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Report on new service business models



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Summary

The objectives of this report include identifying business opportunities that arise from various “triggers”, which are related to operating through flexible energy systems. In addition, the goal is to discuss about the actions needed to utilize those opportunities and also look into the customer’s (network operator) point of view.

These mentioned “triggers” or enablers for new business opportunities arise from various directions. Probably the most important enabler is the growing data gathering related to the operation of the network. There are different data sources, where the data is collected from: network measurement data, environmental data, weather data and statistics to mention a few. Together these data sources form a valuable base for better customer communication. The various data can ultimately be utilized in creating a new information product containing information to be used for example in network planning and proactive maintenance.

Other central enablers include the significant changes in energy network infrastructure and technology development. The shift to flexible energy systems requires new infrastructures and the use of advanced technology. New devices and technology usage opens up not only data management possibilities, but also more traditional possibilities in the form of installation tasks and expert services (for example informing and guiding consumers). The general worldwide goals to reduce emissions and increasing usage of renewable energy sources are also driving forces to changes and new business opportunities.

From Empower’s point of view the actual business opportunities can be divided into two categories: value chain expansion and new services. Value chain expansion means that there are possibilities for service provider to take more responsibility for example in proactive maintenance planning and execution, and also network planning procedures. New services are made possible especially the growing amount of gathered data from the network. New information products and expert services can be offered for customers and consumers, when the service provider has the capabilities to combine different data sources and process the data into information.

This value chain expansion and new services affect Empower’s business model and especially in the value offering and revenue streams categories. Customers can focus on their core competencies, while the service provider offers higher value by using accurate information and acting proactively to ensure the uninterrupted functionality of the energy network.

Tampere, September 2016





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1 Preface

This deliverable is part of the Flexible Energy Systems (FLEXe) research program, which is funded by Tekes – the Finnish Funding Agency for Technology and Innovation. The program brings together 10 research organizations and 17 industrial companies. This co-operation aims to create concepts and raise thoughts on how to plan, build, manage and use the future smart and flexible energy systems.

The discussion in this report concentrates on the business opportunities that are enabled by growing amount of gathered data from the energy systems. These opportunities have an effect on the business model of the organization. This report is written from Empower's perspective, so the focus is on the service provider's business model.

This deliverable is closely connected to two other deliverables in the FLEXe program, where the author is also Empower TN: deliverable 2.2-7/2.2-10 Network monitoring and planning in practice, and deliverable 2.3-6 Role of service providers in real-time information harvest.





2 Introduction

Empower's business is divided into four business operations, where each of the operations form an independent organization/division: power network (Empower PN), telecom network (Empower TN), industry (Empower IN), information management services (Empower IM). In addition, Empower's Baltic operations form a division of its own, so there are five divisions in total. This report is outlined to discuss Empower's business opportunities and business model effect that are especially enabled by the data gathered from energy systems. Empower TN offers telecom network services for its customer and there are three distinctive business lines under this division: telematics, telecom network construction and installation & maintenance. PN's services include electric grid construction and maintenance and IN serves their industrial business partners with maintenance related tasks as well. IM division is concentrated delivering the best information system solutions and information management services for its customers.

Empower's input in the FLEXe research program relates to the practical view of service provider and discussion on service provider's role in information harvest and the effects of growing amount of gathered data from operations on business in practice. Deliverable 2.2-7/2.2-10 discussed about the network monitoring and planning in practice, where one of the main messages was that the network measuring is developing and the amount of gathered data is growing. The network data gathered by sensors can be complemented with open data (for example weather information), which together could be used to create a new service offering. Further, service offering is one central component of a business model. This is why the previously mentioned deliverable is closely related to this one. Flexible energy systems with advanced technology and data harvesting open new possibilities for service providers to fulfill the needs of customers more comprehensively, and these new business opportunities shape the organization's business model.

Osterwalder's and Pigneur (2010) business model framework called business model canvas serves as a basis for evaluation of the effects of business opportunities on organization's business model. The canvas is divided into nine categories: key partners, key activities, key resources, value proposition, customer relationship, channels, customer segments, cost structure and revenue streams. When each category is filled with key organization specific information related to the respective title, a business model is demonstrated. The framework (with blank information) is presented in Figure 1.



