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EMPOWERING PEOPLE FOR THE SMART ENERGY SYSTEM OF THE FUTURE

A TOOLKIT FOR UTILITIES, PROJECT MANAGERS,
ENERGY AGENCIES AND CITY DEVELOPERS



Imprint

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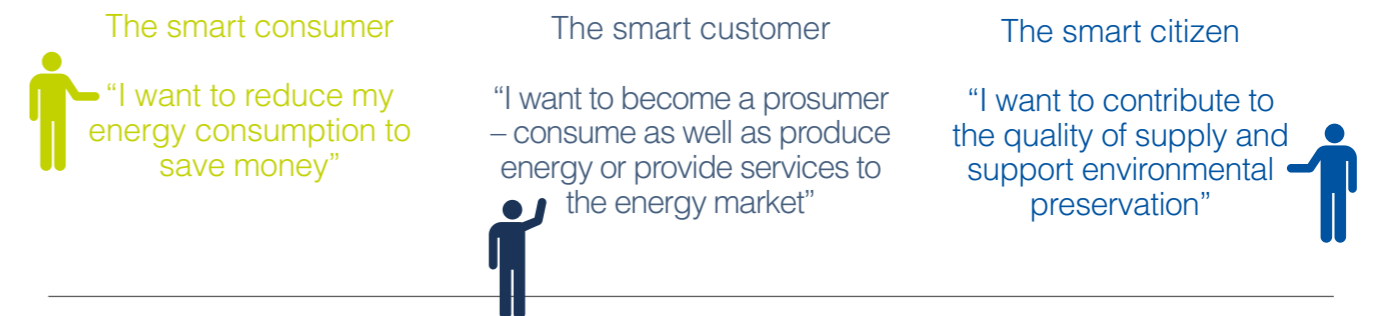
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Empowering people for the smart energy system of the future

“People make the difference in the transition to our future energy system. S3C paves the way for the successful long-term end user engagement“

... with this guiding principle in mind, the Smart Consumer, Smart Customer, Smart Citizen project (S3C) set out to develop a toolkit for the active engagement of customers of energy in smart grid projects. In S3C, we argue that the “One” smart consumer does not exist and uniform solutions are not applicable when human nature is involved. Therefore, the S3C project addresses consumers on three different levels:



The S3C project was funded by the European Union's seventh framework programme for research, technological development and demonstration from 2012 to 2015.



Understanding consumer engagement in smart grid pilots or rollouts is a real challenge. Human behaviour is influenced by many different factors at once, and it is difficult to causally isolate the influence of separate factors. Putting theory and empirical investigations together, we got a first idea on the best practices and pitfalls of consumer engagement, but it was only by actually putting these first ideas into practice – by testing them in the pilots that were willing to cooperate with us – that they could be developed into solid insights.

Dr. Erik Laes, S3C project coordinator, VITO/Energyville



Whether they work in utilities, energy or city development agencies, project manager often face the pain of not reaching their target group – or losing it directly after the big momentum of a project is gone. In S3C, we condensed latest psychological and sociological knowledge into very practical tools and guidelines that are ready for use by all kinds of product and project developers. May they help to combine technological and human approaches when involving end users in the future's more distributed energy system.

Ludwig Karg, S3C senior project manager, CEO B.A.U.M. Consult GmbH

Engaging your customers and stakeholders – the S3C toolkit

How can you support your customers and stakeholders to become part of the energy system of the future? How can you motivate them to think about and possibly adapt their energy behaviour? What incentives are necessary to encourage new routines? We developed our S3C toolkit for everyone who is involved or intends to become involved in the active engagement of end users in smart energy projects.



“S3C has served as a bridge towards other European projects, providing us with insights into how our project relates to other projects; what our strengths are, what makes our project unique and how we can improve our work.” Simon Strandberg, STUNS Energi, UppSol 2020

We are a team of experts from various fields reaching from electrical engineering to social science to psychology. With the experience gained from in-depth analyses of our 32 collaborating smart energy projects, we identified opportunities for engaging customers. From there we have developed a set of customer engagement guidelines and tools

for practitioners from the areas of smart grid and energy efficiency projects, products and services. The S3C toolkit is publicly available at: www.smartgrid-engagement-toolkit.eu

The S3C toolkit – tested and approved by European smart grid experts

In our about 50 guidelines and tools for end user involvement, we have integrated recommendations and feedback from experts from several smart grid research projects and utility partners. Our tools and guidelines have been tested and/or evaluated in the field, since we teamed up with seven utilities and 12 field test beds across Europe. We have improved them according to our experience and the experience of our partner projects and companies.

