Energy Innovation with and for Consumers, Customers and Citizens

—Transcript of a webinar offered by the Clean Energy Solutions Center on 10 February 2016—
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Webinar Panelists

Erik Laes
Ludwig Karg
Klaus Kubeczko

This Transcript

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Sean Esterly

Hello everyone. I'm Sean Esterly with the National Renewable Energy Laboratory. And I'd like to welcome you to today's webinar which is hosted by the Clean Energy Solutions Center in partnership with the International Smart Grid Action Network-Annex 7 and the S3C Project, otherwise known as Smart Consumer—Smart Customer—Smart Citizen. Today's webinar is focused on the Energy Innovation with and for Consumers, Customers, and Citizens.

One important note of mention before we begin our presentation is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center's resource library as one of many best practice resources reviewed and selected by technical experts.

Before we begin I'll quickly go over some of the webinar features. For audio you have two options. You can either listen through your computer or over your telephone. If you choose to listen through your computer please select the mic and speakers option in the audio panel. Doing so will eliminate the possibility of feedback and echo. If you choose to dial in by phone please select the telephone option in the box on the right side of your screen will display the telephone number and audio pin you should use to dial in. If anyone is having technical difficulties with the webinar you may contact the GoToWebinar helpdesk at 888-259-3826 for assistance.

If you'd like to ask a question—and we certainly encourage all of our attendees to please do so—you can use the question pane on the right side of

your screen where you can type in your question directly. If you are having difficulty viewing the materials through the webinar portal you will find PDF copies of the presentations at cleanenergysolutions.org/training. And you may follow along as our speakers present.

Also an audio recording of the presentations will be posted to the Solution Centers training page within a few weeks and will be added to the Solution Centers YouTube channel where you will find other informative webinars as well as video interviews with thought leaders on a variety of Clean Energy policy topics.

Today's webinar is centered around the presentations from our guest panelists: Klaus Kubeczko, Erik Laes, and Ludwig Karg. These panelists have been kind enough to join us to _____ key results, best practice examples, and recommendations for fostering end user involvement from the S3C Project, ISGAN-Annex 7, and beyond. Before our speakers begin their presentations I'll provide a short, informative overview of the Clean Energy Solutions Center initiative. Then following the presentations we will have a question and answer session where the panelists will address questions submitted by the audience, and finally close with a short survey.

This slide provides a bit of background in terms of how the Solutions Center came to be. The Solution Center is one of 13 initiatives Clean Energy Ministerial that was launched in April of 2011. And it's primarily led by Australia, the United States, and other Clean Energy Ministerial partners. Outcomes of the unique initiative include support of developing countries and emerging economies through enhancement of resources on policies relating to energy access, no cost expert policy assistance, and peer-to-peer learning and training tools such as the webinar you are attending today.

The Solutions Center has four primary goals. It serves as a clearinghouse of clean energy policy resources. It serves to share policy best practices, data, and analysis tools specific to clean energy policies and programs. It delivers dynamic services that enable expert assistance, learning, and peer-to-peer sharing of experiences. And finally the Clean Energy Solutions Center fosters dialogue on emerging policy issues and innovation around the globe.

Our primary audience is energy policy makers and analysts from governments and technical organizations in all countries. But we also strive to engage with the private sector, NGOs, and civil society. One of the marquee features that the Solutions Center provides is no cost expert policy assistance known as Ask-an-Expert. The Ask-an-Expert program has established a broad team of over 30 experts from around the globe who have been able to provide remote policy advice and analysis to all countries at no cost.

For example in the area of renewable energy policy markets and finance we are very pleased to have Camilla Ramos, managing director and founder of CELA, Clean Energy Latin America, serving as one of our experts. If you have a need for policy assistance in policy, markets, and finance mechanisms, or any other clean energy sector we encourage you to use this valuable service. Again the assistance is provided free of charge.

If you have a question for our experts please submit it through our simple online form at cleanenergysolutions.org/expert.Or since I know how the Ask-an-Expert service can benefit your work please contact Sean Esterly directly at Sean.Esterly@nrel.gov. We also invite you to spread the word about this service to those in your networks and organizations.

And with that introduction to the Clean Energy Solutions Center I'd like to provide short backgrounds on our three panelists today. Our first speaker today is Klaus Kubeczko. Klaus is senior expert advisor at the Austrian Institute of Technology in the Innovation Systems Department. He is involved in RTI-policy making processes and long term strategic research agenda setting on Smart Grids and low carbon cities. Currently he is operating as an agent of ISGAN-Annex 7 Smart Grids Transitions and coordinator of the ERA-Net Smart Grid Plus project ReFlex.

After Klaus we will hear from Erik Laes. Erik is project coordinator of VITO where he is currently involved in projects concerning scenario analysis, sustainability, evaluation of energy technology, transition management, and smart grid/smart energy users. He is also the senior researcher with S3C.

For our final speaker we will hear from Ludwig Karg. Ludwig is managing director of B.A.U.M Consult GmbH as of 1993 and chairman of INEM, the International Network of Environmental Management. Mr. Karg has led various national and international research and development projects on sustainability, renewable energy usage, smart grids, and energy storage. In the S3C he acted as senior project manager.

And with those three introductions I would like to go ahead and welcome our first speaker, Klaus, to the webinar. And I'd also like to ask the other panelists who might not be presenting to go ahead and please mute themselves so that there's no background noise. Thank you.

Klaus Kubeczko   Hello. So welcome to this webinar, also from the side of ISGAN. ISGAN was launched as the International Smart Grid Action Network at the first Clean Energy Ministerial. It is the International Energy Agency Implementing Agreement for smart grids. ISGAN creates a mechanism to advance the development and deployment of smart electricity grids, technologies, practices, and systems. It aims to improve the understanding of smart grid technologies, practices, and systems.

