

Final report

1.1 Project details

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| Project title | Information til og Uddannelse af Fremtidens Elforbruger |
| Project identification (program abbrev. and file) | IUFE |
| Name of the programme which has funded the project | ForskEL |
| Project managing company/institution (name and address) | Østkraft Holding, Skansevej 2, Rønne |
| Project partners | MDT Analysis, Forbrugerrådet TÆNK, Campus Bornholm |
| CVR (central business register) | 31816211 |
| Date for submission | |

1.2 Short description of project objective and results

The overall purpose of the project was to create elements that could compose an information strategy and programme for power consumers, providing them with an insight into an energy system that is based on renewable energy, smart grid, and flexible consumption. The developed elements, such as training of customers, information letters and videos, teaching school children about renewable energy and others, are all based on Bornholm power customers and participants in the EcoGrid EU project (hereafter: EcoGrid). The project has also made use of insights and results from other relevant projects.

In short: The main objective of the IUFE-project was to compile/create information, education and training on Bornholm to raise the awareness and understanding of:

- The Smart Grid vision and EcoGrid
- Flexible demand of electricity
- New possibilities of controlling electricity consumption
- New energy technology options

The IUFE-project was organised in five different tasks. An information/communication strategy was developed in WP1. The strategy was targeted electricity customers on Bornholm and shows the information/communication effort necessary to the implementation of a full-scale Smart Grid demonstration such as the EcoGrid.

WP1 served as a pillar and inspiration for the other four work packages WP2, WP3, WP4, and WP5.

The aim of WP2 is to engage and prepare second generation electricity consumers (the youth) for the challenges of tomorrow's power system and to show them how smart grid (i.e. EcoGrid) can be a way to manage e.g. a large amount of variable and less predictable wind power generation. Campus Bornholm has successfully performed summer school for the Bornholm 10th grade level. One of the summer courses, TECHLAB, includes experiments with wind energy and energy storage. Moreover, a number of HTX and STX-based educational activities were performed during the IUFE-project period.

The development and implementation of a smart grid energy advice service (WP3) and the realisation of a Smart Grid House on Bornholm was targeted EcoGrid participants on Bornholm, but it possible to use the experiences in other large-scale demonstrations or in a nationwide roll out of smart grid solutions.

The main task of WP4 was to prepare and initiate concrete information and communication measures, especially related to the recruitment of EcoGrid participants.

In WP5, the concept of a Smart Grid demonstration house was developed and realised. The demonstration house Villa Smart in Rønne was established in 2012 and is one of the first of its kind to place the electricity customer at the centre.

The experiences from the IUFE-project are summarized in six deliverables (in Danish):

- D.1.1: Information strategy and focus (Informationsstrategi og focus)
- D.1.2: Smart Grid Information concept with examples of communication tools (Smart Grid informationskoncept med eksempler på virkemidler)
- D.2.1: Education of the future electricity customer – Smart Grid youth educational program (Uddannelse af fremtidens elforbruger – Smart Grid anvendt i undervisningen)
- D.3.1: A concept of a Smart Grid energy service (Koncept for energirådgivning)
- D.4.2: Experience with consumer communication about Smart Grid with examples from the EcoGrid project (Erfaringer med forbrugerkommunikation om smart grid – med eksempler fra EcoGrid på Bornholm)
- D.5.1: A concept of a smart grid showroom/demonstration house (Koncept for smart grid show room/demonstration house)

1.3 Executive summary

As power generation is becoming more and more intermittent due to production from more and more renewable resources there is a need for change in the traditional power system. Customer behaviour is a key factor in this change, as technical solutions cannot solve the challenges on its own. Therefore this project focuses on customer behaviour and what actions are needed to inform the customer, so that he actually changes his behavior and allows automatic regulation. The project result in an information and communication strategy/concept; different forms of information/communication material; a new energy/smart grid consultancy service; and education of teenagers following a youth education programmes. All products were tested on the 2000 participants in the Smart Grid demonstration project EcoGrid taking place on Bornholm from March 2011 to September 2015.

A Communication Strategy for start-up that was to be used for and tested in the project was drawn up on the basis of "Ready, Start, Go..." philosophy. It indicates the initiatives that should be in place before the dialogue with the customer begins. An important part of smart grid information plan and strategy is to clarify the key message, targeting the audience (who is the customer group). Moreover it is important to select your messenger and the information channels and tools.

