

2015

Annual Report



International Energy Agency

Implementing Agreement on Demand-Side
Management Technologies and Programmes



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2015 Annual Report

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Executive Secretary
IEA Demand-Side Management Programme

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Foreword

This report is the twenty-second Annual Report of the IEA Implementing Agreement on Demand-Side Management Technologies and Programmes, summarising the activities of the twenty-second year.

The report was published by the Executive Committee and was edited by the Executive Secretary, with contributions from the Chairman and the Operating Agents.

Stockholm, January 2016

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Overview of the IEA and the IEA Demand-Side Management Programme

The International Energy Agency

The International Energy Agency (IEA) is an autonomous agency established in 1974. The IEA carries out a comprehensive programme of energy co-operation among 28 advanced economies, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports.

The aims of the IEA are to:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

To attain these goals, increased co-operation between industries, businesses and government energy technology research is indispensable. The public and private sectors must work together, share burdens and resources, while at the same time multiplying results and outcomes.

The multilateral technology initiatives (Implementing Agreements) supported by the IEA are a flexible and effective framework for IEA member and non-member countries, businesses, industries, international organisations and non-government organisations to research breakthrough technologies, to fill existing research gaps, to build pilot plants, to carry out deployment or demonstration programmes – in short to encourage technology-related activities that support energy security, economic growth and environmental protection.

More than 6,000 specialists carry out a vast body of research through these various initiatives. To date, more than 1,000 projects have been completed. There are currently 41 Implementing Agreements (IA) working in the areas of:

- Cross-Cutting Activities (information exchange, modelling, technology transfer)
- End-Use (buildings, electricity, industry, transport)
- Fossil Fuels (greenhouse-gas mitigation, supply, transformation)
- Fusion Power (international experiments)
- Renewable Energies and Hydrogen (technologies and deployment)

The IAs are at the core of a network of senior experts consisting of the Committee on Energy Research and Technology (CERT), four working parties and three expert groups. A key role of the CERT is to provide leadership by guiding the IAs to shape work programmes that address current energy issues productively, by regularly reviewing their accomplishments, and suggesting reinforced efforts where needed. For further information on the IEA, the CERT and the IAs, please consult www.iea.org/techinitiatives.

The Implementing Agreement on Demand Side Management Technologies and Programmes (DSM IA) belongs to the End-Use category above.

IEA Demand Side Management Programme

The Demand-Side Management (DSM) Programme, which was initiated in 1993, deals with a variety of strategies to reduce energy demand. The following 14 member countries, and three Sponsors have been working to identify and promote opportunities for DSM during 2015:

Austria	Korea	Sweden	Sponsors:
Belgium	Netherlands	Switzerland	The Regulatory
Finland	New Zealand	United Kingdom	Assistance Project (RAP)
India	Norway	United States	The European
Italy	Spain		Copper Institute (ECI)
			EfficiencyOne,
			Nova Scotia, Canada

Programme Vision: In order to create more reliable and more sustainable energy systems and markets, demand side measures should be the first considered and actively incorporated into energy policies and business strategies.

Programme Mission: To deliver to our stakeholders useful information and effective guidance for crafting and implementing DSM policies and measures, as well as technologies and applications that facilitate energy system operations or needed market transformations.

The Programme's work is organised into two clusters:

- The load shape cluster, and
- The load level cluster.

The "load shape" cluster includes Tasks that seek to impact the shape of the load curve over very short (minutes-hours-day) to longer (days-week-season) time periods. The "load level" cluster includes Tasks that seek to shift the load curve to lower demand levels or shift loads from one energy system to another.

A total of 25 projects or "Tasks" have been initiated since the beginning of the DSM Programme. The overall program is monitored by an Executive Committee consisting of representatives from each contracting party to the Implementing Agreement. The leadership and management of the individual Tasks are the responsibility of Operating Agents. These Tasks and their respective Operating Agents are:

Task 1 – International Database on Demand-Side Management & Evaluation
 Guidebook on the Impact of DSM and EE for Kyoto's GHG Targets – *Completed*
 Harry Vreuls, NL Agency, the Netherlands

- Task 2** – Communications Technologies for Demand-Side Management – *Completed*
Richard Formby, EA Technology, United Kingdom
- Task 3** – Co-operative Procurement of Innovative Technologies for Demand-Side Management – *Completed*
Hans Westling, Promandat AB, Sweden
- Task 4** – Development of Improved Methods for Integrating Demand-Side Management into Resource Planning – *Completed*
Grayson Heffner, EPRI, United States
- Task 5** – Techniques for Implementation of Demand-Side Management Technology in the Marketplace – *Completed*
Juan Comas, FECSA, Spain
- Task 6** – DSM and Energy Efficiency in Changing Electricity Business Environments – *Completed*
David Crossley, Energy Futures, Australia Pty. Ltd., Australia
- Task 7** – International Collaboration on Market Transformation – *Completed*
Verney Ryan, BRE, United Kingdom
- Task 8** – Demand-Side Bidding in a Competitive Electricity Market – *Completed*
Linda Hull, EA Technology Ltd, United Kingdom
- Task 9** – The Role of Municipalities in a Liberalised System – *Completed*
Martin Cahn, Energie Cites, France
- Task 10** – Performance Contracting – *Completed*
Hans Westling, Promandat AB, Sweden
- Task 11** – Time of Use Pricing and Energy Use for Demand Management Delivery – *Completed*
Richard Formby, EA Technology Ltd, United Kingdom
- Task 13** – Demand Response Resources – *Completed*
Ross Malme, RETX, United States
- Task 14** – Market Mechanisms for White Certificates Trading – *Completed*
Antonio Capozza, CESI, Italy
- Task 15** – Network-Driven DSM – *Completed*
David Crossley, Energy Futures Australia Pty. Ltd, Australia
- Task 16** – Competitive Energy Services (Energy Contracting ESCo Services)
Jan W. Bleyl, Graz Energy Agency, Austria
- Task 17** – Integration of DSM, Energy Efficiency, Distributed Generation, Renewable Energy Sources and Energy Storages
Matthias Stifter, AIT Austria, René Kamphuis, TNO, the Netherlands
- Task 18** – Demand Side Management and Climate Change – *Completed*
David Crossley, Energy Futures Australia Pty. Ltd, Australia
- Task 19** – Micro Demand Response and Energy Saving – *Completed*
Linda Hull, Barry Watson, John Baker, EA Technology Ltd., United Kingdom
- Task 20** – Branding of Energy Efficiency – *Completed*
Balawant Joshi, Idam Infrastructure Advisory Pvt. Ltd., India

Task 21 – Standardisation of Energy Saving Calculations – *Completed*

Harry Vreuls, Netherlands Enterprise Agency, the Netherlands

Task 22 – Energy Efficiency Portfolio Standards – *Completed*

Balawant Joshi, Idam Infrastructure Advisory Pvt. Ltd., India

Task 23 – The Role of the Demand Side in Delivering Effective Smart Grids

– *Completed*

Linda Hull, EA Technology, United Kingdom

Task 24 – Phase I: Behaviour change in DSM: From Theory to Policies and Practice

– *Completed*

Sea Rotmann, New Zealand, and Ruth Mourik, the Netherlands

Task 24 – Phase II: Behaviour change in DSM: Helping the Behaviour Changers

Sea Rotmann, New Zealand, and Ruth Mourik, the Netherlands

Task 25 – Business Models for a More Effective Market Uptake of DSM Energy Services

Ruth Mourik, the Netherlands and Renske Bouwknegt, the Netherlands

Task 26 – Multiple Benefits for Energy Efficiency – Catherine Cooremans, Switzerland

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Also, visit the IEA DSM website: www.ieadsm.org

CHAPTER 1

Chairman's Report

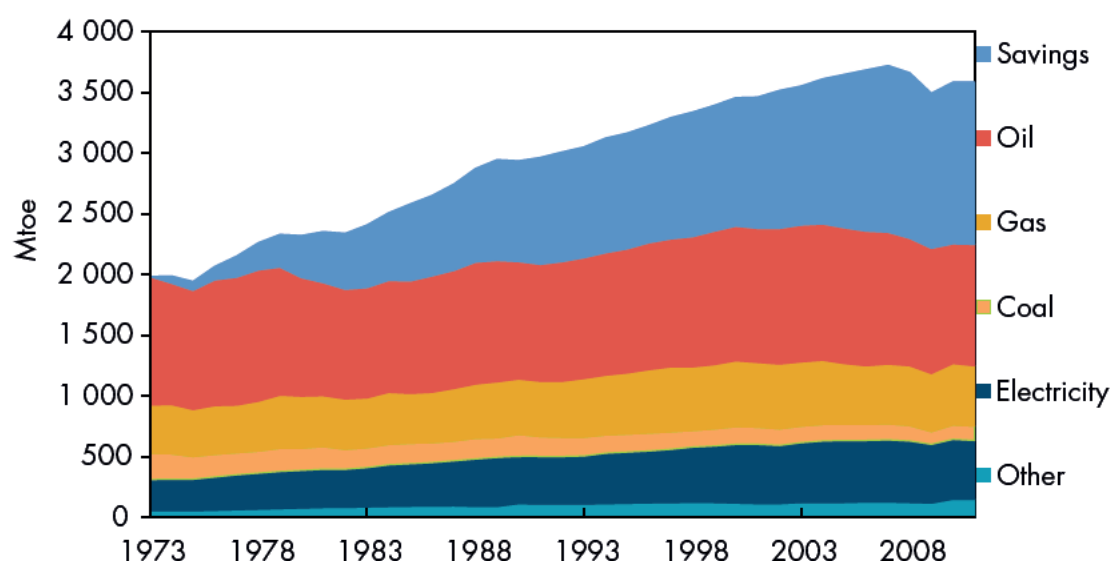
At the time of writing this annual report, the COP21 meeting in Paris is taking place.

To quote Bob Dylan *"the times they are a changing"*. Every professional in the climate and energy world knows that we have to reduce and do it fast and do it drastically.

The IEA Technology Network, which celebrated its 40th anniversary this year, brings together thousands of researchers to work on realistic solutions to make change happen.

The new IEA Executive Director has pledged to mine the contributions of the IEA Technology Collaboration Programmes, of which the IEA DSM IA is one. Our group of international experts will now be joined by those from Nova Scotia, Canada and soon from Ireland, thus enhancing our work on energy efficiency and supporting its important role in the energy mix.

Energy efficiency is the most important "fuel" as shown below in the IEA graph from the report, Energy Technology Perspectives (ETP2012). In this graph the energy use of eleven highly industrialized countries is shown. The blue wedge shows where we would have been without efficiency improvement.



Coming up with ideas, and eventually technologies, to improve efficiency are great results in themselves, but bringing them to the market is a whole other ballgame. It is a necessity to collaborate with industry. And that is what the IEA Technology Collaboration Programmes do. For the IEA DSM IA this collaboration is taken beyond research work to membership – with the Copper Institute as an important Sponsor member.

But we need more, much more, to achieve DSM goals. Within this framework of Implementing Agreements, the IEA DSM IA holds a unique position. We strongly believe we will have to combine different disciplines to get the pace we need.

In this year's annual report you can read about the details of our work, but the global picture requires combining the disciplines, being technology, social sciences and business.

As for technology, it seems without a doubt that we are heading towards an energy infrastructure 2.0. Some think it will be part of the "worldwide web of things", others don't go that far, but one thing is sure – distributed networks will be important elements in the future energy infrastructure. In our Task 17: *Integration of Demand Side Management, Energy Efficiency, Distributed Generation and Renewable Energy Sources*, we are contributing to these developments, and we are doing so in collaboration with the IEA ISGAN IA.

In Task 24: *Behaviour Change in DSM* and Task 25: *Business Models for a More Effective Market Uptake of DSM Energy Services*, we are showing how the knowledge of behaviour can help us create change. Not only a change in personal actions to use energy wisely, but also to accept changing technology as a "supporting act" to these changes. Here the ever-growing possibilities of ICT are major contributions. In terms of business, we are looking at the theoretical side by exploring the knowledge of multiple benefits and making them operational for business decisions as well as smart practical business solutions for energy services.

This year our annual report will change slightly. Instead of being a major source of information on our work, the report will serve to show accountability to our members and a nice introduction to interested parties.

To learn more about the IEA DSM IA visit our website where you will find numerous publications and a monthly online webinar provided by our DSM University and sponsored by Leonardo Energy.

Rob Kool, Chairman

Highlights & Achievements

During 2015 the following Task Phases were completed:

- Task 16: Phase 3, Competitive Energy Services – Energy Efficiency and DR Services
- Task 24: Phase I, Behaviour Change in DSM: From Theory to Practice

Additional details can be found below and in Chapter III.

DSM University

The DSM University is a Leonardo ENERGY project that is targeted at:

- Policymakers interested in learning about the costs and benefits of Demand Side Management and its impact on energy systems.
- Managers keen to learn more about Organisations, Governance, Planning, Programme Structuring and Implementation Methods.
- Programme Implementers wanting “Tricks of the Trade”.

The DSM University (DSMU) is built on 20 years of experience of the IEA DSM Implementing Agreement. DSMU provides access to the knowledge developed in the agreement in a structured way. In addition, DSMU aims to be a community of practice on DSM themes.

At the heart of the DSM-U are webinars. These are developed through our own material and with invited material from external specialists in research and business, and take place monthly.

During 2015, nine webinars were held:

- **DSMU# 10:** How to make the best technology even better, BAT becomes BAT+ Hans Nilsson, Task 3
- **DSMU# 11:** Capturing the Multiple Benefits of Energy Efficiency, Nina Campbell, New Task
- **DSMU# 12:** Consequences of learning curves for energy policy Clas-Otto Wene, Wenenergy AB, Sweden
- **DSMU# 13:** “Do not take away their steering wheel!” How to achieve effective behavioural change in the transport and SME domain” (part 2) Ruth Mourik, Task 24
- **DSMU# 14:** Improving energy efficiency in SMEs – an interdisciplinary perspective Patrick Thollander, Linköping University
- **DSMU# 15:** Smart Grid Implementation – how to engage consumers? Yvonne Boerakker, Task 23
- **DSMU# 16:** Integrating renewables and enabling flexibility of households and buildings – results and experiences from successfully implemented projects, Task 17 Matthias Stifter AIT, Austria, René Kamphuis TNO, Netherlands
- **DSMU# 17:** From selling Energy Efficiency to creating value, Task 25 – Ruth Mourik
- **DSMU# 18:** Simplified Measurement & Verification for Energy Savings – the Task 16 approach, Jan W. Bleyl

For more information on the DSM University, see also Chapter III.

For more information about all DSMU webinars www.dsmu.org

**Task 16 – Competitive Energy Services (Energy Contracting, EScO Services)
Phase 3: Energy Efficiency and Demand Response Services and Phase 4: Life-Cycle Cost ‘Deep Retrofit’; Simplified M&V; (Crowd)-Financing & ES Taxonomy.**

Task 16 Phase 3 started in July 2012 and was finalised in June 2015. The goals of Task 16 – Phase 3 were to contribute to the development and implementation of innovative and competitive energy efficiency and demand response services. Task 16 Phase 4 started in July 2015 and will end in June 2018.

Objectives

Task 16 is working to contribute to the know-how, experience exchange as well as project and market development of performance-based energy services.

- Sustain a well established IEA DSM *Energy Service Expert Platform* for exchange and mutual support of experts, partners and invited guests;
- Support and follow up *country specific National Implementation Activities (NIAs)* in order to foster EScO project and market development;
- Design, elaborate and test *innovative energy and demand response services and financing models* and publish them (Think Tank);
- Use the Task’s Energy Service Expert Platform as a competence centre for *international and national dissemination and consultancy services* (e.g. workshops, coaching, training...) and to contribute to the “DSM University”.

The underlying goal is to increase understanding of performance-based ES as a ‘delivery mechanism’ to implement energy efficiency policy goals and projects: Pros and cons, potentials, limitations and added values of EScO products in comparison to in-house implementation.

Key accomplishments in 2015

During 2015 the Think Tank has worked on a variety of topics which have led to publications and presentations at various national and international events. Some of it is work in progress.

Outlines of current or planned Think Tank topics include:

- Discussion paper: Demand Response Services: Economic Feasibility Model and Case Study for Austria.
- Simplified measurement & verification + quality assurance instruments for energy, water and CO₂ savings.

Furthermore the following is work in progress:

- Business models for comprehensive building refurbishment (‘Deep Retrofit’): Further development of an economic feasibility evaluation tool including sensitivity analyses for deep retrofit application. Application of the tool in several case studies, e.g. in Denmark, Germany and Austria. First bankable project calculations performed. Work in close cooperation with IEA ECB Annex 61.
- Drafting of a Taxonomy paper on Energy Services to be published in a peer-reviewed journal in cooperation with Linköping University.
- Work kicked off on Crowd-Financing for Energy efficiency and renewable investments: What can Crowd-Financing contribute? Access to CAPEX for smaller projects in SME, communities? Bridge the mezzanine financing gap? Reduce risks and transaction cost? In cooperation with GIZ.