By systems we mean physical grids as well as systems of incumbent as well as new actors, markets, and of those institutions which provide the framework for intelligent energy systems. ISGAN facilitates dynamic knowledge sharing, technical assistance, and project coordination. ISGAN participants report periodically on progress and projects to the minister of the Clean Energy Ministerial. ISGAN-Annex 7 deals with the transition from centralized systems with external energy supply towards decentralized systems with internal energy supplies, meaning that the complexity of a system increases dramatically and as we'll hear in this webinar today end users play an important roles here.

The main objective of this Annex is to investigate institutional change associated with smart grid deployment Annex 7, and its sparking off an international coordinated trans_____ research activity in the social sciences supporting and completing technology-oriented smart grid activities. And this is also why we are happy to have the S3C Project involved. And now let me hand over to Erik Laes who is going to present the first part of this session. Thank you.

Erik Laes Okay, also from my side welcome to this webinar where we want to share some of the results that we had in the context of the S3C Project. S3C was a project that was financed by the European Commission and it ran from 2012 to 2015. What was special about this project is first of all that the project as all about people. What do we mean by that? We investigated experiences I about 30 smart grid pilots that at the time we were running all over Europe. But when analyzing the experiences of these smart grid pilots we specifically—

[music] slide—People come in very different shapes and sizes. So that was of course part of the major challenge that we had to face. How can we understand experiences with engaging end users in smart grid pilots when there are so many different motivations and so many different reasons why people would want to join in this project? Secondly the core idea of our project was not only that we wanted to study why people wanted to engage in smart grid pilots or how you could engage them.

But we also wanted to support the energy utilities of the future which will operate in a smart grid environment to effectively cooperate with these end users which means that we wanted to translate our findings on engaging end users to practical guidelines and tools that would be helpful for these utilities. And at the start of the project we identified three let's say main motivations for people why they could be interested in products that are offered on the smart grids market.

And one of these roles are what we have called the smart consumer which we think might actually be the majority of people. What do we mean by the smart consumer? Well a smart consumer is somebody who is not really interested in energy use as such in their homes. But they might be interested in the energy bill that comes at the end of the month. So a smart consumer is somebody we say—we could characterize by this typical catch phrase: I want to reduce my energy consumption to save money, for instance.

The second role or the second main motivation that we identified is the smart customer. Now the smart customer is somebody who is already a bit more actively engaged with energy issues. This could be for instance somebody who has PV panels on their roof and wants to become a prosumer which means consumes energy as well as produce energy and provide services to the energy markets. So this is already—

Compared to the smart consumer this is a more active role. This is somebody who is more actively engaged with energy management in their household. But still let's say mainly from an individualistic point of view. That is why we also identified a third role which is the role of the smart citizen. And a smart

citizen is somebody who wants to engage in the smart grid but from the point of view of contributing something to the common good.

And this could be for instance people who want to contribute to the quality of supply in their neighborhoods or regions. For instance they want to help with the integration of renewable energy sources. Or they want to lower CO_2 emissions for their neighborhood or region, et cetera. So you see compared to let's say the smart customer these people are more motivated by let's say altruistic motives.

Okay say already as of our project we look at smart grid pilots from the point of view of the people engaged in them. And we want to draw on these experiences to help the utilities of the future which better engagement of end users. Now where did we get all this guidance? Where did we get it from? Well as I said first of all this comes from case study analysis from 32 European smart energy projects. Secondly the guidance that we derived from these analyses was also actively tested and validated by 15 partner projects with we called active partners in the S3C Project.

And this also includes five utilities that validated our guidance. So we really wanted to make sure that what we saw as useful guidance for utilities was actually also perceived by these utilities themselves as being useful to them. And then thirdly we also had the pleasure of having an Advisory Board for our project which included 15 high level experts in smart grids coming from very different disciplines or from very different points of view. So that was also very helpful to us in the end.

So we could make over 50 tools and guidelines specifically for end user engagement in smart grid pilots or in the rollout of smart grid commercial products. And these 50 tools and guidelines are all available on a specifically dedicated website that I will show you later on.

So in one slide which was the philosophy that we applied in our project; how did we approach this? Well like I said first of all we started of course with a literature review—what is known about people, about their behavior in their energy end use, and what motivates them to change their behavior. And we derived from this a list of dos and don'ts for end user engagement. But also the things that seem to be at present the unknowns in the literature. So things we don't know yet very well. These could be some promising areas of end user engagement but they really haven't been tested yet so we really don't know how that works or how people react to it.

From these notes we derived then our research questions. So these don't know were of course the interesting things that we could use to question the experiences in case study analysis which ran for about a year from 2013 to 2014. So as I said we looked at experiences with end user engagement in 32 smart grid pilots all over Europe. And we derived from them the best practices and the success factors in user engagement. And we did this by talking to the project managers but also sometimes to people—the actual people that were engaged in these smart grid pilots.

And then both from literature and the case study analysis we derived these tools and guidelines. Ludwig will talk about them in more detail in the second part of the presentation. But as I said and what I want to share again here is these tools and guidelines were made really in an interactive process, also by engaging again with the active partners in our project, and with some utilities. So they actively tested and validated the _____ of our guidelines and tools. And in a feedback group we were able to constantly improve them until they really met the expectations of the utilities.

Now here you see some of the partners that were involved in our project. And as you see it was a very large group. So of course it was a European project so the partners were European partners. In the top circle you see really the S3C Project partners. There were seven of them. That was our project team that did the analysis. Then in the circle on the right below you see what we have called the active partners.

T hose were the partners that not only allowed us to learn from their experiences but that also gave us feedback on the guidelines and tools that we derived. And then in the circle—the lower circle on the left side, those were what we have called the passive partners. Those are the 32 projects that I talked about that shared their experiences with us in order to derive best practices.

Okay so enough introduction about the project. Now we go to some of the results. I will talk mainly about what we have found from literature and investigating the 32 pilots. And then Ludwig will mainly continue with showing you some of the guidance and tools that we have derived from this investigation. Well first of all I wanted to show you this picture because it really summarizes what we have found about framing the behavior of people.