Youth educational Programmes. Smart Grid was used as a topic and EcoGrid as an example in the lessons to make the 'theories' more applicable for the students. Bornholm Vocational College and Bornholm Upper Secondary School prepared and performed several youth education programmes at HTX and STX.

Smart Grid Advisory Service. The new advisory service provides the EcoGrid test participants with information about how they can benefit from making part of their consumption flexible. Øskraft invited all participants to join group training in Villa smart. The EcoGrid project introduces a new concept of variable real-time electricity pricing: Adapting the customer behaviour of flexible resources like electric heating and heat pumps will contribute to maintaining the balance of supply and demand in the power system.

Establishment of the demonstration house Villa Smart. Øskraft established the demonstration house Villa Smart, which was used for training of the EcoGrid participants. The demonstration house has attracted several international visitors, schools and students. The house was opened on the 13th of February 2012, and this was at the same time used as the starting point for recruitment to the project.

IUFE communication activities. The final IUFE report analyse and convey experience as regards customer communication and user involvement in smart grid projects based on the EcoGrid project on Bornholm. The report attempts to provide an answer to how it was possible to recruit and involve a tenth of all household customers on Bornholm (approx. 2,000) in the EcoGrid project. And to what extent it is possible to use the experience from EcoGrid outside Bornholm.

Several PR and information material was developed and used for the EcoGrid project (eg. web-site, EcoGrid magazine, interactive lego model of EcoGrid/Bornholm etc.)

In the middle of the recruitment phase it was decided to organize an EcoGrid event. Aside of the goal of involving the existing/recruited (approx. 900 test-households), the objective was to attract new participants.

It took a large communication effort (much more than expected) to support the test-participants during the demonstration phase. In this phase the IUFE communication activities included different types of online information, which was published on the web-site such as fact sheets about the smart equipment, user guides, online newsletters etc.

Besides, a great effort was made by Øskraft by phone/e-mail support and electrician home visits.

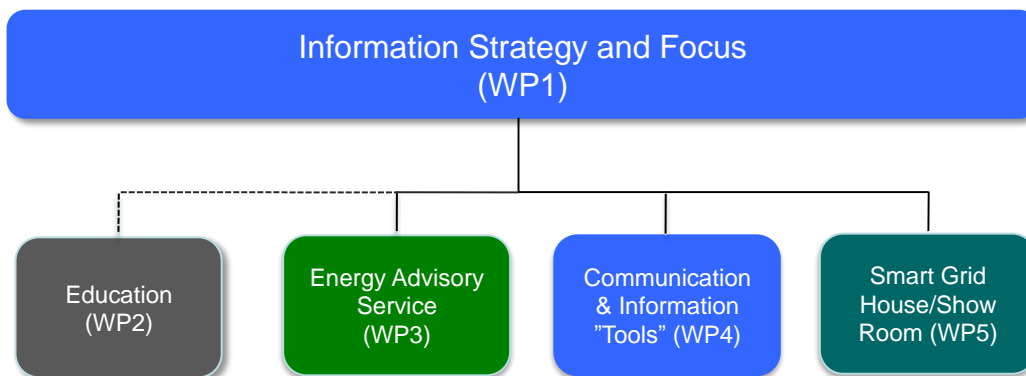
Communication procedures for 'unplanned' events

The customer communication activities in EcoGrid were affected by project delays and unforeseen technical challenges. The overall information concept and strategy developed in IUFE can be used as a checklist of the elements which must (ideally) be in place before starting the dialogue with the customer. One important lesson learned: It is not always possible to foresee the character of eg. technical challenges, but it is possible to prepare communication procedures to manage potential problems (unforeseen or expected).

1.4 Project objectives

The purpose of the project was to create a series of initiatives, which would give the Bornholm power customers and especially the participants in the EcoGrid project an insight in the meaning of smart grid and flexible power consumption. The project was divided in five work packages. WP1 was an overlaying work package, where the basic information strategy was formed with a discussion of focus and which means could be useful. The work from this WP was used directly in training of participants (WP3), communication material (WP4) and creating a Smart Grid showroom (WP5). The ideas from WP1 were also used as inspiration, when local teenager was introduced to renewable energy and flexible consumption as part of their schooling. Special training of electricians and other craftsmen was also part of WP2. The figure 1 shows the project organization of the work packages.