At the S3C toolkit website, we offer three different gateways to access the tools and guidelines. Depending on what kind of support you are looking for, you can choose between:

Learning

Browse through our insights on engaging people in smart grid projects or products. Learn from practitioners why and how you can use our guidelines, or select your own topics to read more about.

Developing

The engagement of end users with smart energy products or services is important in the successive phases of project and product development. In each phase, different topics require attention.

Exploring

In this section you can find all the information about user engagement for smart energy projects sorted by topic.

Additionally, the toolkit website offers the possibility to create your own S3C personal notebook. The personal notebook tool helps you browse through the complete S3C knowledge base including the literature review and empirical case study research and extract the information that is most interesting for you. After selecting which topics you would like to know more about, you will receive your tailor-made S3C notebook as a ready-to-print PDF document.

The S3C guidelines and tools – from background information to step-by-step instruction

People have to be engaged in an exciting journey that allows them to discover the benefits of the smart grid at their own pace.

Our S3C guidelines provide an overview of what you need to take into account: they show the directions of your journey without tracing each step into detail. They offer guidance on a variety of topics that have been identified within the S3C project as the most promising opportunities for customer engagement. Those topics include, for example, co-creation and gamification approaches, choosing the right incentives, getting to know your target group or training installers. Additionally, our guidelines provide you with practical advice on what to take into account when engaging your customers as well as practice examples of smart energy projects, products and services with outstanding customer engagement strategies.

Our S3C tools offer you a detailed, actionable step-by-step account of how to engage people in your smart grid. They are ready-to-use instruments that aim to facilitate the interaction between you and your customers, for example by setting up a sound hotline and customer support, organising a multi-stakeholder workshop or facilitating customer-specific communication by implementing a segmentation approach. Tools can be checklists, excel-tools or step-by-step process instructions.

The next few pages highlight some of the main insights from the S3C research and showcase how our partner projects have worked with tools and guidelines from the S3C toolkit in order to improve the engagement of their customers.

Our S3C guidelines share a common structure:



What is it?

Get an overview of what you can expect from this guideline. What are the topic and scope? Who is the intended target group?

When to use?

Find out for what purposes, in what situation or circumstances you can use the advice in this guideline and for which project phase it is especially relevant.

Best practice example

What can it look like? Read about best practice examples for implementation of the guideline topic from smart grid projects all over the world as well as out-of-the-box examples from outside the area of energy.

What do you need to do?

Receive actionable step-by-step information for implementing the guideline.

Do's and Don'ts

Draw from practical recommendations related to the guideline topic to help you utilise identified success factors and avoid pitfalls.

Further reading

Get a list of relevant background information and further references and suggestions for further reading on the topic.

Walking together – Community Approaches Work

Raising awareness and engaging people for smart energy and smart grids is a societal challenge. In S3C, we found that one of the most successful ways to rise to this challenge is drawing upon community dynamics and emphasising a sense of place. “Being part of something bigger” is a powerful driver for people to engage, especially in local or regionally oriented projects. Many of the projects that S3C has worked with had strong community approaches in place, two of which are introduced here: Mooi Wildeman as a part of the Amsterdam Smart City initiative (Netherlands) and Insero Live Lab (Denmark).

Mooi Wildeman – Co-creating the most beautiful neighbourhood of Amsterdam

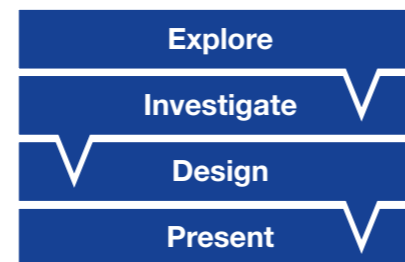
“Is it possible to transform the Wildeman neighbourhood into one of the most beautiful, sustainable and smartest areas of Amsterdam? How can we do this together?”

With these two questions in mind, Amsterdam Smart City, network operator Alliander and The Beach, a design consultancy company focused on social and sustainable innovation, started the Mooi Wildeman project. The motivation for this project came from a community workshop in the neighbourhood

of Amsterdam West in the spring of 2014. A discussion with some residents exposed a neighbourhood-wide question of energy use and potential savings. The community project was conducted under the name: “Saving money with smart energy: the positive energy project”. It aimed at fostering energy awareness and smart energy behaviour in a multi-ethnic low-income neighbourhood. A series of co-creation workshops with the residents to work on a shared vision for the neighbourhood’s future was chosen to arrive at the common goal. S3C provided support for the project by collaborating with the consultants from Alliander and The Beach on how to successfully set up co-creation processes. The S3C guideline “Co-creation - Collaborating to develop smart energy solutions” describes a step-by-step approach on how to involve (future) users in the development of smart energy products and services.