And what is shown in this graph is that you have to be attentive to different phases in behavioral change. First of all you see to the left that people when they use energy they are mostly engaged in habits. They use energy without really thinking about it. So that is the situation that you want to change. You want to really motivate them or catch their interests to change their behavior, for instance to save energy or to provide flexibility to the energy market. So we have to do this by drawing their attention, by playing on their motivations, by playing on their interests.

This is what we have called the activation phase. In the activation phase people become motivated to change their behavior. And they actually also start to change their behavior—so by acquiring new behaviors, and by training them, trying different things, trying new behaviors to see what works for them. But this is an important phase and you can use different tools— engagement tools—to get to this activation. But of course equally important is that once people have activated new behaviors they also continue doing this new behavior.

So this is the continuation phase. And this is often something that we have seen in a lot of the pilots because these pilots just run for let's say a couple of months, three months or so. Something that you see a lot is that people

actually while they are engaged in this pilot they try some new behaviors. But once the pilot is finished they fall back into their old behaviors. So of course once we start talking about the actual smart grid of the future we really want people to continue with their new behavior. Again here in this area of continuation we also have some guidance on how to do that.

This is a slide summarizing some of our findings on behavioral change. What are the enablers and barriers? I'm not going to go through all of them. As you can see here the enablers and barriers fall in different categories. For instance comfort is of course very important to end users. You cannot engage with them if you offer a technology that lowers their comfort. Control is also very important to end users. You always have to give the feeling that they are still in control of their appliances.

Outside of comfort and control there a lot more categories. But important to retain from this slide is that in each of the categories there are enablers as well as barriers. And now I'm going to talk about some of these enablers for the two phases that I showed you earlier which is the activation phase and the continuation phase. So what did we find out about success factors for activating people which means motivating people to acquire new energy end user behaviors?

Well first of all as I've shown you in the first slides there is not such a thing as the typical end user. So this means people have very different interests, very different motivations. This means you also have to really understand what could motivate your customers. You can use this by using segmentation methods. There are a lot of segmentation methods around. We also have seen some smart grid pilots that have actually used these methods.

And from this we have found out that it is important to look at least at three different categories that are important to understanding motivations and the capacity of people to change their behavior. First of all traditionally you looked at the social and demographic factors like the income of the household or the education level. This is important and this explains some of the motivation. But it is not enough. You also have to understand the lifestyles of the household. And perhaps the most important thing that you have to understand is the energy practices of the households.

What do we mean by that? People do not use energy as such but they are engaged in different practices. And as a result of these practices they use energy. But the way they use energy is not really determining what they do in the household. It's the way they do the laundry; it's the way they wash their dishes, et cetera. The timing of these activities, the flexibility they have to alter their behavior when doing these activities, et cetera.

So this is really the important thing that you have to understand when you are thinking about actually changing their behavior. So understand the energy practices and see what room for change there is when they conduct or when they engage in these practices. The second thing to motivate people is of course that you have provided added value to them. If you want to motivate

them to engage in your smart grids pilot or to buy your smart grid product what actually is the added value to them?

The first thing that of course comes to mind is that your good offer some attractive financial incentives. And this can be important, particularly if the financial incentive is high enough. But what we have seen from a lot of these pilots is that actually the financial incentive that you can get from engaging in flexible behavior is most of the time not high enough to really motivate people to change their behavior but be €40.00 or €50.00 a year that you can gain by that. And especially in the high-income households this is not something that will really attract the attention.

So what we have found out is that you really have to provide added value also in other areas and speak to other motivations and other interests of people. So for instance comfort and convenience are very important ones. So you have to show that your technology actually makes life easier, more convenient in the household. It could be that you simply play into the interests of people for new information about their energy use—accurate information for instance on appliance level.

Or it could be that you offer new forms of controls, for instance that you can switch on and off appliances with your smartphone. At least you have to offer people override options. So if your smart grid pilot includes automatic _____ of some of the appliances it is absolutely imperative that you give people to override your automatic controls. So that of course is related to what I mentioned in the earlier slide—the sense of control that people need to have.

Other success factors like I said in the picture—So people have to slowly acquire new behavior. So you have to build up their capacities. You can compare this really to training and training of new behavior. And this means that first of all you have to communicate in the language of your customers. A lot of people actually don't know what a kilowatt hour is or communicating in terms of kilowatt hours—kilowatt hours saved for instance—can be meaningless to people.

So this also relates to the segmentation of course. You have to communicate in a language that speaks to the interests and the motivations of people. It could be they are interested in saving money. Or it could be that they are interested in doing something for the environment. Then you communicate for instance with ecological footprints or things like that. Also for building up capacities it's really important that you show options for saving energy or shifting energy use.

And this again has to be relevant to the particular situation of that household. So you really have to show people what they can do to acquire new behaviors. And then the third thing that we found out is that often the installers of the new equipment are the first points of contact for households when they become engaged in smart grid technology. So it's the installers of the equipment that are their first point of contact. It is important to train these installers exactly to communicate in the language of customers and to show how they have to handle the new technology.

And then the final point for activation is of course you have to create some commitment and appeal for your products. So as I've already said it's usually not enough to only stress the financial aspect of energy saving or shifting energy use. Other things can be applied to create commitment, for instance to draw upon social dynamics. There are some good examples of neighborhood approaches that Ludwig is going to talk about. You could of course also use social media campaigns.

So in sum it is important to create really a new lifestyle around your products and not just say, "Well this new technology will allow you to save some tens of euros per year." That will not do it. Okay then for the continuation phase, so once people started to acquire new behaviors what is important to continue doing their new behavior? Well here it is important to continue using effective feedback, pricing, and communication.

So you have to give feedback about a new behavior of course. And again it has to be adapted to the type of customer that you are giving it. We already talked about that. But also important if you could [noise in audio] [inaudible] that is direct and real time feedback. Why is this so important? Well this enables people to really experiment with their new behavior. For instance they can switch off at night. They can switch off their TV and immediately see what the impact on energy use is for instance.

