Special Report - Session 6
Distribution network as electricity market place and impact of regulation

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Introduction

The role of electricity will be crucial to meet the EU 20-20-20 targets; the reduction of CO_2 emissions, an increase in energy efficiency and enabling renewable generation in 2020. The car industry is in a turning point, and the take-off of electrical vehicles may be quite near. The electricity markets in the future will call for intelligent demand response actions based on market price, energy saving, management of dynamic/mobile loads, energy storages and local generation. These processes will involve new business and regulation models for distribution networks as well as new technical solutions and include new organisational structures and administrative routines, new solutions for a customer gateway, automatic meter management systems and commercial IT system tools.

Session 6 reflects on the above topics, and the 85 accepted papers for the session are grouped accordingly into the following blocks.

Block 1 is related to Smart Grid programs, the present state and future expectations of regulation and their impact on the networks and business of the DSOs. For the block, 29 papers were selected, out of which six were chosen for presentation in the main session. 23 papers will be presented in the poster session.

Block 2 is related to experiences of smart metering and applications based on AMR. For the block, 15 papers were selected, out of which six were chosen for presentation in the main session. 9 papers will be presented in the poster session.

Block 3 is related to the demand response and business impact of electrical vehicles. For the block, 17 papers were selected, out of which six were chosen for presentation in the main session. Six papers will be presented in the RIF session and five papers in the poster session.

Block 4 is related to the role of information systems in a Smart Grid Environment. This block also includes papers focusing on pricing and tariffs, on the risk management and organisational structures of DOSs. For the block, 24 papers were selected, out of which six were chosen for presentation in the main session. 18 papers will be presented in the poster session.

Block 1: "Smart Grid programs, present state and future expectations of regulation of DSOs and electricity markets"

Smart Grid programs

Research and development of a Smart Grid environment and applications have exploded worldwide. In most countries there are ongoing wide-scale Smart Grid programs. The content and objective of programs is multifarious including technology, infrastructure development, management of active resources, management of intelligent networks and integration of Smart Grid functions in the electricity market development.

Paper 0154 presents the plans to formulate the roadmap towards Smart Grids in the Netherlands. The benefits of Smart Grids and some actions associated with the roadmap are analysed in the paper.

Paper 0150 from Sweden focuses on an inquiry on Smart Grids conducted during 2010 by the Energy Market Inspectorate. In the paper, numerous recommendations for tackling the barriers to the evolution of the Smart Grid environment are analysed and presented.

Paper 0244 from the UK presents the practical experience of Ashton Hayes, a community that has run a "Going Carbon Neutral" project since 2006. The role of the DSO is one of the key elements analysed in the paper.

Paper 0261 from Korea deals with the AMI deployment project with 18 million customers of KEPCO. In the paper, also the Smart Grid project in the Jeju Island is described.

Paper 0329 from the Netherlands provides definitions, objectives and concepts for the Smart Grid. For instance, market-,

grid- and system-oriented Smart Grid concepts are analysed.

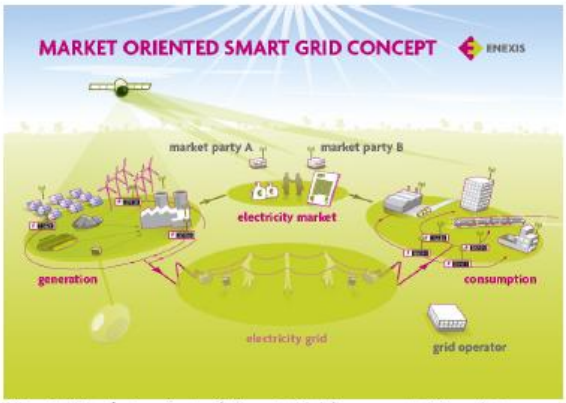


Fig. 2. Market oriented Smart Grid concept (Enexis)

Paper 0455 deals with an InovGrid Smart Grid project organised by EDP in Portugal. The paper presents practical examples and results of a technical platform installed in the city of Evora.

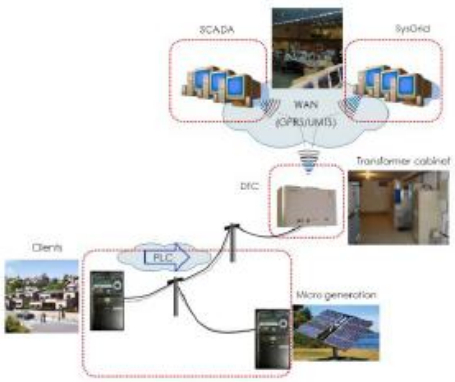


Fig 3 – InovGrid technical platform

In paper 0784, the co-operation models developed to initiate a Swiss Smart Grid standard are presented. A concept for a two-level aggregator model for Demand Side Management is also presented.

In paper 0828 from Germany, the status quo, market barriers and market development of Smart Grids are analysed. The overall market volume in the Smart Grids in Europe is estimated to increase from the existing 100 bn € to the level of 260 billion € in 2030.

Paper 0836 introduces the EEGI and EDSO initiatives to develop the European Smart Grids.