- Drafting of a paper on *Simplified measurement & verification* together with EfficiencyOne (and others?) to be published in a peer-reviewed journal.

This work will be continued and finalized in Phase 4.

During 2015, Task 16 has produced a number of publications and given presentations at various conferences and workshops to disseminate and discuss the Task results. Furthermore, stakeholder workshops were organised in conjunction with each project meeting to discuss Energy-Contracting topics relevant to the host country of the meeting.

For [more information on Task 16](#), see also Chapter III.

Task 17 – Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storages – Phase 3

Task 17 Phase 3 started in May 2014 and addresses the current role and potential of flexibility in electric power demand and supply of systems of energy consuming/producing processes in buildings (residential, commercial and industrial) equipped with DER (electric vehicles, PV, storage, heat pumps ...) and their impacts on the grid and markets. The interdependence between the physical infrastructure of the grid, governed by momentary power requirements, and the market side, governed by energy requirements, will also be looked upon. The scalability and applicability of conducted and on-going projects with respect to specific regional differences and requirements will be explored.

The main objective of Task 17 is to study how to optimally integrate flexible demand with Distributed Generation, Energy Storages and Smart Grids, thereby increasing the value of Demand Response and Distributed Generation, decreasing the problems caused by intermittent distributed generation and reduction of the emissions of the system. The Task will look at integration issues from the system point of view on the grid, market, customer and communities.

The Subtasks in Phase 3 (in addition to Subtasks 1–4 in Phase 1, and Subtasks 5–9 in Phase 2 will be:

Subtask 10: Role and Potentials of Flexible Prosumers

Subtask 11: Changes and Impacts on grid and Market Operation

Subtask 12: Sharing Experiences and Finding Best Practices

Subtask 13: Conclusion and Recommendations

Key accomplishments in 2015

Subtask 10: (1) an international public workshop (Workshop on DSM: Potentials, Implementation and Experiences) has been organised to discuss potentials and flexibility of consumers; (2) A special session during IEEE Power Tech 2015 has been prepared; and (3) a near-to-final draft version of the deliverable has been prepared together with the experts giving their view on the objectives and a discussion on standardisation developments in the field.

Subtask 11: (1) a layout of the planned deliverable has been prepared together with the experts. This will be further developed during the end of 2015 and beginning of 2016.

Subtask 12: (1) an international public workshop (Workshop on DSM: Potentials, Implementation and Experiences) has been organized to discuss implementations and experiences of DSM and DR projects; and (2) a comprehensive list of recent studies and project developments has been started and evaluated in 2014. In 2015 this material has been further extended also related to the session in Eindhoven.

For [more information about Task 17](#), see also Chapter III.

Task 24 – Behaviour Change in DSM Phase II – Helping the Behaviour Changers

Task 24 Phase I started its operation in June 2012 and was finalised in April 2015. A 3-year Task extension (Phase II) started in April 2015 and will be finalised in 2018.

The main objective of this Task is take good theory (from Phase I) into practice to allow ‘Behaviour Changers’ (from government, industry, intermediaries, research and the third sector) to:

- Engage in an international expert network (‘THE EXPERTS’)
- Develop the top 3 DSM priorities to identify the most (politically, technologically, economically and societally) appropriate DSM themes to focus on (‘THE ISSUES’)
- Identify and engage countries’ networks in the 5 Behaviour Changers sectors for at least one of the top 3 DSM themes to develop a collective approach (‘THE PEOPLE’)
- Use and test a Collective Impact Approach to develop shared methodologies, guidelines and a common ‘language’ based on narratives to aid Behaviour Changers’ decision making of how to choose the best models of understanding behaviour and theories of change (a ‘toolbox of interventions’) (‘THE TOOLS’)
- Standardise how to evaluate behaviour change programmes ‘Beyond kWh’ and ‘Beyond Energy’ including multiple benefits analysis (‘THE MEASURE’)
- Collate national learnings into an overarching (international) story to understand, compare and contrast the different behaviour change approaches, risks and opportunities and which recommendations can be universally applied (‘THE STORY’).

Task 24 Phase II is divided into the following Subtasks

Subtask 0: Admin

Subtask 5: Social media expert platform

Subtask 6: Understanding Behaviour Changer Practices in Top DSM Areas (‘The Issues’)

Subtask 7: Identifying Behaviour Changers in these areas (‘The People’)

Subtask 8: Developing a toolbox of interventions to help Behaviour Changers (‘The Tools’)

Subtask 9: Standardising Evaluation beyond kWh (‘The Measures’).

Subtask 10: Telling an Overarching Story (‘The Story’).

Subtask 11: Voluntary

Key accomplishments in 2015

- Progress in the last year was satisfactory, Task 24 now has >235 experts on the expert platform and professional films from all presentations of the Graz and Toronto workshops online. All other final reports are on the IEA DSM website, which has been updated for both Phase I and Phase II. Google Analytics show continued utilisation of the Ning website, especially after broadcast emails with links to all new content are sent. We continue having great successes in matchmaking experts, with several spending time at each others' Universities, for example, or developing new research collaborations.
- Subtask 6 has been kicked off with workshops in Toronto in May and October, Stockholm in June, New Zealand in September and the ECEEE and BECC conferences in June and October, respectively. We have started collecting lists of DSM interventions and energy efficiency and behaviour priorities in each of these countries. We have discussed the top 3 issues in each of these countries during workshops. In addition, work on this Subtask has started in the Netherlands where top issues are being discussed and a selection is made to focus on ICT use in higher education buildings.
- Behaviour Changers have been identified for the top issues decided on in Subtask 6 for Canada, Sweden and New Zealand. Their sector stories have been told during workshops and we have initiated deep discussions around relationships, mandates, stakeholders, restrictions and value propositions for each of the Behaviour Changers using the 'Behaviour Changer Framework'.
- Some work on continued development of the evaluation tools from Subtask 3, Deliverables 3A and B has taken place. Storytelling in Task 24 has been published and presented, to a lot of acclaim, at the eceee summer study. We are currently working on a Special Edition Issue on Storytelling for the Journal of Energy and Social Science Research. The Task 24 monitoring and evaluation work was also presented at the ECEEE summer study and further evaluation work has been published in the *Energy Efficiency Journal*. A factsheet on multiple benefits in the building retrofit sector has been created (in Dutch). Sector stories in Canada, New Zealand and Sweden have been collected as well as the Behaviour Changers' intervention tools in each of these sectors. Multiple benefits and metrics of the issue decided in ST 6 have been collected for Canada.
- Karlin (the Principal Investigator of this Subtask) et al have published a paper at the IEPPEC conference in August that outlines the basics of the Beyond kWh toolkit they are developing for ST 9. It is co-funded to the tune of US\$100,000 by PG&E and Southern California Edison and will be tested and validated in our Task 24 countries in 2017.

For [more information about Task 24](#), see also Chapter III.

Task 25 – Business models for a More Effective Market Uptake of DSM Energy Services

Task 25 focuses on identifying existing business models and customer approaches providing EE and DSM services to SMEs and residential communities, analysing promising effective business models and services, identifying and supporting the creation of national energy ecosystems in which these business models can succeed, provide guidelines to remove barriers and solve problems, and finally working together closely

with both national suppliers and clients of business models. The longer-term aim of this Task is to contribute to the growth of the supply and demand market for energy efficiency and DSM amongst SMEs and communities in participating countries.

The objectives of Task 25 are:

1. Identify proven and potential business models for energy services in different countries, with special focus on (how to create conducive) market dynamics and policies in different countries
2. Analyse acceptance and effectiveness of these energy services and their business models in creating lasting load reduction, shifting or generation and other non-energy benefits and in creating a market
3. Research success and failure factors in 9 building blocks of business models + market dynamics and policies
4. Develop a canvas for energy service business models able to mainstream and upscale and disseminating it through national workshops
5. Creating roadmaps with necessary policies and strategies of different stakeholders to encourage market creation and mainstreaming of business models in different countries
6. Creating and maintaining a digital platform for shared learning, best practices and know-how with national sub departments focused on bringing knowledge to the national market, including banks and other funders!
7. Develop a database including useful contractual formats, business plans etc.

Key accomplishments in 2015:

- The Task identified country specific suppliers, clients, and their stakeholder networks for the Netherlands, Sweden, Switzerland, Austria and established were relevant, national advisory expert networks.
- The focus of both services, target groups and typology of business models was narrowed down, and how the different parameters of success of business models and services will relate to each other in the analysis was clarified. A selection criteria toolkit was developed concordantly.
- A long-list overview of existing services and business models has been completed for all countries except Norway (joined later)
- A shortlist overview of services completed for all countries except Norway.
- A global analysis was performed by CREARA, hired by the ECI partner.
- An individual analysis of all shortlisted cases is being performed, as well as the global analysis: (1) Deliverable 2 is being drafted for each country, using a format or template developed in close cooperation with all national experts; and (2) deliverable 3 is finished and ready for publication.

For [more information about Task 25](#), see also Chapter III.

Task 26 – Multiple Benefits of Energy Efficiency

Task 26 on Multiple Benefits for Energy Efficiency presented their Work Plan to the Executive Committee in October 2015. The Task was given the go-ahead and will start in February 2016. The Task will be run jointly with the IETS Implementing Agreement.

The objectives of the proposed “Joint Annex” are the following:

- **Analytical toolbox.** The first main objective is to provide businesses’ internal staff (energy managers, facility managers) as well as the external consultants advising them and public programmers, with an analytical tool to be used upstream to better identifying and assessing the MBs.
- **Database.** The second main joint Task objective is to provide practitioners and policy-makers with a data base, which will contain data collected worldwide (at least in all IEA member countries).
- **Marketing & Communication tool.** The third main joint Task objective is to provide businesses’ internal staff, consultants advising them and public programmers with a communication tool, to be used to present MBs in a common and convincing way to decision-makers.
- **Dissemination.** The fourth main objective is to actively disseminate information to policy-makers on MBs and on their contribution to activate the untapped potential of energy efficiency.

The DSM IA is well situated to take on the supervisory Task “Multiple Benefits in Action” and to do so in co-operation with other relevant IEA Energy IAs.

The overall work should cover all aspects of MBs as laid down in the IEA report “Capturing the Multiple Benefits of Energy Efficiency”:

- **Macroeconomic.** (Economic development, employment, energy price changes, trade balance are mentioned. For DSM energy price-changes are of importance for the planning/regulation/market design and employment is for advocating programmes)
- **Public budget** (Several of the issues are complicated and not crucial for DSM planning but since some programmes have an impact on, or are dependent on, tax structures and tax spending there is a need to cover some aspects)
- **Health and Well-being** (In particular indoor climate is an important factor where collaboration can be sought also from other IAs. A particular problem here is the “split incentive” since investors seldom reap the benefits)
- **Industrial sector** (In the same way as above collaboration should be sought with other IAs. Here the incentive cases are simpler)
- **Energy delivery** (The IEA DSM IA has already covered Energy Efficiency Obligations (EEOs) in Task 22. There are however some aspects that need further investigation e.g. energy security and the possible monetisation thereof).

However, two important aspects have been pointed out:

1. purely macro benefits (such as macroeconomics impacts and public budget impacts at national level) have to be assessed at a global level, which seems to be out of the scope for DSM. In addition, energy delivery is firstly a supply and not a demand-side issue.
2. IEA Secretariat and IETS focus on the secondary sector and, within this sector, on energy-intensive industries (i.e. “process industry”, including refineries, bulk chemicals, iron & steel, pulp & paper, cement, food & beverage).

Therefore Task 26 will focus on three main Multiple Benefit (MB) categories:

- MB for municipalities
- MB for the business sector
- Health & well-being benefits for organisations

The Task will be conducted over a period of 36 months, from 1 February 2016 to 31 January 2019.

For more information see [New Initiatives](#) on the DSM website.

Visibility

Maintaining and increasing visibility of the Programme among its key audience continues to be a major activity of the Executive Committee. The principal tools available at present are the Website, the Annual Report, the Spotlight Newsletter, the Programme Brochure, Task flyers and Social Media.

The Annual Report for 2014 was produced and distributed to approx. 250 recipients in January 2015. It pulled together in one substantial document an overview of the Programme's activities and details on each of the individual Tasks.

The Spotlight Newsletter is produced in electronic format only and is designed as a printable newsletter. It is distributed by e-mail to a wide list of contacts. Executive Committee members forward the newsletter to those national contacts that used to receive the printed version or they print and distribute hard copies. Four issues were produced in 2015 and included articles on:

Issue 56 – March 2015

- Task 25: Beware: Energy Efficiency Services in the Making!
- Note from the Chairman: We've got a new logo!
- DSM University
- Task 24: Did You Behave As We Designed You To? – Monitoring and Evaluating Behavioural Change in Demand Side Management
- South Korea: Energy Paradigm Shifts from Supply to Demand
- Italy: IEA National Day

Online version of the Spotlight Newsletter – Issue 56

http://www.ieadsm.org/wp/files/56.Spotlight-Issue56-March_2015.pdf

Issue 57 – June 2015

- Task 15 – Network Driven DSM: Impacts of Demand-Side Resources on Electric Transmission Network Planning
- Note from the Chairman: We don't Google
- Task 17: Demand Flexibility – Dream or Reality
- Task 16: A Role for Facilitators to Play – National Perspectives

Online version of the Spotlight Newsletter – Issue 57

http://www.ieadsm.org/wp/files/57.Spotlight_Issue57_June_2015.pdf

Issue 58 – September 2015

- Task 24 – Helping the Behaviour Changers
- Note from the Chairman – Is DSM getting old?
- Task 26 – Multiple Benefits of Energy Efficiency
- Task 16 – New partners welcome in next phase of EE work
- Task 16 – Facilitators – A role for facilitators to play – national perspectives

Online version of the Spotlight Newsletter – Issue 58

<http://www.ieadsm.org/wp/files/IEA-DSM-Spotlight-Issue58-September-20151.pdf>

Issue 59 – December 2015

- IEA Energy Efficiency reducing energy bills
- Note from the Chairman – Which way are we heading?
- Bright Business – Showcases best-in-class for energy efficiency
- DSM University
- Nova Scotia – energy efficiency: a source and a solution
- New Publication – Austria: The Energy Hunt

Online version of the Spotlight Newsletter – Issue 59

<http://www.ieadsm.org/wp/files/IEA-DSM-Spotlight-Issue59-December-2015.pdf>

At the beginning of a new Task, a flyer is produced to stimulate interest in participating in the Task. When the work is completed, a second flyer is produced reporting on Task activities and results.

Analysis of visits to the website shows a worldwide readership. In 2015, the DSM website was re-designed and given a new logo, and was moved to a Word Press platform. The new website was launched in 1 st July 2015.

The DSM Programme introduced social media to their website in 2010. The number of members on the DSM LinkedIn and Facebook groups and the Twitter account is increasing on a daily basis. Strong relationships with other social media energy efficiency mavens have continued to build in 2015 including the DSM Programme being showcased in the largest industrial energy efficiency social media network, the EEIP (www.ee-ip.org), the 'Energy in Demand' blog (www.energyindemand.com) and the eceee website via columns (www.eceee.org). Social media will continue to be a strong feature of the DSM Programme in 2016.

During 2015, Dr Sea Rotmann, Visibility Committee Chair, has continued the development of a communications strategy for the DSM Programme (together with the Chair/s, Secretary, Editor and Programme Advisor), and individual communications and dissemination plans for all current Tasks (with Task Operating Agents). The plan was presented and finalised in 2015.

Participation in the IEA DSM Programme as of December 2015

Task	1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	18	19	20	21	22	23	24	25
Country	ST 8	ST 9																					I + II	
Australia		*		*		*						*		*		*								
Austria				*					*						*	*							*	*
Belgium	*	*				*									*								*	
Canada	*	*										*												
Denmark	*		*	*		*	*				*	*												
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France	*	*	*	*		*		*	*			*	*	*		*	*	*	*	*				
Greece						*		*		*	*							*						
India														*		*	*	*	*		*			
Italy		*		*					*	*		*	*			*						*		
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Sweden	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Switzerland		*		*		*		*					*		*					*	*	*	*	*
United Kingdom		*	*	*		*	*	*			*	*	*					*	*	*	*	*	*	*
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World Bank/ Tanzania					*																			
RAP																					*			
ECI																								*
EfficiencyOne																								



Operating Agent and participating country



Operating Agent



Co-operating Agent and participating country



Participating country

Completed Tasks ST = Subtask

Benefits of participation

Enables complex and/or expensive projects to be undertaken. Many countries do not have the expertise or resources to undertake every desirable research project. A collaborative project enables the strength and contribution of many countries to undertake collectively what individually would be prohibitive.

Enhances national R & D programmes. National researchers involved in international projects are exposed to a multiplicity of ideas and approaches.

Promotes standardisation. Collaborative work encourages the use of standard terminology, notation, units of measurement, while also encouraging the portability of computer programs, and common methodology, procedures and reporting formats make interpretation and comparison easier.