It enables them to experiment with new behavior and immediately see the effects of this new behavior in terms of an impact that they want to realize. And to do that it's also important to give feedback that is specific to appliances or to specific spaces. For instance your TV is using so much energy right now or you are using so much energy in your living room at this moment. I said it might not be really meaningful to communicate in kilowatt-hours so you use graphic information, for instance smiling faces.

And it's also important to stress the positive aspects. Not give messages in terms of you are not doing so well but give this communication more of a positive spin by stressing what can be done to improve the situation for instance. In terms of feedback also it could be very important because people most of the time like to engage in games or in competition. So it could be a good idea to set an individual goal. For instance I want to save five percent energy this month.

So then it becomes kind of a game and this is really motivating for people to continue doing better in their behavior. And then it's also important to give really concrete tips and tricks for constant improvement. What can people actually do to reach these goals? Finally it's of course also for the continuation phase to have really easy to use plug-and-play solutions with intuitive designs that really speak to the people that really are self-explanatory in a way. Feedback you give has to be on accessible devices.

People really have to be able to just pick it up and get whatever information they want on their energy use. This can be for instance on tablets of smartphones. In a lot of smart grid pilots we have seen that they really had to have access to a dedicated website to get the information on their energy use.

And they then have to open their computers, give a password, et cetera. And a lot of the time this is already too much to ask from people. So it just really has to be accessible.

And all this feedback can also be given with fixed devices like in home displays. And if you do that you can—It's really best to consider placing them in central locations in the house, whether it's in the kitchen which is often kind of the engineering room of the house. And also what we have seen in some of the pilots that seemed to work very well is that you couple the information you give on energy consumption to other types of information that interests people.

For interest weather forecasts was used in some of the pilots. So people in the morning check what the weather will be that day. And in the meantime they get information on their energy use of the previous day and what they can do to improve the situation. And then finally for the continuation phase it's also a good practice to stimulate social comparison. What we mean by that is that it could be a good idea to compare the energy behavior of households to peers which are households in the neighborhood, or households in the same customer segments, or comparable households for instance with the same number of kids.

So you show them actually what the other households that are comparable to them are actually doing in terms of energy use. And there is one thing that you need to take into account in this case which is that you have to watch out for fallback behavior of households that are already doing very well in their energy use. So if you show them actually that their peers are doing worse than them their reaction could be, "Oh okay so we can relax a bit." This is of course something that you do not want to happen.

So in this case you have to combine the social comparison that you give for instance with individual goal setting and tips and tricks to continuously do better. Okay that's almost it for my part of the presentation. As I said these are some of the findings on good practices that we found from literature and from our case studies. We translated all of this in practical tools and guidelines to help utility source smart grid pilot managers to better engage their end users.

What do we mean by guidelines and tools? Well it is explained in this slide. You can look at it from the following point of view: a guideline is something like a user manual. It gives you an overview of what you need to take into account, for instance when choosing the type of feedback that you are going to give. So it gives you the directions of your journey but without tracing each of the steps into detail. Whereas the tools are really like a hammer. So they offer really detailed actionable step-by-step account of how to engage people in your smart grids pilots.

And here is the website where you find all of these tools and guidelines. So you can see there are three different addresses for this. And here so you find 35 guidelines and 15 tools for end user engagement. And you also see on the slide that there are three different gateways which are the learning, the developing, and the exploring gateway. Exploring gateway is really where

you find each of the individual guidelines and tools. So if you look for a specific information on for instance getting feedback to people you will find a guidelines that explains to you how to do this.

If you go to the developing entry point for the website this shows you how to develop particular project phases or new services in the areas of smart grids. And then the first entry point is the learning entry point where you really get some training materials on specific topics of end user engagement. One of the tools that's on the learning gateway is actually a personal notebook tool which asks you what type of topic you are looking for, what type of information you want on this topic.

For instance do you want theoretical findings or do you want what we have learned from the _____ cases? Do you want practical guidance, et cetera? So this tool really allows you to compose your own personal notebook with information on a particular topic that you are interested in. And with this I now will hand the presentation to Ludwig.

Ludwig Karg   Thank you. I'm trying to give you my screen. Is it up? Can you see my screen?

Erik Laes   Yes.

Sean Esterly   Yeah it looks great. Thank you very much.

Ludwig Karg   Okay thank you. So now I could easily speak for another three hours to explain to you all the details and backgrounds of what we have done and _____ I'm not going to do that—only one-half of an hour. And I will take you a little bit through the findings when we looked at the behavior and the motivations of people from a psychological and sociological point of view. And as Erik has been explaining before, we looked at people in their different roles.

In a more like passive role which we called the consumer role, more like active role which we called the smart customer role, and in a more like group role which we then called the smart citizen where the citizen usually comes in groups. And when you look at people in and if you talk to psychologists they would tell you that people cannot change their behavior if they don't have it.

So for example if you look at a person who is tired then the person would sit down on this chair. If a person says I'm hungry this person will prepare a meal. And so they typically do something. If they want to have some good talks they go visit a friend. But what is it that they want to have, that they want to achieve? So they say I will use some energy. What the psychologists taught us is people do not voluntarily use energy. Use of energy is sort of side effect. And if using energy is not a behavior it's a bit tricky to change it. That's the psychological point of view.

And this was the driving force in developing all these tools that Erik has been mentioning. And then when you look at what the customer really wants there's a tendency that we think that the customer or the consumer or the

citizen wants to have a kilowatt-hour. No they don't. And they do not want to have power like a kilowatt. And they do not even want to have some cubic meters of gas.

What they want is a warm room. They want light. And they want to have some kilometers with their cars. This is what they really want. And in using energy they can achieve what they want. But energy is a means to an end. And once you have understood that you would treat people completely different.

This is a nice depiction of the people's needs. You may have heard about the _____ of psychologist Maslow. You might know the needs of people in five categories. From the bottom to the top is the psychological needs like you need air, food, water, light, and warmth. And once these needs are met you want to have that forever. You want to have work and you want to have security. You want to have a house.

