Market study of the   
Energy Data Feed Platform

Background study  
17 July 2013  
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# Introduction

Elering AS is an independent electricity transmission system operator in Estonia whose main duty is to guarantee high quality electricity supply to Estonian consumers at all times.

Elering is leading a consortium to prepare a development project for a new innovative energy management service platform in Estonia, named *Energy* *Data Feed (EDF) Platform*. Elering has commissioned Gaia Consulting Ltd. to contribute to the project plan preparation by

1. Conducting a market study to identify business opportunities for the EDF Platform; and
2. Presenting an overview of project impact assessment methodologies focusing on environmental and socio-economic impacts as well as developing preliminary Key Performance Indicators (KPIs) for the project.

This report presents part A of the contribution, the market study. The study is structured on the basis of the target segmentation for the Energy Data Feed Platform, illustrated in Figure 1 below. EDF Platform will create business opportunities to various data feed and service providers. Value will ultimately be created through services to end customers in the target segments.



**Figure 1.** Framework for the market study.

First step in the market study is to identify how much added value the platform can create in the end customer market. Therefore, this market study is structured as follows:

* **Chapter 2. End User Applications** **market** – Value creation opportunities by the end customer service providers for the end customers.
* **Chapter 3.** **Energy Data Feed Platform market** – Value creation opportunities by the EDF Platform for the end user service providers.

This report has been prepared by Laura Oja and Iivo Vehviläinen of Gaia Consulting Oy in Finland during June–July 2013. Market study is carried out on the basis of a literature review that is complemented with in-house knowledge from previous projects of the consultant.

# End user applications

## Selection of business cases for the study

Energy Data Feed Platform (EDF Platform) is a unique value proposition for the market in the intended scope and breadth of services. One key objective with the platform approach is to provide market participants opportunities to innovative and create new types of end user services. However, because most commercial innovations have their basis in current R&D work, it is possible to provide ideas of possible business opportunities that the EDF Platform can enable.

The business cases in this study have been selected on the basis of a review of market literature in smart grids, energy efficiency, and ICT services. List of key organizations, research institutes, and market participants whose work has been studied include:

* Boston Consulting Group
* CGI
* Eriksson
* IBM
* IEA
* McKinsey&Company
* The Norwegian Smartgrid Centre / Sintef
* Tieto
* U.S. Department of Energy
* VTT, the Technical Research Institute of Finland

Many of the sources above report same business cases with only small variations. Full list of used references is included in the end of the report. The work has also been supplemented by the earlier work and results of Gaia, who have carried out many similar market studies.

The long list of business cases has been narrowed down to around 15 most relevant business cases. Selection is made on the basis of the business potential, applicability to Estonia and other potential target markets, and the potential environmental and societal impact. Business cases from all target segments of the EDF Platform have been included. Some cases have also been included as they have been considered for piloting by the project partners.

For each of the selected business cases, the key idea, potential implementation, key benefits, potential target customers for the end user services, and potential customers for the platform, i.e. the market service providers, are listed. In addition, work has been done to find out examples of similar existing business cases or R&D projects. These cases are used as the basis for estimating the value creation potential of the platform and also as the basis of the EDF Platform Impact Analysis (see separate report).

The selected business cases next are presented for each of the target segments: Electricity grid, District heating, Renewable energy, and Energy end users.

## Electricity grid

### Local grid system management

|  |  |
| --- | --- |
| Idea | Coordination of power use and generation can make the local electricity grid more stable. This has a value for the distribution company (DSO) that otherwise would have to invest in reinforcement of the local grid.[[1]](#footnote-1) |
| Implementation | Energy Data Feed Platform can provide consumption data for the specific areas of interest. Energy Data Feed Platform enables the coordination of grid management. Technically, this means integration and use of grid data with data from demand response, local generation, and storage possibilities to support grid management.  It is also possible to use gathered data on energy use to support long-term decision making on required grid investments etc.. |
| Benefits | Lower capital requirements and potentially higher return on investments for the distribution companies. For benefits of the demand response to the end users see separate case study below. |
| Potential customers for the service | Distribution companies |
| Potential customers for the Platform | IT-companies, ESCOs, distribution companies |
| Examples elsewhere | Integration of smart grids and energy storages and response to regional grid conditions are being tested in several regions, for example in Hvaler, Norway[[2]](#footnote-2) and Salem, Oregon, U.S.[[3]](#footnote-3). Also in a Norwegian research project called Manage Smart in SmartGrid **[[4]](#footnote-4)** [[5]](#footnote-5)solutions for local grid management to optimize the energy consumption arebeing developed. U.S. markets are also well developed in the investment analysis, for example in the integration of smart grid features to utility investment scheduling[[6]](#footnote-6). |