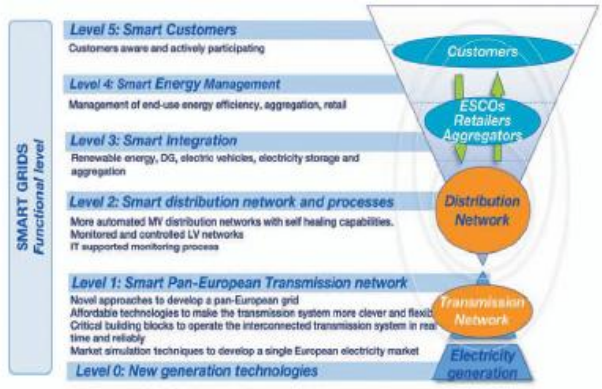


Figure 1: EEGI Smart Grids model

Paper 1000 from Finland presents the existing Smart Grid version 1.0 and introduces the migration towards to the next generation Smart Grid. The basis for the development is a national Smart Grid and Energy Market (SGEM) five-year research program having significant business players outside the traditional power sector.

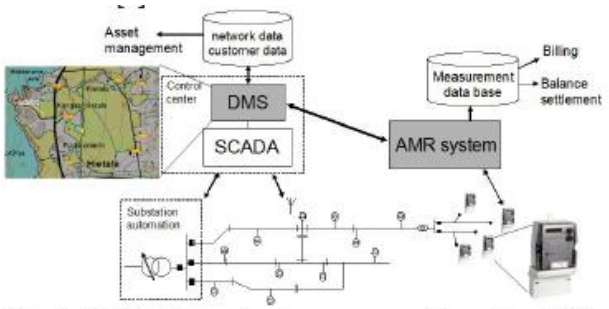


Fig. 4. Distribution network management by using AMR

Paper 1237 from Ireland focuses on the question of how the Smart Grid can help to achieve the targets on reduced carbon emissions, improved competitiveness and less reliance on imported fossil fuels.

Regulation principles and methods

Most of the papers in the field of economic regulation deal with the questions of which kind of barriers there are for the Smart Grid development and how these barriers can be tackled. In parallel with this discussion, the updated versions of regulation models have been and will be implemented. For instance, the new regulation model to be applied in Sweden from the beginning of 2012 onwards has activated authors to write four papers into this regulation session.

Paper 0292 written by EURELECTRIC focuses on the challenges faced by the European DSOs when investing in Smart Grids and introduces principles towards smarter regulation. In the paper, the results of the survey of the status quo of economic regulation are presented.

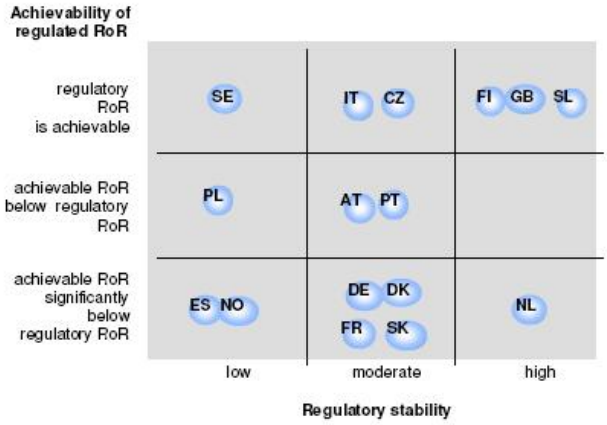


Figure 2: Regulatory framework – achievability of RoR vs. regulatory stability

Paper 0340 from Brazil analyses the regulatory barriers to small-scale renewable-based electricity production. Small distributed generators connected to the distribution grid face technical, legislative and regulatory barriers.

Paper 0427 from Sweden provides an overview of the new Swedish economic regulation to be used from the beginning of 2012 onwards. The main focus of the paper is on the determination of capital costs in the regulation model. The norm costs and the WACC method will be applied in the regulation.

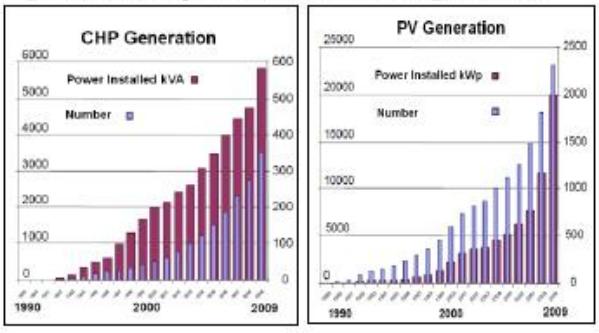
Paper 0485 from Sweden presents the key services provided by the DSO and introduces regulation principles enabling and accelerating the new services required in the future.

Paper 0629 introduces the present status and forthcoming changes in the electricity distribution business and regulation in Turkey.

Paper 0646 analyses the possibility and potential to use equivalent comparison standards to judge the effective costs of DSOs in the economic regulation in Sweden. The results are based on interviews and surveys distributed for all Swedish DSOs.

In paper 0931 from Germany, the Smart Grid investments needed in metropolises (e.g. Berlin) are analysed, and recommendations for improving the economic regulation to boost the change are presented.

Figure 3: Development of CHP and PV generation



In paper 0978, the group of European Energy Regulators (ERGEG) presents the view and recommendations for regulation of Smart Distribution Networks. The paper presents a definition for a Smart Grid as follows:

> Smart Grid is an electricity network that can cost efficiently integrate the behaviour and actions of all users connected to it – generators, consumers and those that do both – in order to ensure economically efficient, sustainable power system with low losses and high levels of quality and security of supply and safety.

