Beware: Energy Efficiency Services in the Making!

The necessity for transitioning towards a low-carbon energy system is becoming so evident that any introduction to these problems seems superfluous these days. One of the solutions is sought in DSM energy services. And the current difficulty to mass market such energy services seems to suggest we need new, innovative business models. There is thus a big role laid out for business model research focused on which business models could play an important role in transitions towards a more sustainable energy supply and demand. IEA DSM Task 25: Business Models for a More Effective Uptake of DSM Energy Services sets out to find out how and which business models can result in a more effective market uptake of DSM energy services.

Business models at the level of established firms as well as in the niche market aimed at demand side management are being used. The innovation and experimentation of business models seems to have become a necessity in the energy sector and is becoming more of a trend. IEA DSM Task 25 seeks to answer what these different business models look like and what works, how it works and what kind of conditions are needed. Furthermore, success and fail factors in the system context will be described. This will ultimately lead to the creation of guidelines and advice on how to create both more effective propositions and how they work and what underpinning business models and the necessary supporting policies.

Austria, Sweden and Switzerland are involved in the Task with in kind support from the Copper Alliance and the Copper Institute.

Note from the Chairman

We've got a new logo!

Now you might think “So what a new logo.”
We could explain in length the deep and meaningful elements of the new brand. Indeed it combines the healthy elements of the blue planet with the green of nature that we try to preserve. In our case, this means using less energy until we have a stable system.
We could also point out that this logo moves us closer to the IEA, which has a similar logo style.
But we know we can’t fool you. Unless we’re willing to wait another hundred years so our logo can become “vintage” we have to develop and maintain our communication material.
For us, this WeberWeb design means more than just a new fresh look. The market demands an increase in outreach. In our new strategy, we made it clear that we understand that message and that it is an important task for the next year.

As Demand Side Management isn’t the easiest phrase to use to link countries and organisations to our work, we have now added “energy efficiency” as a subtitle to
Netherlands, and more countries, including South Korea, Norway and India have expressed an interest in participating. In addition, organisations such as the EBRD have contacted us to keep a close watch on results.

Our First Workshop
On March 10th the first national experts meeting was convened in the Netherlands. The meeting took the form of a day full of workshops, discussions with involved Dutch entrepreneurs who have developed interesting DSM energy services and accompanying business models. And of course, time was set aside for the presentation of some first results. All the participating partners completed a first inventory of interesting energy services in their respective countries, which will be compared and discussed in detail.

First Results
One interesting finding from the Dutch inventory, where more than 60 energy services were identified, is that large, established and often multi-national firms hindered by multiple issues and lacking an innovative business model still go for a business as usual model, which will likely make them become less competitive. While those business developers that aim to build a longer term personalised relationship with their clients, providing incremental add-ons and additional services to fulfil emerging needs have the potential to become quite successful.

A number of examples of more innovative Dutch (business to business (b2B), business to consumers (B2C) and business to public parties (B2P) drew our attention:

NERDALIZE: changing computers into heating equipment
Nerdalize built a business model that appreciates that what is regarded as waste by one firm can be a resource to another, and turned this into a business proposition. This Dutch company places datacentres (computer servers) in homes and buildings to replace conventional heating systems while saving on cooling costs normally needed in data centres. Within the first few hours Nerdalise had 150 customers, and this start-up was even mentioned in the New York Times. The company is valued between 2 million and 3 million euros.

REIMARKT: refurbishing without hassle
Another interesting proposition is marketed by Reimarkt, the company fully unburdens the customer’s refurbishment (households, but also housing corporations), preferably at the community level. Reimarkt plans and implements the refurbishment, after which they engage in a loan that is paid by savings on the energy bill. Reimarkt ensures that the customer does not have to make risky, high-cost investments. Their key message being communicated is that of a win-win situation: no hassle, save money while saving the environment.

GREENIANT: going beyond the information deficit
Greeniant is able to map the energy consumption of appliances at households and business premises by means of Non-Intrusive Load Monitoring and devices based only on information collected from the smart meter. Their unique software makes it possible to read each individual energy device. With this information Greeniant provides insight into the energy consumption, delivers tips and tricks on how to reduce energy use, provides actionable advice on potential obsolescence of appliances and notifies users in case of deviations and sends reminders on appliances’ need for maintenance. Greeniant has been contracted to integrate its technology in the household smart thermostat “Toon” that is mass marketed by the retailer Eneco, ensuring a mass-market rollout of Greeniant’s service.

The user will be central to the business model development work.

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DSM University

Webinars are the “heartbeat” of the IEA DSM University, and what an opportunity to be able to learn more about DSM from experts in the field. In collaboration with Leonardo Energy, the DSM Programme held eight webinars in 2014, and 2015 will be just as active a year.