### National grid system management

|  |  |
| --- | --- |
| Idea | TSO can use Energy Data Feed Platform to procure necessary system services to maintain national grid system stability. |
| Implementation | Distribution companies, end users, or aggregated service providers can offer real-time data on their possibilities to offer for example reserve capacity to the TSO. The capacity data can include also information on e.g. pricing, availability, ramping times, etc. |
| Benefits | National grid management can be tighter integrated as part of local grid management and electricity market operation. |
| Potential customers for the service | National TSOs |
| Potential customers for the Platform | TSOs directly, ESCOs or other service providers |
| Examples elsewhere | TSOs everywhere are facing the same problems of more intermittent power generation, more volatile demand, and need for more integration. As an example, Statnett in Norway has proprietary software development to support the smart integration between the market participants (see figure below) and R&D project in Northern Norway[[7]](#footnote-7).  [[8]](#footnote-8) |

### Dynamic tariff structures (real time billing)

|  |  |
| --- | --- |
| Idea | Shifting of load from peak periods to off-peak periods can be done with the help of dynamic tariff structures. Energy peak payment can be included in time-of-day network tariff in addition to the traditional components. Energy peak payment is higher during the predefined peak periods, for example from 8 to 10 in the morning and from 17 to 19 in the afternoon on work days.  Also different tariffs for power quality can be introduced and market signals provided to distributed resources or microgrids to monetize the value they provide the grid.[[9]](#footnote-9) |
| Implementation | Utilities could enable consumers to access the information stored in the Data Feed Platform through software apps. Those apps would allow customers to optimize efficiency offerings, demand tariffs and demand response/dynamic market earnings. |
| Benefits | Load shift from peak periods to off peak periods, reduced energy cost. |
| Potential customers for the service | Energy utilities |
| Potential customers for the Platform | Energy utilities directly, ESCOs |
| Examples elsewhere | In a Norwegian Research project pilot time-of-day (TOD) network tariff stimulated to load shifting.[[10]](#footnote-10) Also France has experiences from dynamic tariff structures called TEMPO Electricity Tariff [[11]](#footnote-11). |

### Combined metering

|  |  |
| --- | --- |
| Idea | Metering and transfer of metering data for multi-utilities, for example electricity, water and district heat can be made more effective when the different utilities install a joint remote meter reading system. |
| Implementation | Utilities have the opportunity to read several data from the meters. The data is transferred through the Data Feeding Platform which can then be used for operational or informational purposes. |
| Benefits | More effective meter readings resulting cost savings. Consumers are provided with better service. |
| Potential customers for the service | Utilities |
| Potential customers for the Platform | Automation and measurement solutions providers, energy and water utilities directly |
| Existing platforms elsewhere | Piloting of multi-utility measurements is ongoing in several regions, for example in in Roskilde and Hilleroed in Denmark. Meter reading servers are hosted by Kamstrup in Skanderborg while the operating PC is placed with the companies in Roskilde and Hilleroed. Data transmission between Sealand and Jutland takes place via the Internet.  http://kamstrup.fi/media/3869/Visio%20RH%20System%20GB[[12]](#footnote-12) |

### Secure information sharing

|  |  |
| --- | --- |
| Idea | Energy Data Feed Platform can provide high quality cybersecurity features to users and service providers. |
| Implementation | Cybersecurity features of the Energy Data Feed Platform can include for example identification and authentication services, access controls, and continuity of operations.  EDF Platform can also include features to make transactions more robust, e.g. to control and validate certain data values, and authenticate transactions. |
| Benefits | Integrated implementation of cybersecurity features to Energy Data Feed Platform improves efficiency in implementation, and ensures high level implementation with all participating service providers. |
| Potential customers for the service | All smart grid operators |
| Potential customers for the Platform | IT security companies, smart grid operators directly |
| Examples elsewhere | Cybersecurity of smart grids is high on the agenda for many governments and regulators, for example in the U.S.[[13]](#footnote-13) and Norway[[14]](#footnote-14). |

