to follow up their electricity consumption on an hourly basis. The result from this test is now the base for Hourly Metering roll-out in Sweden.

Table 3: Papers of Block 3 – Session 6

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
0320 Impact of the enforcement of a time-of-use tariff to residential customers in Italy	X			X
0377 Demand Side Management (DSM), what are the potential benefits?	X			
0588 From consumer to prosumer : the case of smart grid technology				X
0662 Power-saving benefits of demand side management				X*
0668 The interface between the utility sector and home automation				X
0800 Evaluation methods for market models used in smart grids	X			X*
1164 Applying fuzzy techniques to model customer comfort in a smart home control system				
1259 Advanced smart multi-metering: synergies between gas and electricity sectors for efficient operations and customer awareness				
1282 Hourly metering opens for new business opportunities and improved customer service	X			X
1333 A better knowledge of electricity consumption for residential customers through the Linky smart meter	X			

Block 4: Smart grids projects

Block 4 presents altogether 9 papers describing different experiences from smart grids projects – covering both large scale roll-outs and demonstration projects.

Paper **0636** presents initial results from a 13 million customer roll-out in Spain, where existing solutions from Italy has been developed further for this application.

Papers **0563** and **0743** both presents status and results from the InovGrid project in Portugal. Paper **0563** states that Smart Grids bring not only considerable challenges to DSOs, but also several benefits that can be reaped by the different stakeholders and players in the industry. Paper **0743** concludes that the project is placing the client in the center of the electricity sector, which represents a transition from a mere economical concept to a social and behavioral one.

Paper **0836** summarizes findings from the Grid+ project analysing on-going research and demonstration projects in Europe. The paper describes a methodology and the first results of gap analysis of the EEGI Roadmap 2010-2018. The gap analysis gives European TSOs and DSOs clear indications about the activities that should be prioritized ahead.

Paper **0914** reports on how results from the Royal Seaport pilot in Stockholm can be extrapolated to a national scale, investigating the challenges of large scale implementation of a proposed price model for electricity that combines the cost of energy with the cost of distribution that aims tp encourage end-consumer Demand Response.

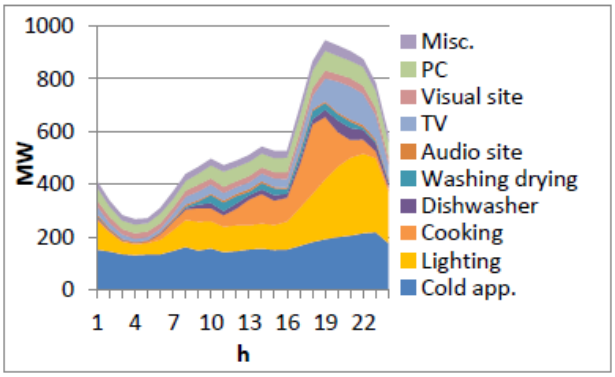

Figure 8 - National scale aggregation of the specific electricity consumption of Swedish apartments during a typical weekday - Paper 0914.

Paper **1127** describes Italian results concerning the challenge of RES integration in the MV network. The need to increase the distribution network hosting capacity of RES is imperative. The demonstration project addresses this topic through a control system for MV networks and involving the MV customers (generators and customers with no generation) in network management.

Paper **1220** addresses island territories which have some characteristics, which make them attractive as laboratories to test, demonstrate and deploy smart grid components and systems. The experience gained from smart grids projects on islands could be replicated in remote areas or extended in future large scale deployment.

Paper **1261** paper introduces the first results of the Meter-ON project aimed at collecting and sharing lessons learned from several European Smart Metering experiences. The project has already shown how different technological solutions have been adopted in 15 projects that are going to involve about 100 million customers in the next few years. The technological solutions involve different communication protocols within the metering infrastructures as well as different available devices/systems aimed at directly communicating with the final customer and supporting active demand applications.

Finally, paper **1474** reports from the Ecogrid EU project concerning real time price based load control and economic benefits in a wind production based system. The paper presents work regarding price elasticity and availability of process loads with internal relations and saturation restrictions. An industrial compressed air system, equipped with a compressed air storage unit and an electrical water heater are used as examples of flexible loads. The paper discusses how the volatility in the real time price and the quality of the price forecast consequently affects the energy costs and efficiency of this group of flexible consumer loads.

Table 4: Papers of Block 4 - Session 6

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
0536 InovGrid, a smart vision for a next generation distribution system ...		X		X
0636 First results in Endesa smart metering roll-out				
0743 The new paradigm of metering in Portugal				X
0836 Analysis of the on-going research and demonstration efforts on smart grids in Europe		X		
0914 National scale impact of the Stockholm Royal Seaport project		X		
1127 Enel's large scale demonstration project inside Grid4EU: the challenge of RES integration in the MV network				X*
1220 Smart islands, laboratories of smart grid technologies				X
1261 The Meter-ON project: how to support the deployment of Advanced Metering Infrastructures in Europe?		X		X
1474 Ecogrid EU project - real time price based load control and economic benefits in a wind production based system		X		X