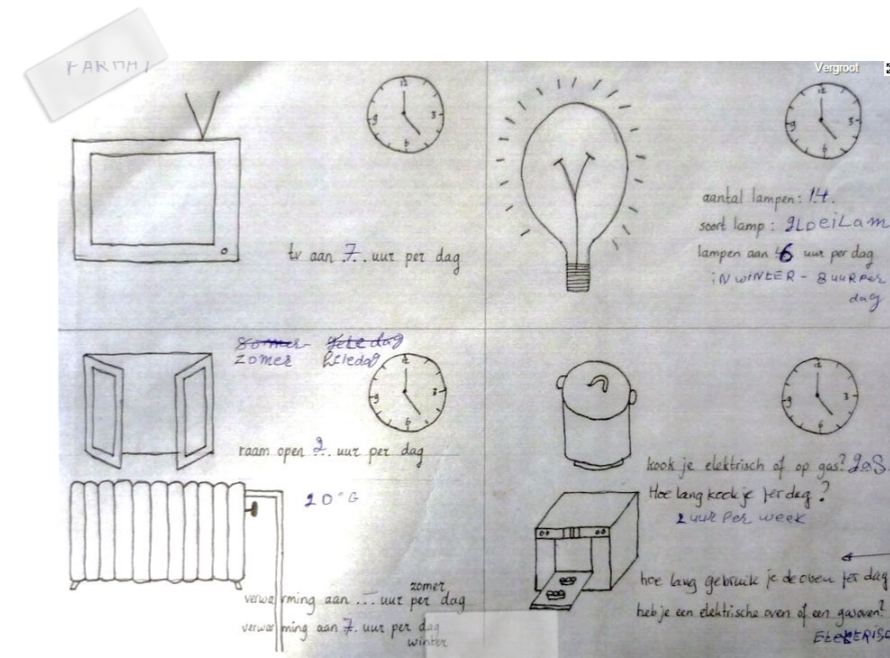


The co-creation phases that took place in the positive energy project were:



A series of eight workshops with residents resulted in insights in energy use for residents, an increased energy awareness, potential energy savings and an exploration of the opportunities for local renewable energy. The first two workshops exposed a widely shared question about energy “literacy” among residents in the multi-ethnic Wildeman neighbourhood. Their main question was: How can we lower energy use and reduce our energy bills? Several residents kept an energy diary and stakeholders were invited to provide insight in the residents’ energy use and potential savings.

During the next workshops, the focus



shifted towards opportunities for local renewable energy generation through solar cells. As a result, the local residents and Alliander explored scenarios to organise the installation of solar cells on the roofs of social housing blocks.

This project showed that you don’t necessarily need to deploy technologies to change people’s behaviour – in this positive energy project, the objective to realise a shift in awareness, attitudes and behaviour concerning energy use in the Wildeman neighbourhood was achieved. Two partners are looking at possibilities for follow-up projects (e.g. a feasibility study, stakeholder alignment) to implement their common vision of renewable energy implementation in the area.

Insero Live Lab – Engaging people through telling stories

The Insero Live Lab project is a living laboratory where energy technology and services are trialled by real-life customers. It is located in Stenderup, a village in Denmark, where the homes of 20 families have

been equipped with the newest technology from the energy and ICT sector. The Insero Live Lab approach focuses on collaborating and communicating with their participants, including, for example, interviews, co-creation workshops and several local events. With support from S3C, the communication strategy was complemented by a storytelling approach where participants of the project told the story of how they interacted with the new equipment in their daily lives. The video stories have been published online at the Insero Live Lab website and the project’s social media channels.

The storytelling structure outlined in the S3C guideline was transferred into semi-structured interviews with the families willing to share their experiences publicly. Instead of explaining the new technologies deployed in the village, which range from heat pumps over photovoltaic panels to electric vehicles, the families explain their journey and tell the story of how they overcame challenges (e.g. technical difficulties) to make the most of their new options

and become “energy heroes”.

The storytelling interviews and videos have been a great success for the Insero Live Lab project in three areas:

- ✓ For marketing and dissemination
- ✓ For educating consumers
- ✓ For learning about their participants’ experiences in the project (self evaluation)

The little stories told by (local) peer families are much easier to remember for customers and create a sense of a common project, in which people share their successes and challenges.