Paper 1213 from Brazil presents the model to optimise the DSO's operational costs based on the reference firm model used in the regulation.

Paper 1293 from Sweden analyses the impacts of a Supplier Centric Model on the business of distribution companies. In the Nordic countries, customers interact today with both their supplier and distribution company. The possible change in the market model drastically changes the role of the DSO.

Other topics related to regulation

The topics of the following papers deal with the quality of supply, experiences of deregulation and the reputation of the power industry.

In paper 0072 from Norway, the reputation of the power industry and its drivers are analysed over the last decade.

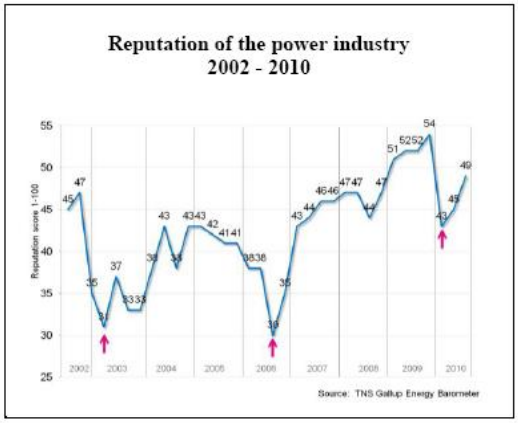


Figure 2: During the last eight years, the Norwegian power industry has experienced three crises of reputation, caused by high fluctuation in the electricity prices.

Paper 0089 from Norway sums up the main observations of 20 years' deregulation in the Nordic power market. In conclusion of the paper it is stated that "Opening of power market has been the benefit to the society and to industry".

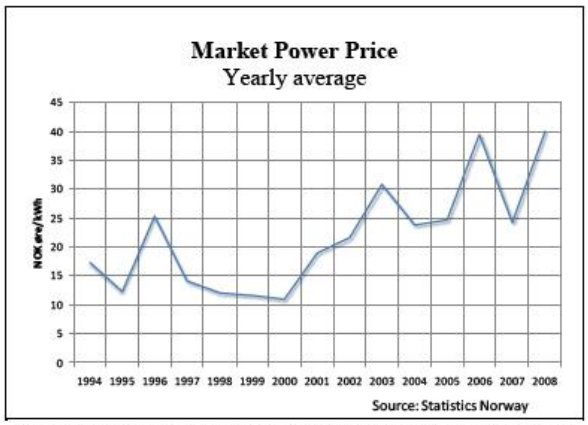


Figure 2: Power prices at the power exchange stayed low for 10 years, but price volatility rose considerably.

In paper 0148 from Egypt, the web-based system for managing consumers' complaints is presented. Some statistics of SAIFI, SAIDI and CAIDI developments are also presented.

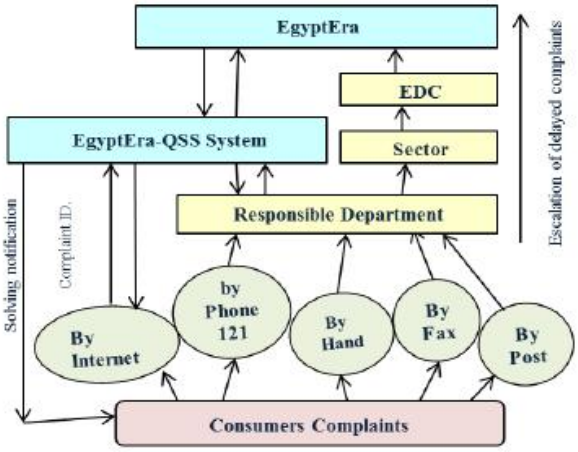
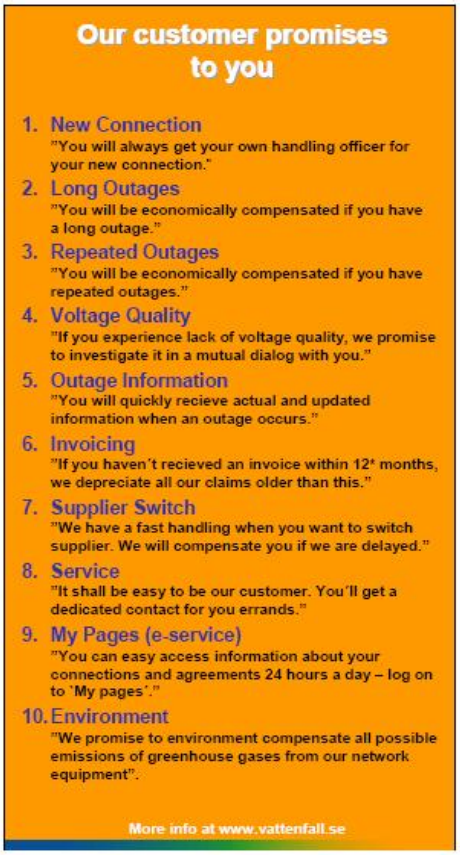


Fig.1. Complaints flow

Paper 0233 introduces the Swedish benchmarking report on the continuity of supply. SAIFI and SAIDI values over the past decade are presented in the paper. The statistics also include the data of very long interruptions (> 24 h, 12–24 h). The average values for SAIFI in rural areas and in urban areas are 1.3 and 0.3 interruptions/customer,a and the respective SAIDI values are 110 and 16 min/customer,a.