And if you have all of that then you're on the third level where the social needs are. That is then about closeness, love, mobility, social networks and all that stuff. And it is clear when you look at our societies at least in the Western countries most of us live on this third level. And this is why people can make a business from social networks like Facebook, Google, and all the others.

Some even take it to the fourth and the fifth level where it's about individual needs, individual fulfillment, creativity, transcendence, success, spontaneity. But mostly we are on this third level. And this is why we also said okay when this third level is about networks—networks of people, groups of people— then we also should consider groups of citizens. That is why we have been taking that into account when we created the guidelines. We will see that in a minute.

With this little picture we always try to show the situation. I mean this is a wall. And behind the mall you have the generators, the suppliers of the energy. And in front of the wall you have the so-called consumer. And there are some small holes in the wall. And the wall is high and the consumer cannot see the supplier. And this is the situation more or less that we have today which at the end means that if you look at the supplier then cannot see the customers.

Well how should they treat them? And so they are believers that the customer is the plug in the wall more or less. And this is going away. I mean today what we see is that the former demanders become suppliers and they form networks with the grid operators and the utilities. They form cooperatives that are partially owned by the retailer and partially owned by private people. So the tendency, the trend, is towards big networks or small networks on a local or city or rural village base.

If you take that into account you can immediately see that there's a big bunch of new services that a utility can provide to their former just passive consumers. Now Erik has been mentioning that. When you look at what drives people you would think that it's mostly money or reducing the costs.

Yes that is the case to some degree. But still when you want to give monetary incentives you have to know what? How do you build a dynamic tariff that works? We have written a guideline that helps you to decide what type of dynamic tariff you want to have.

What is the split between the low and the high cost of the tariff? We also created a tool, a strategy finder for tariffs and incentives. So if one really wants to create a wise new tariff system go there and find the guidance. But very often you find yourself in a framework—in a regular tariff framework—that doesn't allow you to just develop the tariff that would be attractive for the people. And Erik was mentioning that. I mean if the new tariff gives you only something like €40.00 a year why the hell should you change your behavior?

So some started to set up sort of simulated tariffs which more or less means that you keep the tariff you have in the regulatory framework but you collect some payback points or something. And once you have gotten enough payback points your utility, your retailer, your grid operator, or whoever would give you some gift. I often explain that as my home territory. I'm on the south of Bavaria and I like skiing. And when I was young—50 years ago—there was one German Mark to ski for all day.

Today a ticket for the ski lift is something like €40.00 or €50.00. The best thing you can give to me as a gift is a one-day ski ticket. And this is something that this supplier and grid operator in that area did. They wanted to make people behave well in a sense that they have flexible use of energy and there are a lot of affordable _____ there. And so they didn't want them to use energy at night. They wanted them to use energy while the sun was shining.

And what they did there is they had this payback system and they gave them tickets—free tickets—for the ski lift. And that is something that motivated people a lot. And this is exactly the borderline between monetary and non-monetary incentives. In a non-monetary incentive it's about the positive self-image. It's about a sense of achievement. I can achieve something. I can do it. It's my activity. Or you have social _____ or social prestige or some community dynamics.

Remember I said we live on the third level of Maslow that it's very important that your community rewards you for what you do. And a non-monetary incentive is also fun of course. And many people are after fun. That takes us then into the entire discussion of games. What you can see here is we have provided various guidelines about _____ _____'s system about social competition and how do you do a correct comparison so that people are motivated from comparing to the neighbors?

And there's also a guideline: how do you introduce gamification on a local level? So how would a local utility or municipal utility—how would they involve their customers, their consumers, their citizens? Why games that are displaying exactly the village—the city—that these people live in? So we have written some guidance to that.

Of course people are not the same. And as Erik stated segmentation is quite important. You have to look at what does your target group –? What does this specific group that you want to address—what is their need? What is their expectation? And then you can create your incentive scheme. And here is some guidance. I'm not going to read it to you but you have to clearly understand that this bullet point number four. You should develop a plan for scaling up and replicating your incentive program.

It does not help if you can incentive 25 people if all the others expect something different. So from the very beginning when you start a project and you want to involve the consumer, the customer, or when you develop a new product for the market look at a reasonably big number of individuals that you want to have in your target group. Otherwise you can spend a lot of money to just treat 25 or 50 people and at the end you get nothing. When you really want to scale up and you really want to replicate what you do in a _____ project for example you may want to find some allies on a regional level that can be politicians that can be people from the church, that can be the environmentalists, that can be the local crafts—many.

And also you need to involved these people is quite a big task. And they also have needs and expectations. The guidelines that we created are about how to recruit the participants and how to make them interested. And there's one that you wouldn't expect to be there that's called engaging people through telling stories. It's interesting. I mean sit back and think about what TV does or what radio does. They keep telling you stories. And people are very much after stories.

And if you make a story about your project or your product the you get the interest of the people. And then when you take it a step further this is a picture that shows that we have segmentation support. How do you do that? There are tables that you can directly use. And the linear project did that. They did selection of different target groups like idealistic, selfless inconsequent people, thirty people, materialistic people, convenience-oriented people, problem-aware people.

Then they said okay how do they react on various types of bonuses? And this is depicted here. And different groups to react differently on the amount of monetary incentive that you give. Here we put together some golden rules for incentives. First of all experience tells that you shouldn't restrict yourself to just one incentive model. It's always a mixture. As I said before it may be a dynamic tariff plus some what we call fake tariff or a simulated tariff plus some gifts for the payback points that you earn with your behavior.

So very often it's a good mixture of those. And if you have the mixture you may meet the needs of quite a reasonable number of your partners. You have to keep it transparent. Don't hide what you do. This doesn't pay. And again create a narrative. Tell them stories or even better let them tell the stories. Let your partners, your consumers, your customers tell the story. And again don't underestimate the relevance of monetary incentives. Clearly people are after cost reduction and they are after earnings. But also don't overestimate that.