Accelerates the pace of technology development. Interaction among project participants allows cross-fertilisation of new ideas, helping to spread innovative developments rapidly, while increasing the range of technologies and approaches employed.

Promotes international understanding. Collaboration promotes international goodwill, and helps participants broaden their views beyond their national perspective. The IEA DSM Programme provides an international platform of work. This is the only international organisation that addresses management of energy on the demand side of the meter in a collaborative manner.

Reflects latest trends and issues. New areas of work are continually added to the programme's scope to address changes in the energy market.

Enables complex and/or expensive projects to be undertaken. Collaborative projects allow countries to undertake projects that otherwise would be prohibitive due to lack of expertise and/or resources.

Saves time and money. Countries fund a portion of the international team's work, but have access to all project results.

Creates important networks. Specialists active in Demand Side Management, Demand Response, and Energy Efficiency, have the opportunity to work with other key experts from around the world.

Increases the size of the technology database. Collaboration among multiple countries creates a pool of information much larger than a single country could assemble by itself.

Permits national specialization. Countries can focus on particular aspects of a technology's development or deployment while maintaining access to the entire project's information.

Promotes standardization. Encourages the use and diffusion of standard terminology, notations, units of measurement, methodologies, and procedures and reporting formats to make interpretation and comparison easier.

To learn more

Visit the DSM Programme web site www.ieadsm.org to view:

- Project publications – handbooks, guidelines, technical reports and data bases
- DSM newsletters, Spotlight
- DSM Annual Report
- Contact information
- Conferences, workshops and symposia

Streamlined Steps for Joining the DSM Implementing Agreement (DSM IA)

If you are from a country that is a member of the IEA or is currently participating in an Implementing Agreement, take these three steps and you can join the DSM IA:

1. Talk to Us
2. Meet with Us
3. Write to Us

And You Are In!!

Details below:

Interested Country - DSM Programme

1. Talk to us – Your country expresses interest in joining the Implementing Agreement by contacting an Operating Agent, the Chairman or the Executive Secretary. The Executive Committee promptly provides information on activities, participation obligations, benefits and the process to join the Programme. The Executive Committee also invites country to attend Executive Committee meetings and Task meetings of interest.
2. Meet with us – Your country attends Executive Committee meetings and Task meetings as an Observer.
3. Write to us – If your country is interested in joining the DSM Programme, your country sends a letter to the IEA Executive Director identifying the contracting party, who will sign the Implementing Agreement, the Executive Committee member from that country, and the Task or Tasks that country will participate in. Immediately upon receiving a copy of that letter, the DSM Programme will consider your country to be a participating country

If your country is not a member country of the IEA or not participating in an IEA Programme, after Step 1 the Executive Committee will forward your country's expression of interest in joining the DSM Programme to the IEA Secretariat for consideration and approval. Once that approval has been received, the DSM Executive Committee will vote to invite that country to join the Implementing Agreement. If favourable, the Executive Committee will invite your country to the next Executive Committee meeting, leaving Step 3 to complete the process to join.

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CHAPTER II

DSM Priorities and stories in Participating Countries 2015

AUSTRIA

The Energy Hunt – an Energy Saving Competition of Groups of Households¹

The Concept and the Aim

The general idea of the campaign is an energy saving bet between cities and their citizens. A group of five to twelve households promised to save at least 9% of energy (electricity and heat) during a campaign period of four months – normally during the winter period.

In order to measure the energy savings, participating households had to meter their energy consumption and to enter the respective data into an online tool. This tool automatically calculated the expected energy consumption of the household until the end of the campaign. In this way, participants got an idea if they would perform well or if they would have to increase their energy saving efforts. All groups of households that managed to reach the energy saving limit of at least 9% were awarded in a special energy-saving ceremony with some smaller prizes and certificates.

The energy-saving activities of participating households had to focus on behavioural changes. In addition, some smaller investments in energy-saving products were allowed. Nevertheless, energy saving activities should not lead to a reduction in the comfort levels of the participants – so that nobody would suffer from low indoor temperatures during winter in order to win the challenge.

A core element of the campaign was the co-called ‘Energy Master’: Each group had one enthusiastic person who coordinated the members of his or her group and supported them around organisational issues. When it comes to the question of “how to save energy” three levels of support were implemented in the campaign:

- a) Energy saving tips (print and online materials)
- b) Training of the Energy Masters
- c) Support within the groups of households (“friends helping friends”)

It was the idea of the campaign that people come together to compare their energy bills, discuss the reasons of variability in energy costs and identify promising measures to save energy.

¹ This DSM story is a summary based on the Task 24 – Subtask 2 report for Austria: Gerhard Lang: The Energy Hunt (with comparison to CO₂-Management), Sept. 2015. <http://www.ieadsm.org/wp/files/Subtask-2-Austria-Energy-Hunt.pdf>

The quantitative targets of the campaign are the reduction of energy consumption and greenhouse gas emissions in households. In addition to these “material” targets, the project also addresses social and individual targets:

The social target of the campaign is to bring people together to discuss environmental topics, to define and reach a common goal and to give support to members of their own group or to other participants.

The individual target is to change some behaviours of the participants long-time, i.e. to continue after the campaign. This includes buying new energy efficient appliances, checking and fitting the settings of appliances, computers, hot water boilers, heat pumps, turning down indoor temperature etc. and to change some daily routines (like turning off artificial lighting, cooking with a pressure cooker, applying power strips to avoid stand-by waste...).



Figure 1: the marketing of the Energy Hunt

The Energy Hunt was part of the energy saving competition “Energy Neighbourhoods 2”, funded by the EU within the Intelligent Energy Europe (IEE) Programme. It took place in 16 EU Member States. The concept was based on the experiences gained by the project “Klimaatwijken”, set up in Flanders with support from the Flemish Government. In the course of the EU funding, the project was undertaken twice in Austria in the province of Styria: in Winter 2011/2012 and Winter 2012/2013. Another campaign without support of the EU and with some conceptual changes was implemented in the Winter of 2014/2015 by the Styrian government within the “Ich tu’s” campaign. The Energy Hunt competitions were coordinated and implemented in Austria by Graz Energy Agency.

The Methodology

The Energy Hunt is based on a systemic, social approach, including the individual and material context. Actors of the campaign (the participating households) are operating in an inter-personal network. As the campaign is embedded in a bet on the municipal level, aspects of community cohesion and collaboration are also addressed.

Behavioural changes realised by the Energy hunt are caused by the following models:

- a. Change via social networks: groups of five to twelve households are working together to save at least 9% energy in average in all of these households. Members of this group of households meet to exchange information and to support each other.
- b. Change by learning: people get informed by the project organisation team (directly via printed information materials, the homepage, newsletters and meetings as well as indirectly by training representatives of the cities and the Energy Masters.
- c. Self-regulation & feedback: every household records the individual, current energy data and gets a personal forecast on their achievement of the 9% energy saving goal. In this way, participants are able to check if they are on track or if they have to increase their efforts. In addition, every household gets mobile energy consumption meters to check the level of energy consumption of the electric appliances. Feedback is not coming only from technical infrastructures – feedback is also given by members of the respective group of households, e.g. during the group meetings or discussions with the Energy Masters.
- d. Emotion raised by gamification: all groups managing to save at least 9% energy are winners in terms of the project – they have won the bet against their city and are awarded in the course of a final event.

The Results

8 Styrian Cities took part in this programme in year two. In the third round the competition was expanded to all people living in Styria.

In total, in the betting periods 560 Styrian households with more than 1,600 people took part in the Energy Hunt. These were able to save 11.2% of energy within the betting period, on average. In total 76,000 kg of CO₂ emissions could be avoided, which corresponds to a saving of 170,000 kWh of energy in total.

Best performing households reached energy savings of 19% in the first period and 26% in the second period. Higher savings were not expected by the Austrian organisation team – until the third edition of the Energy Hunt: the winning household managed to save energy by more than 67%!

Nevertheless, not all groups stayed the course of the campaign. Approximately 5% of participating groups dropped out of the campaign during the challenge. And not all of the “finalists” managed to reach the 9% limit. Some groups even did not save any energy during the campaign. In most of these cases this was related to additional members in these households (babies), different circumstances (e.g. retired people or vacations in the reference period).

The project team of the EU-project “Energy Neighbourhoods 2” has highlighted the following: “The social aspect of the project and the commitment of the Energy Masters have been identified as key factors for the success of the project. Saving energy together, motivating each other to keep going and being supported by an Energy Master who knows the participants well, are elements that really keep the team together and are vital to the neighbourhood’s success and the success of the project overall. ...

The Energy Neighbourhood project has shown that small changes in behaviour can contribute to significant home energy savings. For this project to work, however, and to bridge the gap between knowledge on how to save energy and making actual changes to attitudes and practices, there are other key elements that need to come together: the

provision of relevant energy advice; ensuring that the project is fun and motivational – the use of competition and the social aspect of working as part of a team scored highly in this respect; a working calculation tool and continuous support from the organiser of the project.”

BELGIUM

A Belgian story about demand response: a network operator perspective

Once upon a time in the Kingdom of Belgium ...

Not so long ago, the Belgian electricity sector was vertically integrated from production to delivery, like in most European countries. Exchanges with neighbouring countries were mainly driven by network security purposes.

Since the liberalisation of the Belgian electricity sector at the very end of the 90s and the subsequent unbundling of activities, in the context of the creation of the EU’s internal energy market, the situation has changed dramatically. So have the network operating activities, with separate transport and distribution operators.

Another game changer ...

The integration of significant and growing volumes of (variable) renewable energy sources and the decline of conventional (supply) resources in recent years are challenging network operating activities, while national markets are becoming more and more interconnected. Altogether, these changes are moving the centre of gravity for decision making closer and closer towards real-time while at the same time the system is operated closer to its limits. Controlling the whole network poses many new challenges, increasing the need for coordination and the development of new concepts and technologies.

New players, new solutions ...

In this context, demand response (DR) has gained momentum, offering ever increasing flexibility opportunities to help balancing the network. At the TSO level, demand participation can be used either for frequency control through primary reserves directly connected to the TSO grid, or for balancing power purposes using tertiary reserves, either through interruptible load on TSO grid (“R3 ICH”) or through (big) end users with a dynamic consumer profile (“R3 Dynamic Profile” or “R3 DP”)².

Demand participation (through the tertiary reserves) has many advantages:

Interruptible load (R3 ICH), provided by industrial consumers with flexible processes and/or aggregators, is adapted to load constraints, with a limited number of activations per year and a limited duration, per activation and over the contractual period. It is a highly flexible and fast product, and the most efficient solution to deal with sudden outages of big power plants.

R3 DP is used to de-saturate the balancing market and can replace part of the R3 contracted from production units. It is directly provided by aggregators and it allows DSO-connected flexibility to participate.

² The Belgian TSO has developed in 2014 a new product called the “strategic reserve” to deal with the security of supply challenges during the seasonal peak period, in which demand side resources can participate.

Market perspectives and new challenges ...

Year by year, volumes dedicated to demand side participation for balancing products are increasing³ whereas the product offer is being diversified⁴, allowing smaller market players to participate.

However, the growing participation of demand side resources connected to the distribution grid to the balancing market involves new (contractual and operating) challenges at DSO level. Whereas a general legal framework is still required to enable the development of a flexibility market and demand side participation at DSO level.

ITALY

Latest news about DSM in Italy

The White Certificates mechanism, enforced since January 1st 2005, is by large the main policy instrument to promote energy efficiency in Italy and represents one of the first experiences worldwide of implementation of a market-based tool for the promotion of end-use energy efficiency.

The mechanism consists in a mandatory regime for Distributors of electricity and gas serving more than 50,000 customers, in which each Distributor must reach every year an energy efficiency target related to the amount of energy delivered. Obligated parties have three options to comply to their obligation:

1. to directly implement energy savings projects on final end users;
2. to develop energy savings projects on final end users in collaboration with third parties;
3. to buy White Certificates from parties whose projects are “producing” efficiency in excess to their targets (market-based component).

Non-complying Distributors have to pay a sanction. The rationale for trading is the possibility to guarantee, at least in principle, that savings will occur where it is more economic.

Efficiency projects can be implemented in any end-use sector: Industry, Residential, Tertiary, Transportation, Agriculture and Public Lighting. After an evaluation procedure is carried out, every eligible project is awarded with a number of White Certificates which depends on the acknowledged energy saved (1 White Certificate= 1 toe saved). The savings are measured according to the principle of “Additionality”, i.e. the projects implemented in the White Certificate mechanisms should realize savings which are in addition to the savings which are realized anyway due to other existing supporting policies and therefore are measured with respect to a defined “Baseline”.

Complying Distributors are also entitled to a reimbursement of the costs sustained which depends on the market price of the White Certificates.

³ Elia, the Belgian TSO, contracted 261 MW R3 ICH and procured 60 MW of R3 DP sourced from customers in 2015.

⁴ e.g. for R3 DP : short and long term tenders, capacity offers for smaller volumes, fixed volume (« drop by ») or fixed shedding limit (« drop to ») flexibility, use of submetering, ...

After ten years of enforcement and more than 20 Mtoe of certified savings (by the end of 2014) the mechanism is now on the eve of a major upgrade, designed to make it able to achieve at least 60% of the national targets for energy efficiency in 2020, according to the National Energy Strategy.

In the coming years, in fact, new Guidelines are expected to go into force, with the aim to strengthen and qualify the mechanism and, at the same time, to solve some critical issues encountered in the implementation phase, such as:

- risk to count savings and attribute certificates for potential future savings that could not be realized, due for example to closure, relocation or early retrofit of the facilities;
- need to update the role, the resulting responsibilities and rights of the agents involved in the implementation of a project;
- need to timely update the evaluation methodology of projects, so to take into the account the evolution of the technology, of the market and of the regulation;
- absence of an effective way to take account of technological progress in the life of the project, which should lead to review the duration of public support.

Moreover, contacts are under way with the European Commission to investigate the applicability of the new rules on state aid to the promotion of savings through market models such as white certificates, and in order to assess any Reporting requirements attached. All this taken into account, the revised mechanism will:

- promote the skills of the legal entities admitted by foreseen their compliance with the new European Standards for ESCOs and for Experts in energy management;
- eliminate the risks of over-compensation of projects;
- reward the most efficient technologies through a clearer definition of the principle of additionality;
- rationalize, harmonize and differentiate appropriately the tools supporting energy efficiency in force, in order to better direct the resources available;
- review the procedures for the recognition of White Certificates in order to eliminate the risk of recognizing them for savings that may not be realized;
- update the roles of subjects such as the developer of the project and the participant customer;
- specify the procedures for carrying out checks.

SOUTH KOREA

The importance of demand side management has significantly been gaining its prevalence in energy sector over recent years in Korea. In accordance with the Second Basic Energy Plan(2014-2035), the government has presented “The 5th Energy Use Rationalization Plan” at the end of 2014, which has set the nation’s mid-term goal to reduce 4.1% of projected total final consumption and improve 3.8% in energy intensity(TPES/ GDP) by 2017. It is aimed to achieve such goals through the advanced demand side management policy distinctively driven by new technologies and market scheme rather than government regulated energy conservation policies.

In addition, the government announced the upgraded strategy to boost new industry for energy sector by 2030 in this November. The principal ideas in the strategy include energy prosumer, low carbon power generation, electric vehicles, and eco-friendly manufacturing, and various innovative and transformative programs integrated with ICT are planned throughout the energy field. In terms of building sector, zero-energy building policy will be implemented gradually as mandatory for all newly constructed buildings by 2030. For the industry, energy efficiency smart factories and eco-friendly manufacturing process with new technology is expected to expand. Furthermore, disseminating electric vehicles will be actively sought after through fostering EV-related businesses and infrastructures, and the part of the plan is to replace vehicles in Jeju Island, the biggest island in Korea, with the electric vehicles until 2030.

According to the plan, It is important to note that the so-called “energy prosumer market” will be opened for electricity market in which customers can sell the amount produced or saved through renewable energy, energy storage systems(ESS), and electric vehicles. Prior to this plan, demand response has already been allowed to participate in Korea’s wholesale electricity market since April 2014. It was implemented as one of the Korea’s “Creative Economy” initiative which has different measures to deal with domestic energy demands and to respond to global climate change.

On behalf of the government, KEA(Korea Energy Agency), formerly known as KEMCO has been implementing various measures regarding energy efficiency, renewable energy and GHG reduction in Korea. Among those measures, it is remarkable for newly introduced program this year to promote energy efficiency, which is called the Energy Efficiency Resource Market Pilot Program. It is to trade what has achieved through the energy efficiency projects regarded as resources in the market. Since it has not been established a capacity market in Korea yet, as a pilot program, it was instituted for participants to compete in an auction format and receive subsidies based on the demand reduction(kW) after the post-installation M&V utilizing ICT.