Paper 0684 from Romania deals with the contradiction between system reliability, cost minimisation and environmental issues in a Smart Grid environment.

Paper 0909 from Sweden introduces the customer promises given by Vattenfall in Sweden and Finland.



Paper 1079 from Brazil presents the method for calculating the technical losses and medium- and low-voltage networks according to the regulation model.

Paper 1207 from Iran focuses on a reward and penalty structure to be applied by the regulator and by the DSO.

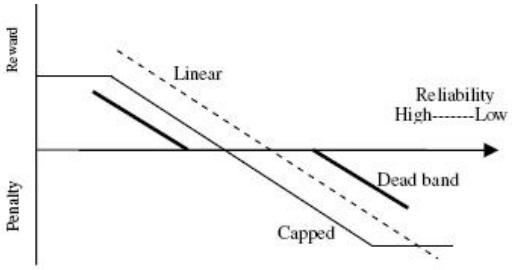


Figure 2. Different structures of reward and penalty

Table 1: Papers of Block 1

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
0072 Does the power industry need satisfied customers and a good reputation?				X
0089 20 years of Competition - Did the Nordic Power Market serve its purpose?				X
0148 Electricity Consumers Quality of Service System (QSS)				X
0154 Roadmap Smart Grids Dutch Branche Organisation Nethebeer Nederland				X
0160 The Swedish Government Inquiry on Smart Meters and Intelligent Networks				X
0233 The Swedish benchmarking report on continuity of supply				X
0244 Community Energy from Policy to Practice				X
0261 Pilot Smartgrid Project in Jeju island and KEPCO'S AMI deployment				X
0292 EURELECTRIC Paper on Regulation for Smart Grids	X			
0329 Demystifying Smart Grids - Different concepts and the connection with Smart Metering				X
0340 What are the Current Regulatory Barriers in Brazil for Small Renewable Power Plants?				X
0427 Capital Costs in New Swedish Revenue Regulation				X
0455 Inovcity - Building Smart Grids in Portugal				X
0485 Adopting a general regulatory approach on the European electricity market	X			
0629 Electricity Distribution Business in Turkey: Current market status and forthcoming practice				X
0646 The potential of using equivalent comparison standards to judge effectible costs in electrical distribution tariff regulation				X
0684 Optimizing the contradiction between enhanced energy security, environmental protection and minimizing the costs				X
0784 Smart Grid Switzerland: Cooperation models to schieve a standardized and open smart grid				X
0828 Smart Grids in Distribution Networks until 2030 – Technologies, Potentials, Market Developments				X
0836 EEGI and EDSO: the initiative to develop European Smart Grids				X
0931 Regulatory requirements to support the deployment of Smart Grid from the perspective of a DSO	X			
0978 European Energy Regulators' views on regulating smart distribution networks	X			
0909 Introducing customer promises in Sweden and Finland				X
1000 Finnish Smart Grids - A migration from version one to the next generation				X
1079 Determination of Descriptive Attributes used to Calculate Technical Losses of Medium and Low Voltage Networks According to the Brazilian Regulatory Model				X
1207 Principal requirements of designing the reward-penalty schemes for reliability improvement in distribution systems				X
1213 Optimized Management of Operational Costs based on regulatory goals (Reference firm)	X			
1237 Tactical and Strategic SmartGrid Implementation in ESB Networks				X
1293 Implications of regulatory changes of the market model on the distribution business	X			

Block 2: "Experiences of Smart Metering and future trends"

Smart metering

Paper 0016 presents experiences of the implementation of an AMR/AMM project in Bosnia-Herzegovina. Different types of communication; GSM, PLC, fibre optic, have been utilised with successful operation. In the future, the AMR/AMM system together with SCADA/DMS systems opens significant new application tools for intelligent network operation.

Paper 0169 from China presents the smart meter management system for small customers. One objective is to achieve smart Demand Side Management applications.

Paper 0296 from Finland presents a methodology for real-time determination of distribution losses. The methodology is based on data obtained from AMR meters and conventional kWh meters.

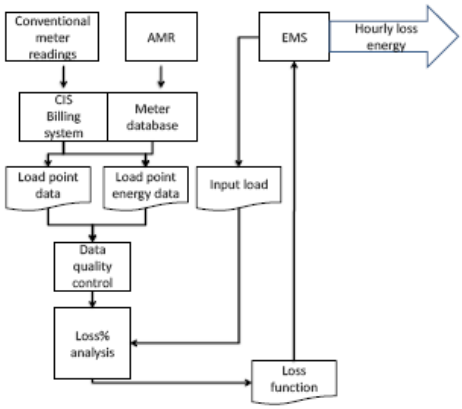
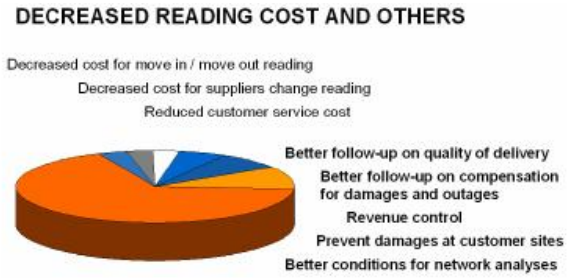


Fig. 7 The loss analysis and estimation data flow.