Figure 1: Project organization and work packages



Østkraft, the project manager of IUFÉ, had the role of recruitment and installation of participants for the EcoGrid project. After both projects started in March 2011, Østkraft began to clarify, how the different customer segments could be involved in EcoGrid. The participants were divided in 5 main groups: statistical reference, manual control, IBM/Greenwave Home Energy Management System (HEMS), Siemens HEMS and business. As business customers was only 100 out of the 2000 planned participants it was decided that IUFÉ would only focus on the residential customers in the first 4 groups.

From the beginning, the IUFÉ-project was planned to evolve along the EcoGrid project. As the EcoGrid project was delayed it had impacts on IUFÉ and both projects started in March 2011. The delay mostly impacted deliverable 3.1 of WP3 and deliverable 4.2 of WP4, both were finalized December 2015 (Approx. six months after the EcoGrid demonstration was finalized).

1.4.1. The objectives of the individual work packages

The objective of WP1 (Information/communication strategy and concept) is to reach out to the private electricity customers in order to create a better public understanding of the main challenges of the current and future power system, and not least inform them about the new opportunities and benefits that different types of smart grid technologies can provide to the electricity customer. The aim of WP1 was also to develop a smart grid information concept. It was to include proposals and examples of communication actions and measures relevant for the implementation of smart grid demonstration project/roll out in general, and for the EcoGrid project in particular. Also, the aim was to materialise the strategy and concept into concrete actions, i.e. smart grid education of youth (WP2), training/consultancy of EcoGrid participants (WP3), recruitment activities/communication means (WP4), and establishment of the smart grid demonstration house Villa Smart (WP5).

The objective of WP2 (Education) is to give the next generation (the 'youth') a better understanding of the fundamentals and the challenge of the existing and future power system. This includes knowledge of the smart grid perspectives – exemplified by the EcoGrid demon-

stration project. More than 80% of young people complete an upper secondary education. The smart grid courses at the STX and HTX-level (upper secondary education) should also be a means to widening the smart grid message to other family members, thus making it easier to explain complex topics such as the smart grid and the concept of flexible consumption.

The objective of WP3 is to add an extra dimension to the traditional energy consultancy service. The aim was to i) increase the general awareness about (Danish) energy policy and the future challenges of the power system; ii) create an understanding of the concept of flexible consumption; and iii) explain how smart grid would affect the participants and how they should do their personal settings to ensure their comfort but at the same time provide the desired flexible consumption.

The objective of WP4 was to develop/perform communication activities that would make it possible to recruit and involve a tenth of all household customers on Bornholm. Concrete communication actions made it possible to test the impact of communication that was targeted the mass (the public) and a special type of customer groups, respectively. In a final report of WP4, there is an attempt to provide an answer to how it was possible to recruit and involve a tenth of all household customers (about 2,000) in the EcoGrid project. The report should include examples of experiences that can be used advantageously in other demonstration projects and/or in connection with a broader, nationwide roll out of smart grid.

The objective of WP5. From the beginning it was decided that the demonstration house Villa Smart should represent an ordinary residential house in Denmark. The aim was to show the visitors a house they could identify with. They should experience solutions that easily could be translated into their own homes. Therefore, the house was designed with components and devices, which are also available for ordinary people, but at the same time add a certain level of smartness functionality, so the house could actually symbolize the future smart home.

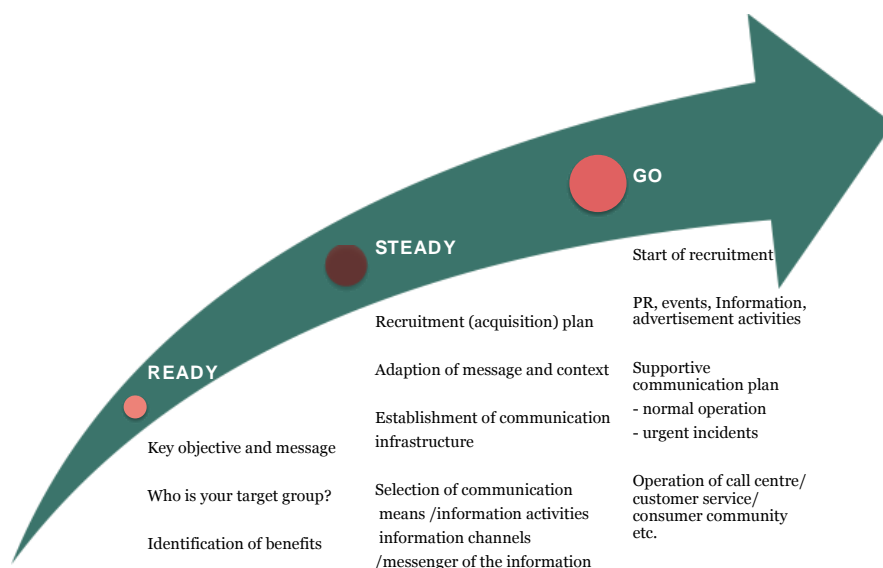
1.5 Project results and dissemination of results

The project results will be presented for each work package (WP1, WP2, WP3, WP4 and WP5) in section 1.5.1, 1.5.2, 1.5.3, 1.5.4 and 1.5.5. Dissemination results are described in section 1.5.6.