Through this Pilot Program, the total of 10 billion KRW(9 million USD) will be allocated for the energy using equipment(e.g. LED, inverters and motors). Qualified EE resource is replacing devices that can continuously reduce the peak demand over the life cycle without additional control or dispatch after installation of energy using equipment. LED and inverter have to reduce at least 20kW and 30kW respectively in order to participate. Such energy using equipment has to be performed during summer peak period of time, 2 to 6 pm from July to September excluding weekends or public holidays as equal to before the installation.

EER providers must participate within the determined bidding range of each item. Winning bids will be selected on KRW/kW ranking up to the each item’s available budget. Although the cleared project should be compensated based upon the actual measurement, considering receptivity to such new pilot program and initial difficulties of M&V, 50% of subsidy is provided after the installation and the rest 50% after the post-installation M&V for the first year of the EE pilot program.

In this year, 391 projects were cleared through three auctions and the total of expected demand reduction is 40.4MW. Smart meters and LTE modem are installed at LEDs and inverters from the cleared projects, and consequently electricity consumption data and inverter frequency are reported to the server at KEA in every 15 minutes. As the device performs normally during the specified peak hours, the amount of peak reduction is measured and, in turn, it is compensated as per kW basis.

It is planned to continuously develop the EE Pilot Program through adding more items such as heating and cooling facilities and improving M&V protocol and infrastructure.

THE NETHERLANDS

In October 2015 for the second time a National Energy Outlook⁵ (NEO 2015) was published. We summarise several general observations from this outlook, as well as information on energy savings and the electricity market.

Faster growth in renewable energy

As a result of the efforts by the public and private sectors and by citizens, combined in the Energy Agreement, the growth rate of renewable energy is increasing. Whereas an increase of around 3 percentage points was realised in 2000–2013, the forecast for the period 2013–2023 is 10 to 11 percentage points. Policy incentives will be necessary in order to realise further increases after 2023.

Fall in energy consumption and greenhouse gas emissions not yet a structural trend

Energy consumption and greenhouse emissions fell until 2013. This is not yet a structural trend, however. Energy consumption will remain stable or decrease slightly until 2030. Greenhouse gas emissions will fall only slightly after 2020. This relates partly to a presumed increase in electricity production in the Netherlands due to falling imports and rising exports. However, this increase is subject to the ETS emissions ceiling, which balances the local increase in the Netherlands with reductions elsewhere in Europe. Greenhouse gas emissions outside the ETS sector are no longer showing a rapid decrease. The stagnations described here are probably related to the lack of a specific climate and energy policy for the period after 2023.

A long-term perspective on climate and energy policy is necessary for setting priorities

The lack of a concrete long-term perspective in the Netherlands makes it difficult to make decisions and choices regarding the innovations that are needed. In many cases, it is not easy to achieve proper coherence between the various necessary steps in the innovation process. In neighbouring countries it is evident that a long-term perspective also helps in structuring energy-transition policy, setting priorities at the national level, and also in consulting and coordinating with neighbouring countries.

Tipping point

These observations support the conclusion that energy supply in the Netherlands is at a tipping point. On the one hand there are signs that the transition to a sustainable energy system is being effected: energy efficiency is increasing, energy consumption and the related air pollution have fallen, and the share of renewable energy will increase in the years to come. On the other hand, the signs are not very robust: although non-CO₂ greenhouse gases have shown a downward trend since 1990, CO₂ emissions have been constant for many years, the contours of a sustainable energy system are

⁵ The National Energy Outlook 2015 is produced by order of the Dutch Ministry of Economic Affairs, the Ministry of Infrastructure and Environment, The Ministry of the Interior and Kingdom Relations and the Standing Committee of the Energy Agreement and established with contributions by the Netherlands Environmental Assessment Agency (PBL), Statistics Netherlands (CBS) and the Netherlands Enterprise Agency (RVO.nl).

still vague, and a specific long-term perspective for this is lacking. Lack of clarity with regard to the position of natural gas is contributing to the uncertainty.

Energy savings

The average energy-savings rate in the Netherlands will increase in the coming years

In the period 2000-2010, the average energy-savings rate in accordance with the Protocol for Monitoring Energy Savings was 1.1 percent per year. Under existing policy, this rate will increase in the period 2013-2020 to approximately 1.3 percent per year. Taking intended policy into account, the rate in that period is expected to be 1.5 percent per year. The increase in the energy-savings rate in relation to the period 2000-2010 is largely attributable to the provisions of the Energy Agreement. The savings referred to here relate to primary energy and are not the same as the 1.5% energy-savings target in the Energy Agreement, which relates to final energy consumption. In the built environment in particular, an increase in the energy-savings rate is expected. In the longer term (2020-2030), an average annual savings rate of 0.9 percent is projected. Despite the fact that certain policy measures will continue to have an effect in this period, this rate is lower because the remaining potential of current energy-saving measures will decrease over time. The energy-saving effect cannot be directly compared to a reduction in final energy consumption. This is because energy saving is defined as the difference between actual energy consumption and reconstructed reference energy consumption, which indicates what consumption would have been without energy-saving measures. The reference consumption is determined by all manner of developments that have nothing to do with saving energy but do affect final energy consumption, such as economic growth, and growth distribution between sectors.

The Netherlands is expected to easily achieve the energy-savings target set in the EU Energy Efficiency Directive

There is a relatively high level of uncertainty with regard to the Netherlands achieving the target in the directive. Under existing policy, the Netherlands will almost attain its target of 482 petajoules in energy savings by 2020. If intended policy is also taken into account, it is expected that the target will be achieved by a wide margin. This also fulfils the expectation in the Energy Agreement, namely that the Netherlands will comply with the EU Directive. In this context it is important to note that discussions are still on-going in Europe as to which savings the Member States are allowed to count.

The effects of the measures in the Energy Agreement will become clearer, but the energy-savings target of 100 petajoules will remain out of reach.

This year, the estimate in the NEO also includes the savings as a result of European vehicle standards. The estimated effect of all measures that count towards the Energy Agreement target is 10 petajoules [5-13 petajoules] of savings in 2016 and 55 petajoules [33-76 petajoules] in 2020. This means that both the interim target of 35 petajoules of energy savings in 2016 and the final target of 100 petajoules in savings in 2020 are out of reach. The revision of values from the NEO 2014 is mainly due to the fact that this year's figures include savings realised in the transport sector.

Electricity

Fossil fuels play a predominant role in electricity generation

In the period 2000 to 2010, most electricity was gas-generated. In recent years, and in particular in 2014, the proportion of gas used to generate electricity fell substantially, and the proportion of coal increased. In the period to 2030, coal will be predominant in central electricity generation. However, the share of gas in total electricity production will remain larger than that of coal, as a result of decentralised electricity production by gas-fired cogeneration plants.

In the long term, the proportion of coal and gas used to provide electricity will fall, and that of renewables will rise

Despite all the fluctuations in the proportions of the various types of fuel used in electricity generation in the Netherlands, the long-term trend is clear: the proportion of conventionally generated electricity will decrease and that of renewably generated electricity will increase. In 2013, approximately 82 percent of electricity was conventionally generated. This figure is expected to fall to approximately 60 percent in 2020, and to fall further to around 50 percent in 2030. In 2030, some 50% of all electricity will be generated from renewable sources, against approximately 10 percent in 2013. The remainder of the electricity supply in 2030 will be generated from nuclear power and other sources such as waste incineration.

The electricity market will be increasingly influenced by developments outside the Netherlands

Due to the combination of low coal prices (in relation to natural gas), the low price of CO₂ emission rights, over-capacity and low wholesale electricity prices in Germany, the position of natural gas in electricity production has declined in recent years. In the years to come, this will be reinforced by the increase in network connections with Germany. This will exert further downward pressure on electricity prices. This situation will change in the longer term, however. Compared to the NEO 2014, this NEO assumes a stronger upward trend in foreign electricity demand and a less strong upward trend in production capacity abroad. As a result, the situation for Dutch electricity production from natural gas will become somewhat more favourable again in the long term. In combination with the expected increase in fuel prices, this will lead to a rise in wholesale electricity prices. As result of these developments, in the years around 2022 the Netherlands will switch from becoming a net importer of electricity to a net exporter. This could mean that, despite the increasing proportion of renewable electricity, gas-fired power stations that have been mothballed are re-opened in the decade to come. Developments in the Netherlands depend to a large extent on developments in demand and supply in other countries in northwest Europe.

NEW ZEALAND

The NZ Ministry of Business, Innovation and Employment, with the support of the Electricity Networks Association commissioned the NZ Smart Grid Forum in early 2014. The Forum brings together relevant parties from business, scientific and academic circles, along with policy makers, regulators and consumers and is independently chaired by the National Energy Research Institute.

The Forum's objective is *'to advance the development of smart electricity networks in New Zealand through information sharing and dialogue, supported by analysis and by focussed work-streams where these are considered to be appropriate.'*⁶

The Forum's has a diverse membership including many organisations from outside the electricity industry, has a strong consumer-focus, is lightly resourced and is not directed at the implementation of a specific government policy such as decarbonisation or technology export.

As a result of this, the Forum's work has the credibility of independence and diversity. It has been influential in the development of thinking about the impact of new technologies on the power system including contrasting experiences of free market and regulated investment in smart technology to identify coordination needs that would result in benefits not available to any single investor acting alone.

Market-led investments

The Forum *reviewed recent market-led investments in smart metering and ripple control* upgrades in New Zealand to identify lessons for future smart grid technologies. Both of these relied on market participants investing and were notable for the lack of government or regulatory intervention.

The smart metering and ripple control case studies provide some themes which should be relevant for other technologies:

- **The new smart grid technologies will be fast-changing** – The nature of these technologies means they require a 'trial and error' approach and there is a risk that a particular approach could be a technological dead-end. A market-led approach places the technology risk with participants.
- **It is appropriate to use market forces where practicable** – Given uncertainty and rapid change, where practicable there are advantages in relying on market forces to allocate risk and enable on-going incentives for providers to provide value to customers.
- **Data access and interoperability issues are currently left to the market but may need coordination over the longer term** – Efficient use of new technologies and new commercial arrangements may require, for example, access to customer information, to consumption data or to information about equipment such as electric vehicle chargers or on site generation. This may also require new interfaces between participants or between equipment which ideally should be interoperable, allowing switching between equipment types or participants. Data access and interoperability is largely left to the market to resolve through commercial arrangements for new technologies. However, there are opportunities to provide clearer governance and

⁶ Overview of the Forum on the [New Zealand Smart Grid Forum website](#)

coordination of standard formats and processes for the longer term when smart grid technologies become more widely adopted, or potential competition issues arise.

- **Coordination across multiple parties can constrain as well as create opportunities** – Coordination can improve outcomes, but it can result in inadvertently constraining outcomes through deciding too early on a particular technology which is subsequently supplanted by alternatives, or stifling innovation. Improved cooperation could provide earlier opportunities to encourage open dialogue for multiple beneficiaries, to coordinate trials and share experience, and to leverage international experience.
- **There are benefits in sharing network experience** – We are in the early days of understanding the benefits of ‘distribution edge’ technologies. At this stage sharing experiences between networks is important, especially for smaller network companies.
- **It is important to understand and communicate customer benefits** – To achieve the Forum’s long term vision it is important that customer benefits are understood and communicated and that customers are able to take advantage of the benefits and choices as they become available to them. There are opportunities to communicate with customers about how they can monitor their electricity use and the different tariffs and smart appliances that can help them reduce their bills. Similarly there are opportunities for communication with appliance suppliers, or with other industries that may support smart grid development.
- **Regulatory incentives require monitoring to ensure recent changes have their intended effect** – There have been recent changes to the regulation of the electricity distribution businesses but the incentives distributors face warrants monitoring to ensure they do not encourage over investment in long-lived assets that may become stranded, and that they facilitate innovation in technology and commercial models.
- **Artificial uncertainties are a problem** – Companies face investment uncertainties. This is not a concern when it is a function of developing technology, or changing customer needs. It is an issue if it is an artificial uncertainty hindered by regulation or poor communication.

Future technologies

These case studies expose the type of issues and opportunities that will present themselves as customers exploit new and emerging technologies in the future.

The Forum’s work on future scenarios has identified the potential for radical transformation in customer choice and benefit as the costs of battery storage, electric vehicles and photovoltaic generation fall. We note however that questions of standardisation and interoperability have been raised overseas as subsidies have accelerated the rate at which consumers invest in them – from electric vehicle charging infrastructure in London⁷ to the standards for photovoltaic production⁸. It will be important to monitor whether similar issues emerge through New Zealand’s adoption of these technologies and, where possible, anticipate and pre-empt them.

⁷ <http://www.telegraph.co.uk/motoring/green-motoring/11184799/Londons-electric-car-infrastructure-falling-into-ruin.html>

⁸ <http://www.theglobeandmail.com/globe-debate/the-darker-side-of-solar-power/article24649804/>

NORWAY

Smart meters – smarter consumers

By 2019 all Norwegian households will have installed a smart electricity meter. This technology deployment represents the starting gun of something close to a revolution in the power system. It meters, of course, electricity consumption – accurately and at a time resolution down to a quarter of an hour. Metered values are recorded and automatically reported to the grid owner, freeing the consumer from this “chore”. Moreover, the communication capabilities of the smart meter enables services and functions that have been impossible within the existing “dumb” technology. Both existing and prospective actors within the power market are now working hectically to shape and create content to this technology shift.

Why smart meters?

The date of complete rollout of the smart metering infrastructure is set by national regulation, and it is probably fair to say that not all grid owners have embraced this requirement with enthusiasm. One relevant question asked by these actors is related to what problems we aim to solve with this technology. The answer to this question will vary in an international context, depending on the characteristics of the national power system. In Norway the answer will be related to not only the current situation, but also to the expected future developments in the electricity system. In the short perspective, a main challenge is related to bottlenecks in the grid. These bottlenecks are found in certain situations between production regions at the transmission level, or localized in branches of the distribution grid. These limitations are related to the power peaks of the household electricity demand, typically morning and afternoon during the work-week. The Norway specific dependence on electricity for heating (water and space) and cooking, contributes to these peak loads. Periods with cold temperatures during winter are particularly challenging to the Norwegian power system, due to the high and lasting power demand for space heating. In this situation tools for both energy efficiency (reduced energy need) and load shifting (reducing peaks) are needed.

In a longer time perspective, we expect a fundamental transformation of the power system. First of all, more energy loads or functions will be integrated with the power system. Electric vehicles will be one obvious load, already becoming part of the Norwegian energy system, energy storage could become another function. Second, distributed small-scale generation, e.g. photovoltaic, wind and hydro, will grow in the future. This means an increasing complexity of the system with more components to coordinate, with more complex energy flows, and actors changing roles between energy demander and supplier and vice versa from one instant to the next (in other words, they become prosumers). Third, the Internet of things makes possible communication and coordination even among devices in the system, opening for a degree of accuracy in system optimization that is not possible today. One of the main benefits of this smart grid is the avoided or reduced need for investments in capacity expansion of the existing grid. The power system of the future will be fundamentally different from the current, and the smart metering and communications infrastructure will be the backbone in this system.

Learning the smart grid

Fundamental system transformations, of which a full-fledged smart grid would be an example, usually do not come about quickly or painlessly. Given the investment in the smart metering infrastructure: Which are the best services and functions to build on this infrastructure, how do we design and implement them, and which actors will play roles in this market development? The Norwegian national energy agency Enova SF and the Norwegian Water Resources and Energy Directorate have launched a large project to start finding answers to these questions. Based on a tendering procedure, seven energy companies have been chosen to implement various pilot tests involving 25.000 homes. The seven “winners” are EB Strøm, Eidsiva Marked, Fjordkraft, Follo Energi, Lyse Energisalg, NTE Marked og Ringeriks-Kraft Strøm w/partners, and the main theme of this project is to explore the potentials related to the use of real-time consumption data. The cost frame of the project is 6,3 mill Euros.

Expected project outcomes

Paradoxically, the smart meter technology as such “disconnects” the consumer even more from his/her consumption, since manual meter readings become superfluous. Some kind of mechanism to “reconnect” the consumer to the household’s energy use is therefore necessary. Existing research indicates that a well designed feed-back presentation of household consumption data can trigger savings in the order of 10 % or more, resulting mainly from increased awareness of own energy use followed by appropriate behavioural adjustments. This project will look into this issue by exploring various technologies for real-time information feed-back, using different presentation platforms and media such as smartphones and tablets in addition to more dedicated displays. Energy saving is the aim of this part of the project.

The peak load problem is not necessarily solved through energy savings. Cutting the peaks requires that consumers refrain from certain high load uses during peak periods. This behaviour can be achieved in different ways, ranging from voluntary non-use, via technological solutions (including timers) to economic incentives. Economic incentives could be a time-of-use tariff, which may reflect also the peak load grid cost in addition to the peak energy price. Allowing for remote control (by grid owner) of domestic loads, in exchange for a grid tariff discount, is another incentive model that is facilitated within a smart metering infrastructure. These are examples of approaches to the peak load issue that will be explored in this project.

The *Smart meter – smarter consumers* project commenced in 2015 and will run through 2021. Project participants look forward to launching the practical trials, and to start sharing results and experiences with the community.