Paper 0313 presents the AMI strategy of one Romanian distribution company. Special emphasis is put on the analysis of social, ecological, political and economic impacts of AMI investments.

Paper 0415 from Sweden deals with the availability and reliability of AMR data after the full-scale smart metering roll-out. Also the experiences of new services based on an AMR system are reported. At the beginning, the AMR investment was based on decreasing the reading costs. In addition to this, a lot of additional benefits have been indentified.



Paper 0478 from Belgium presents the method to determine the connectivity of low-voltage customers based on data obtained from the AMR meters. The connectivity problem is the following: the distribution substation is customer connected.

Paper 0737 from Japan presents the results of an investigation of wireless telecommunication in AMI installations. 2.4 GHz wireless LAN, 950 MHz and 429 MHz low-power radio systems were evaluated and reported.

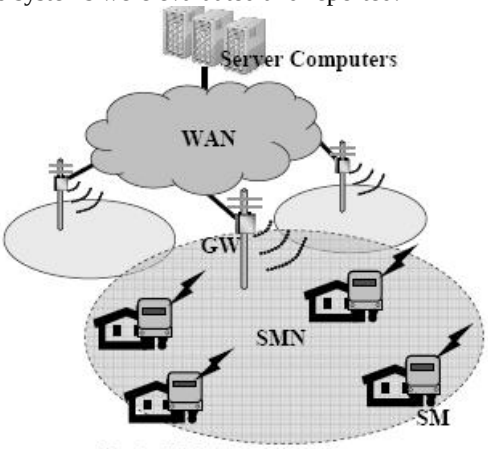


Fig. 1. A Model of AMI System.

Paper 0754 from Sweden presents the results of a study in which the customers' interest in having advanced consumption services accessible through the Internet was investigated. Customers like to have quite detailed information of their consumption, and in some cases they are willing to pay for the services.

Paper 0829 introduces the "Meters and More PLC protocol", which will be open for all business players in the AMR sector.

Paper 0845 from Korea deals with the security schemes of AMI systems. An algorithm based on public key encryption is developed to guarantee the security of the AMI system and data communication.

Paper 0887 from Finland presents the methodology to categorise the customers based on the data obtained their AMR meters. The results seem to be valuable for the DSOs and retailers, and there seems to be business potential for tar-

geted marketing and dynamic pricing.

Paper 1019 from Portugal presents the consumption data models and data exchange systems used in the Iberian Electricity Market.

Paper 1230 from Germany analyses the business opportunities and challenges in the metering business. As a conclusion, the meter data management system to be used as a data exchange platform for different energy market players is required in the future.

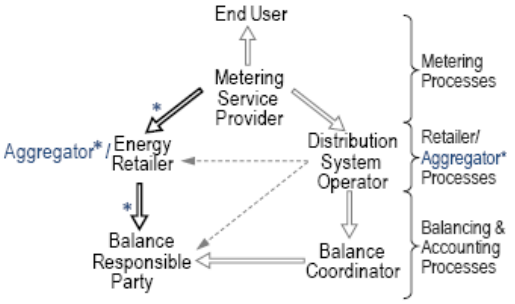


Figure 1. Market roles, data exchange agreements, and associated processes: status quo, the 2011 amendment, and future market roles

Paper 1249 from Switzerland introduces the plans to launch a multi-energy Smart metering pilot project integrated with energy follow-up applications.

Paper 1267 from the Netherlands presents smart-metering-based methodology for detection of an electricity theft. The accuracy of the method depends on the accuracy of the theft power factor estimation, the accuracy of measurements and the network model accuracy.

Table 2: Papers of Block 2

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
0016 Implementation of AMR/AMM system: results and plans ELEKTROPRIVREDA BIH				X
0169 Research on Smart Meter Management System for Low-voltage Customers				X
0296 Real time purchase and settlement of distribution losses				X
0313 Electrica's AMI Strategy updates				X
0415 Experiences from operations after a full-scale Smart Metering rollout regarding availability and reliability.	X			
0478 Improving the data quality of the LV-connectivity	X			
0737 Investigation of Wireless Telecommunication for AMI	X			
0754 Making the electricity consumption visible				X
0829 Cervantes project and Meters and More: the state of the art of smart metering implementation in Europe	X			
0845 Security Schemes for AMI	X			
0887 Smart Metering and Customer Consumption Behaviour Profiling -- Exploring Potential Business Opportunities for DSOs and Electricity Retailers				X
1019 Data supply for the Portuguese branch of Iberian electricity market				X
1230 Meter data management – from the smarter grid to future market platforms in liberalized energy markets	X			
1249 Green E-value : Smart Metering for energy efficiency				X
1267 Electricity Theft Localization Based on Smart Metering				X

Block 3: Impact of electrical vehicles and demand response on distribution business

Electrical vehicles; impacts on the distribution grid and business models for charging and discharging

A lot of research and development work is going on with the smart integration of electrical vehicles and electrical grids. Most of the proposed papers deal with the management and operation of a recharging eco-system. On-line management of charging transactions requires co-operation with the power and ICT sector players. Other interesting questions are related to managing the possible negative and positive network impacts of EVs.

Paper 0398 from Italy introduces the management system for charging EVs and PHEVs. Three main business processes have been analysed; the charging infrastructure, clearing the financial transactions of the charging process and managing the loads of the distribution grid.