That is something that we stress in all the S3C and I give you some examples here.

Here you have an example of a project: Hus 14. It was in Sweden. They have a big hall—entry hall. And what they said, they wanted to attract people to this energy—end energy savings with a candela. This is a candela what you see here. And then the head of the candela shows how much energy they were using yesterday or the other week. And we described that in guidelines how to make energy visible. This is a nice means to make it visible. But then they asked sociologists how do we do that exactly?

And then sociologists said okay take some of your employees. Let them be creative. Let them create the outfit of this candela. And they really did even better. They changed the outfit of the candela every four weeks or four months. And when people were involved or your colleagues were involved in doing that it created way more intensive attraction to the employees. So what does that tell us? Involving people in the means by which you want to involve people—that is one of the key issues.

That is one of the key success factors. People need to get a relation to the means that you use in involving them. And that is a general guideline that is in many of our guidances. And I'm coming back to this storytelling thing. What you can see here, and when you download this document and you click the link you'll find a little nice video. It's on YouTube I guess. And that was from the Insero Live Lab where they managed to involve a few people.

And then they let them talk about what their experiences were. And so they told the story. They told it better and more authentically than any employee of the utility could do. So involving people and let them design the means, the feedback systems, et cetera. And let them talk about their experiences. This is sort of the golden rule. Erik mentioned that. When you really want to make people move, make them move as a group or make them move in competition with each other in their peer group.

Many start to do energy audits for households. And we also describe that in one guide on how you do that right. But we also describe how you could effectively and efficiently do social comparison and attractively do social comparison and competition. If you do it wrong you can also lose people. I mean on the top right you see an invoice. And many have now started to put sort of competition to the invoices that you receive on a monthly or yearly basis where it says okay this is your consumption and this is the consumption of your peers or the average of your neighbors or something.

That can easily demotivate people also. So you have to do it right. And we try in our guidelines to describe how you do that right. Or for example on the top left what you can see is a display that a household puts on their balcony and says okay this household used 35 percent energy yesterday or something. Okay so this is up to this household to display. They get a sort of blackboard, chalkboard, and they write it there. It's up to them how they display their success there—their performance.

This is something that we really suggest that you let people decide how they display themselves. This is a more like formal way that is in Sidney or Perth—I cannot recall—where they asked the city quarters to compete with each other in energy efficiency. They wrote it on the roads. And then they displayed it with the cars. They used many, many different measures to display the performance of every city quarter. And they awarded quarters of the city in groups of the people.

And this is something—That is a picture that shows different information. The first information is the bigger the ball the more performance you can trigger with the measure that the ball stands for. So for example if you have intrinsic motivation people just out of themselves want to do something that may create a lot of effects—high performance. If you add social reward to that the ball becomes bigger. They perform even better if they are rewarded in their group.

And whereas you find a small ball the small balls depict low monetary award. Then you have a medium monetary award. But even with the medium monetary award the effects—the performance—that you trigger may be less than what you can achieve with a social reward. Of course if you can't manage to give them a high—a very high monetary award—most probably would achieve a lot. But sit back and think about where you get the funds from to give them really high monetary award—if at all. The regulatory framework allows you to do so.

So what that pictures as okay don't—Again don't underestimate the social rewards, the non-monetary rewards. But what this pictures also shows, and you may ask why the hell did they put balls? Normally you would do that in a histogram. When we looked at what feedback systems are—good feedback systems—you immediately learn that it's mostly the engineers that can interpret a histogram. Psychologists tell you if you put a histogram information goes right to the left part of your brain.

If you put such a ball the information goes right to the right part of the brain. And guess how many people would react on balls and how many people would react on a histogram? So this is also something that you can read. What is a good means to display, a good means to give feedback, as to consumption, as to achievements, et cetera.

Okay when it comes to monetary incentives we would normally say that saving cost is a big driver. Yes, maybe but you have to save a lot so people react and change their behavior. What may be easier, and this is a picture of Southern Bavaria where the Allgäuer Überlandwerk which is the local utility allowed people to invest in PV stations. It could've been windmills as well or any other generators but they said okay you can invest in PV stations and you can also invest in the energy management system that makes these PV stations go to the grid in a very good saving and good protecting means.

What I'm saying is that people in this case can invest money. They can earn money. That is something that was very popular—or still is in Germany where we have something like 900 or 1,000 even cooperatives of people. And

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people invested in PV stations, in biogas plants, in big mills, et cetera. So what I'm saying is do not only think in cost reduction. Also think in terms of investment. That may attract a completely different group of people.

That is a depiction of a project that we had in Germany again to learn about new structures and new investment structures and energy efficiency. What it shows basically is that you have a regional partnership made up by municipalities, citizens, banks, companies, associates, et cetera. They give money into a regional energy efficiency cooperative. You may call it a regional energy efficiency fund or something. This cooperative takes the money, invests it in energy efficiency appliances.

That pays back of course because if you are efficient you'll save money. And so there comes a payback and at the end the people get their money back with interest. And the interest in this case—and we did that with three regions—in this case the interest was way higher than what you can get from a bank today. So we did that in practice and it attracted a lot of people to this new type of involvement in financial terms.

Now the question is of course I mean what is it that people want to have in practice? And this is an example that we did with a utility in Switzerland where the utility invited some 10 or 15 small and medium size enterprises and asked them what is it exactly that you expect from us? What are the products that you would expect? What are the new services that you want us to provide you? And we have been describing that in our guidelines. A guideline is about collaborating to develop smart energy solutions.

And one guideline is about developing innovative products. And we used these guidelines and tested them with this group. And at the end they had many ideas. And I was moderating that. And I think there were 25 ideas. I mean how in the hell would a utility come up with 25 ideas for new products? By asking their customers. They did and then they did a selection and they boiled it down to eight concrete product ideas. And these product ideas are now being followed up by the utility.