To help you identify topics of most interest to you, the webinars are grouped into six themes: logic of DSM, governance, energy efficiency, flexibility, integration and business models. The next webinar will be part of the energy efficiency track.

Don’t miss out on this free resource, register today online so that you can participate in upcoming webinars and listen to past webinars.

Next scheduled webinars are:

**Consequences of Learning Curves for Energy Policy**
Wednesday, April 15
15h00-16h00
Central Europe Time

**Improving Energy Efficiency in SMEs – An Interdisciplinary Perspective**
Wednesday, June 10
15h00-16h00
Central European Time

In the next few months, the participating partners will conclude their national and the worldwide inventory of propositions and business models involved in energy efficiency services. A selection of these will be fleshed out and the resulting case studies will highlight success and failure factors, conducive political environments and shed light on questions that are still pertinent in this new area of research.

Next to the practical activities, IEA DSM Task 25 will provide a more theoretical insight into business models for DSM energy services. A literature review being performed in the first six months of 2015 will:

1. Provide an overview of the theory regarding socio-technical transitions in relation to business model innovations. Specific attention will be given to the agency of the firm on a systems level, when developing energy services.
2. Identify the enabling or inhibiting role of policy. Policy is often seen as a way to stimulate the formation of new business models, however contemporary, institutionalized policy can also inhibit novelty.
3. Assess the usefulness of user-centred design to business model design. The impact of user-centred approaches and design on business models is currently a hot topic that certainly sounds promising in theory, while the implications for a business model in practice are less well known. Moreover, many firms claim to be user-centred, but it is unclear how this is put into practice.

In the third quarter of 2015, participating countries will host workshops for national business developers to share lessons learned and discuss how to improve business development of energy services in national contexts. Next year, all the lessons learned will be translated into actionable business model canvasses and guidelines for the different stakeholders.

For more information on this Task, please contact the Operating Agent, Ruth Mourik at ruth.mourik@duneworks.nl.

**Task 25 – from page 2**

**WOONCONNECT: user centred building and renovating**

Woonconnect is an online three dimensional tool, a Building Information Model (BIM) that incorporates a multitude of information flows (end-user preferences, living concepts and energy options) to allow both housing corporations, homeowners and tenants to make tailored choices in terms of energy, finances, comfort and income impact. The tool incorporates energy modules. Woonconnect is very successful and has been used in several large-scale renovation projects encompassing several hundreds of buildings.

**Next Steps Forward**

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Did You Behave As We Designed You To?

Monitoring and Evaluating Behavioural Change In Demand Side Management

IEA DSM Task 24: Closing the Loop - Behaviour Change in DSM, From Theory to Policies and Practice tackled one of the key contemporary challenges facing energy Demand Side Management interventions: finding the right ways to monitor and evaluate behaviour change interventions and the actual and preferably longitudinal behavioural change impacts. To explain our work, we recently published three reports on this issue.

Our report, “What Do We Know About What We Know?” undertakes a methodological review of 85 papers (including 16 from our Task 24 Subtask 1 ‘Monster report’) that clearly shows widespread agreement on what evaluation data to collect and how to collect it is still lacking in the literature. It argues for the use of a standard measure that would enable cross-comparisons to be made across different studies and countries (this will be developed in more detail in Subtask 9 of the Task extension).

In our report, “Did You Behave As We Designed You To? Monitoring and Evaluating Behavioural Change in Demand Side Management” we explain monitoring and evaluation of behavioural change in DSM interventions, its current practice and importance to policymaking, and how different disciplinary underpinnings of interventions influence this practice. We demonstrate how the focus on outputs instead of outcomes in current DSM monitoring and evaluation practices largely follows the economic and psychological underpinnings of most recent behavioural interventions. However, as the field increasingly develops more systemic, sociology-underpinned types of interventions, this will require a rethinking of our current monitoring and evaluation practices. We demonstrate that it is useful to consider the disciplinary underpinnings of interventions. Each discipline has its own focus and units of analysis, and the different disciplinary underpinnings affect goals and thus influence what can and should be monitored.

Monitoring and evaluating DSM behavioural interventions is a complex field, with no clear answers yet to several of the pertinent questions and challenges that ‘Behaviour Changers’ face when attempting to monitor and evaluate behavioural change in DSM interventions. These challenges can briefly be summarised as:

- A lack of benchmarking, which is an adequate instrument to measure improvements against a set baseline.
- A focus that is often mostly on the implementation stage (supply side) instead of the in-use phase (end users), which means that the occurrence and evolution of behavioural change is not addressed.
- A lack of longitudinal M&E, which makes it impossible to assess the long-term outcome.
- Involvement of an M&E team only after the intervention is concluded. Consequently, requirements for monitoring and evaluation are often not included in the fine-tuning of an intervention.
- Monitoring often being based on modelling and irrelevant proxies of behaviour, for example energy savings, cost savings, number of homes retrofitted and the floor area insulated etc.
- The lack of monitoring of the distribution of costs and benefits between different stakeholders, while this is crucial to understand why end-users have responded the way they did.
- Insufficient acknowledgement of the existence of different stakeholders that may have different definitions of success, which are often not made explicit. In addition to this, end-users’ success definitions are often not identified, monitored or evaluated at all.
- A focus on individuals and not on practices or socially-shared ways-of-doing among social groups.
- No participatory elements or feedback loops in traditional M&E.
- Incapability of conventional measurements of success to capture many of the potential additional or multiple benefits of an intervention (e.g., health, comfort, convenience).