## District heating

### Network temperature optimization

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| --- | --- |
| Idea | The heat loss in district heating networks can be minimized by network temperature optimization. The inlet temperature is continuously adjusted to the lowest possible, taking into account the amount of heat that has to be supplied to the consumers in the network, and ensuring that each consumer has at least the minimum guaranteed supply temperature. Also the accumulated energy in the network and the changes that will occur due to changes in weather conditions are considered. |
| Implementation | The data needed for the network temperature optimization is transferred through the Energy Data Feed Platform. The EDF Platform also gives an overview of the network in real-time, thus providing operational data from areas in the network where there is no instrumentation. The real-time plot can show supply or return temperature, pressure, heat loss or other relevant information based on very limited instrumentation. The instrumentation can be at the plant, and in other locations in the network. |
| Benefits | Reduction of the heat losses, cost savings, CO2 emission savings, indirect savings related to network maintenance |
| Potential customers for the service | District heating companies |
| Potential customers for the Platform | Technology and integrated solutions providers, ESCOs |
| Existing platforms elsewhere | Hørning district heating company in Denmark is using the automatic Temperature Optimization module (TERMIS TO) to minimize the heat loss in district heating networks.[[15]](#footnote-15) |

### Buildings as heat storage

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| Idea | The inside room temperature can be automatically reduced for a short while when there is a high peak in heating the usage water. In other words when the threshold value is exceeded, the heat exchanger transfers the heat energy, which it has been retrieved from the district heating network, to the water boiler and shuts down or reduces the radiators. Consumer doesn’t notice the temporary decrease of the room temperature because the buildings work as heat storage. |
| Implementation | Energy consumption data for heating the apartments and water is stored in and retrieved from the Data Feeding Platform. Automated solutions are created to control the operation of the heat exchanger. |
| Benefits | In large scale implementation the demand fluctuation could be evened throughout the network. The consumer benefits from the reduced heating costs at peak hours. |
| Potential customers for the service | District heating customers |
| Potential customers for the Platform | ESCOs, district heating companies directly |
| Existing platforms elsewhere | Technology has been investigated for example in Sweden, see for example Smart District Heating Station by Peter Gummérus[[16]](#footnote-16). |

### Heat generation optimization

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| Idea | With the help of real-time measurement system the heat producer can follow the demand fluctuations in shorter delay. The system sends a notification to the heat producer when certain threshold values are exceeded. The notification automatically turns on the most economical technology at the given moment that can cover the heat demand. |
| Implementation | The smart system analyses constantly the consumption data that is available in the Data Feed Platform and optimizes the usage of the production capacity according to the heat demand as well as heat and weather data.  The development of measurement technology enables also the integration of district heating and cooling consumption data into a same system which improves their simultaneous utilization. |
| Benefits | The usage of the heat generations capacity is optimized and heat losses are minimized. |
| Potential customers for the service | District heating companies |
| Potential customers for the Platform | Automation solutions providers, ESCOs |
| Existing platforms elsewhere | Advanced district heating companies are already using proprietary systems to optimize heat generation, but most lack real-time data access that could be provided by the Data Feed Platform. |

## Renewable energy

### Virtual power plants

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| Idea | Aggregators can combine distributed renewable generation to Virtual Power Plants (VPP). Centralized management interacts with local infrastructure to optimize the energy generation, local consumption, and sales to electricity market. [[17]](#footnote-17) [[18]](#footnote-18) |
| Implementation | Energy market information and the individual energy contract and consumption data of each consumer are made available for the aggregators through the Data Feed Platform. The data will allow service providers to create optimized offerings for each individual consumer.  Similarly, the quality and efficiency of the service delivery is supported by the Data Feed Platform. The platform can be used for example in reporting for maintenance and in energy generation and consumption monitoring. |
| Benefits | Energy usage optimization, balanced grid demand and supply, reduced energy cost, reduced emissions, bringing renewable energy to new areas |
| Potential customers for the service | Energy consumers (or prosumers), distributed (renewable) energy generators |
| Potential customers for the Platform | ESCOs, renewable energy technology providers |
| Examples elsewhere | For example a Finnish turnkey provider One1 Oy delivers energy models for residential and industrial areas based on renewable energy. One1 integrates, coordinates and refines vendors' technologies and products to build an ecological and affordable energy model. One1 brings together numerous companies in the renewable energy field and uses their products to build complete energy solutions.[[19]](#footnote-19)  One1 Energy Model delivery Concept  Another example of R&D activity with VPP and the energy market is illustrated in the Figure below:[[20]](#footnote-20)  energy_smartgrid_cropped_0 |