1.5.1 WP1: Development of an information and communication strategy/concept

A communication strategy for start-up that was to be used for the project, was drawn up on the basis of Ready, Set, Go ... philosophy. It indicates the initiatives that should be in place before the dialogue with the customer begins. Figure 2 shows the key elements of the concept.

Figure 2: The Ready, Set, Go Strategy



A smart grid information plan and strategy, including the development of efficient communication/information material, requires a clarification of five key elements:

- Define your message
- Targeting the audience
- Who is the customer group?
- Choose your messenger
- Select your information channels and tools

The message:

One of the key elements in any communication strategy is to define the message that you want to put across. It is important to focus on positive outcomes and benefits associated with the project (here: the benefits/outcomes of EcoGrid). As the success of the EcoGrid demonstration depended on high end-user participation, there was a special need to raise consumer awareness of the Smart Grid concept in general, and of innovative trading arrangements introduced through the EcoGrid market concept in particular.

An example of the main message to the Bornholm electricity customers –formulated in the first EcoGrid magazine is given in the text box below. Note that this message work particular good for island communities: People want a positive image of their island.

Bornholm leads the way...

"As yet, EcoGrid is one of the largest projects of its kind in the world, in which 2,000 consumers from Bornholm are going to test new possibilities of testing their electricity consumption.

That will be necessary in the future when the majority of the electricity will come from renewable energy. When the weather is calm, or when the sun is not shining, there will therefore be less electricity. Then it will be smart that the consumers reduce their electricity consumption and move it to periods in which more electricity is generated. If a sufficient amount of consumers does that in the future, it will save the society billions of Danish kroner on expansion of the power grid and expensive power reserves. And just as importantly, it is a condition for having more renewable energy.

EcoGrid participants will lead the way to a more intelligent and green society, and seriously help putting Bornholm on the world map".

Targeting the audience:

In preparation for recruitment to the EcoGrid demonstration project, it was important to clarify how information efforts must be designed so that they could help attract the sufficient number of test persons. The people who are the easiest to attract, are most likely (potential)

first movers, i.e. the electricity customers who are willing to take risks and who are committed to spearhead the Smart Grid deployment or, who just find it interesting to follow the latest technological developments. It is not realistic that you will find only enthusiasts, first movers, and early adopters of new technology in a field test that will have to involve every tenth residential household on Bornholm. Also, the participants could not be randomly selected. It was necessary to recruit participants who had no particular interest in either energy topics or the EcoGrid project.

Who is your customer?

In any dialogue with the consumers, it is most important to "Meet the customer where he is"! This requires some knowledge about who your customers are.

Although the main motive for EcoGrid participation was the prospect of saving money for potential participants, we experienced that also environmental and innovative aspects are very high priorities. Furthermore, smartness from a consumer point of view is certainly not about kWh, but rather about convenience or comfort.

Several customer surveys were performed during the EcoGrid project. However, prior to the recruitment process we started from "scratch" and we learned a great deal about customer preferences and energy behaviour through existing customer analysis and lessons learned from other smart grid demonstration projects.

Choose your messenger

Østkraft (DSO on Bornholm) was the key messenger of information to the customers. Also, the mayor of Bornholm was appointed ambassador for the project. Moreover, the Danish consumer organisation was involved – representing the consumers' voice throughout the project period.

Section 1.5.4 gives examples of information tools and means and communication activities which were used in the recruitment of EcoGrid participants.

Selection of information tools and channels

Before the official recruitment, activities were implemented to raise the general awareness of EcoGrid among the public on Bornholm. The first step was to achieve general acceptance from local politicians. Next step was to attract the interest of the media. The active involvement of the media proved to be an efficient channel for wide spread distribution of information about EcoGrid to the public.

The official recruitment activities were initiated by a press conference and open house events in the smart grid demonstration house Villa Smart. Information material was distributed at local events such as the annual Energy days and the 'famous' Folkemødet on Bornholm attended by highly profiled Danish politicians, industry and NGOs.