“Storytelling has shown to be a very good tool to communicate the small findings from the everyday lives of the participants that, however, have a big relevance for the acceptance of the tested technologies.” Munna Hoffmann-Jørgensen, Innovation Consultant, Insero Business Services

Money alone is not enough



In S3C, we learned that monetary incentives are not always the best way to involve people, especially when it comes to long-term engagement. While we do not underestimate the impact of monetary incentives, we have learnt that there is a variety of options to combine monetary incentives with non-monetary ones.

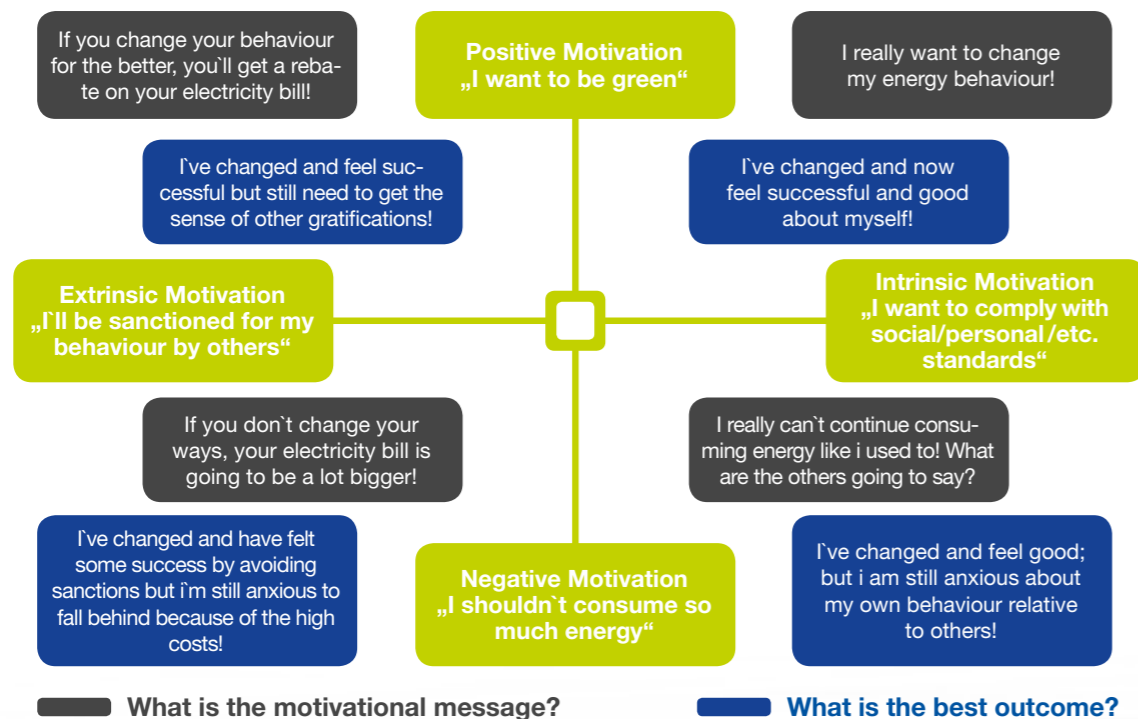
Incentives can be used to trigger people along several dimensions. They can appeal to either intrinsic or extrinsic motivation, i.e. wanting something for your own sake or wanting something from others. Incentives can also be mapped according to whether they appeal to positive or negative motivation. Do you want to actively achieve or avoid something? Social science research indicates that non-monetary incentives appealing

to people's intrinsic motivations for changing behaviour ("I want to comply with social/ personal/ etc. standards") are particularly successful. However, beyond this insight, non-monetary incentives remain largely untested in an energy context. We made the effort to map different options and present as many best practice examples as we could find. In general, we differentiate between five different types of non-monetary incentives:

- ✓ Positive Self-Image
- ✓ Sense of Achievement
- ✓ Social Prestige
- ✓ Being part of something big / community dynamics
- ✓ Having fun

S3C guideline "Choosing and combining monetary and non-monetary incentives"

When it comes to choosing monetary incentives – or a combination of monetary and non-monetary incentives – different influencing factors have to be taken into account. What budget is available for the incentive? Can I cooperate with regional businesses? What value proposition am I offering? Who are my customers, what are their motivations? We partnered with several experts from the area of smart energy research as well as SWW Wunsiedel, a regional German utility focused on innovative products, to put our advice on choosing incentives to the test. The S3C guideline offers a (non-exhaustive) overview of theoretical backgrounds, differentiating characteristics of different



types of incentives and hints for the implementation during different project stages.