These challenges lead us to conclude that the traditional quantitative proxies used at present often do not correctly reflect the real behavioural changes that occur. We reflect on how a learning process around monitoring and evaluation could look and how to make it relevant to end-users, ‘cost effective’ and doable as well as measuring actual behavioural change, focusing on both the individual and societal level, allowing for different...
definitions of success and flexibility in changing goals and methods, and providing learning about the processes underpinning that change. We conclude with proposing an alternative that challenges common beliefs, addresses new issues, and proposes innovative methods to the current mainstream approach. This includes a focus on double-loop learning, allowing for different definitions of success and creating a more participatory approach focused on both process and outcome.

In the context of DSM interventions, single-loop learning is instrumental and focused on short-term learning about effectiveness in meeting goals. It is output focused. Double-loop learning includes learning about single-loop learning, but takes an additional step to allow time and context and reflection and focus on both strategic and operational results. Double-loop learning is process-oriented, focused on the how, when, where, how long, and for whom. It is about questioning goals and the prevailing norms and rules underlying these goals. In addition, double-loop learning is focused on interactions, the quality of participation, learning by doing and doing by learning, and aligning expectations, in short, double-loop learning is about reflexive governance of interventions. See Figure 1 for an overview of the differences between single- and double-loop learning.

This process of including more double-loop learning in current monitoring and evaluation practices should be entered as a collective and collaborative learning process involving policymakers, funders, researchers, end-users, technology developers, and other stakeholders involved in systemic DSM interventions. The current monitoring and evaluation practice is one where decision-makers and funders often choose to support interventions on the basis of the possibility of evaluating these with existing methods. These interventions are evaluated with single-loop learning indicators and output indicators. Insufficient focus is put on outcome, both short-term and long-term.

Interventions are evaluated too often on the basis of modelled projections of savings and improvements, and too little on the basis of real measurements. A problem with this situation, is that it actually recreates and sustains the status quo in interventions, monitoring and evaluation, and does not elicit actual double-loop learning. So instead of continuing funding and supporting only those projects that are aimed at establishing the single-loop learning types of outputs and that can be evaluated by means of the current proxies and methods, we might also chose to engage more with projects where we explicitly work to collectively and collaboratively learn about behaviour change.

In parallel, we of course need to work on identifying and quantifying relevant indicators for different kinds of stakeholders and for different types of behaviour to allow for a mix of qualitative and quantitative monitoring and evaluation. We have attempted to develop a template, which is applied in our report, “From ‘I Think I Know’ To ‘I Understand What You Did And Why You Did It’”. This work will be continue for another three years as part of the extension of IEA DSM Task 24. For more information on this work or the Task, please contact the Operating Agents, Dr. Ruth Mourik ruth.mourik@duneworks.nl or Dr. Sea Rotmann drsea@orcon.net.nz
South Korea

Energy Paradigm Shifts from Supply to Demand

Korea is one of the top energy importers in the world. With 96% of country’s primary energy supply coming from overseas, energy security has always been a critical energy policy issue. The country has seen tremendous growth in energy consumption since the ’90s, and as a result various energy efficiency measures in different sectors were developed and implemented with the hope of reducing the nation’s growing energy consumption and greenhouse gases.

In January 2014, the Korean Government finalized the Second National Energy Master Plan, which is revised every five years and incorporates the government’s long-term energy policy framework for 2013–2035, in order to achieve early conversion to a highly energy efficient structure. The plan pursues the policy of the controlled energy demand and breaking away from the conventional supply driven energy policy. There is a noticeable change in the energy mix: the proportion of nuclear energy is aimed at 29%, reduced from 41% in the first plan, and an increase in new and renewable energy. Also, the new plan indicates an important paradigm shift that moves attention to demand from supply and uses mainly economic and market driven instruments to drive this change.

The government expects total energy consumption to increase by an annual average of 0.9%, reaching 254 million tonne of oil equivalent (toe) by 2035. The demand for electricity is projected to be the fastest growing energy source with an annual average increase of 2.5%.

The target of this plan is to reduce by 2035 the final energy consumption by 13% and electricity demand by 15% from the business-as-usual level. Reduction Industry will account for 47% of total demand reduction, followed by transportation at 36% and commerce at 9%.