Section 1.5.4 gives examples of information tools and means and communication activities, which were used in the recruitment of EcoGrid participants. Section 1.5.5. describes the concept of the demonstration house Villa Smart.

1.5.2. WP2: Youth Educational Programmes

Smart Grid was used as a topic and EcoGrid as an example in the lessons to make the 'theories' more applicable for the students. Bornholm Vocational College and Bornholm Upper Secondary School prepared and performed several youth education programmes at HTX and STX.

Example of educational programmes:

HTX: Simulation of the power system. 2.g classes participated in the course "Energy production and consumption", where they have worked with a model of the power generation and power supply. The model includes components such as a wind turbine, energy storage device, light bulb, electric motor for a consumption unit, and an electrical circuit to connect and control components. For example, the students should measure the output from the wind turbine and calculate the turbine's efficiency. The students make a report, including a discussion about the challenges related to the transition from coal-based energy production to renewable sources such as wind power.

STX: Sun and wind. The class participated in a comprehensive program with a focus on green energy production and distribution. The students worked theoretically and practically with solar panels and wind turbines over a longer period. In the end of the course the students should design and test methods for intelligent control of solar terms. Example of activities:

- A visit in Villa Smart where Øskraft gave a presentation of the company's involvement in the EcoGrid project
- A visit to the DR city to see the solar energy system in DR-building.
- One day visit at DTU with lectures and exercises within the areas of wind and solar power
- Programming of solar panels

10. Class: Rain on solar and wind. The class built a model of a society with electricity-consuming devices and power generating units. The EcoGrid project has been discussed, and the concept of flexible electricity consumption was modelled. The students measured energy output from a wind turbine. Capacitors were used as the storage medium and a small motor was representing the energy consumer. The class was on a 3-day stay at Sorø Science Center with lectures and practical experiences within the theme of energy.

1.5.3. WP3: Smart Grid Advisory service

All customers who participated in the EcoGrid project were invited to group training in Villa Smart. The customers were divided in different training groups dependent on which experimental group they belong:

- 1) Customers in the manual response group had a smart meter and access to the feedback system/web price portal "My EcoGrid".
- 2) Customers with automatic control who owned electric heating or heat pumps were equipped with different automation systems to control their heating. All customers in the automated groups also had smart meters and access to the feedback system.

The training was adapted to the different experimental groups (a manual control group and three different automatic control groups). The training was held with a maximum of ten participants per group and the duration of a training session was 1½ -2 hour. Approximately 600 EcoGrid customers participated in the training.

Many participants, in particularly the households with automatic control equipment, requested individual advice. This was given through Øskraft's EcoGrid phone/e-mail helpdesk or through home visits from Øskraft's electricians.

The training programme

All participants were given a general introduction to smart grid and EcoGrid. They also learned how they could use and respond to information from the feedback system "My EcoGrid".

The manual control group was given examples of ways to change electricity consumption behaviour by adjusting the time of use for their washing machine, dryer, dishwasher etc.

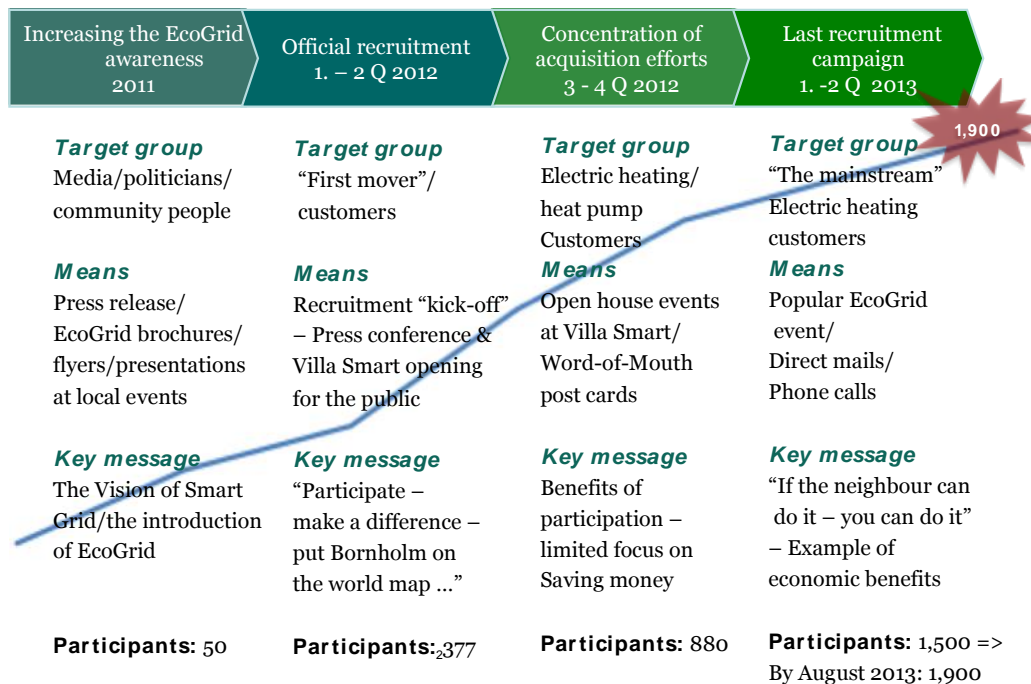
The training of the participants with automatic control options focused on functionality of their automated control equipment, ie. how they could pre-programme the smart home equipment according to their comfort preferences. They could also programme how "flexible" or price responsive they wanted to be. Some participants made settings that allowed their electric heating to be regulated up and down within a room temperature band of for example 19-22 degrees.