Figure 1: The three modules of the Operation Center

Paper 0838 from Italy focuses on the management of a smart recharging infrastructure for EVs. The paper suggests that DSOs will be responsible for the development of the recharging infrastructure. This will guarantee the optimised integration of EVs into the Smart Grid.

In paper 0889 from the Netherlands, the market model for a public charging infrastructure is presented. The model development is based on the needs of all market players, the DSO and the TSO, the energy supplier, ministries, municipalities and mobility service providers.

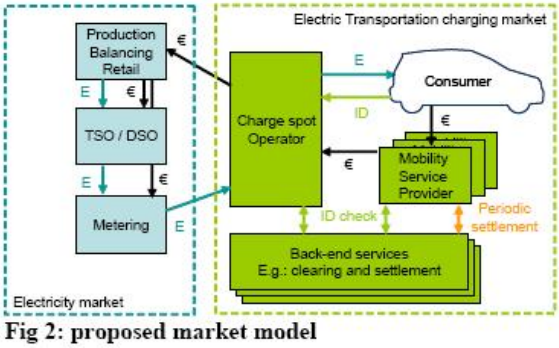


Fig 2: proposed market model

Paper 1273 from Germany introduces the concept for a framework and marketplace for electric vehicles in Europe.

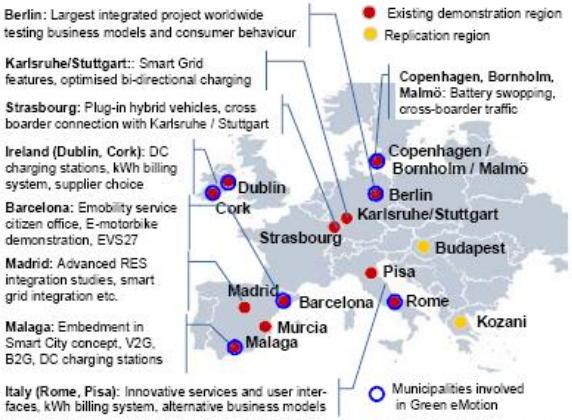


Figure 1 – European Demonstration within Green eMotion (status 2011)

Paper 0773 from Finland presents a methodology for analysing the grid impacts of large-scale penetration of electric vehicles. The results of a wide-scale case study are also presented.

Table 2. The feeder peak powers before and after optimisation.

Powers [MW]	F1	F2	F3	F4	F5	F6
Present peak	5.6	5.0	5.5	3.7	8.0	3.6
Peak with EVs, no optimization	7.6	6.0	6.8	5.0	10.6	5.7
Peak with EV optimisation	5.6	5.0	5.5	3.7	8.0	3.6

Paper 0967 from Germany focuses on ancillary V2G services based on a pool of electric vehicles. The analysed services are the negative and positive frequency control.

Paper 1061 from Germany and UK introduces a shared business to business (B2B) service platform as a common infrastructure for billing the charging of EVs. Platform will be an easy interface for operators and promotes care-free compatibility for end-users.

Demand response

Management of demand response resources is investigated in many of the proposed papers. In most them, the main perspective comes from the energy market point of view. However, it is important also for the DSOs to have a good understanding of possible changes in the load curves, peak powers and grid losses when demand response resources are activated by the customer, energy supplier or aggregator.

Paper 0480 from Switzerland presents home energy management tools allowing individual real-time electricity consumption visualisation and control. Also the impacts on the demand response are discussed in the paper.

Paper 0697 from Spain presents the model for managing the

demand response resources in the energy and capacity markets. For instance, the simulation results of the residential response through an aggregator are described in the paper.

In paper 0786 from the Netherlands, an introduction of local system services (LSS) is provided. As an example, an analysis of applying an energy storage in a low-voltage network is presented. The impacts of the price-based control of energy storages for grid loadings are analysed. As a conclusion, a residential storage has the advantage to reduce losses and loading within the low-voltage network, while the disadvantages are a less certain response to control signals and higher costs.

Table 3. Possible impact of LSS for different actors

Actor	Possible impact of LSS
Consumer	Cheaper energy in exchange of flexibility, privacy issues
TSO	More complexity
DNO	May offer additional services (DNO → DSO (distribution system operator))
BRP	Local balance control might assist global balance
Supplier	As contact to consumer: new contracts
Regulator	New legislation
Service company	*May offer services (buying/ selling energy, selling flexibility, ...)*

Paper 0789 from China presents a model for optimal operation of generators within technical transmission network constraints.

In paper 0937 from Germany, three business cases; balancing services, demand-side management and micro grid operations, have been evaluated with respect to costs and revenue. In the studied situation, the DSM seems not to be financially viable. The two other ones seem to be profitable.

In paper 0939 from Finland, the profitability of short-term AMR-based load forecasting is analysed from the retailer perspective. Another topic presented in the paper deals with the optimal control of customer loads in the smart grid environment.

Paper 1003 from Austria presents persuasive strategies and technologies encouraging domestic customers into energy saving.

Figure 2: GreenPocket smartphone application and web page

Paper 1085 from Finland focuses on the conflict of interest between the DSO and the retailer within demand response activities. The optimal actions for active customer load control can be different from the DSO or retailer point view. It seems that in the future the DSO tariffs need to be more or less ampere based having quite a low energy component. Then, the customer has an incentive to reduce both the peak power and the use of energy.

Paper 1261 from the UK presents methodology for analysing the grid impacts of new low-carbon technologies at domestic and commercial/industrial customer sites. Based on the results, the peak demands in the LV and MV networks will be increased.