"The advice in this guideline sensitises utility employees to see more than just monetary incentives and check the value propositions offered to their customers by the marketing department or advertising agency in charge." Dr. Gerhard Kleineidam, SWW Wunsiedel

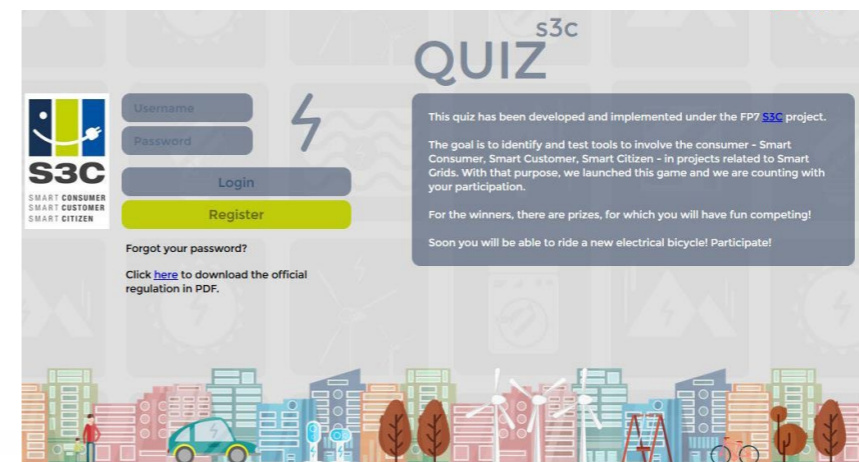
The InovGrid project – Promoting sustainable energy behaviour through games and fun

The Portuguese distribution operator EDP Distribuição has been a pioneer in the deployment of the smart grids concept, especially through its awarded InovGrid project. In the Alcochete

Municipality, one of the InovGrid trial sites, EDP tested an online gamification platform based on the advice from the S3C guidelines "Gamification – Making energy fun", "Motivating consumers with social comparison and competition" and "How personal goals can motivate behavioural change".

The quiz game was developed for families and students in the Alcochete Municipality in order to encourage a more sustainable and efficient energy behaviour in their community. Participants can win points in two ways: by answering the quiz questions and by reducing their energy consumption compared to their historic consumption. At the end of the test period, the player with the most points receives a new e-bike. The quiz platform was launched at the Alcochete Secondary School.

"[the gamification initiative] is extremely important, because it is a project that promotes skills, teaching citizens how to manage energy in their home on a daily basis. We're in schools, because the game is particularly meant for the younger generation, but we will also distribute it among the adult population with whom we work more directly." Patrícia Caetano, municipal chamber of Alcochete

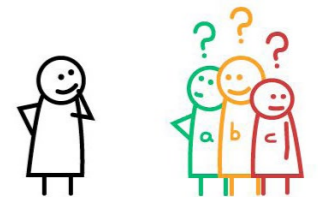


The expert and practitioner knowledge in the guidelines was combined with the associated partners' knowledge of their region to develop a unique gamification experience for energy customers. The initiative was successful and supported by regional stakeholders.

If you are looking to create a gamification experience for your customers ...

... we have the first steps readily available for you on the toolkit website. The S3C consortium partnered up with ETH-Zurich spin-off BEN Energy to create a quiz to raise energy awareness. Service features of the S3C quiz tool include:

- ✓ Free activation of the quiz module for each participating utility
- ✓ Easy implementation on websites of utilities, agencies, schools etc.
- ✓ Total of 520 quiz questions related to energy topics with three answer options each.
- ✓ Provision of one set of five quiz questions each week over two years
- ✓ The service is provided up to five years, dependent on demand
- ✓ Provision of aggregated anonymous user data once a year
- ✓ Optional integration of localised quiz content provided by the respective institution



Before starting the quiz, quickly introduce yourself and get to know your competitors

Involving commercial customers

While all customer groups – residential, commercial and industrial – have the potential to become Smart Consumers, Smart Customers or Smart Citizens, the successful engagement of commercial customers would be one of the most promising steps towards the energy system of the future. While many utilities all over Europe develop new and innovative products and services for private end users, we have worked with several partner utilities to include guidelines in our S3C toolkit that facilitate the development of products and services together with and for small and medium sized enterprises (SME).