I would guess that some five of those will be a product to be offered to their entrepreneurial customers in a year or two from now. The key to the success was again ask them what they need, what they expect. And what we can do and we did with small and medium sized enterprises we did in other cases. In the Amsterdam case with private people—private consumers—that was in a quarter of the City of Amsterdam—Wildemanbuurt where they set together with citizens eight times in co-creation workshops to explore, to investigate, to design and present the new ideas—what I call the new goods on the market of the energy.

New services, new support for people that want to operate their own generators whether it be a micro-CHP or PV station or whatsoever. What support do people need that want to optimally charge their electric meters, et cetera? So what is it that the utility of the future should supply to their customers? Again if you want to read about all that check the respective

guidelines. They are being called something like innovative product development or collaborating to develop smart energy solutions.

Then it is nice to know that segmentation is important and that you should carefully look at what different customer groups want. But still there is something that is in common with almost every group. Independent from the H, independent from the education, independent from the income, most people like to play games. They are gamblers. And that is why we carefully looked at that. And not only in the S3C project. This is a page taken from the FINESCE Project which was another European-funded project about the future internet and how this future internet can support energy measures and energy transition.

And in that project we developed two different types of games. One was like a Facebook game. And the other one was something that you can download. It was very close to what some people know from SimCity. And these games—and we were astonished. These games attracted so much attention that we are now about to create more games and offer them to utilities so that utilities can involve their customers and consumers and citizens via local games.

One of our partners was EDP, the grid operator and retailer in Portugal. And they also did a game—an easy game—that was a quiz. And they did the schools that used this quiz to attract pupils in the secondary school to this topic of energy and flexibility and energy efficiency. And they have been very, very successful to that. And so we said okay for the users of the S3C toolkit we want to give them something that they can use right away. And that's why we created a nice little tool.

It's an energy quiz with some 500 questions. It's available in English, German, French, and Italian. If you go to the website or if you follow the link on this page you will find the guideline how to use this quiz in your local environment. You sort of download it. You put it on your own website whether you are a utility or a school or an energy cooperative or whomsoever. You can use that right away.

It adapts to the style that your website has and you can offer that to your partners, to the pupils, to the customers, to the consumers. That is what we call a low-hanging fruit if you want to get deeper into that. And of course we carefully looked at what is it that people are attracted with. So it was the psychologists and the sociologists that were involved in developing this quiz.

Well I have to come to an end. The guidelines, the tools, are meant to be used by practitioners. They are ready to use. They give a lot of information when you develop your products or when you develop your projects. But of course other partners, other groups of stakeholders also need some advice. And that is why this S3C community that's the researchers together with the advisory board developed a set of recommendations. There's a study that you download from the website as well.

It's written towards in this case EC legislation and research programs. It's written towards national policy makers, funding authorities, regulatory bodies of all types of countries. It's written towards local authorities and associations of energy and ICT industry. It's written towards curriculum developers of educational institutions. And it's written towards suppliers to energy industry as well because I mean how should energy industry deploy the best feedback system if their supplier doesn't provide it?

So we give recommendations from what we have learned. You'll find that in this study recommendations contain something like better manage the overall and specific customer expectations. If customers have a wrong expectation you will never be able to meet it. So expectation management is something important. Media is something important. And I'm chomping down to the last one where it says implements means to convey learnings and tools of S3C (and other similar projects) to practitioners in utilities.

And I'm appealing to you people out there. Please help us to convey what we did in S3C. We think we have been doing quite a good job in researching, assessing, and then turning it into practical guidance. So please spread the news. Check the website. You'll find it—It's being displayed here. If you are friends of Google you just enter S3C Project and you'll find it anyway. And then the website takes it through all the background, through all the psychological, sociological findings.

And right to the toolkit with all of these ready to use guidelines and tools. And don't forget the quiz. This is a nice one. You can do that tonight. Thank you.

Sean Esterly

Great. Thank you very much. And thank you to all three of you: Klaus, Erik, and Ludwig. Really interesting content here. We have a couple of questions and I guess we'll just dive right in. And again for those of you attending if you do have questions please feel free to type them in to the question pane on the right side of your screen there and we will go ahead and pass them along. So without any further ado is for Erik. It comes from Nicholas Watts.

Nicholas is part of a UK program working with schools in which the children take an active role in persuading their families to engage in energy saving behaviors and informing their parents about renewable energy opportunities. He was just wondering if your findings have at all addressed the role of children as motivators or actors in domestic energy use, or if you'd like to comment on the role of children in any way.

Erik Laes

Well yeah, as a matter of fact one of our partners in S3C which as EDP, the Portuguese partner, they also worked intensively with schools in their smart grid project. I think the energy quiz that they developed was used in local schools to really engage the students or the young people in energy issues and to also introduce this quiz in a playful way in their household situation. So yeah I can really recommend going to this energy quiz which is on our complete website.

Ludwig Karg	Can I add to that? Didn't we describe this postcard from the future also? That is a very proven method to involve people and let them think about the future. And I recall there was one school that asked their pupils to write postcards from the future to their parents. And that was something that I can recall.
Sean Esterly	Oh great. I'm glad to know that there are a couple of efforts going on in that area then. Moving on—a couple of other questions. So the toolset is a pretty large toolset. And I think it might help some of our attendees to have an indication of really where they should start reading and how they can start digging into it.
Ludwig Karg	Yeah we have seen that at the end. [laughter] We were astonished how big it became at the end. And then we started to develop what—I think Erik you mentioned it—what we call the notebook. More or less you can go there. You'll find it in this training section. And you'll say okay what am I interested in? Am I interested in more like sociological backgrounds? Or am I interested in learning about what is the feedback? Or am I interested in more like monetary incentives or non-monetary incentives?