1.5.4. WP4: IUFE communication activities and recommendations

The final IUFE report (WP4, D4.2) analyse and convey experience as regards customer communication and user involvement in smart grid projects based on the EcoGrid project on Bornholm. The report attempts to provide an answer to how it was possible to recruit and involve a tenth of all household customers (approx. 2,000) in the EcoGrid project. And to

what extent it is possible to use the experience from EcoGrid outside Bornholm. An overview of the activities in the recruitment phase is given in figure 3.

Figure 3: Overview of (targeted) communication activities



Example of PR and information material developed and used for the EcoGrid project:

- EcoGridBornholm.dk web-site
- EcoGrid flyer
- EcoGrid magazine
- Word-of-mouth post cards
- Interactive legomodel of EcoGrid on Bornholm (made by lego enthusiasts and with financial support from Energinet.dk)
- Youtube videos
- Direct mails

Invitation to public EcoGrid event on Bornholm. In the middle of the recruitment phase it was decided to organize an EcoGrid event. Aside of the goal of involving the existing/recruited (approx. 900 test-households), the objective was to attract new participants. In order to create 'word-of-mouth', EcoGrid postcards and advertisements were distributed to 70% of all households on Bornholm through the local newspaper. The message was: "We are still looking for more participants, particular those with electric heating/heat pumps".

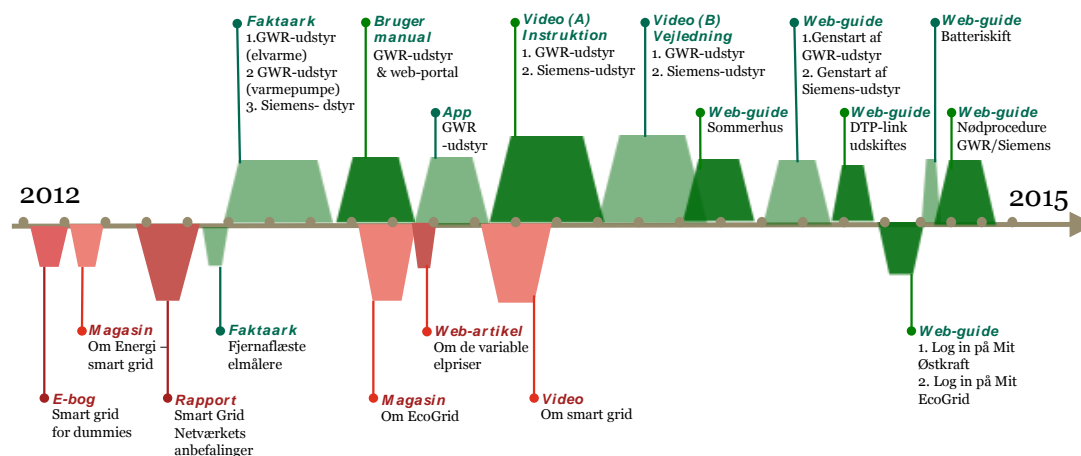
Supportive information

The next phase (after the recruitment of the participants), the challenge is to keep the participants involved. It took a large communication effort (much more than expected) to support the test-participants under the demonstration phase.

In this phase the IUFEE communication activities included different types of online information through the web-site, eg.