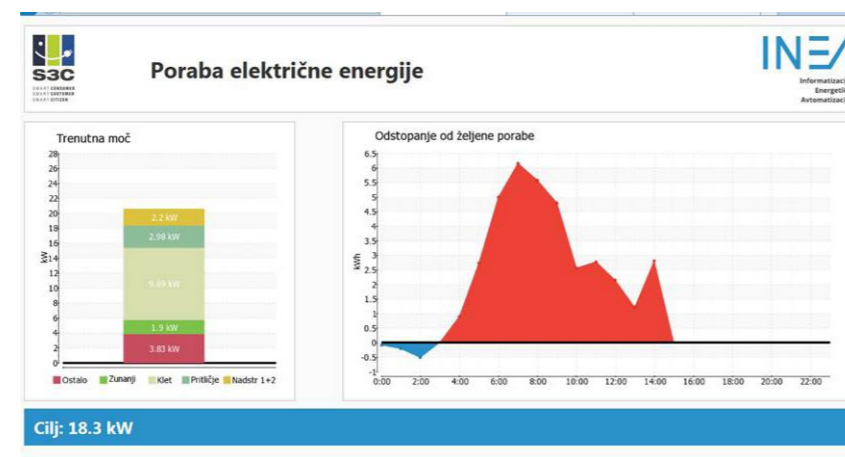
The SPEU project – Monitoring energy efficiency at the workplace

SPEU (Service portal for the Monitoring of Energy Efficiency) was as Slovenian project aimed at developing and testing a cloud computing service for energy efficiency monitoring in order to make energy consumption more efficient in business and industrial buildings. Based on the advice from the S3C guideline “How to make energy visible through feedback”, the SPEU consortium developed a web application that monitored the energy efficiency of several commercial customers to enable an inter-company comparison. In a co-creation approach, the future application users participated both in the development and the design of the feedback application.

In our research on residential customers, we had learned that

relatable, non-technical information appeals to most people. Through our cooperation with the SPEU project, we learned that a business perspective on feedback is completely different – especially if the businesses involved have a technology and/or engineering background themselves.

The tech-savvy employees and engineers who co-created the feedback application developed within SPEU opted for accurate, exact and real-time information. Their pre-existing “energy literacy” helps them to understand the information without further help. In fact, the SMEs sharing the office building in which the new feedback display is tested actually agreed on common energy saving goals that they want to achieve with the support of the feedback information.

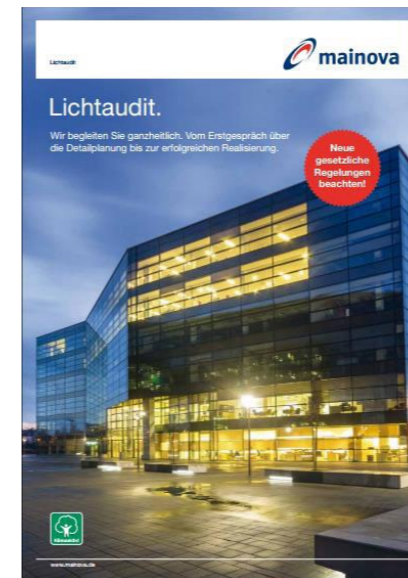


The blue line at the bottom of the feedback application display indicates the target power for the entire office building in real time (in this case 18.3kW). The optimum power is dynamically

recalculated according to how many employees are working in the office building at the moment.

The chart diagram on the right side of the feedback application shows the total deviation from the target power in kWh on the daily level. Blue indicates that consumption was lower than the target and red above the target value. The block diagram on the left side indicates the power consumed in the building in real time. The different colours refer to the different floors of the office buildings (cellar, ground floor, upper floors, lodgers etc.) to render the individual consumption of the different companies in the office building transparent. In fact, collaborating with S3C has helped the companies in the office building not only to implement a

feedback scheme, but to develop their own voluntary energy saving programme in addition.



ABGnova and mainova – Checklists for smart energy product development

Innovative product development processes for smart energy products and services strongly contrast traditional product development in utilities. As changing energy markets put new demands on utilities, the development process of energy products and services will change from a more technical focus to an organisational collaboration across departments. In the S3C guideline “Innovative product development” and its corresponding checklists, we offer support to utilities in adapting internal processes to develop well-aligned smart energy product and service innovations.

With the support of S3C, the utility company of Frankfurt am Main, mainova, and its subsidiary ABGnova developed a new SME-centred product: the “light audit”. Applying the S3C checklists for innovative product development facilitated a product development process that systematically involved all necessary utility departments. The checklist on the “customer”, especially aims at

keeping the value that the new product has for its target audience, in this case SMEs, front and centre during all stages in the product development process. The checklists on the topic “product” and “cooperation” serve to entice collaboration not just within but also outside of the utility and help to keep the regulatory and business cultural aspect manageable. Overall, the product developers that collaborated with S3C on the guideline valued the fact that the checklists kept them on track and brought them together with the necessary stakeholders within their organisation from the start.