NOVA SCOTIA, CANADA

Energy efficiency set to compete in Nova Scotia

Contributed by: EfficiencyOne

Canada is often marvelled for its sheer size. Just shy of 10 million square kilometres, it is the second largest country. More than 35 million Canadians live here, dispersed throughout its ten provinces and three territories.

Nova Scotia, one of its Atlantic provinces, is almost a contrast of that in terms of size. It is the second smallest province in Canada, topping just over 55,000 square kilometres of land, and home to less than one million people. And yet, it is this diminutive province that's representing Canada as the first in the country to join the International Energy Agency – Demand-Side Management (IEA-DSM) group.

This is our story

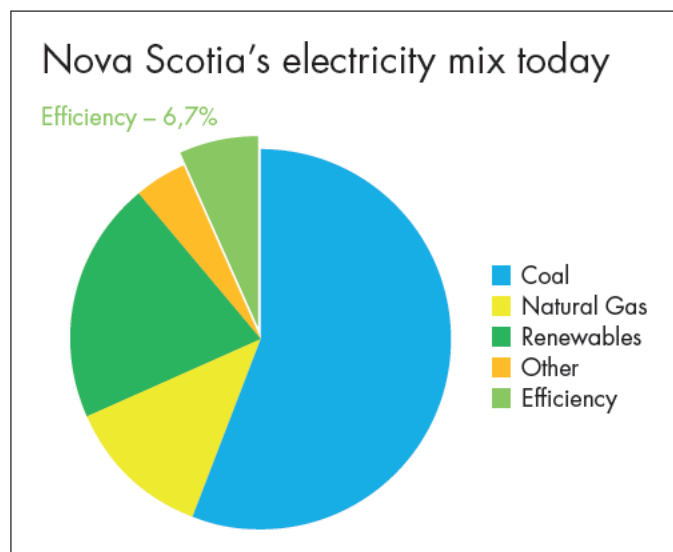
Transformative change has been happening quietly in Nova Scotia's energy industry for the past several years. As a province that is still disproportionately dependent on fossil fuels, with some of the highest electricity rates in the country, it's transformation that needs to continue.

Provincial legislation established *EfficiencyOne* to operate Canada's first electricity efficiency utility, *Efficiency Nova Scotia*. We also deliver non-electric efficiency and conservation services through a contract with the Province of Nova Scotia, and operate on a non-profit basis.

Nova Scotia is the only province that treats energy efficiency as a "supply" to our electricity system. Energy efficiency competes with other supply options like wind, coal, and natural gas. Efficiency can compete, now costing around \$0.02 to save a kilowatt hour versus about \$0.12 cents to produce and deliver energy.

Already, Nova Scotians have reduced electrical energy consumption through energy efficiency by 6.7 per cent since 2008. We are on pace to achieve a 12 per cent reduction by 2018.

This structure sets Nova Scotia apart. Other jurisdictions are looking to this model as an example of how to best establish energy efficiency programs and services in their region. In a recent report, the Alberta government named *EfficiencyOne* as a model to follow to address climate change, and the needs of its electricity market.



Value of efficiency supported

As a supply source, the province's electricity provider, Nova Scotia Power, buys the energy we save. Like the power company and other utilities, EfficiencyOne's work is regulated by the Nova Scotia Utility and Review Board (NSUARB).

After reviewing the Integrated Resource Plan (IRP) and other evidence, as well as hearing testimony from several supporters, the NSUARB ruled that Nova Scotia will invest in efficiency. Most recently, the Province extended our contract to operate Efficiency Nova Scotia until 2025.

In the demand side management business, government policy has a big impact on the successful implementation of services. By legislating policies that include efficiency as a fuel, we're seeing cheaper, greener fuel sources take the place of smoke stacks.

In our Province's *long-term electricity plan*, they highlight the value of efficiency, noting the importance of making significant investment decisions in efficiency measures and programs. Additionally, it says that Nova Scotia's strength in efficiency is a key component of how climate change will be addressed in the future.

The plan also notes the value of bringing energy efficiency measures to First Nation communities, and highlights the success of Efficiency Nova Scotia's residential direct installations in Mi'kmaq homes. The project provided jobs within the community along with training, community engagement, data collection and the installation of energy efficient products.

Do more, save more incentive structure

More than 200,000 program participants have homes or businesses that have benefited from Efficiency Nova Scotia programs. While we're really proud to have helped so many, in 2015 we made the shift to go deeper with these savings.

This fall, we reduced the cost of home energy assessments to make it more accessible. We've also revised our rebate structure so homeowners who do more to control their energy use can access higher incentives.

We are employing similar tactics to help businesses pursue deeper savings. Over the past year, we worked with five large industrial companies to establish a strategic energy management plan. As part of this initiative the companies developed a framework for goals and policies and then engaged employees through education and various behaviour modifications. Preliminary results show that four of the five companies who participated, exceeded their savings target within the year.

Some of most substantial savings have been realized through the work of our onsite energy managers. These experts are contracted to work with large organizations, like hospitals, municipalities and universities, to change energy demand, support capital investments and engage employees.

Cape Breton University recently announced that through its partnership with us, they've been able to offset 800 tonnes of carbon dioxide and 1,400 MWh of energy savings. After first focusing on managing their energy use, they are now focusing on investments in renewable energy. The university believes they're close to offsetting all of their direct CO₂ emissions.

These are the kind of innovative efforts that are driving transformative change in Nova Scotia. We hope to influence continued change within our province and beyond.

SWEDEN

Examples of DSM-related activities in Sweden 2015

The Swedish government has commissioned the Swedish Energy Agency be responsible for, and manage the National Energy Research program.

The Agency therefore finances various R&D and demonstration projects with an annual budget of 1.3 billion SEK, focusing on renewable energy sources and energy efficiency. Additionally a number of private companies and organizations co-finance these projects. <http://www.energimyndigheten.se/en/innovations-r--d/>

1. Smart cities – R&D examples

- Nordic Built – was initiated by the Nordic Ministers for Trade and Industry - is a Nordic initiative to promote the development of sustainable building concepts. The Swedish Energy Agency is, together with the Swedish research council Formas, the funding partners from Sweden. <http://www.nordicinnovation.org/sv/nordicbuilt/>
- JPI Urban Europe is a *joint programming initiative*. The aim is to create attractive, sustainable and economically viable urban areas, in which European citizens, communities and their surroundings can thrive. Currently, JPI Urban Europe has 12 members: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden and the United Kingdom. <http://jpi-urbaneurope.eu/about/who/>

2. Other news of interest for DSM

- *Smart grid Coordination council*. The Swedish government appointed 2012 the Swedish Coordination Council for Smart Grid with representatives from authorities, organizations, the business community and various research settings. The Council's role was to inform, encourage, and plan for the development of Smart Grids that contribute to more effective and more sustainable energy use. One important task for the Council was to develop a road map (for the years 2015-2030) that was presented the 8th December 2014, with recommendations on how to stimulate the deployment of smart grids. <http://www.swedishsmartgrid.se/>. The government will now launch a new Smart Grid Forum in the beginning of 2016, and the Swedish Energy Agency will coordinate this forum. The aim of the forum is to realize the ambitions pointed out in the Smart Grid road map.
- The Swedish Energy Agency co-finances, at the moment, three smart grid pilots in Sweden (were for example possibilities for demand side participation are investigated.) For further information on these projects use the links below:

<http://www.malmo.se/English/Sustainable-City-Development/Climate-smart-Hyllie.html>

<http://www.stockholmroyalseaport.com/en/>

<http://www.smartgridgotland.se/eng/about.pab>

Examples of running R&D programme activities which might include DSM-oriented perspectives

The Swedish Energy Agency has, together with different stakeholders, initiated several programmes, here are some examples:

- The Swedish Energy Agency has allocated 140 million SEK (2013-2017) for a research and innovation program together with the building sector, called Energy Efficient Buildings and inhabitants, and the building sector will allocate at least the same amount of money during the period. This program is concerned with both energy efficient buildings as well as the inhabitants and their lifestyles related to energy use.
- “SolEl”-programme (2013-2017). The programme aims to facilitate integration of solar cells in cities, buildings and the power grid. The programme finances, e.g., projects investigating the potential for increased profitability for solar electricity production through increased self-consumption of solar electricity, including demand side management measures.
- Fjärrsyn is a research programme to strengthen district heating and cooling. The programme is interdisciplinary as well as multidisciplinary and encourages competitive business and technology and efficient and flexible solutions for future sustainable energy systems. It is co-financed by the Swedish Energy Agency and the Swedish District Heating Association. The programme has a total budget of 66 million SEK (2013-2017).
- Energy, ICT and Design is a research and development programme where the Swedish Energy Agency has allocated 60 million SEK (2013-2017). The programme combines behavioural science, design and information technology (ICT) in order to meet the challenges in the future energy area and in particular stresses the importance of interdisciplinary collaboration, design elements - such as ease of use and attractiveness.
- SweGRIDS (Phase 2) has been approved in 2014, to run for 4 years, with a total budget of 206 million SEK. SweGRIDS is the Swedish Centre for Smart Grids and Energy Storage located at KTH and Uppsala University. Started in December 2011, it is a partnership of academia, industry and public utilities, with major funding from the Swedish Energy Agency as well as the corporate partners. There are currently around 40 research projects in SweGRIDS, each involving industrial and academic researchers working with a PhD student or PostDoc.
- *Energy efficiency in the transport sector* (2014–2017). The programme has a total budget of 100 million SEK. The programme’s overall goal is to contribute to the build-up and development of knowledge regarding energy efficiency mainly in land and sea transport by supporting research and development concerning energy efficiency relating to the transport system and its actors (and aspects such as logistics, transport integration, planning, organization, IT, behaviour change).
- General Energy systems research programme (2014–2018) The programme has a total budget of 130 million SEK. The programme contributes to this area by linking social and humanitarian science with technical perspectives, preferably with interdisciplinary approaches. The starting point of the research is that actors, institutions and other parts of the energy system interact with one another.

SWITZERLAND

A DSM Story from Switzerland

Once upon a time ... Somewhere in the Scottish highlands, horses were used to carry out heavy work and increase productivity. However, every month, the fodder for the horses cost a bag full of money. Until one day, a clever mind known by the name James Watt applied an innovative marketing strategy to promote his newly invented steam engine. He said: “We will leave a steam engine free of charge to you. We will install these and will take over the customer service for five years. We guarantee you that the coal for the machine costs less, than you must spend at present on fodder for the horses, which do the same work. And everything that we require of you, is that you give us a third of the money which you save.”

This was the birth of a business concept called “Energy Performance Contracting”.

Every day ... People in Europe and in other industrialized parts all over the world consume a lot of energy for living, electronic devices, mobility and at work. The economy, residential and also public buildings are heavy energy consumers.

But, one day ... Some wise businessmen remembered Mr. Watt’s business concept and brought up the idea “Why don’t we earn money by saving energy”. Energy Service Companies (ESCO) were founded that started to sell so-called Nega-Watt-hours. Briefly explained – like James Watt did it more than 200 years ago – ESCOs sell energy services, they guarantee energy savings and the only thing they ask for is to share the savings. What a great story – everybody is winning: the customers are getting guaranteed energy savings, are profiting from other non-energy benefits such as increasing comfort, and they do not even have to finance it by themselves. The ESCO earns more money the more energy is saved and the environment can breathe a sigh of relief because of the reduced CO₂ emissions and other pollutants.

Because of that ... Once the concept was particularly common and well known overseas, politicians from several European countries were attracted by this market-oriented concept. Energy services focusing on savings found its way on the political agenda and even in legislations. In the last two decades, European public authorities started to use energy performance contracting to increase the energy efficiency in public buildings. The IEA DSM Implementing Agreement is aware of the high potential of energy performance contracting and an international think tank under the operating agent, Jan W. Bleyl, was established. This successful Task 16 recently started its fourth phase.

But ... There is a small island in the middle of Europe. Its breath taking, snow capped mountains seem to build a wall against the concept of energy performance contracting. Let’s call this island Switzerland.

This beautiful tiny country decided in 2011 to phase out of nuclear power and established a new Energy Strategy to secure energy supply for all Swiss residents also in the future. A major pillar of the new strategy, which is currently discussed in Parliament, is energy efficiency. The public authority is requested to give a good example and to act as a role model.

As in other countries, Swiss public buildings are predestined for energy performance contracting projects. There is an energy saving potential and the long-term contracts of up to ten to fifteen years do normally not cause any problems in the public sector.

However, no substantial energy performance contracting projects have been conducted in this sector in the last years. There were only few small projects in public schools that were labelled as “leisure activity” by the project manager of a large ESCO. Besides these small activities, energy performance contracting can still be seen as peacefully sleeping at the bottom of an impressive mountain called potential.

Until, finally ... In autumn 2012, people decided to leave the island and travel abroad to participate in IEA DSM Task 16 in order to benefit from the enormous knowledge of the participants of this think tank. Independently, an ESCO in the French part of the country started successful EPC projects in the private sector. This ESCO was rewarded with the so called “Prix Watt d’Or” – the Swiss Federal Office of Energy’s gold medal for outstanding concepts in energy savings and production.

In a national workshop within the scope of Task 16 in 2013, a small group of ESCOs, facilitators, investors, researchers and people of the public sector discussed the future of the energy performance contracting market in Switzerland. Over the last two years, these discussions intensified, a research project to analyze the Swiss energy performance contracting market started, and finally, the association “swissesco” was founded in autumn 2015. The association reunites all interested stakeholders of the energy performance contracting market and aims to promote energy performance contracting projects in Switzerland. The association is financially supported by SwissEnergy – the agency of the Swiss Federal Office of Energy for energy efficiency and renewable energies.

Furthermore, the Swiss Federal Office of Energy used the upcoming dynamic in this topic to organize another national workshop assisted by the operating agent of Task 16 in November 2015. The workshop aimed to remove existing information asymmetries between ESCOs and customers and to give understanding, especially to those responsible for public buildings. More than 80 participants made the workshop a full success and interest awoke to learn more about the energy performance contracting concept.

And, ever since then ... The awareness of energy performance contracting is rising in Switzerland. First pilot projects are starting. Using the gained experiences and the vast existing pool of information from abroad, Swissesco, in cooperation with the Swiss Federal Office of Energy / SwissEnergy, will develop manuals, sample contracts and further material. This will help to foster this “new” – only 200 years old – energy efficiency concept in Switzerland and contribute to reach the goals of the Energy Strategy 2050.

The end.

UNITED STATES

DSM Developments and Priorities in the United States

Last year's annual report from noted that while the U.S. has a wide diversity measured in a number of ways that affect DSM, such as a diverse people, cultures, lifestyles, geography, weather, type and size of electric and gas utilities and related end-use companies and institutions, and above all a federal system with 50 different states each with their system of laws and policies, overall, DSM continues to expand in the US.

This year's annual report shows the DSM in the U.S. continues its expansion as shown by a number of events and reports:

FERC's 10th Annual Report on Demand Response & Advanced Metering Shows Continued Significant Growth

The Federal Energy Regulatory Commission (FERC) is a national agency that regulates most of U.S. wholesale electricity and the bulk power system. States, in contrast, regulate the retail (customer-facing) side of the electric and gas delivery system that is owned by private electric and gas utilities.

A 2007 law of the U.S. Congress requires FERC to annually publish a report on the status of demand response (for electricity) and advanced metering. Their reports are based on publicly-available information and discussions with market participants and industry experts. The December 2015 report has these findings:⁹

- Deployment of advanced meters continues to increase throughout the country. According to the Energy Information Administration, an additional 8.7 million advanced meters were installed and operational between 2012 and 2013, resulting in advanced meters representing almost 38 percent of all meters in the United States;
- States and various federal agencies continue to undertake significant activities to promote demand response;
- Supported by new policy efforts at the retail level, demand response in conjunction with other established and developing resources and technologies is facilitating innovative grid architectures and system operations; and,
- While demand response barriers continue to be addressed, there is jurisdictional uncertainty [between the Federal government and states] associated with the U.S. Supreme Court's review of [a legal challenge to FERC's involvement with demand response known as] *Electric Power Supply Association v. FERC*"

Federal Government Issues Largest Energy Efficiency Product Standard in U.S. History

The U.S. Department of Energy (DOE) announced in December historic new efficiency standards for commercial air conditioners and furnaces. These standards will save more energy than any other standard issued by the DOE to date. A number of Federal laws over the last several decades tell DOE to issue rules setting energy efficiency standards for a range of products.

These new commercial air conditioning and furnace standards will occur in two phases. The first phase will begin in 2018 and will deliver a 13 percent efficiency improvement

⁹ <http://www.ferc.gov/legal/staff-reports/2015/demand-response.pdf>

in products. Five years later, an additional 15 percent increase in efficiency is required for new commercial units.

Commercial air conditioners, also known as rooftop units, are commonly used in low-rise buildings such as schools, restaurants, big-box stores and small office buildings. They cool about half of the total commercial floor space in the United States.