- Fact sheets about smart meters and EcoHome equipment
- User guides for EcoHome equipment and My EcoGrid price portal (Videos and written materials)
- Newsletters
- Facebook
- FAQ

Figure 3: Massive supportive communication activities 2012 - 2015



Besides, a great effort was made by Østkraft by phone/e-mail support and electricians' home consultancy.

1.5.5 Demonstration house

Østkraft has established the demonstration house Villa Smart, which has been used as a smart grid showroom. The house is located in Rønne. The basic idea of the house was to create a place where EcoGrid participants were trained in the use of their smart home equipment. The idea and utilization of the house was soon expanded. Villa smart became a place where people could learn about eg. house renovation and operation of heat pumps. In addition, the house attracted about 400 international visitors coming to Bornholm to hear about the EcoGrid project. Today more than 600 students have also been visiting the house. These visitors have gained insight into why we need smart grid and how this system could work in practice.

Villa Smart represents an ordinary residential house with some smart components, including the EcoGrid equipment and solutions.

Example of educational tools and installations in Villa Smart:

- An interactive educational wall showing the EcoGrid setup. The wall gave the participants an overview of the communication and power flows in the EcoGrid system. The wall show how the installed smart home solutions communicate with the households' equipment (e.g. heat pump or electric heating) and interact with the rest of power system through real-time price signals.
- An interactive EcoGrid lego model of the island of Bornholm
- Smart power nodes (register electricity consumption per household device)
- A heat pump installation with automated control options
- A electric heating panel with automated control options
- Installation of a 6 kW PV plant. On a computer the visitors could see the electricity production in real-time



The educational wall in Villa Smart

1.5.6 Dissemination of results

The IUFÉ project activities have contributed to raise the public awareness about smart grid/EcoGrid on Bornholm, Denmark and the global society.

Examples of key dissemination results include:

- Before the official recruitment, activities were implemented to raise the general awareness of EcoGrid among the public on Bornholm. The first step was to achieve general acceptance from local politicians. Next step was to attract the interest of the media. The active involvement of the media proved to be an efficient channel for wide spread distribution of information about EcoGrid to the public
- The EcoGrid project and its (IUFÉ) recruitment and consumer involvement practice has been honored as 'the second best' pilot of the ISGAN Award of Excellence (2014)
- 400 visitors from 50 different countries have been on Bornholm to learn more about EcoGrid, including the Danish IUFÉ activities
- About 600 students visited Villa Smart to learn about smart grid and EcoGrid.
- Through active consumer involvement and strong customer support it was possible to keep the majority, approx. 80%, of EcoGrid participants interested during the field test. More 80% test participants said that they want to participate in a project such as EcoGrid again
- 900 participants are participating in a the new EcoGrid demonstration project (version 2.0)

The experiences from the IUFÉ-project are summarized in six deliverables (the reports are available in Danish):

- D.1.1: Information strategy and focus (Informationsstrategi og fokus)
- D.1.2: Smart Grid Information concept with examples of communication tools (Smart Grid informationskoncept med eksempler på virkemidler)
- D.2.1: Education of the future electricity customer – Smart Grid youth educational program (Uddannelse af fremtidens elforbruger – Smart Grid anvendt i undervisningen)
- D.3.1: A concept of a Smart Grid energy service (Koncept for energirådgivning)
- D.4.2: Experience with consumer communication about Smart Grid with examples from the EcoGrid project (Erfaringer med forbrugerkommunikation om smart grid – med eksempler fra EcoGrid på Bornholm)
- D.5.1: A concept of a Smart Grid showroom/demonstration house (Koncept for smart grid showroom/demonstration house)

1.6 Utilization of project results

The results of the IUFE project will be utilized in a new EcoGrid version 2.0 demonstration project (2016-2019). Approx. 90 % of the test participants with automated EcoGrid control of heating system are involved. The new project partners are: Dansk Energi (project manager), Copenhagen Business School, Insero Software, Uptime-IT, Krukow og 2plus1.

The partners behind the demonstration project Energy lab Nordhavn will use some of the experiences from IUFE with regards to recruitment of their test participants and communication activities. Moreover, the experience from IUFE has been exchanged with distribution companies in Denmark (e.g. SEAS-NVE). The IUFE activities have been used as input/inspiration for the tool box developed in the European S3C project (Smart Consumers, Smart Customers, Smart Cities): "Empowering people for the smart energy system of the future - A toolkit for utilities, project managers, energy agencies and city developers" (<http://s3c-project.eu/>).