Utility of St. Gallen – Co-creating the energy future with local SMEs

The utility of St. Gallen in Switzerland was interested in implementing a co-creation approach involving SMEs based on the S3C guideline “Co-creation - Collaborating to develop smart energy solutions” that had previously been tested with residential customers in the Mooi Wildeman project. In S3C, we learned that the “one size does not fit all” rule for customer engagement applies not only to residential, but also to commercial customers. By applying the guideline for a different target audience, we were able to optimise and adapt our advice on co-creation processes to also fit different business target audiences.



“For the enterprises as well as the utilities, it was important to express their concerns. Working in small groups helped to come to a common understanding of cooperation potentials”
Andreas Schläpfer, coordinator of the energienetz GSG initiative

Together with the energienetz GSG initiative, the utility St. Gallen invited representatives of regional businesses to a joint half-day workshop to identify possible areas of collaboration and work on common business models. The process was facilitated by an experienced moderator. Participants openly presented their needs ranging from supply anxiety to the will of jointly operating distributed energy devices.



Surveys are not enough – really learn about people



Many of the first wave smart grid projects that actively included end users came to the conclusion that interest in smart grid solutions was high and that people respond particularly well to monetary incentives. However, these initially very optimistic estimates were often mainly based on what people said they would do in surveys rather than what they actually did in the pilot project. For most customers, energy consumption is merely the 'side effect' of routinised practices (e.g. doing the laundry, washing the dishes, drying clothes), subject to different motivations, and a change in behaviour is difficult to achieve. Surveys alone are often not sufficient to gain an insight into the different motivations behind the customer's energy consumption habits. Our S3C toolkit features advice on several qualitative and quantitative methods that complement traditional surveys and can help you to get to know your customer.

The Linear project – Are you an idealist or a materialist?

The Linear (Local Intelligent Network and Energy Active Regions) project is a large-scale smart grid rollout project in Belgium that includes more than 250 households. The Linear consortium collaborated with S3C during the evaluation of the test results in order to find out why some customers in the project had performed better than others. Together, we implemented the S3C guideline "Using segmentation to better target user groups" and its corresponding tool to gain more insights into the

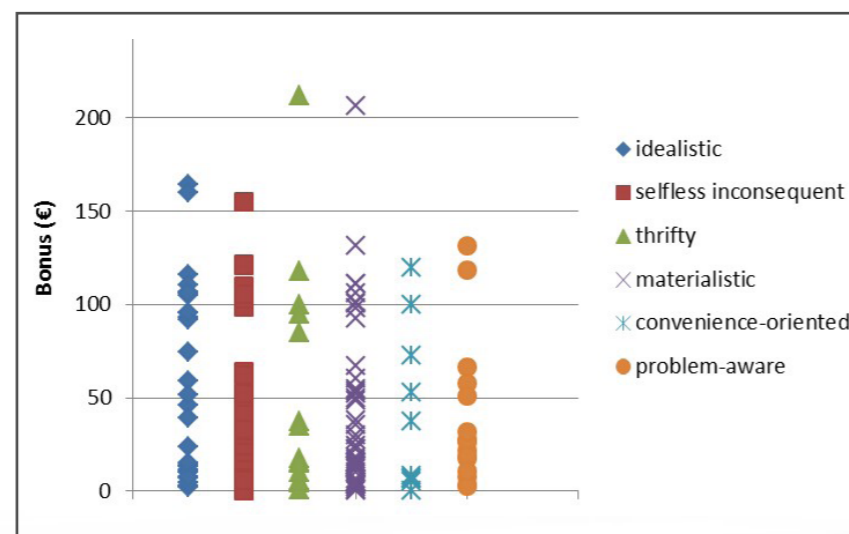
relation between the customer segments and performance in the field test as well as their general attitude towards smart grids.

Applying the segmentation model helped to understand why the performance of certain user groups had not made sense at first sight. Why did some people proclaiming a positive attitude towards smart appliances in the survey perform worse in the field test than customers who had been "doubtful" from the beginning? What made some participants especially successful? Contrary to the initial survey results, the segmentation analysis suggested that receiving a financial benefit did neither influence the behaviour of idealistic participants, nor the behaviour of materialistic participants.