To finalize this standard, the Department convened 17 stakeholders, including major industry organizations, including the Air Conditioning, Heating, and Refrigeration Institute and Air Conditioning Contractors of America, along with some of the nation's leading manufacturers, utilities, and efficiency organizations. These standards also come after years of industry innovation. Over the lifetime of the products covered in this latest standard, businesses will save \$167 billion on their utility bills and carbon pollution will be reduced by 885 million metric tons.

Energy Efficiency Allowed under Landmark Power Plant Greenhouse Gas Reduction Requirement

In August 2015, the U.S. Environmental Protection Agency (EPA) released a final version of its "Clean Power Plan", a rule that sets individual state targets and performance rates for carbon dioxide (CO₂) emissions from existing electric power plants. The rule aims to reduce carbon emissions 32% nationwide by 2030, relative to 2005 levels for the electricity sector, under the authority of a never-used part of the U.S. Clean Air Act known as "Section 111(d)". The electricity sector is the source of about 1/3 of U.S. greenhouse gas emissions.

The final rule requires that each U.S. state must develop and implement plans that ensure the fossil-fired power plants in their state – either individually, together, or in combination with other measures – achieve the equivalent, in terms of either emissions rate or mass, of EPA's interim CO₂ performance rates between 2022 and 2029, and the final CO₂ emission performance rates for existing fossil power plants within their state by 2030. States, who are now working closely with the electric generation owners in their states and others, to develop the compliance plans that must be filed with EPA, are given a wide latitude of compliance measures to use. These measures include improvements to existing fossil plants, use of new zero-carbon emitting generation such as nuclear and renewables, and emissions trading in their state or with other states.

In addition, states can choose to also use energy efficiency and/or demand response (ie. DSM) as part of their compliance plans, as long as the state submits evidence that meets their requirements for measurement and verification of carbon reductions. The energy efficiency that is allowed is not just end-use energy efficiency, but also use of energy efficiency technologies in the transmission and distribution system, as well as improvement to power plant operating efficiency. EPA's Clean Power Plan will likely further accelerate the growth of all three kinds of energy efficiency, as well as demand response, in the U.S.

Scorecard Shows that Energy Efficiency Measures Continue to Flourish in U.S. States: Massachusetts Edges Out California as Most Energy-Efficient State, Maryland Among Most Improved

The advocacy group American Council for an Energy Efficient Economy (ACEEE) in October 2015 released its 9th annual "scorecard" of energy efficiency policies and measures of U.S. states. This year's scorecard shows Massachusetts edging out Califor-

nia as the most energy efficient state. Several states—including California, Maryland, Illinois, Texas and the nation’s capital, Washington, DC—took major steps in 2015 that improved their ranking.

The 2015 state scorecard can be summarized by:¹⁰

“The top 10 states for energy efficiency are Massachusetts, California, Vermont, Rhode Island, Oregon, Connecticut, Maryland, Washington, and New York, with Minnesota and Illinois tied for 10th place. Massachusetts retains the top spot for the fifth consecutive year based on a strong commitment to energy efficiency under its Green Communities Act. In California, requirements for reductions in greenhouse gas (GHG) emissions, major efforts to achieve energy efficiency in schools, and implementation of a cap-and-trade program earned the state several more points this year, putting it only a half-point behind Massachusetts in the state rankings.

A solid 20 states rose in the *State Scorecard* rankings. California, a leading state, is also one of the most improved states this year. Maryland, Illinois, the District of Columbia, and Texas also deserve recognition for improvement over the past year.

Commenting on the release of the scorecard, ACEEE executive director Steve Nadel said: ‘As states move to frame their plans under the federal Clean Power Plan, this year marks a tipping point for energy efficiency. State policies are increasingly encouraging utilities to invest in cost-effective efficiency, prompting them to adopt new business models that align their interests with those of customers and policymakers. We can see this taking hold in the 20 states that improved their *Scorecard* rank in 2015. Utilities across the United States invested more than \$7 billion in energy efficiency over the past year alone.’”

How Do U.S. Publicly-Owned Utilities Compared with Private Investor-Owned Utilities for Energy Efficiency?

Electric utility energy efficiency policies and programs, which are funded by utility customers (also known in the U.S. as “ratepayers”) have grown tremendously over the past decade in the U.S. During this time, much attention has gone to private investor-owned electric utilities and private power marketers, since they account for about 72 percent (52 and 20 percent respectively) of U.S. electricity sales to end-use customers.

However, over 15 percent of all customers (and corresponding electricity sales) in the United States are served by the public power utility sector. The U.S. has 2013 publicly-owned utilities owned by states, cities, irrigation districts, and public utility districts. While some are large, such as serving Los Angeles, Seattle, Nashville, Jacksonville, and San Antonio, the majority are small cities, with the median size serving 1,750 customers (or about a population of 4,400). Regulation and thus policies are set by local governing boards, often the elected local city council or mayor. In contrast, private investor-owned utilities are always regulated on retail issues, including their use of energy efficiency as a resource, by states.

A recent report by the American Council for an Energy Efficient Economy (ACEEE) looks at the energy efficiency efforts of the smaller but numerous public power sector.

¹⁰ <http://aceee.org/press/2015/10/aceee-state-scorecard-massachusetts>

ACEEE's findings are that:¹¹

"it is definitely possible for municipal utilities to 'hold their own' against their investor-owned neighbors. [ACEEE]identified and surveyed a total of 23 municipal utilities with substantial energy efficiency efforts and achievements. Overall, this group had an average annual energy efficiency spending of 2.44% of revenues, and an average annual savings of 1.0% of sales..... When asked about factors that tend to inhibit aggressive energy efficiency efforts, municipal respondents most often mentioned the concern over revenue loss. In that respect, municipal utilities share that concern with their private utility counterparts."

Reflecting the diversity of U.S. cities, states and regions, there is much variability in the level of energy efficiency activity across the public power sector, but the study documents many examples of aggressive energy efficiency achievements.

What the Cost is of Utility Customer-Financed Energy Efficiency in the U.S.

An April 2015 study by the Lawrence Berkeley National Laboratory (LBNL), funded by the U.S. Department of Energy, gives the most detail and thorough estimates of the full cost of saving electricity through efficiency programs funded by customers of U.S. investor-owned utilities. LBNL defines the total cost of the electricity efficiency resource to include the investment by both the program administrator (typically but not always the electric utility with that cost recovered from the utility customer ultimately) as well as the out-of-pocket costs of efficiency program participants (again, the utility customer) in saving a kilowatt-hour (kWh). It is a valuable metric that utility resource planners, state utility regulators and others can use to assess and compare the relative costs among efficiency programs and between efficiency and energy supply investments.

A previous report (Billingsley et al. 2014) drew upon LBNL's Demand-Side Management (DSM) Program Database to assess the costs to program administrators of saving electricity. For this study, LBNL updated their database with information from 20 states where one or more program administrators reported sufficient data for analysis of total costs. Based on more than 2,100 program years of data, LBNL compared the total cost versus the program administrator cost of saved electricity at the national and state levels, as well as for market sectors and the most prevalent program types.

The U.S. average total cost of saved electricity, weighted by energy savings, was \$0.046 per kWh (2012 dollars) for the period 2009 to 2013 for the LBNL dataset. Of that cost, \$0.023 per kWh on average was the program administrator cost. The report breaks down these costs further, including by the three categories of residential; commercial, industrial, and agricultural; and low-income utility customers.¹²

¹¹ <http://aceee.org/blog/2015/11/yes-municipal-utilities-can-compete>

¹² <https://emp.lbl.gov/sites/all/files/total-cost-of-saved-energy.pdf>

CHAPTER III

DSM University

The DSM University is a Leonardo ENERGY project (through sponsor: Copper Institute) that is targeted at:

- Policymakers interested in learning about the costs and benefits of Demand Side Management and its impact on energy systems.
- Managers keen to learn more about Organisations, Governance, Planning, Programme Structuring and Implementation Methods.
- Programme Implementers wanting “Tricks of the Trade”.

The DSM University (DSMU) is built on 20 years of experience of the IEA DSM Implementing Agreement. DSMU provides access to the knowledge developed in the agreement in a structured way. In addition, DSMU aims to be a community of practice on DSM themes.

At the heart of the DSM-U are webinars. These are developed through our own material and with invited material from external specialists in research and business, and take place monthly.

Accessing the resources of the DSM University requires a one-time registration, which is free of charge.

The DSM-U is located on a web platform that allows Leonardo ENERGY to manage the material in a structured way and provide more formal training material as it develops. The web platform is based on Moodle and allows for a wide variety of interactive services such as forum, chat, wiki, survey, test, glossary etc. The DSM-U is accessed via www.dsmu.org and requires user registration.

Title	Task/OperatingAgent/Presenter	DSMU #
Theme 1 – The logic of DSM		
Behavioural changes are necessary to get the full impact on energy efficiency. What works and what doesn't (part 1)	Ruth Mourik, Task 24	9
Capturing the Multiple Benefits of Energy Efficiency	Nina Campbell, New Task	11
“Do not take away their steering wheel!” How to achieve effective behavioural change in the transport and SME domain” (part 2)	Ruth Mourik, Task 24	13
2. Governance		
Impact evaluation of Energy Efficiency and DSM programmes	Harry Vreuls, Task 1–(9)	5
3. Efficiency – Load Level		
ESCo market development: A role for Facilitators to play	Jan W. Bleyl, Task 16	1
Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes	David Crossley, RAP, Task 22	4
Customized, Systemic, Strategic – the way to succeed with energy efficiency in industry	Catherine Cooremans, Business School of Geneva	7

Taking Stock – 40 years of Industrial Energy Audits	Peter Mallaburn, UCL (eceee)	8
Improving energy efficiency in SMEs – an interdisciplinary perspective	Patrick Thollander, Linköping University	14
Simplified Measurement & Verification for Energy Savings	The Task 16 approach, Jan W. Bleyl	18
4. Flexibility – Load Shape		
ISGAN Annex 2 Spotlight on Demand Management	Laura Marretta, ISGAN	2
Using Demand-Side Management to Support Electricity Grids	David Crossley, RAP, Task 15	3
Smart Grid Implementation – how to engage consumers?	Yvonne Boerakker, Task 23	15
5. Integration		
Managing Variability, Uncertainty and Flexibility in Power Grids with High Penetration of Renewables	Lawrence Jones, Alstom	6
Integrating renewables and enabling flexibility of households and buildings – results and experiences from successfully implemented projects	Task 17 Matthias Stifter AIT, Austria, René Kamphuis TNO, Netherlands	16
6. Business Models		
How to make the best technology even better, BAT becomes BAT+	Hans Nilsson, Task 3	10
Consequences of learning curves for energy policy	Clas-Otto Wene, Wenenergy AB, Sweden	12
From selling Energy Efficiency to creating value	Task 25 – Ruth Mourik	17

Webinar schedule first quarter 2016

January 14th with the title:

“Energy Efficiency Labels. What can be learnt from the European Success Story”.

Presented by Benoît Lebot, who is the Executive Director of IPEEC. Mr. Lebot has had an extensive career in the fields of Energy Efficiency, Climate Change Mitigation and Clean Energy Policies.

February 18th with the title:

“Involving people in Smart Energy: A toolkit for utilities, energy agencies and smart city developers”.

Presented by Ludwig Karg, CEO of B.A.U.M. Consult, who was a senior advisor in the EU S3C project which had the aim to pave the way for a the future Energy System that will:

- provide a variety of new energy related services on existing and new market places
- revolve around end users and address them as consumers, customers and good citizens
- follow approaches from social sciences and behavioural psychology and include experience from other business areas

March 17th with the title:

“Advancing Utility Sector Energy Efficiency in the U.S.: Highlights of the ACEEE National Conference on Energy Efficiency as a Resource”.

Presented by Martin Kushler who is a senior fellow at ACEEE where he directs numerous widely acclaimed national studies of utility sector energy efficiency policies and programs, and provides technical assistance to help advance energy efficiency policies in many states. The conference he will be talking about is arranged biannually and gathers several of the more advanced US utilities to exchange their experiences.

Task 16

Competitive Energy Services

Innovative Energy Services Phase 3 (end) Energy Efficiency and Demand Response Services

Phase 4 (start) Life-Cycle Cost; 'Deep Retrofit'; Simplified M&V; (Crowd)-Financing & ES Taxonomy

Operating Agent: Jan W. Bleyl - Energetic Solutions, Austria

Summary

In Task 16 “Innovative Energy Services”, energy service experts from countries around the world join forces to advance know how, experience exchange and market development of (mainly performance-based) energy services. We view energy services as a ‘delivery mechanism’ in order to implement energy efficiency and renewable energy projects in the context of energy policy and climate change goals.

Main subtasks are country-specific National Implementation Activities, an Energy Services Expert Platform for mutual exchange and support as well as national and international dissemination activities including the DSM University. The Think Tank is the common research platform with key publications like ‘Simplified Measurement & Verification’ of energy savings, Demand Response Services: Economic Pre-Feasibility Model and Case Studies for Austria, the ‘Facilitator’ concept, Comprehensive Refurbishment (‘Deep Retrofit’) business models or the ‘Integrated Energy-Contracting’ business model.

Task 16 is active since July 2006. Phase III “Energy Efficiency and Demand Response Services” ended in June 2015, Phase IV “Life-Cycle Cost; ‘Deep Retrofit’; Simplified M&V; (Crowd)-Financing & ES Taxonomy” started in July 2015 and will end in June 2018.

This annual report focuses on content and key results of the current task work as well as the future work planned. For a more detailed activity and management report, please refer to the bi-annual Task Status Reports.

For more information or to explore options how to collaborate, please feel free to contact the Operating Agent Jan W. Bleyl under +43 650 7992820 or EnergeticSolutions@email.de.

Energy services: a ‘delivery mechanisms’ for energy policy goals

The success of further increasing energy efficiency in all sectors of consumption will play a vital role in coping with the challenges of our common energy future. Avoiding energy consumption by increasing end-use efficiency is a highly effective means to meet all three key targets of energy policies: Security of supply, affordable costs of energy (services) and environmental soundness.

Energy Efficiency (EE) has found its way up on the political agendas over the course of the last few years and is now often referred to as a 'first fuel'. Worldwide, concrete saving targets for CO₂, Renewables and Energy Savings have been declared, although often indicative in the case of energy efficiency.

But what are the appropriate 'delivery mechanisms' to bring energy efficiency and demand response to the end-users? Now and for the foreseeable future there is an urgent need to join forces and to conclude and support all suitable political, regulatory and market-based instruments for the implementation of Energy Efficiency, Renewables and CO₂-reductions.

Performance-based energy services (ES) - also referred to as Energy-Contracting or ESCo service - is not a 'silver bullet' but a many times proven 'delivery mechanism' for implementing energy efficiency measures such as lighting, HVAC or building refurbishment. An ESCo takes over the technical and economical implementation risks and provides performance and output guarantees for the results. ES are also well suited to implement renewable energy systems with guaranteed outputs as displayed in the following figure. Yet Potentials but also limitations, pros and cons and added values of ESCo products in comparison to in-house implementation are often not very well understood.

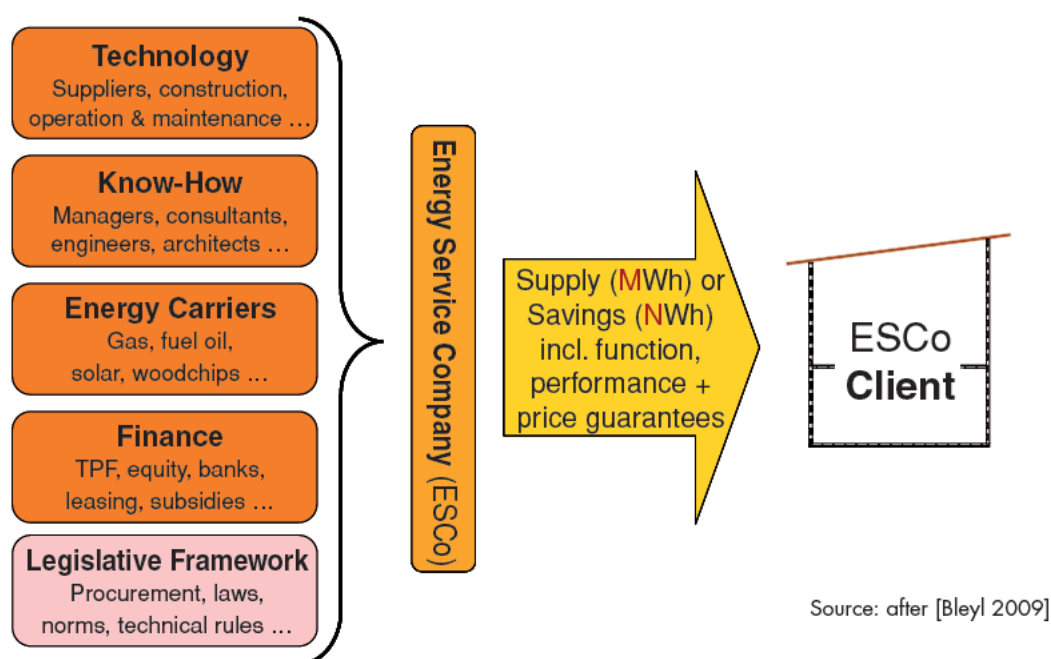


Figure 1: What is Energy-Contracting/ESCO?
An integrated service package with output and performance guarantees for the client

Furthermore, the increasing integration of fluctuating renewable supply sources into ('smart') electricity networks will need to be accommodated by growing balance energy/capacity or other types of markets, which may in part be provided by demand response sources provided by energy service providers (ESP).