### SCADA services

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| Idea | Provide renewable energy generators with the possibility of sharing generation site data and control possibilities with SCADA (*Supervisory Control And Data Acquisition*) type functionality. Smaller energy generation sites do not have the possibility to have manned control rooms and the control is done remotely. |
| Implementation | Energy Data Feed Platform can collect operational data from the generation units and supplementing data (e.g. wind and solar data). The platform can rely also control messages to the generation units. |
| Benefits | Provides cost-efficient integrated alternative to disperse proprietary solutions. Enables smaller technology providers to offer similar functionality to larger vendors. |
| Potential customers for the service | Distributed (renewable) energy generators. |
| Potential customers for the Platform | B2B and machine-to-machine telecommunications service providers, ESCOs, renewable energy technology providers |
| Examples elsewhere | Many renewable energy technology providers have integrated operations and maintenance services. These rely typically on separate proprietary systems. As an example, the figure below presents an overview of the SCADA system used by Enercon GmbH of Germany[[21]](#footnote-21).  http://www.astroman.com.pl/img/magazyn/900/o/ENERCON__11_Scada_Remote.JPG |

## Energy end users

### Energy cost management

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| --- | --- |
| Idea | Energy reporting services help customers to monitor their energy consumption and pricing hour by hour. Customers can use the service to record their own energy consumption targets and set monthly spending goals.  They can also monitor their achievement as well as compare their energy consumption to different time periods and to their reference groups (benchmarking).  Consumers can stay on budget with usage reports and automated alerts. Staying on budget can be further eased by giving the information needed to make the right adjustments. |
| Implementation | Real-time energy consumption and price data is retrieved from the Energy Data Feeding Platform. |
| Benefits | Energy consumption and price management is enabled. |
| Potential customers for the service | Energy end users (esp. households, SMEs) |
| Potential customers for the Platform | Energy companies, ESCOs |
| Existing platforms elsewhere | Several utilities offer similar services. Examples include Sävel+[[22]](#footnote-22) of Helsinki Energy of Finland and U.S. based Edison’s SmartConnect & Budjet Assistant[[23]](#footnote-23). |

### Demand response

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| Idea | Demand response provides an opportunity for consumers to reduce or shift their electricity usage during peak periods in response to time-based electricity tariffs or electricity prices, or other forms of financial incentives**[[24]](#footnote-24)**. Demand response can also be used to limit the maximum load for a specific consumption point, e.g. in order to optimize connection fees. |
| Implementation | Energy Data Feed Platform can provide possibilities to rely both energy consumption monitoring data and possibility to control energy use. Technical requirement is a control system that can switch off electrical devices for a specified time. Requirements of the specific activities in the property (e.g. production processes) have to be observed in order to prevent unwanted negative influence.  Technically, demand response can also be achieved if the consumption can be supplied from battery storage, e.g. from uninterrupted power supply units (UPS) or from batteries of electric vehicles. |
| Benefits | Reduced energy cost, reduced exposure to high energy prices[[25]](#footnote-25). In a case study on cold storage houses in Germany, savings on total energy costs in the magnitude of 5-10% were calculated[[26]](#footnote-26). Benefits also local and national grids (see cases under electricity distribution and transmission above). |
| Potential customers for the service | All energy consumers that have flexible energy loads |
| Potential customers for the Platform | Building automation providers, ESCOs |
| Existing platforms elsewhere | Several companies are pursuing demand response possibilities with proprietary solutions. There are both building automation providers (e.g. Honeywell or Schneider Electric) and independent service providers (e.g. Energy Pool of France[[27]](#footnote-27) or SEAM Oy of Finland, see example an illustration below) [[28]](#footnote-28).  Demand response schemes have been run also on national level (e.g. in Ireland**[[29]](#footnote-29)** and several U.S. states). |