The figure below is a graphic evaluation of the findings from the segmentation analysis. It indicates the bonus amounts that households classified under a certain segment

have achieved. The difference between the flexibility offered by people belonging to the same customer segment and thus their success of obtaining a bonus is very strong.

Whether idealism or financial interests were claimed to be main drivers of the behaviour in surveys, the outcome could be very different. Overall, the LINEAR collaboration provided further evidence for the overarching result that monetary incentives are not the only determining variable for a successful customer engagement. Segmentation based on what people actually do to save energy can help to reveal different motivations for different people, and can help you to effectively communicate with people in 'their own language' (e.g. develop incentives that appeal to different types of customers beyond purely monetary approaches).



Working with the S3C toolkit website

We developed our S3C toolkit website www.smartgrid-engagement-toolkit.eu for everyone who is involved or intends to become involved in the active engagement of end users in smart energy projects or rollouts.

Whether you are working in a utility or in city development, in a research institute or in an energy agency – psychological and societal issues matter, if you want to successfully engage customers in your project!

A dedicated person within or an entire project team should not take the focus on customer needs for granted. It takes a conscious effort to build up the structures in your organisation to ensure that customer behaviour is not just treated as a by-product or "intervening variable" in your project or rollout. Several of our guidelines and tools help you to assess and improve your structures and team performance.

Have a look at the toolkit as early as you can!

The earlier you are in the design for your research or product development project, the more benefit our tools and guidelines will have for you. Our collaboration with more than 40 research projects and utilities all over Europe has shown that while our

advice is valid for any project phase, having a comprehensive customer engagement strategy in place from the beginning of the project is crucial. In particular, funded research projects often have little leeway to adapt their approaches once the project is underway.

written. In case you want to dig deeper into certain fields, we give you the opportunity to compile the part of our theoretical and empirical background analyses that is really relevant to you. To that end, we provide the "Personal Notebook" tool on our website. It will enable

you to browse through the most relevant topics while deciding which ones you are most interested in. In the end, you will receive a customised PDF with our findings on those topics that you selected.

The toolkit website will stay online for five years and the S3C consortium partners remain keen to share their knowledge.

The upside: If you plan a research project, this is great inspiration for your project proposal!


If you have the option to use our guidance early on in the process, you might actually utilise it before your project even kicks off. We offer you state-of-the-art insights and validated advice that you can reference and that can guide your decision making regarding what you can test and how you can do this while taking previous findings into account!

Of course, we could not put all the theoretical and practical findings we have analysed and reviewed into the guidelines and tools we have

While the project may end, you can still get in touch with the S3C consortium partners in your area, if you have questions about the guidelines and tools. If you need counselling on specific S3C topics, an experienced facilitator or an extra expert for your team or project, we are happy to help. The contacts are available in this brochure and on the toolkit website.

For a brief theoretical background of customer engagement and best practices – use our Personal notebook tool!

<http://notebook.smartgrid-engagement-toolkit.eu/>



GUIDELINES

Bonus & malus – changing behaviour with rewards and penalties	Introducing demand side management to SMEs
Choosing and combining monetary and non-monetary incentives	Introducing smart appliances
Co-creation – collaborating to develop smart energy solutions	KPIs for energy consumption effects
Collection of survey questions for smart grid evaluation	Learning about target groups
Designing a dynamic tariff	Making leaflets to educate the customers
Develop FAQs to assist the support staff	Motivating consumers with social comparison and competition
Energy audits for households	Predicting effects of renewable energy integration
Engaging people through telling stories	Privacy and data protection
Gamification - making energy fun	Recruiting participants
How personal goals can motivate behavioural change	Self-assessment to create a reflecting team culture
How to create a consumption baseline	Setting up customer support in a smart grid
How to gather community support for your smart grid	Smart meter monitoring and controlling functionalities
How to identify regional stakeholders	Testing tariff schemes in a pilot context
How to improve your smart energy project through check-ups	Training installers
How to make energy visible through feedback	User-centred KPIs for the evaluation of smart grids
How to monitor demand response performance	Using flexibility manually or automatically
Innovative product development	Using segmentation to better target user groups



TOOLS

Checklists for innovative product development

Collecting FAQs during the installation process

ENact 2020 – exchanging know-how in a multi-stakeholder workshop

How to estimate your load shifting potential

Monitoring and evaluation through stories – Most Significant Change

Optimising the meter installation process

Postcard from the future workshop method

Questionnaire for engaging SMEs

User group segmentation “light”

Web-based quiz

Contact

You are interested in working with the S3C toolkit, but need more information or support?

Contact us!



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