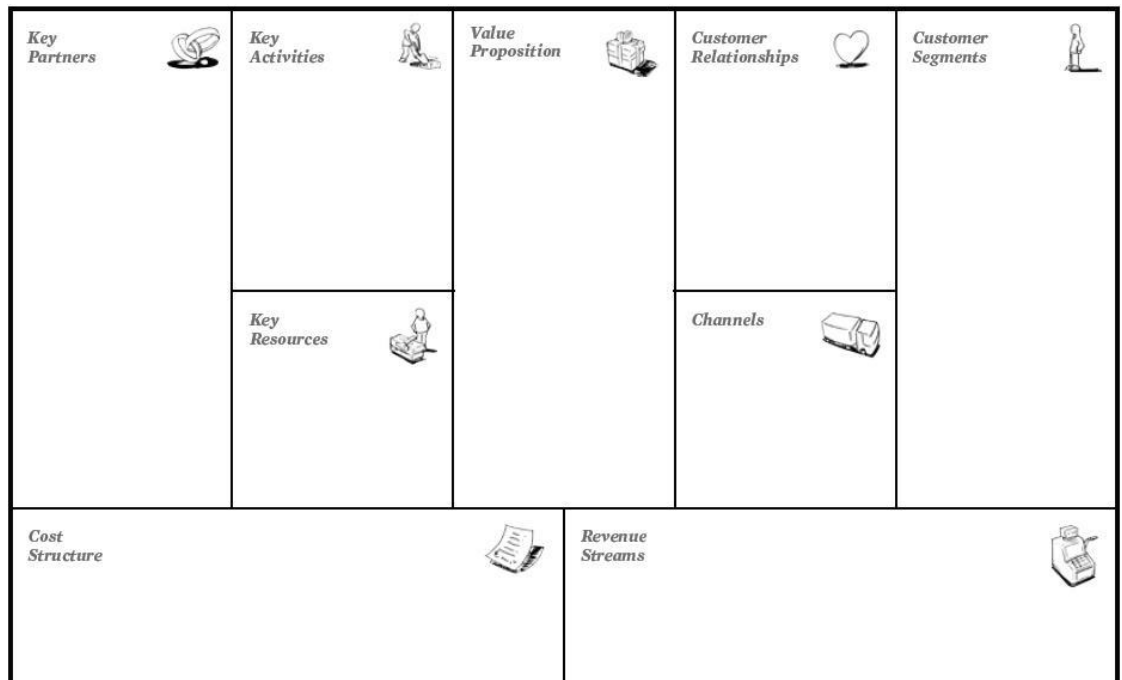


Figure 1. The business model canvas (Osterwalder & Pigneur 2010, p. 44).

After the introduction, this report continues with objective setting in chapter 3. The core content of this report is in chapters 4, 5 and 6. Chapter 4 concentrates to identify the enablers for new business opportunities. Chapter 5 discusses the actual new business opportunities that is enabled by certain factors related to the shift to flexible energy systems and development in data harvesting. These new business opportunities have an effect on the organizations business model and more specifically on the categories illustrated in the business model canvas. Effects on the business model and remodeling of that canvas is discussed in chapter 6.





3 Objectives

The main objective of this deliverable from service provider's point of view is to identify relevant business opportunities that arise when operating in a flexible energy system. The purpose is also to reflect what improvements could be made particularly to Empower TN's business model canvas with these new business opportunities. Naturally business opportunities for other divisions of Empower are considered as well.

In addition to identifying new business opportunities, also the actions needed to utilize those opportunities is beneficial to discuss. At the same time when action plan is created, the procedures and benefits need to be measured/evaluated. Thus, possible indicators need to be discussed that assist in evaluating the utilization of business opportunities and provide also numerical data on the benefits of those opportunities. In other words, the goal is to identify business opportunities, measure their effect on business, discuss about action plans to utilize them, and reflect their impact on organization's business model.