And you click and pick. And at the end you push a button and it creates your PDF file. And this PDF file is your personal notebook to optimal involvement of consumers or customers. If you click everything you may have—I don't know—1,000 pages. If you exactly decide what you are interested in it can go down to 10 or 15 pages and it's an easy to use notebook for your daily work. |
| **Sean Esterly** | Okay great. I hope that should be helpful. Kind of going off of that are there any intents to translate some of these tools and guidelines into other languages in the future? |
| **Ludwig Karg** | Actually I can report from Germany. Just the other week we have been talking to another German partner and they are about to translate at least part of the guidelines. And we hope that we find other countries or funding agencies or—I don't know—whomever who will help us translate that. The question is right. I mean very often the practitioners in say something like municipal utilities are not so used to reading highly sophisticated English texts. And you have to take that into account.

And we are the ones who say okay you have to look at the needs of the people. And the needs of some of the practitioners are clearly that they get it in their local language. And yes so we try to work on that. Please help us. Ask this question to your governments and ask this question to your funding institutions. We would be more than happy to translate it to more languages. |
| **Sean Esterly** | Okay great. And again all the contact information should be in the presentations which will be posted to the Clean Energy Solutions website. So if any of our attendees do have any input or would like to be involved in that regard I would encourage them to check those presentations for the panelist's contact info. And please do reach out to them. |
| **Ludwig Karg** | Correct. |

Sean Esterly	So moving on we have a question here about why is it that only the S3C initiative has really tackled the issue of consumer involvement from sort of this sociological and psychological framework that you've been looking at? Are there others that have not worked at it from that sort of sociological angle?
Erik Laes	Perhaps I can respond to that. Well at the time when we started which was back at the end of 2012 there was a specific goal by the European Commission to look into these sociological and psychological issues because up till then the main research focused in the smart grid area and in the area of smart grid pilots was really from a technical and economic point of view. And so the commission itself noticed that this aspect was a bit neglected and then launched a specific call on that. Yeah so we were one of the projects that then got selected to do this sociological investigation together with what we have called our _____ project. But I forget the name. Ludwig help me.
Ludwig Karg	Advanced. It was the Advanced Project.
Erik Laes	Yeah.
Ludwig Karg	And they also did—They especially looked at the feedback system. So what is the optimal feedback? They dealt a lot with smart meters. And what is the best feedback from smart meter data? And we have cooperated a lot. But so to say I think Erik that is true. We dipped a little bit more into these psychological/sociological questions. And so it's a bit unique. Yes you are right—whoever asked that question. My guess would be that it's not only a question of the advance and the research programs. It's also a question of a need and a question of taking the consumer into account cam with the utilities when they realized that it's not only about sending them energy and after a year _____. Today utilities and especially grid operators definitely need the support from their consumers and their customers. And they need it especially in cases where they have _____-generation. I mean no I'm from Germany and you have heard that in Germany we have high penetration from photovoltaics and wind. So we are facing and our utilities are facing this problem now. They must ask and convince and involve their customers into managing this volatility of the generation. They must talk to their customers about flexibility and try to incentivize that. Only in the past years that became an issue. There hasn't been much reason to do that psychological/sociological investigation five and ten years ago. But now in some countries utilities and grid operators have to bother with that. And they have to take that into account. And what we also see is that there's a bunch of new market players that tried to enter these energy businesses. Look at what Google does. Look at what Facebook does and what _____ do. They come from a completely different angle. They come from the marketing angle. They do not come from the grid management. And so they will drive the energy market and the energy market

	players towards more new products and to better involved customers and to better learn what they need.
Klaus Kubeczko	Maybe I can add from the ISGAN-Annex 7 perspective. We've done a little survey on social science humanities research in the energy context. And the European Commission has made an interim evaluation of its Horizon 2020 Project. It seems—And they have a real—now a strong focus on social science humanities in their research project. But it's very hard really to have them as integrated, trans and interdisciplinary projects because they are so different.
	The thinking is so different. And I think Ludwig Karg explained it quite well I mean how the different thinking can be from the old traditional way that users were just seen as a black box. And now you have to understand them. But Annex 7 is highly interested in promoting social science humanities research and we're also working on a strategic research to _____ down these issues.
Sean Esterly	Well this is a fairly—You know this new framework, this new perspective, is probably new to most utilities and system operators. And tools like this can be very comprehensive. So in case someone needs support to help implement some of those comprehensive tools who can a utility or system operator approach for assistance in implementing them?
Ludwig Karg	Well S3C was hard work but we didn't die from it. So we are available. The entire consortium is willing to support you. You'll find our addresses and telephone numbers on the S3C website. So if somebody really needs support beyond the guidelines—and we expect that you need some more support to translate that to your local real environment—we are very much willing to help you. In all these countries that we are in—that was Germany, Netherlands, Sweden, Portugal, and Italy.
	So we cover most of Europe but we are also willing to come to Australia and Japan and America.
Sean Esterly	Great. Well that about wraps up our question and answer session. If anybody has any additional questions again I'd encourage them to please feel free to reach out to the panelists directly. So before we close we'd just like to ask all of our attendees to please participate in a short survey. So if you can go ahead and please answer the question that appears on your screen right now we'd appreciate it.
	Okay great, thank you. And the next question—Okay wonderful. We have three. Okay great the fourth one is coming up. Thank you and one last one for everybody. All right, thank you very much. We appreciate you taking the time to answer that brief survey. With that, on behalf of the Clean Energy Solutions Center, I'd certainly like to extend a big thank you to all three of our panelists: Klaus, Erik, and Ludwig as well as all of our attendees for joining us today.

We invite everyone to check the Solutions Center website if you'd like to view slides and listen to a recording of today's presentation as well as previously held webinars. Additionally you should find information on other upcoming webinars and other training events on the Clean Energy Solutions website. We're also posting webinar recordings to the Clean Energy Solutions YouTube channel and ask that you please allow for about one week for the audio recording to be posted to that channel.

We invite you to inform your colleagues and those in your networks about the Clean Energy Solutions Center resources and services including our no cost policy support and Ask-an-Expert program. And with that I'd like to invite everybody to please enjoy the rest of your day or the evening as the case may be. And we hope to see you all again at future Clean Energy Solutions Center events. Thank you very much and this will conclude our webinar.