### Weather data based heating

|  |  |
| --- | --- |
| Idea | The heating of buildings is controlled by automation systems. The controls are typically done only on the basis of current temperature. However, because buildings store heat, more intelligent control can be made possible with the use of weather forecasts. It has been estimated that up to 10–15 % savings are possible[[30]](#footnote-30). |
| Implementation | Weather forecasts and building heating measurements are made available through the Data Feed Platform. The data will allow service providers to create predictive optimal controls for the heating system. These controls are fed back to the building automation systems through the Data Feed Platform. |
| Benefits | Energy savings, reduced energy cost, reduced emissions, new business opportunities |
| Potential customers for the service | Possible for office buildings, apartment blocks, and detached houses |
| Potential customers for the Platform | ESCOs, building automation system providers |
| Existing platforms elsewhere | Ekonor has developed a method based on differential pressure compensation. The thermostat receives information concerning the actual heating needs of the property and is the heat regulation is not based solely on outside temperature. [[31]](#footnote-31)  The OptiControl project deals with the automated control of blinds, electric lighting, heating, cooling, and ventilation of individual building zones. OptiControl combines the newest developments from the fields of building technologies, numerical weather forecasting and control engineering. The project develops and tests novel, predictive control approaches plus corresponding software modules to be incorporated in commercial building automation systems.[[32]](#footnote-32) |

### Secure smart houses

|  |  |
| --- | --- |
| Idea | Smart houses have been proposed and piloted for decades with various features. With the advent of smart measurements and mobile communications, the relevant technologies start to be in place for more widespread deployment of smart features to mainstream households. Energy Data Feed Platform can provide a combined basis for secure smart house applications. |
| Implementation | EDF Platform can be used to create real-time services for reporting and if necessary alerting users on energy consumption or other relevant data. Reporting can be also directed to third parties, for example to monitor the behaviour of elderly or disabled residents or to prevent unauthorized access or use. The platform can also facilitate communication between various control devices and building automation systems. |
| Benefits | Cost savings, energy efficiency, business development, improved security, secure investments, customer satisfaction |
| Potential customers for the service | Households, especially elderly and disabled people |
| Potential customers for the Platform | ESCOs, telecommunication companies, power grid operator, public service providers |
| Existing platforms elsewhere | In a Norwegian Demo Lyse project smart grids combined with web-based welfare services are being tested. Participants in a pilot programme control for example the heating and lighting in their homes using iPads. If the fire alarm is activated, the fire brigade is notified and at the same time the cooker and heaters are automatically switched off. In the event of fire, the alarm centre can use cameras installed in the home to obtain images and ascertain whether people are present in the room where the fire alarm was triggered.[[33]](#footnote-33) |

# Energy Data Feed Platform market

## Competitive services

EDF Platform creates a unique value proposition with regard of the possible end user applications and the nationwide implementation potential. The opportunities can come through savings in energy, savings in operative costs, or new revenues. The key to the opportunities is the better and timely availability of data that can ideally be used for decision making in an automatic and optimized fashion, such as in the example of weather data based heating of buildings or use of building stock as heat storage. Same services could in some cases be possible to be implemented without the EDF Platform, but with higher costs.

Platform type of service has gained traction in the past few years. Popular example from the consumer markets is the Apple AppStore that has created a multi-billion dollar business ecosystem just within a few years. However, the planned EDF Platform is more closely linked to other modern IT platform services. An example is Axeda that provides Platform-as-a-Service to M2M applications[[34]](#footnote-34). Their solutions are based on flexible ability to connect various data sources and extract useful information for business needs. Energy related piloting has been done e.g. by the U.S. Energy Department in their NREL research site[[35]](#footnote-35).

The market study has not found exactly similar scope of services in any country or region. Although there are many ongoing pilots for the end user applications, they focus on only one or a few services and are limited geographically. On the basis of this study, EDF Platform would be the first consolidating data feed platform with potential for market expansion outside Estonia. Closest market opportunities would be in other Baltic countries and in the Nordic countries that are all increasingly part of the same Nordic electricity market. Expansion to other EU market areas would also be relatively straightforward extension from the Estonian business environment. Outside the EU the regulatory environments become more complex and would need a more in-depth study to provide a comprehensive view on the applicability of the business model e.g. in the various markets in the U.S.

## Business opportunity

The end user applications described in the previous chapter illustrate the potential for value creation to the end users with the Energy Data Feed Platform. The end user applications are enabled through the services provided by the EDF Platform. These services include data consolidation, data filtering, scheduling, data privacy (logging, signing), agreement management, billing, data access mandates, data monitoring, and data provisioning[[36]](#footnote-36).