1.7 Project conclusion and perspective

One of the largest tasks, preceding the EcoGrid demonstration (and later: in a deployment perspective), has primarily, been to establish a broad understanding of the smart grid vision behind EcoGrid and of how activating small-scale electricity consumption /electricity production via a real time market can make a difference.

The experience is that the message to be communicated should include not only financial benefits (unless the potential savings are very obvious), but also societal and environmental benefits). Some consumers are interested in increasing insight into their consumption; they must be so for different reason. Some people are interested in the technology behind it; others are aiming to save money.

Through the IUFE activities it was ensured that all relevant target groups (in Denmark and on Bornholm), continuously were informed and updated about the (EcoGrid) project progress. Bornholm citizens and test participants were informed via web-site, online newsletters, TV documentary stories, EcoGrid interviews for the local media, open house arrangement in Villa smart, and EcoGrid partner representation at local events etc. At the national level the understanding of EcoGrid project was well anchored with the Danish authorities, the Danish consumer organisation and the energy industry.

The experience from EcoGrid is that from the customers' point of view, the best advice is provided through personal contact. However, to keep costs on an acceptable level, 80-90 % of this consultancy can be provided through mass communication and successful installation.

The project group has reached the following key recommendations:

- Communication strategy, including a contingency/emergency plan. From the very beginning of the project it is important to create a broad anchoring of the project (smart grid) in the population/region, including an understanding of the interaction with and the difference between flexible consumption and energy efficiency improvements. An always updated FAQ may act as a good internal and external information channel. Closed on-line user platforms can engage the customer and contribute to problem solving. An emergency plan with communication routines and platforms should be established to avert adverse consequences of unplanned events such as server crashes, etc.
- Pre-test of the project. A pre-test should be conducted, including the entire value chain and a limited number of users. Included should be testing of technical equipment and solutions as well as education of installers and project staff in the use of equipment, identification of the need for user guides, etc., and development/testing of guides for how to use the equipment. In the overall evaluation of the pre-testing process consumers as well as project employees and installers are involved. Evaluation must also contribute to ensure that employees are equipped to tackle tasks of a both technical and communicative nature. It is recommended that the actual recruitment for the project will only begin when there is assurance that the systems will work within the planned horizon. Pre-test can prevent problems and requests/claims from customers – and reduce the need of personalized – and resource intensive customer support and communication.

- Requirements for technological solutions and usability. Remote update of equipment should be possible so that the electrician/installer will not have to visit the customer every time there is a need to update/modify the software, and errors can be solved centrally. There must be simple user access, e.g. to interrupt automatic control so that the customer can switch to manual control. The chosen solutions must follow current standards for interoperability to avoid connecting to other devices and the replacement of equipment being prevented by proprietary solutions. Complex user guides can be replaced with more simple ones.

Perspectives

The project experience is that the great support of the EcoGrid project from the public on Bornholm has been an important precondition for the recruitment to the EcoGrid demonstration and willingness to test the EcoGrid real-time market concept.

The perspectives for a wider implementation of EcoGrid therefore depend on the degree of 'smart grid readiness' among the electricity consumers. The support of the project from the public on Bornholm is probably due to the fact that the population already was aware of many of the challenges associated with wind power and that the goal of converting to a CO2 neutral electricity production is deeply entrenched among the people on Bornholm and the Danes in general. In other words: It will be easier to realize the EcoGrid project in areas where the environmental awareness is already high and the challenges of handling more renewable energy and wind power are largest – and thereby also the wish for effective solutions to the challenges.

Communication with the electricity consumers on Bornholm has appealed to good citizenship rather than pure financial gains. It is likely to work well in the initial phase of the smart grid development (and for pilot projects). However, in a broader and national deployment perspective the services to be offered to customers should be clearer with regards to technology, functionality and customer benefits, than the ones tested in EcoGrid.

The experience from EcoGrid is that many people give higher priority to convenience than financial benefits. For them, the benefits were mainly related to automation. Some participants said that remote control was a convenient way to regulate their heat pumps/electric heating system. The significance of individual gains of smart grid must not be overlooked in future communication with the mainstream customer group. This will enable greater effect from the communication concept and means developed in the IUFE project and tested in the EcoGrid project.

Annex/links:

www.ecogridbornholm.dk

www.eu-ecogrid.net

Deliverables of WP1, WP2, WP3, WP4 and WP5 are sent separately.