Another important perspective to consider is the customer (network owner) point of view. The new business opportunities for service providers can have naturally an impact also to customers' operation. Indeed, another important objective is to discuss about the impacts of service provider's new business opportunities on customers. The basic fundamental goal is to ensure, that the new business opportunities that could be realized on the service provider side, could also create benefits for the customer.





4 Enablers for new business opportunities

Network owners have a need to monitor the usability and reliability of their network as accurately as possible, which opens possibilities for network service providers. Empower TN (in co-operation with Empower IM) has the resources and capabilities to plan how data is gathered and analyzed, and what field operations are needed to ensure that the plan is realized. The first enabler for new business opportunities relates to the growing amount of data that is gathered from the network or is related to the operation of the network. There exists a great amount of open data, which could be utilized in for example in network planning and maintenance plans. The data sources for the actual data could be categorized in four classes. These classes and data source examples are presented in Table 1.

Table 1. Useful data classes and sources related to energy network operation.

<i>Data class</i>	<i>Data source</i>
<i>Measurement data</i>	Network measurement sensors
	AMR-measurement
<i>Environmental data</i>	Maps
	Aerial photography
	Infrastructure construction plans
	Field worker observations
<i>Weather data</i>	Weather forecasts and statistics for example of: <ul style="list-style-type: none"> - Wind - Rain - Lightning - Ground frost
<i>Statistics</i>	Fault statistics: <ul style="list-style-type: none"> - Number of faults - Causes of faults



Measurement data includes the sensors and devices in the network that measure the networks functionality and usability. For example, network load and component & cable functionality/quality measurements are important indicators that can be used in network planning and planning of maintenance activities. Environmental data consists of various open data, such as maps,



target location photographs and field worker observations that are utilized especially in proactive maintenance and grid planning. Also weather and statistics data can provide extremely useful data, when deciding proper components for the network in planning phase. When there is need to gather all this accurate data, it raises thoughts whether service providers could create new service products and do the data analyzation for the customer. These thoughts evolve into business opportunities, and some of those might lead to actions and business benefits.

Another enabler for new business opportunities is connected to the infrastructure and technology factors. The infrastructure of the future flexible energy system is a significant factor, because information and communication networks are connected with traditional energy system structure, and together they form an intelligent energy system. This opens possibilities for telecommunication service providers to offer their services for energy network operators. Technology development is also another crucial factor that create opportunities from service provider point of view. There is demand for advanced technology including measuring sensors and smart devices (communicating between the end customer and network owner) in the network that capture data. Besides replacing old components and devices, technology development can assist in developing new service offerings, where the advanced technology plays a crucial role. From service provider view this could for example mean that advanced smart device installation services could be offered for not only B2B customers, but also for end customers.

There are some environmental factors that affect directly to the future infrastructure and technology requirements, which also means these factors have an indirect effect on the creation of business opportunities. These factors are e.g. objectives to reduce emissions, increase renewable energy production, growing demand of energy (for example the amount of electric vehicles is increasing) and energy security. They all direct requirements for the development of energy system's infrastructure and technology used. Further, this results in more advanced technology and infrastructure, where service providers not only handle the installations, but work as a data analyzer and information distributor.

Services provider's capabilities and resources are also very significant characteristics that really affect what opportunities there exists for the organization and how well it can utilize those opportunities. Empower TN has a great amount of human resources on the field to do the installation tasks and also observe the functionality of the network and identify risks. From data analyzation point of view, Empower TN's capabilities and resources can be complemented with Empower IM's capabilities.

Close customer relationship is an important supporting factor that assist in turning opportunities into actions. Existing close relationships with significant customers provides better starting point to negotiations on how to perform the distribution of work between service provider and B2B customer. Close co-operation and partnership with a customer drives to seek mutual benefits,





which could result in new business opportunities. For example, service provider could extend its responsibilities and handle network planning more comprehensively, while the operator can focus on serving the end customer. In this context also the power of innovations can be brought up. If new ways are found to provide a higher quality service for the end customer, it can open possibilities for both service provider and network operator.