Concrete opportunities in electricity distribution relate to secure handling of data, where new considerations have risen due to the ongoing installations of smart meters. Later on the data security issues are likely to affect also district heating companies. For end users, secure data handling enables secure smart house solutions and for renewable energy generators SCADA type of services.

Demand response and virtual power plants created by several small renewable generators can both be made more easily possible through Energy Data Feed Platform. The ability to aggregate consumption and generation data creates possibilities for new types of service providers that can interact between energy prosumers and energy markets.

Network management can always be improved with better understanding of consumption patterns and locations, in local electricity distribution and national electricity transmission, and in district heating networks. These same patterns can also be made to guide energy use with dynamic network tariffs. Combined utility metering is likely to be a future direction where Energy Data Feed Platform could contribute to the potential implementation.

Figure 2 illustrates the various business opportunities through the EDF Platform. First, the Energy Data Feed Platform Project creates the platform. On top of the platform various end user services are expected. These include pilots implemented during the project and other business opportunities, some of which have been identified in the previous chapter. The end user applications create value in Estonia for end customers, end user application service providers, and for the EDF Platform itself. At a later stage, it is possible that the EDF Platform expands to other countries.



**Figure 2:** Framework for the market potential assessment.

Business opportunity in the end user applications has been analyzed by the value created to the end users. In some cases, value is created through savings in energy costs or operative savings. In other applications, the customers receive a new type of service whose monetary value for the customers can be estimated on the basis of their willingness to pay for the service. Value capture for the end user application service providers is estimated on the basis of project partner experiences elsewhere to be around 25 % – 50 % of the value creation for the case of savings. In the market potential estimate below, the EDF Platform is estimated to be able to take a 5 % stake of the value creation for the end user for the service.

Total value creation through the services in the platform is estimated to be from 18–35 million euro annually. With rough estimates, of this value 10–20 million euro will stay with end users (utilities, renewable generators and energy end users) as benefits compared to current situation. Various service providers that use the platform gain 7–15 million euro. The revenue for the platform is estimated to be 1–2 million euro, assuming even 5 % share of the value creation.

**Table 1.** Summary of preliminary potential annual impacts of the identified business opportunities. Energy savings potential is calculated from all energy use per year. Coverage estimate describes the assumed potential adoption by 2020. Economic value creation takes coverage estimate into account.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Value (in M€ / year) | | | |
|  | Idea | End users | Customers | Platform | Total |
| ELECTRICITY DISTRIBUTION AND TRANSMISSION | Local grid system management | 0,4–0,7 | 0,1–0,3 | 0,03–0,05 | 0,5–1,1 |
| National grid system management | 0,5–0,9 | 0,2–0,3 | 0,03–0,07 | 0,7–1,3 |
| Dynamic tariff structures | 0,9–1,8 | 0,3–0,7 | 0,07–0,1 | 1,3–2,6 |
| Combined metering | ~0,1 | ~0,1 | ~0,01 | 0,1–0,2 |
| Secure information sharing | ~0,2 | ~0,3 | ~0,03 | ~0,5 |
| DISTRICT HEATING | Network management | 1,3–2,7 | 0,5–1 | 0,1–0,2 | 2–4 |
| Buildings as heat storage | ~0,1 | ~0,1 | ~0,01 | ~0,2 |
| Heat generation optimization | 0,5–1,1 | 0,2–0,4 | 0,04–0,08 | 0,8–1,5 |
| Dynamic tariff structures | 0,5–1,1 | 0,2–0,4 | 0,04–0,08 | 0,8–1,5 |
| Combined metering | ~0,2 | ~0,3 | ~0,03 | ~0,5 |
| Secure information sharing | ~0,2 | ~0,3 | ~0,03 | ~0,5 |
| RENEWABLES | Virtual power plants | ~0,2 | ~0,3 | ~0,03 | ~0,5 |
| SCADA services | ~0,2 | ~0,3 | ~0,03 | ~0,5 |
| ENERGY END USE | Energy costs management | 2–3 | 0,5–1 | 0,1–0,2 | 2–4 |
| Demand response | 0,3–0,6 | 0,3–0,7 | 0,03–0,07 | 0,7–1,3 |
| Weather data based heating | 3–5 | 1–2 | 0,2–0,4 | 4–8 |
| Secure smart houses | new service | 3–7 | 0,1–0,3 | 3–7 |
|  | **Total** | **10–20** | **7–15** | **1–2** | **18–35** |

This value creation potential for the platform in other countries is more uncertain. The size of the opportunity can be roughly estimated by scaling the value creation by the energy use. For example, in Norway, electricity and district heating use is around 8 times greater than in Estonia. The value for the services by the EDF Platform Project could therefore be in the range of 10 million euro annually.