Paper 1271 from the USA presents a methodology for providing demand curves for distribution systems based on aggregation of information obtained from Smart Grids. These results provide information regarding demand elasticity.

Table 3: Papers of Block 3

Paper No. Title	MS a.m.	MS p.m.	RIF	PS
0398 Operating the Charging Infrastructure for Electric Vehicles in Distribution Grids		X		
0480 Smart Energy Products for Efficient Demand Response: Results of Swiss Smart Grid Pilot Project			X	
0697 Assessment of the Possibilities od Demand Response Resources in Energy and Capacity Markets			X	
0773 Network Effects of Electric Vehicles - Case from Nordic Country		X		
0786 The introduction of local system services: the case of storage in the low voltage network			X	
0789 Study of optimal dispatching strategy of Demand Side Bidding considering the network constraints				X
0838 The recharging infrastructure to support the mobility development in Italy optimising the impact on the network		X		
0889 Charging Electric Vehicles in a Liberalized Electricity Market		X		
0937 Assessment of Flexible Demand Response Business Cases in the Smart Grid			X	
0939 Impacts of Smart Grids on electricity retail Business				X
0967 Economic assessment of elecric vehicle fleets providing ancillary services		X		
1003 Supporting Domestic Energy Reduction Via Persuasive Technology			X	
1061 Charging for charging				X
1085 Demand Response: Conflict between Distribution System Operator and Retailer				X
1261 A practical approach to accommodating low carbon consumers in existing distribution networks				X
1271 Economics Behind Dynamic Pricing Benefits in Smart Grids				X
1273 Green eMotion - Integrated European Demonstration on Electro-Mobility		X		

Block 4: Information Systems, Pricing & Tariffs, Asset Management, Organisations

Information systems

The cornerstone for the Smart Grid development is an accurate on-line information flow between the information systems and organisations. The role of standardisation of communication cannot be overemphasized.

Paper 0081 from the USA introduces conceptual aspects of the standard-based bidirectional integration of operations and information systems used in a Smart Grid environment.

Paper 0210 from Sweden deals with IT compliance in Smart Grids. The paper underlines the need for standards and certifications as tools for reducing the technical, economic and operational risks.

Paper 0393 from China introduces the frame for a Smart Grid's communication standard.

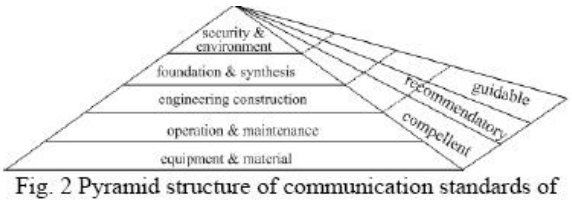


Fig. 2 Pyramid structure of communication standards of

Paper 0493 from Finland presents a data interchange interface for energy suppliers and their service providers.

Paper 1223 from Serbia deals with a geo-information system to be used in the management of low-voltage networks.

Paper 1231 from Germany introduces the communityware

Smartgrid. The basic assumption of the paper is that the critical mass for the Smart Grid development will be reached by goal-driven communities rather than addressing each consumer individually.

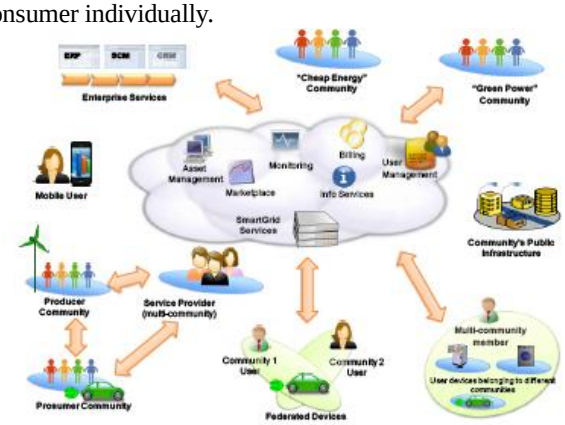


Figure 2 – Communityware empowered smartgrid

Pricing and tariff structures

Papers dealing with the pricing methodology mainly focus on peak power pricing used at the transmission level. Some contributions are provided for the determination of feed-in tariffs in distribution systems.

Paper 0356 from Argentina presents a method allocation task; how to allocate the payments of network expansion to different market players.

Paper 0368 from Iran introduces a load-factor-based tariff. The main objective is to reduce the peak powers in the grid.

Paper 0420 from the UK deals with the marginal pricing of transmission networks. The tariff calculations are based on nodal marginal charges determined by the AC power flow.

In paper 0469 from Brazil, the methodology based on the peak load pricing theory for the determination of user tariffs in distribution systems is presented.

In paper 0782 from China presents the pricing system integrated with interruptible customer loads.

Paper 1092 from the UK introduces the results of a case study where domestic customers receive a feed-in tariff, and the community as whole is free to participate in regular market clearing and the spot market.

Asset Management

Paper 0088 from the UK presents an asset-based risk model to be applied in the determination of network investment programmes. The basis for the model is Condition Based Risk Management. Load-related risks and Smart-Grid-related risks (e.g. new technologies) are the novel features of the model.

Paper 0448 from Germany presents the model for optimising the replacement investment timings within the given time scale.