5 New business opportunities

The previous chapter focused on the enablers for new business opportunities. This chapter goes forward to discuss about the actual opportunities for the service provider that arise due to the effect of enablers.

The discussion is divided into two sub chapters: value chain expansion and new services. Value chain expansion topic takes a stand on whether it is possible for service operator to take responsibility of a part of operator's business processes in a way that mutual benefits are achievable. Secondly, technology development and increasing data gathering from network operations are creating possibilities for new services. Thus, new service opportunities are discussed in the second sub chapter.

5.1 Value chain expansion

Value chain consists of various processes and activities that together form the service delivery to the customer. One valid way to seek and utilize new business opportunities is to try to expand the value chain of the company. In practice, in this case this could be achieved through shifting a part of supplier's or B2B customer's business process (responsibility of certain tasks) to the service provider. Our focus is to provide better and more comprehensive services for Empower's customer, so the discussion here aims to seek possibilities to expand the value chain to the customer side. Naturally, there has to be benefits also for the customer in order for the value chain expansion to happen.

This value chain expansion section uses Empower TN as an example, so our main focus is on telecom operators and their business processes. That being said, also Empower PN (Power Network) face opportunities to expand their responsibilities to grid operators' processes, so that is included in the reflection as well. There are three key areas, where Empower TN could serve their customers more comprehensively and take more responsibility: network planning, maintenance and fault repair. Especially fault repair is an area, where Empower TN could have a possibility to serve the end customer (a firm or consumer) more extensively and be the operator that solves a greater variety of problems.

Figure 2 presents the operational processes and tasks related to Empower TN's and operator's (telecom network customer A) businesses. Yellow boxes represent customer's processes and blue ones are on the responsibility of Empower TN. The three previously mentioned key areas are circled to demonstrate in which processes Empower TN could take more responsibility and possibly handle independently in the future. The transition to flexible energy systems brings the energy and telecom network operations closer to





each other. The data gathered from energy systems is going to increase tremendously, so it would be beneficial for energy network operators to utilize service providers to handle data gathering and analysis from energy networks. Hence, the driving force for value chain expansion for service provider is the shift to flexible energy systems, which results in requirements to gather more data and for network operators to focus on key business operations, i.e. providing the highest quality of operator and consumer services.

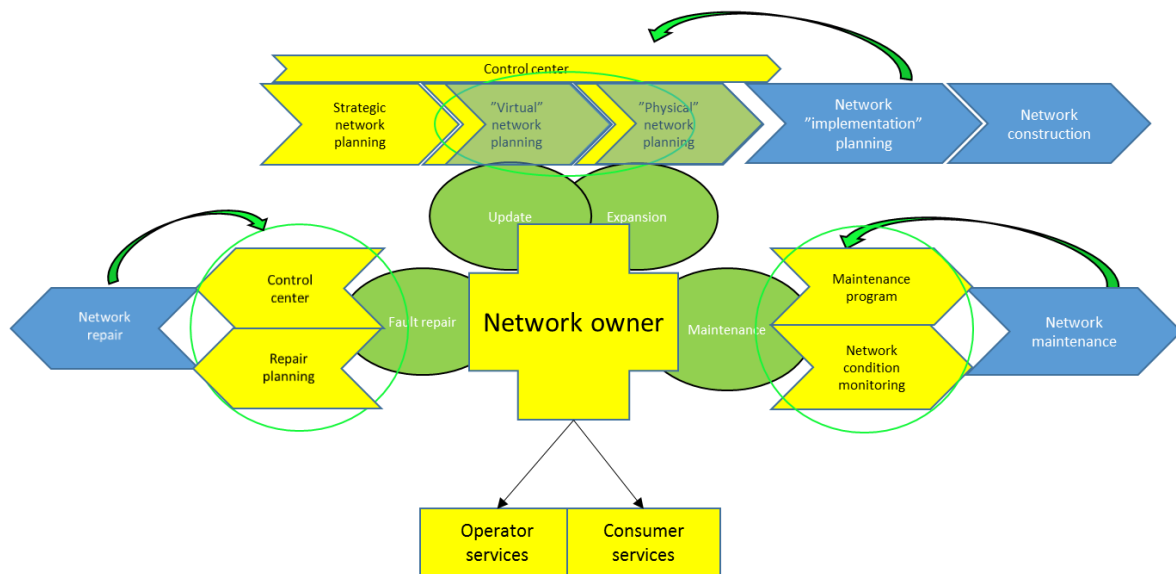


Figure 2. Network owner's (customer A) and Empower TN's combined value chain.