The fundamental notion of this plan is to promote DSM. Taking advantage of Korea’s advanced Information and Communications Technology (ICT) industry will be the key approach to achieve the goal. Some of the DSM measures set out in the plan are to expand incentives for SMEs with tax and loans and to compensate industries for higher costs through subsidies for ESS (Energy Storage System). Also, building codes will be strictly reinforced, and all new buildings should be “zero energy” by 2025. Another goal is that 15% of electricity be from distributed...
generation by 2035. And, transportation is expected to reach the level of advanced countries in terms of fuel efficiency by 2020.

Overall, the government will pursue an energy policy focused on controlling demand so that energy efficiency can be enhanced in a creative and voluntary manner in people’s daily lives along with industrial and economic activities. (For more information about the Second National Energy Master Plan, please visit http://www.motie.go.kr/language/eng/policy/Epolicies.jsp)

Under the Rational Energy Utilization Act in Korea, energy suppliers are to establish and implement annual DSM investment plans to increase energy efficiency in production and energy use and to reduce energy demand. Their plans are to be submitted to the government, and KEMCO (Korea Energy Management Corporation) has been evaluating reports on plans and results of energy utility DSM. It is expected that energy efficiency and load management will be achieved with investments from energy utilities, which in 2014 totalled 405 billion KRW.

With regard to the recent demand side strategy, there has been significant interest in implementing DSM measures based on ICT. Since this new paradigm for energy policy was announced in August 2013, which included an emphasis on the importance of demand side management, public and private sectors have been encouraged to invest in related fields, such as energy storage systems (ESS), energy management systems (EMS), smart plugs, and energy efficiency equipment with ICT technology. In accordance with this plan, the electricity utility plans to expend 625 billion KRW introducing the frequency regulation ESS by 2017, and several electricity intensive companies have plans to invest in ESS as well.

As a subsequent measure to reduce the energy demand and tackle climate change, the government announced a plan to support several new businesses, in which ICT converges with the energy business, as Korea’s next economic growth engine and to develop them into a 2 trillion KRW market by 2017. These businesses include:

- **Demand Response Business**: Implement energy saving systems in their buildings and plants, collecting unused power for profitable sale in the energy market. Through this scheme, 1.9 million kW of DR resources will be secured by 2017.

- **Integrated Energy Management Service Business**: Build ESS, EMS, and LED systems combining finance and energy management technology, and provide maintenance services. It is planned to disseminate ESS across the 100 entities and replace lighting systems with LED in 1,000 units by 2017.

- **Independent Micro-Grid Business**: On islands with a high unit price for power generation, replace diesel generators with a hybrid micro-grid combining new and renewable energy with ESS.

- **Electric Vehicle Servicing and Charging Business**: Install systems and provide charging for electric car service providers, including electric taxi service providers.

- **PV rental Business**: Rent PV systems, such as water purifiers to households, to generate profit through energy savings.

- **Business Using Waste Heat from Thermal Power Plants**: Make use of the massive waste heat from thermal power plants on adjacent farms.

For more information or questions please feel free to contact the South Korean IEA DSM Executive Committee member, Ms. HyoJin Lim, hjlim@kemco.or.kr.

Energy efficiency in buildings and communities and smart integration of urban energy systems are key focus areas in global and European climate and energy policies. And, the work of the the IEA's multilateral energy technology initiatives (better known as Implementing Agreements or IAs) address many topics linked to these focus areas. However, often the impact and the opportunities offered through this work is not well known so ENEA organized an IEA National Implementing Agreement Day in Rome on February 27th. The goal of the workshop was to provide an overview of the R&D activities and the outcomes of the IAs that Italian institutions are participating in.

The presentations opened a debate with Italian stakeholders of the energy and building sector on the following topics:

- main stakeholders’ needs that research and innovation can respond to
- best practices and recommendations to improve dissemination and exploitation of IA results
- barriers and opportunities of participation in IEA Energy Technology Network.

The IA on DSM was represented by Simone Maggiore from RSE who described the results obtained during the activities of IEA DSM Task 24:

continued on page 8
Closing the Loop - Behaviour Change in DSM: From Theory to Practice, with a specific focus on buildings. These results showed how end users’ acceptance is fundamental to achieve success in energy efficiency policies in Italy. In order to obtain such a goal, it is crucial to gain a profound understanding of the behavioural issues surrounding end users’ active involvement.

The domain of “building retrofitting” is a field in which Italy has already done a lot, but the inclusion of behavioral insights will certainly provide a fresh boost to improve the existing legislation.

The workshop also led to a sharing of the results among the Italian stakeholders looking to find synergies and collaboration that could be better developed and diffused, both from an Italian and European perspective. Another workshop on the work of the renewable energy IAs is already in the planning stage.

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Note from the Chairman

Rob Kool
DSM Chairman

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