Task objectives

Task 16 is working to contribute to the know how, experience exchange as well as project and market development of performance-based energy services. Thus we:

1. Sustain a well established IEA DSM Energy Service Expert Platform for exchange and mutual support of experts, partners & invited guest,
2. Support and follow up *country specific National Implementation Activities (NIAs)* in order to foster ESCo project and market development,
3. Design, elaborate and test *innovative energy and demand response services and financing models* and publish them (Think Tank),
4. Use the Task's Energy Service Expert Platform as a competence center for *international and national dissemination and consultancy services* (e.g. workshops, coaching, trainings ...) and to contribute to the "DSM University"

The underlying goal is to increase understanding of performance-based ES as a 'delivery mechanism' to implement energy efficiency policy goals and projects: Pros and cons, potentials, limitations and added values of ESCo products in comparison to in-house implementation.

Structure of the work and subtasks

Task 16 Phase IV continues to work with its well-established structure. The four operational subtasks are:

1. IEA DSM Energy Services Expert Platform (ES-Platform, subtask 19)
2. Innovative Energy Services Think Tank (TT, subtask 20)
3. Support and coaching of individual National Implementing Activities (NIAs, subtask 21)
4. Dissemination and cooperation (subtask 22)

The following scheme illustrates the general structure of the task extension:

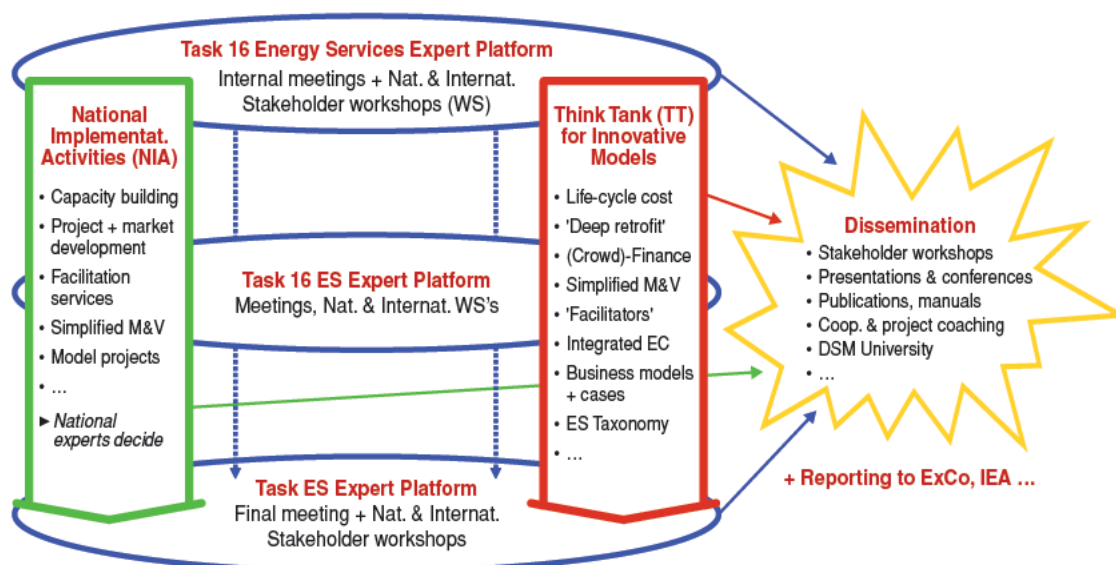


Figure 2: Task 16 – Phase IV: Work structure and subtasks

In the left pillar, the 'National Implementing Activities' (NIAs) such as capacity building or project and market development activities take place according to the individual needs and resources of the participating country.

The Think Tank is the common research platform with key publications like 'Simplified Measurement & Verification' of energy savings, the 'Facilitator' concept, Comprehensive Refurbishment ('Deep Retrofit') business models, Demand Response Services: Economic Pre-Feasibility Model and Case Studies for Austria or the 'Integrated Energy-Contracting' business model. Current topics are Life-cycle cost appraisals, (Crowd)-Finance, Simplified M&V (continued) and ES Taxonomy.

The IEA DSM Energy Services Expert Platform (ES platform) serves as the link between the two pillars and is our internal as well as external communication hub. The results of Task 16 are disseminated in a series of stakeholder workshops, presentations at conferences or workshops and through publications. Furthermore we co-operate with other national and international projects and organizations.

Think Tank results in 2015

The Think Tank has worked on a variety of topics, which have led to publications and presentations at various national and international events. Some of it is work in progress. The following subchapters provide abstracts and outlines of current and planned Think Tank topics. If you have questions or remarks to these topics of Task 16 work, your feedback is highly welcome. You can reach the authors at Energetic Solutions, attention to Jan W. Bleyl.

Demand Response Services: Economic Feasibility Model and Case Study for Austria

Task 16 has published a discussion paper: *Demand Response Services: Economic Feasibility Model and Case Study for Austria*. The lead author is Christof Amman, e7, Austria. This is the abstract.

With this discussion paper we want to answer the question, whether the participation at the energy balancing market could be an interesting field of business for innovative energy service provider (ESPs) and what the key parameters are to assess the economic pre-feasibility of demand side management (DSM) measures, taking Austria as an example.

This discussion paper gives an overview on the potential of demand side management in Austria, it describes the balance energy market and products relevant for demand response (DR) services. Based on that the feasibility of new innovative DSM services will be analysed using case studies of the cement industry and office buildings as case studies.

As a result of energy policy developments, with the goal to increase the share of energy production from renewables, the need for balancing of production and consumption in electricity grids has increased. Balancing energy may either come from centralized production sites, from decentralized DSM measures or distributed energy generation (both potential sources also labeled as flexibilities). The energy balancing market is highly regulated but it is open for new participants which fulfill specific technical pre-qualification requirements like minimum power, time restrictions etc. The so called "tertiary control" was selected as the most appropriate market to verify the feasibility for new business cases for ESPs.

To assess the pre-feasibility for new business models we developed a simplified DR-revenue model which is based on average prices and a DR-revenue model with product prices. Revenues are in the range of 2.500 EUR per MW and year for the case that switchable power is offered for 1 hour daily. For the case that power is offered for one product on weekdays and weekend (4 hours per day), and time slots with the highest prices are selected, revenues can go up to 24.000 EUR per MW of switchable power.

In two case studies revenues are calculated to test feasibility of the developed revenue models as well as to reveal prospects for new business models. In the first case study, 2 cement companies with a switchable power of 5 MW are modeled with the result, that revenues vary from appr. 6.000 EUR/year to 25.000 EUR/year depending on the number and duration of switchings. Case study 2 includes calculations of potential revenues for a medium sized office building with ventilation and cooling. Due to high requirements for comfort in the building, revenues are below 100 EUR/year for ventilation and 750 EUR/year for cooling.

From this pre-feasibility analyses we conclude that potential revenues for individual DR-projects are most likely not sufficient to cover CAPEX and OPEX expenses of the DR-measure, project transaction cost as well as expected financial returns for the ESP and the flexibility providers at current energy balancing market price levels in Austria.

However, business cases may turn out to be financially viable with higher capacity prices as it is the case in most economies with high energy demand growth rates e.g. in many Asian, Arab and developing countries. Also subject to further investigations, economies of scales through project aggregation and standardization could result in a positive business case. Furthermore, investigating other capacity markets such as the secondary control with a max of 30 seconds response time may prove to be profitable.

The full Task 16 discussion paper is available for download from www.ieadsm.org/.

Simplified measurement & verification + quality assurance instruments for energy, water and CO₂ savings

In addition to the ECEEE paper, Task 16 has published a discussion paper, which includes national perspectives on simplified M&V approaches: *Simplified measurement & verification + quality assurance instruments for energy, water and CO₂ savings. Methodologies examples and national perspectives*. Subsequently the abstract.

Measurement & Verification (M&V) is a prerequisite to assess the quantitative outcomes and performance of energy, water or CO₂ saving measures and to translate these into savings cash flows for energy efficiency financing and other purposes.

In practice M&V – if pursued at all, particularly in the case of in-house implementations – is often complicated by limited data availability or accuracy, a limited comparability between ‘Baseline’ and ‘Reporting’ periods or a lack of a clear M&V plan and having the resources to follow it up. If accomplished, understanding M&V reports requires expertise, which is not necessarily available with a facility owner. To make things worse, exercising M&V often is a rather ‘boring’ topic – even within the professional energy community.

Furthermore, at least in many European countries, commonly acknowledges methods for M&V of energy, water or CO₂ savings are mostly based on utility meters and invoices – whereas in Anglo-Saxon influenced markets ‘retrofit isolation techniques’

for individual saving measures are accepted as good practice for the verification of energy savings cash flows (e.g. IPMVP Options A or B).

All of the aforementioned adds to the inherently complex nature of energy efficiency projects. And it often results in insecurity for energy managers, project developers, energy service providers (ESPs) and their (potential) ESP customers and financiers on verifiable future energy savings cash flows, which may lead to risk surcharges or no project implementation at all. Yet a full scale M&V plan is often not applicable or desired, due to its (perceived) complexity, lack of resources or its cost is prohibitive for smaller projects.

As a possible solution and often feasible compromise between no M&V at all and the effort and (perceived) accuracy of a full scale M&V approach, this paper proposes simplified M&V approaches for individual or groups of electricity, heat, water or CO₂ saving measures (ECM) in combination with so called quality assurance instruments (QAI). QAIs shall verify the functionality and quality of ECMs, but not necessarily their exact quantitative outcome over an entire project cycle. In many cases the simplified M&V approaches proposed are combinations of savings calculations to determine savings cash flows backed up by QAIs.

The paper starts with the key saving calculation basics and methods including formulae to then introduce the concept of QAIs to back up the quality of saving measures. Before the conclusions we provide examples both for electricity as well as thermal saving measures with a specific focus on industrial applications.

Methodologically, the paper is based on practical experiences with realized Integrated Energy-Contracting (IEC) projects, which apply simplified M&V in combination with QAIs for their saving measures [Bleyl_2011]. It is supplemented with expert inputs from IEA DSM Task 16 [Task 16 2013], the Energy-Contracting competence center of the German Energy Agency dena [dena 2013] and examples from colleagues in the field. And off course we draw on the „International Performance Measurement and Verification Protocol“ [IPMVP_2012] and other literature sources.

The full Task 16 discussion paper is available for download from www.ieadsm.org/.

The original paper has been published at ECEEE Industrial Summer Study 2014, paper ID 1-088-14, Arnhem, the Netherlands June 2014.

Work in progress

Furthermore the following is work in progress:

- Business models for comprehensive building refurbishment ('Deep Retrofit'): Further development of an economic feasibility evaluation tool including sensitivity analyses for deep retrofit application. Application of the tool in several case studies, e.g. in Denmark, Germany and Austria. First bankable project calculations performed. Work in close cooperation with IEA ECB Annex 61
- Drafting of a Taxonomy paper on Energy Services to be published in a peer-reviewed journal in cooperation with Linköping University
- Work kicked off on Crowd-Financing for Energy efficiency and renewable investments: What can Crowd-Financing contribute? Access to CAPEX for smaller projects in SME, communities? Bridge the mezzanine financing gap? Reduce risks and transaction cost? In cooperation with GIZ

- Drafting of a paper on *Simplified measurement & verification* together with EfficiencyOne (and others?) to be published in a peer-reviewed journal

This work will be continued and finalized in Phase IV.

Think Tank activities planned for 2016

For 2016, the following Think Tank activities are planned:

- New Task 16 experts will review and complement the Task 16 discussion paper *Simplified measurement & verification + quality assurance instruments for energy, water and CO₂ savings. Methodologies and examples. Including examples and national perspectives Task 16 experts*
- Drafting of a paper on *Simplified measurement & verification* together with EfficiencyOne (and others?) to be published in a peer-reviewed journal
- Continue work on business models for comprehensive building refurbishment ('Deep Retrofit') in cooperation with IEA ECB Annex 61: Further development and application of an *economic investment grade and financing evaluation tool including sensitivity analyses* for deep retrofit application
- Drafting of a paper on a *Life cycle cost pre-feasibility model with 'Deep Retrofit' case studies* in cooperation with IEA ECB Annex 61
- Finalization of a *Taxonomy paper on Energy Services* paper to be published in a peer-reviewed journal in cooperation with Linköping university

Meetings held in 2015

Experts meetings in 2015

Date	Place	# of Experts	Type of meeting	Government	Industry	Academic
30/05 – 01/06	ECEEE, France	12	Experts meeting	4	6	2

Seminars/Conferences/Workshops in 2015

Date	Place	Participants	Type of meeting	Government	Industry	Academic
19–21/01	Milan, Italy	250	Conference	30	200	20
10–13/02	Peking, China	35	Workshop	20	10	5
04–05/03	Durban, USA	40	Workshop	25	10	5
08/04	Vienna, Austria	10	Seminar	4	4	2
09/04	Vienna, Austria	15	Seminar	4	10	1
07–08/08	Bad Lauterberg	60	Workshop	30	25	5
15/09	Salzburg, Austria	8	Seminar	4	4	0
13/10	Graz, Austria	25	Workshop	5	20	0

14/10	Berlin, Germany	35	Workshop	25	5	5
22/10	Brussels, Belgium	35	Workshop	10	25	0
02/11	Vienna, Austria	14	Seminar	2	12	0
03–05/11	Vienna, Austria	300	Conference	40	250	10
25/11	Bern, Switzerland	80	Nat. Stakeholder WS	50	25	5
19/12 ff	Pinkafeld, Austria	40	Lecture			40
16/12	webinar	?	webinar	?	?	?

Meetings planned for 2016

Planned Experts meetings

Date	Place
23–25/02	Brussels, Belgium
Oct./Nov. (tbd)	Netherlands (tbd)

Planned Seminars/Conferences/Workshops

Date	Place
07+16/01	Fh Pinkafeld
23-24/02	Brussels (Stakeholder WS with A61)
20+21/04	Vienna, Austria (Seminars)
tbd	Pakistan, Marokko, Carribean ... (Trainings, workshops, conferences)
03+04/11	Vienna, Austria (Seminars)
fall (tbd)	Netherlands (Stakeholder WS)
15–17/11	Barcelona (EUW conference)

Publications produced in 2015 (selection)

In 2015 Task 16 produced the following publications:

- Amman et al. 2015 *Demand Response Services: Economic Feasibility Model and Case Study for Austria*. IEA DSM Task 16 discussion paper 2015, available for download from www.ieadsm.org/
- Bleyl et al. 2015 *Simplified measurement & verification + quality assurance instruments for energy, water and CO₂ savings. Methodologies and examples. Including examples and national perspectives of Task 16 experts* IEA DSM Task 16 discussion paper 2015, available for download from www.ieadsm.org/
- Bleyl et al. 2015 *ESCo project and market development: A role for ‘Facilitators’ to play. Including national perspectives of Task 16 experts*. IEA DSM Task 16 discussion paper (amended 2015)

Task 16 also contributed to the DSM University with a Leonardo ENERGY Webinar on *Simplified M&V*, which is available for streaming through www.leonardo.org.

Publications planned for 2016

For 2016 the following publications are planned:

- *Simplified measurement & verification + quality assurance instruments for energy, water and CO₂ savings. Methodologies and examples. Including examples and national perspectives Task 16 experts.* Amended version 2016
- *Simplified measurement & verification* together with EfficiencyOne (and others?) to be published in a peer-reviewed journal
- *Life cycle cost pre-feasibility model with 'Deep Retrofit' case studies* in cooperation with IEA ECB Annex 61
- *Taxonomy paper on Energy Services* paper to be published in a peer-reviewed journal in cooperation with Linköping university

Dissemination of results

Results were disseminated through publications, meetings, presentations at seminars and workshops, the IEA DSM Homepage as well as webinars (c.f. previous chapters). Also the experts disseminate the work by applying it in their day-to-day work lives. For a more detailed list of dissemination activities please refer to the Task Status Reports.

Involvement of industry and other organisations

Task 16 closely collaborates with the ESCo industry, e.g. through concrete market and project facilitation activities.

Its experts are also engaged with the national and international ESCo associations/initiatives. Experts actively participate in national and international ESCo, Energy Efficiency and Renewable industry conferences. E.g. Task 16 has established close cooperations with ESCo Europe, the ESCo Industry conference with an outreach even beyond Europe (www.european-utility-week.com) as well as with IEA EBC Annex 61 on "Business and Technical Models for Deep Energy Retrofit in Public Buildings" (<http://annex61journal.com/annex-61>) with a focus on business models.