At the moment Empower TN's network planning tasks (for customer A) include the network "implementation" planning, i.e. the planning of the field work execution. Also "virtual" and "physical" network planning is included under Empower TN's responsibilities, but not completely (seen as light blue in the figure). In addition, the actual field work tasks related to network construction are carried out. As the figure above demonstrates (green circle), the network planning could be extended to cover all of the "virtual" and "physical" planning of the network. In practice this means the software based planning of the network and planning procedures on the field. This would make the distribution of work clear and presumably decrease planning lead-time, when the planning processes are completely under one operator.

Network maintenance and fault repair field activities also belong to the core operations of Empower TN. Still, these areas could be expanded to cover also the maintenance and repair planning activities. Empower TN has a great amount of human resources on the field to monitor the condition of the network, so it would be efficient solution to exploit these resources in making maintenance and repair programs. The common goal for service provider and network owner should be to decrease the amount of network faults. The maintenance and repair programs promote this goal and ensures better





usability of the network. Ultimately the improved usability of the network results also as higher end customer satisfaction.

Maintenance planning includes the planning of proactive actions that should be executed in order to prevent the failures to happen in the network. This plan requires for example the life cycle analyzation of the components of the network. This life cycle evaluation can heavily be supported by the network measuring sensors that were also discussed in deliverable 2.2-7/2.2-10. These sensors deliver data regarding the functionality of the network components. Maintenance plans could support the overall network investment planning. These together form the basis for the improved usability of the network. Naturally network faults can still happen for various reasons. Besides utilizing Empower TN's field workers' observations on the field, network fault information could be gathered also from consumers or through utilization of aerial photographing.

The value chain expansion could also be realized closer to the end customer (firms or consumers). Meaning, Empower TN as a service provider could be the sole operator that can handle a variety of problems. At the moment Empower's responsibilities limit to the properties' telecom distribution centers, and if the problem occurs in the intranet, it is handled by the customer. There are situations where the problem is unclear, which then might cause a situation where Empower's field worker goes to the end customer just to see that the problem is actually somewhere in the intranet or end customer's peripherals. In the future Empower could provide more comprehensive service for the end customer, where a variety of problems could be solved by a sole service provider. These services could also include guiding end customers in using the smart devices related to the energy grid. Overall this would result in more efficient use of resources and higher end customer satisfaction, because the problems are solved considerably faster.

This Empower TN's value chain expansion to cover telecom operator's processes is very valid and closely related to the grid operator's processes, because in many cases electrical network and telecom network planning and construction are executed simultaneously on the target site. The actual energy network planning, maintenance and construction tasks are under Empower PN's responsibilities. The same opportunities that Empower TN is facing with telecom network customers, can be replicated to Empower PN with grid operators as well. PN can utilize TN's and IM's data analyzation skills to offer grid operators proactive maintenance services and create repair and maintenance plans the same way as was discussed earlier in TN's case.



5.2 New services

This section concentrates on bringing up completely new service opportunities that arise especially due to the fact that data gathering from energy systems is increasing. Energy and telecom networks are closely interconnected in the



future flexible energy system, and the condition and usability of the energy network is monitored and measured continuously.

As was already discussed in deliverable 2.2-7 / 2.2-10, Empower TN together with Empower IM have great capabilities to gather energy network measurement data, analyze it centrally and then distribute the useful information to target groups (for example grid operators) that use it. The increasing data gathering and analyzation from energy networks opens possibilities for service providers to create “information packages” that support network planning and maintenance. The information in these packages are gathered from data sources that was already discussed earlier: measurement data, environmental data, weather data and statistics. These altogether provide useful information that set requirement for the planning of energy network components and location, and for the maintenance plans/programs. So these new information products are targeted especially for the energy system operators to ensure the feasibility of planning decisions and usability of the network. The role of Empower TN is to ensure the information flow and convert the collected data into useful information.