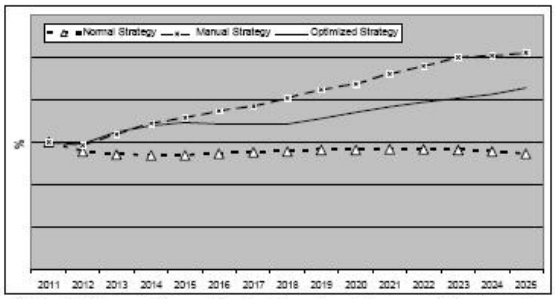


Fig. 7: Proportion of actual repl. value on older assets

Paper 0487 from Germany presents a strategic asset simulation tool for an electricity distribution network. The optimal CAPEX/OPEX and quality of service alternatives over the asset life cycle can be analysed, and appropriate choices of action can be determined.

Paper 0757 from China presents an asset management system based on the use of the key performance index (KPI).

Paper 0286 from Finland focuses on the distribution transformer condition assessment. Information from the transformer monitoring system is integrated into the reliability analysis. In a case study, the profitability of a new distribution transformer condition monitoring system is analysed.

Paper 0551 from Nigeria presents the outage monitoring system based on the SMS (Short Message Service) in mobile phones. In the case of supply interruption, the customers will send a SMS to the DSO's outage management system.

Paper 0589 from Iran presents the methodology for comparing the effect of alternative maintenance strategies on the system reliability and costs. A dynamic programming-based algorithm has been developed for the optimisation of resource allocation.

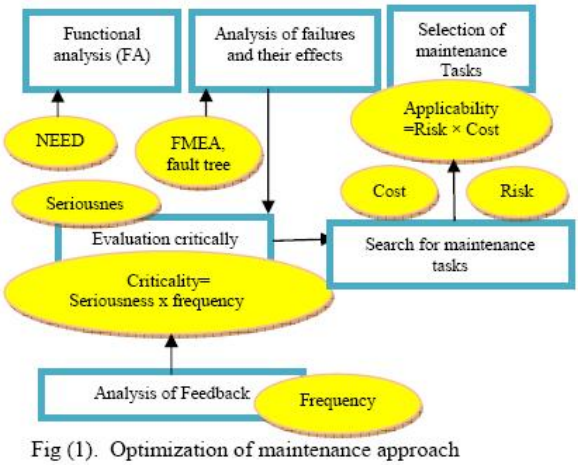


Fig (1). Optimization of maintenance approach

Paper 0594 from South Africa presents the principles of an integrated risk management framework used by Eskom. One objective in the risk management is to have resilience across the various organisation levels and investment decisions.

Paper 1157 from Iran presents an approach to the reliability-based identification of critical components in distribution systems. The results will be used in the prioritisation of maintenance actions.

Paper 1328 from the UK presents methods for an asset replacement analysis. The main focus is on age profiling. The alternative methods to determine the replacement investment decisions are age replacement, average age replacement and extended age replacement. The case study focuses on HV circuit breaker replacements.

Organisations

Partnership networks are a growing part of the distribution business. In parallel, the multi-utility concepts are growing. Two papers concentrate on these topics.

Paper 0291 from Finland introduces the principles for the management of partnership networks. One finding presented in the paper is the use of the partner's scorecard as a management tool for the partnership network management.

Paper 0372 from Germany presents a multi-utility grid operation model (electricity, gas, water). Outage clearance and restoration processes are the key elements in the model. The model is a tool to determine the optimal resources within the desired key reliability indices.

Table 4: Papers of Block 4

Paper No. Title, Pricing and tariffs	MS a.m.	MS p.m.	RIF	PS
0081 Why standards based integration is more important than ever: Everything a non-IT manager should know		X		
0088 Building risk based investment programmes		X		
0210 IT Compliance in Smart Grids		X		
0286 Transformer Condition Assessment Integrated with Reliability Analysis				X
0291 Management of Partnership Networks in Electricity Distribution Business		X		
0356 A method to allocate distributor and other agent payments for transmission expansion				X
0368 Load factor based tariff				X
0372 Multi utility grid operation: An organisation study				X
0393 Communications technical standards infrastructure of the smart grid		X		
0420 Marginal Pricing of Distribution Networks Using AC Power Flow				X
0448 Development of target grid strategies supported by the asset simulation optimization core having regard to target costing				X
0469 Peak load pricing applied to deverticalized distribution network usage tariffs				X
0487 Automatic Asset Optimization to confirm the chosen asset strategy for an electricity grid				X
0493 Common and accepted electronic data interchange interface between Finnish electricity supplier companies and their service providers				X
0551 Development of an SMS-Based Outage Reporting System				X
0589 Risk-based asset maintenance management in distribution systems				X
0594 Building System Resilience through Multi-Disciplinary and Cross-Divisional Regional Resilience Teams				X
0757 Improve the life cycle asset management performance based on the systemic KPI application				X
0782 The distribution electric pricing considering interruptible load in the electricity market				X
1092 Feed-in Tariffs and Community Aggregated Trading of Microgeneration Sourced Electricity.		X		
1157 An Approach for Critical Component Identification in Reliability-Centered Maintenance of Power Distribution Systems Based on Analytical Hierarchical Process				X
1223 GinisED Enterprise GIS - framework for the utility of the future				X
1231 Communityware smartgrid				X
1328 Age Profile Analysis for HV Assets				X