**Table 2.** Assumptions behind the estimates.

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| --- | --- | --- |
|  | Idea | Assumptions in preliminary impact analysis |
| ELECTRICITY DISTRIBUTION AND TRANSMISSION | Local grid system management | Operative savings estimated to be 1–2 % of the distribution cost or 0,4–0,8 % of the total cost of electricity compared to situation with no smart grid functionality (e.g. Schwartz, 2010). Adopted by 20 % of the distribution network customers. |
| National grid system management | Operative savings estimated to be 0,5–1 % of the transmission cost or 0,2–0,4 % of the total cost of electricity compared to situation with no smart grid functionality(e.g. Schwartz, 2010). Adopted by the whole transmission network. |
| Dynamic tariff structures | Operative costs savings potential estimated to be around 1–2 % and adoption rate 20 % by 2020 (e.g. Schwartz, 2010). |
| Combined metering | Operational cost savings from combined meters and infrastructure. Savings assumed to be 1–3 €/meter (e.g. Gaia 2012a) and adoption by 10 % of the ~700 000 customers. Service provider’s uptake is 50 %. |
| Secure information sharing | Operational cost savings from reduced need for ITC investments. Total savings estimated on the basis of alterative implementation cost (e.g. Gaia 2012a). Service provider’s uptake is 50 %. |
| DISTRICT HEATING | Network management | Energy loss savings potential estimated to be around 1–2 % of total district heating and adoption rate 50 % by 2020 (e.g. Gaia 2011). |
| Buildings as heat storage | Cutting peak heat demand by 20 % by using around 5 % of the building stock results in savings in operational cost and investments (e.g. Kärkkäinen, 2003). Adoption rate 20 % by 2020. |
| Heat generation optimization | Operative costs savings potential estimated to be around 1–2 % and adoption rate 20 % by 2020 (e.g. Gaia 2011). |
| Dynamic tariff structures | Operative costs savings potential estimated to be around 1–2 % and adoption rate 20 % by 2020 (e.g. Gaia 2011). |
| Combined metering | Operational cost savings from combined meters and infrastructure. Average saving 25 000 €/company/year for 20 companies out of 200 (see e.g. Gaia 2012a). Service provider’s uptake is 50 %. |
| Secure information sharing | Operational cost savings from reduced need for ITC investments. Average saving 25 000 €/company/year for 200 companies (see e.g. Gaia 2012a). Service provider’s uptake is 50 %. |
| RENEWABLES | Virtual power plants | Estimated potential 10 aggregated users with 50 000 €/user/year fees (estimate on the potential purchasing power of the plants). Service provider’s uptake is 50 %. |
| SCADA services | Estimated potential 250 renewable energy generating plants using the service with 2 000 €/plant/year fees (estimate on the basis of other SCADA applications and the potential purchasing power of the plants). Service provider’s uptake is 50 %. |
| ENERGY END USE | Energy costs management | Estimated 20 % of energy use can be affected and 5–10 % savings occur. In total  1–2 % energy saving potential in electricity and district heating and 20 % adoption by 2020 (e.g. Gaia 2010). |
| Demand response | Estimated 1–2 % cost saving potential in electricity and 10 % adoption by 2020 (e.g. Schwartz, 2010). |
| Weather data based heating | Estimated 5–10 % energy saving potential in district heating and  20 % adoption by 2020 (e.g. Tampereen Sähkölaitos, 2013) |
| Secure smart houses | Estimated that 2–5 % of 600 000 households invest 240 €/year for the new services. (e.g. Gaia 2010) |

Energy savings potential indicates the total estimated potential if all users would adopt new services. Actual coverage of services is estimated for the period until year 2020. Value creation potential is estimated on the basis of actual coverage and 60 €/MWh cost for district heating (current end user prices 40–80 €/MWh, Estonian Competition Authority) and 100 €/MWh for electricity (current end user prices 80–100 €/MWh, Statistics Estonia).

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