As already mentioned earlier, this operational network data could be gathered to a data platform, where for example Empower TN’s service center could analyze the data into information, which would be then sent to grid operators. Data gathering from consumers could be carried out for example with a web-based application, where it is possible to upload photos and add information related to the photo. These photos and information could then be sent to the data platform, where various other network related data could be handled: examples include network component data, fault statistics and weather impact data collected from the data sources mentioned earlier. Then this data on the platform could be analyzed centrally by Empower TN (and possibly in co-operation with IM) in order to create information that can be utilized in maintenance and repair planning.

These information products should be connected to the everyday field operations and also to the maintenance and repair programs. As discussed earlier, the programs could be handled by Empower. The planning information package provides information regarding the functionalities of the network components and whether the components should be replaced (based on life cycle evaluation) or updated for better regional performance of the network. In this way the information package works as a prerequisite for proactive maintenance activities.

Advanced technology amongst the future flexible energy systems also opens up possibilities for expert services. Smart network devices in the consumer or firm side communicate with the energy system operators and control the power input according to the level of consumption. In this way the loss of energy can be minimized. The first step is the installation of new measuring sensors and smart devices into the network. The installation tasks could be seen as expansion of current service offering. But in addition, Empower TN





could offer new expert services for the end customers to ensure that the flexible energy systems are used and utilized to full potential.

6 Business model development

This chapter concentrates on evaluating the effects of new business opportunities on Empower TN's business model. These effects and possible changes are reflected to the Osterwalder's and Pigneur's business model canvas, which was presented in the introduction chapter. Figure 3 presents the Empower TN business model canvas, which has been relevant in recent years. The abbreviations are derived from the different categories of the canvas: Key partners (KP), key activities (KA), key resources (KR), value proposition (VP), customer relationship (CR), channels (CH), customer segments (CS), cost structure (C\$) and revenue streams (R\$).

<p>KP</p> <ul style="list-style-type: none"> -Material supplier -Key customers -Venture capitalist 	<p>KA</p> <ul style="list-style-type: none"> -Coordination and scheduling -Process development <p style="text-align: center;">↓ Enable</p> <ul style="list-style-type: none"> -Technical design & work -Excavating work -Documenting -Concentrated services 	<p>VP</p> <ul style="list-style-type: none"> -Turnkey projects -Enables customers to focus on their core competencies - Delivery reliability (ability to meet changes in demand) -Nation-wide service provider <p>-Continuous development</p> <p>-Lowering costs</p>	<p>CR</p> <ul style="list-style-type: none"> -Meetings with key customers (operative meetings, contract follow up meetings) -Trade fairs, exhibitions -Personal influencing -Local "collaboration evenings" 	<p>CS</p> <ul style="list-style-type: none"> -Telecom operators -Grid operators -Others, e.g., cities, municipalities, defense forces, security companies <p>Grouped into</p> <ul style="list-style-type: none"> -Key customers (3 – 5) -Named customers (~20) -Local customers
<p>C\$</p> <ul style="list-style-type: none"> -Own personnel (fixed & changing costs) -Materials -Excavating work (subcontracted) -Other subcontract work 		<p>R\$</p> <ul style="list-style-type: none"> -Fixed pay per transaction contracts for 2- 3 years -Piece rate (e.g. euro/h) -Separately tendered projects (majority of current invoicing) -Fixed pay per month contracts (minority) 		

Figure 3. Empower TN business model canvas (Kuparinen 2012).



The new business opportunities discussed earlier contribute especially to the value proposition and revenue streams categories. Value chain expansion and new service possibilities affect the value offered for telecom and energy network customers. Empower TN is able to handle larger process entities and customer is able to increasingly concentrate on their core competencies. Moreover, through increasing data gathering and analyzation for maintenance planning and connection to proactive maintenance activities, a comprehensive



service package all the way from information gathering to planning and execution can be offered for customers. For grid operators, Empower TN can offer the data gathering and analyzation services, while Empower PN is able to take responsibility of the maintenance tasks on the field. Proactive focus shifts the weight from fault repair to preventative actions. From customer point of view, proactive tasks are known to happen at a certain point of time (maintenance plans), so the costs are more visible beforehand compared to fault repairs. Additionally, the improved usability of the network (due to proactive tasks such as active network component updates/replacements) results in higher end customer satisfaction. The enablers of business opportunities create possibilities for value chain expansion and new services, which further fine-tunes the business model and reinforces the value proposition.

The second category effected by the new business opportunities and especially proactive maintenance is the revenue streams. The revenue generation model is tuned, because the weight is moved from "random" fault repair tasks to more planned and predictable proactive maintenance activities. There could be specific contracts for the regular maintenance tasks that are connected to the maintenance plans. These contracts could be based on a standard monthly pay. In addition, there could be an extra percentage on top of the standard pay, which is related to the improved (or weakened) usability of the network. The usability can be measured with the help of fault statistics. Desired categories for fault numbers could be created in order to work out, whether the last month went according to goals. Improvements add an agreed percentage to the pay, but if faults have increased, it reduces the monthly payment.

Shift to flexible energy systems results in deeper co-operation with grid operators. The importance of the data collected from the network is crucial in optimizing the function of the energy system network. As stated earlier, it is not only about installations and maintenance, but also data capture and analyzation. This is why the grid operators are definitely going to receive more attention in service provider's key account management.





7 Conclusion

Shift from traditional energy systems to flexible energy systems together with advancing technology and stricter environmental regulations are examples of driving forces that create new opportunities for service providers. By expanding the value chain or offering new services are ways for service provider to develop their business and allow the customer to concentrate on their core competencies.

Empower TN has great capabilities to serve its telecom network customer more comprehensively and take more responsibility on certain processes. Especially maintenance and repair planning are areas, which we could handle independently in the future. The aim is to improve the usability of the network and decrease the network faults. When the planning and actual field work tasks are handled closely together by the service provider, reacting to problems and drawbacks is presumably faster and lead-times are expected to decrease. These same expansion opportunities apply also to Empower PN with grid operators. They have the resources to make plans on maintenance frequencies and repair procedures. These tasks can be significantly supported by the network data analyzation skills of Empower TN and IM.

In order to realize these business opportunities related to expansion of value chain, constructive discussions need to be arranged with customers. It is important to communicate the value for customers that are achievable through the reorganization of process responsibilities. When mutual agreement is achieved with the customers, then the next steps are related to the change management (process transition management and organizational management). This ensures that needed organizational changes (process responsibilities decided, possible recruitments) are done in order to handle the new processes and a smooth process shift from customer to the service provider (process and information flow descriptions needed).

New service opportunities are related especially to the growing data gathering from energy networks that is driven by the technology advancement and transition to flexible and smart energy systems. The data is gathered together from various data sources, which were discussed in more detail in chapter 4. This data can be captured by Empower TN and analyzed centrally by for example Service Center.

Also new service opportunities and their realization requires deep discussions with customers. Empower TN as a service provider first has to clarify, what are the exact customer information needs regarding the usability and operational information of the energy system network. Then the new information products can be tailored according to individual customers. Naturally in case of new products also market analysis needs to be performed in order to find out the full potential of the new service or product.





The development projects that are created to take these opportunities forward can have several key measurement indexes that either describe the development of the project implementation or the results achieved. The measurement indexes of the results are particularly important in order to reflect the business impact. This kind of key measurements include e.g. value of work, gross profit margins and human resource utilization rates.

The most important factor in achieving the business benefits discussed earlier is management commitment and alignment of service provider's and customer's business views. When upper management in both parties (customer and service provider) believes the changes will improve the business, the development is possible. From Empower TN's point of view, the business model is tweaked especially in value proposition and revenue streams categories. In addition, for example proactive and regular maintenance activities would help to distribute the workload and aim to level the demand pattern. This describes how the new business opportunities can create a sequence of benefits and considerably drive forward the way we conduct business.





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