Furthermore, Task 16 collaborates with the following organizations/energy services projects:

- ECB Annex 61 => Deep retrofit: Economic feasibility and business models
- FH-Pinkafeld for lecture series
- Linköping university => ES taxonomy

Also through its regular stakeholder workshops, Task 16 is involved with industries and other organizations. Collaborations with other organizations and projects are welcome.

Positioning of the Task – v.s. other bodies

Task 16 is not developing any particular technology within the Task. However it is advancing and disseminating innovative and performance-based energy service business models and supporting project and market development to implement and deploy almost any kind of end-use efficiency or renewable technology with market-based instruments. As a prerequisite, the technology must have reached a commercial development status.

ESCo services apply whatever efficiency and renewable end-use technologies are available on the market. Accordingly, successful examples are available in all sectors of efficiency technologies such as street lighting, heating, ventilation and air conditioning (HVAC-technologies), combined heat and power systems (micro-CHP) or comprehensive refurbishment of buildings and others. Future topics also encompass demand response services,

Task 16 is a unique task in providing an international expert platform for Energy-Contracting experts, developing innovative energy service business models, initiating and mutually supporting national implementation activities and disseminating results to national and international stakeholders. Examples for collaboration with other bodies and projects are listed in the previous chapter. Collaborations are open with other bodies and experts.

Outreach of the Task – success stories

In November 2015, the Swiss Federal Office of Energy SFOE organized a national stakeholder workshop on Energy Performance Contracting, which attracted some 80 stakeholders from the public sector on national, provincial and communal levels as well as service providers and facilitators in order to foster demand side market development.

As an example from the industrial sector, a large scale energy savings project for a steel mill based on a performance-based ESCo business model is currently being facilitated in Northern Africa.

As another example of practical outreach, hands-on trainings for ‘bankable project calculation and financing’ were continued in a number of countries (South Africa, Egypt, Caribbean, Morocco, Pakistan, Jordan and for GIZ staff), which were particularly appreciated by the audiences. They were also appreciated by national and international finance corporations (CDB, IFC, IDC, State Bank of Pakistan) participating in these trainings and may possibly result in further co-operation.

Also the cooperation with Linköping University has potential for mutual benefit and is a good opportunity to get Task 16 results into Academia.

Activity time schedule

Task 16 Phase 3 started in June 2012 and was finalised in June 2015. Phase 4 started in July 2015. The project timetable and current status is summarized in the chart below:

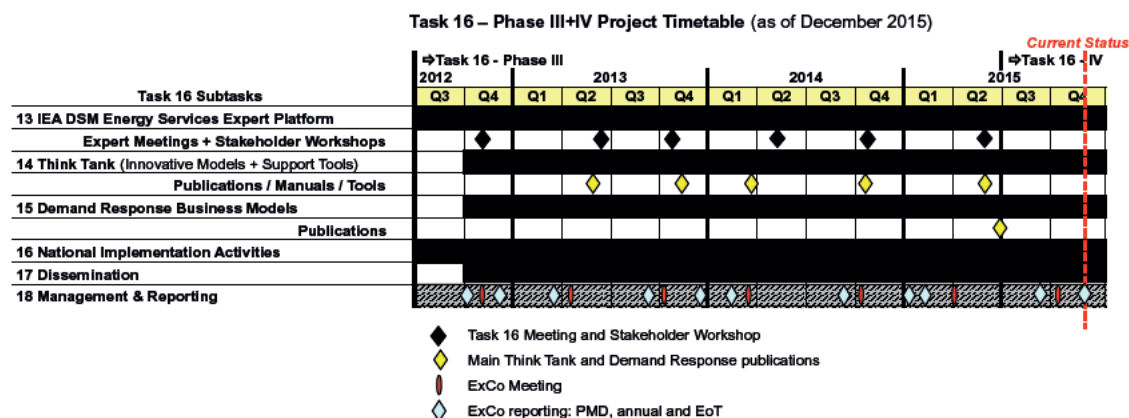


Figure 3: Task 16 – Project timetable overview

IEA DSM Task 16

Participating Countries, Experts and Financiers

Participating Institutions Phases I–IV

Austria

Energetic Solutions (*since 07/2012*)

e7 www.e-sieben.at/

(*since 01/2014*)

Grazer Energieagentur

www.grazer-ea.at

(*until 06/2012 and again since 01/2014*)



Belgium

Fedesco: www.fedesco.be

EnergInvest (*since 07/2010*):

www.energinvest.fr

Factor4 (*since 07/2010*):

www.factor4.be



Canada (*since 07/2015*)

EfficiencyOne

www.efficiencyns.ca



Finland (*until 06/2009*)

Motiva Oy:

www.motiva.fi



GIZ Germany (*since 07/2013 until 04/2016*)

Deutsche Gesellschaft für Internationale Zusammenarbeit:

www.giz.de



India (*until 06/2012*)

Bureau of Energy Efficiency:

www.beeindia.gov.in



Japan (*until 06/2009*)

Japan Facility Solutions, Inc.:

www.j-facility.com



Korea (*since 07/2012 until 06/2015*)

Korea Energy Management Cooperation:

www.kemco.or.kr



Korea Association of ESCO

www.esco.or.kr



Netherlands

Netherlands Enterprise Agency:

www.rvo.nl

Essent Retail Services BV (*until 06/2012*):

www.essent.nl

ESCOPLAN (*until 05/2015*):

www.escoplan.nl

AHB Consultancy (*since 06/2015*):

www.ahb-consultancy.nl



escoplan™



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Sweden (*since 07/2012*)

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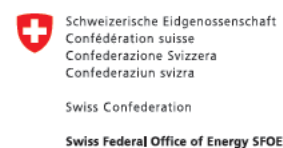
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www.energytech.at



Belgium (until 06/2015, decision for continuation pending)

Federal Public Service

Economy, S.M.E.s, Self-Employed and Energy

DG Energy – External relations

<http://economie.fgov.be/>



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EfficiencyOne

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GIZ Germany (since 07/2013 until 04/2016)

Deutsche Gesellschaft für Internationale Zusammenarbeit

www.giz.de



India (until 06/2012)

Bureau of Energy Efficiency

Ministry of Power

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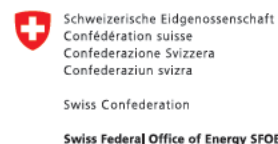
www.swedishenergyagency.se



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www.bfe.admin.ch/



All Task 16 project partners wish to *explicitly thank the IEA DSM ExCo members of the participating countries and their financing partners* for their much appreciated support.

Task 17

Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storage

Operating Agent: Matthias Stifter, AIT/Austria and René Kamphui, TNO/the Netherlands

Description

Phase 3 of IEA-DSM Task 17 addresses the current role and potential of flexibility in electric power demand and supply of systems of energy consuming/producing processes in buildings (residential, commercial and industrial) equipped with DER (Electric Vehicles, PV, storage, heat pumps, ...) and their impacts on the grid and markets. The interdependence between the physical infrastructure of the grid, governed by momentary power requirements, and the market side, governed by energy requirements, will also be looked upon. The scalability and applicability of conducted and ongoing projects with respect to specific regional differences and requirements will be explored (see <http://www.ieadsm.org/task/task-17-integration-of-demand-side-management/>).

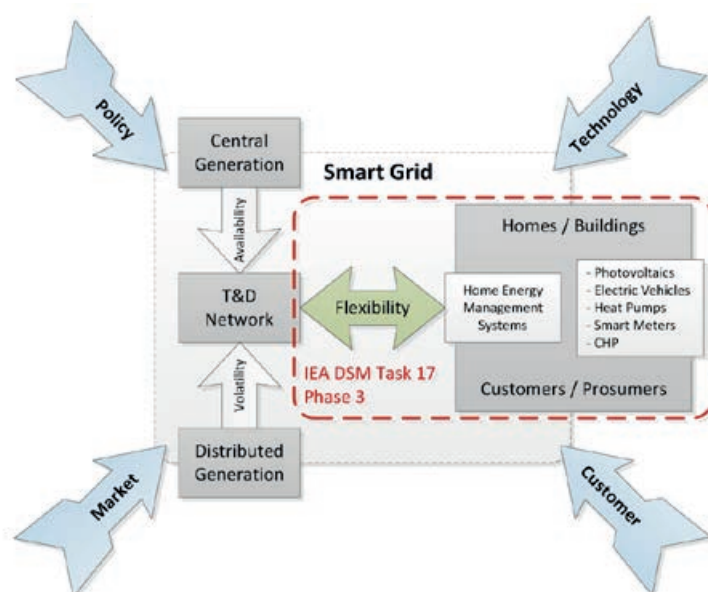


Figure 1 Focus of the IEA DSM Task 17 Phase 3 on enabling the consumption and production flexibility of electricity delivery

Task aims & objectives

Subtask 10 – Role and potentials of flexible consumers

Apart from traditional players in the energy field, also energy communities and energy suppliers in new roles as energy service companies are coming up as stakeholders in the market. The regulatory and market design frameworks in different countries as well as the physical topology of the transmission and distribution networks differ considerably on a country-by-country basis. Therefore, barriers and opportunities also differ on a per-country basis. From the policy point of view currently there is a strong momentum for harmonization; from the technical point of view standardization processes are en-

forced. In this context, the introduction of the ICT-enabled communicating meter for retail consumers can be seen to not only lead to increased possibilities to provide consumer/prosumer feedback, but also allows for actively monitoring electricity usage and production by stakeholders to optimize operation from a market or electricity distribution point-of-view. Instead of a very loosely-coupled role for retail customers in the market, receiving one overall yearly bill based on a fixed tariff, virtually without any incentive for honoring demand response, a smart meter allows a more direct exposure of this customer category to the commercial electricity market and value creation as an asset in the operation of the physical grid infrastructure becomes possible.

Subtask objectives

Assess the concepts and implementations of customer and home energy management systems (CEMS/HEMS), possibly linked to the smart meter, in different (participating) countries by:

- Comparing DR and DG specific requirements in households, communities, functional (office) buildings and industrial processes
- Role of Smart Meters (SM), (CEMS/HEMS gateways) and their interaction with flexible demand/supply devices as well as distributed energy resources in the terms of technical concepts
- Role of telemetry and existing process control systems and their interface to the HEMS or SM
- Evaluating strengths and weaknesses of ICT enabled aggregations of flexible demand and controllable DERs in the form of energy communities

Subtask deliverables

IEA-DSM-17.3.10: “Roles and potentials of providing flexibility in production/consumption using CEMS/HEMS systems”

Work carried out

- An international public workshop (Workshop on DSM: Potentials, Implementation and Experiences) has been organized to discuss potentials and flexibility of consumers
- A special session during IEEE PowerTech 2015 has been prepared
- A near-to-final draft version of the deliverable has been prepared together with the experts giving the view on the objectives and a discussion on standardization developments in the field

Subtask 11 – Changes and impacts on grid and market operation

Currently, in a number of European countries, connection of large scale and small-scale DG-RES leads to problems on the electricity market (negative prices for electricity in case of massive Wind supply in periods of low consumption) and problems with Voltage level and stability (especially in rural areas with large PV-production and low local demand). Furthermore, substitution of energy transports and storage of gas and liquid fuels by electricity leads to capacity problems in existing electricity grids. Examples of the latter are EVs and heat pumps. This theme has been the subject of a

number of national and international research projects. Also, on the EU-level and in the US, inventories of project portfolios have been made. The introduction of renewable energy resources in competitive energy market environments can be seen not to have the effects originally targeted. Goal in this subtask is combining all this information in a common methodology for deriving quantitative information on these issues and how the flexibility uncovered in subtask 10 can be utilized to counteract inefficiencies. Smart Grid technologies currently are in the infancy phase.

For software engineering in the 70s by the Carnegie-Mellon institute a Capability Maturity Model (CMM) was defined, which was used very extensively in the industry as a yardstick for measuring the software process in an organization. Recently, a similar initiative for assessing the introduction of Smart Grids has been developed, which is also used in ISGAN. Therefore, a link to the work done in ISGAN using the SGMM (Smart Grid Maturity Model) is foreseen.

Subtask objectives

Assess the impact on grid and market operation based on technology penetration scenarios developed in subtask 5 and 9 (developed in phase 2) by investigating the following areas of interest:

- Energy balancing possibilities and potentials for commercial and grid operation optimization objectives of CEMS.
- Optimization potentials from a technical and market point of view using the SGAM framework
- Design a methodology to estimate potential and to cost effective activation in-line with SGAM and SGMM.
- Regulatory and market design issues for grid and (local) market operations

Subtask deliverables

IEA-DSM-17.3.11: “Financial and maturity assessment of technologies for aggregating DG-RES, DR and electricity storage systems”

Work carried out

- A lay-out of the planned deliverable has been prepared together with the experts ; this will be further developed end 2015 and beginning 2016

Subtask 12 – Sharing experiences and finding best practices

Subtask objectives

Based on the collected pilots and case studies from the previous subtasks, the results and findings of the finished projects in term of successful implementations, barriers and effectiveness will be analyzed.

- Lessons learned from existing pilots derived from workshops (e.g.; E-Energy Germany, EcoGrid-EU Bornholm, PowerMatchingCity-I and -II, USEF, NL-TKI projects, model city Salzburg, Amsterdam SmartCity, ...). During the mid-term symposium the project base was extended.
- Innovation projects with large scale demand response in industry

- Comparisons and analysis of country specific differences in the implementation
- Assessment and development of a methodology to apply different demand response mechanism to individual countries.
- Extrapolation of the results from previous collected projects on applicability on a large scale.

Subtask deliverables

IEA-DSM-17.3.12: “Best practices in applying aggregated DG-RES, DR and Storage for retail customers”

Work carried out

- An international public workshop (Workshop on DSM: Potentials, Implementation and Experiences) has been organized to discuss implementations and experiences of DSM and DR projects.
- A comprehensive list of recent studies and project developments has been started and evaluated in 2014. In 2015 this material has been further extended also related to the session in Eindhoven

Subtask 13 – Conclusion and Recommendations

Subtask objectives

Recommendations will arrived at in close interaction with the experts’ opinions and will at least provide a ranking based on impacts, costs and likely future penetration of the technologies.

Subtask deliverables

IEA-DSM-17.3.13: “Conclusions and recommendations for applying DG-RES, DR and storage in electricity grids”

Progress towards Subtask objectives

This Subtask has not yet commenced.

Activities completed in 2015

Mid-term symposium organized. Several other symposium and workshop contributions. Work on three deliverables.

Activities planned for 2016

Final meeting and symposium (9./10. May in Austria – SG Week). We plan to have a collaboration with other tasks and annexes from other IEA implementing agreements. The targeted event would be the Austrian Smart Grids Week in May 2016 in Linz (1h from Vienna).

Meetings held in 2015

Experts meeting/seminars/conferences

Experts meetings

Date	Place	Type of meeting	Total	Government	Industry	Academic
13-3-2015	Webmeeting	XM	11	2	3	6
09-6-2015	Webmeeting	XM	10	2	3	5
29-6-2105	Eindhoven, NL	XM	12	5	4	3
11.12.2015	Webmeeting	XM	8		3	5

XM = Experts meeting

SHM = Stake holder meeting

Seminars/conferences

Date	Place	Type of meeting	Total	Government	Industry	Academic
1-4-2015	Capetown, SA	DUE (domestic use of energy)conference	70	10	40	30
29-6-2015	Eindhoven, the Netherlands	Mid-term event: Parallel session IEEE Powertech 2015 in Eindhoven. IEA DSM: Demand Flexibility – Dream or Reality	120	20	40	60
10/11-9-2015	Lusanne Switzerland	A critical perspective on international demonstration projects, results and their scalability. Contribution to IRGC International Risk Governance Council conference Expert Workshop "Demand response: challenges and opportunities in the context of energy transitions".	60	20	20	20
30-09-2015	Australia	Lecture/Webinar, International Energy Centre's (IEC) Master of Energy Studies program	25	5	10	10
14-10-2015	Brussels	Webinar in Leonardo / DSM university: Integrating renewables and enabling flexibility of households and buildings	90	10	10	70
21-10-2015	Halifax, Canada	International DSM Day, EfficiencyOne	20	15	4	1
22-10-2015	Paris	Contribution to IEA ECES Fourth Meeting Annex 28: "Distributed Energy Storage for the Integration of Renewable Energies" DESIRE	15	6	3	6

Meetings planned for 2016

Experts meetings/seminars/conferences

Experts meetings

Date	Place
Spring	Sweden, Stockholm
Summer	Austria, Linz

Seminars/conferences

Date	Place
Austrian Smart Grids Week in 9./10. May 2016	Austria, Linz

Publications produced in 2015

- Short Summary of public Workshop on DR – Dream or Reality (IEEE PowerTech)

Publications planned for 2016

- Deliverable of Subtask 10: Current role and potentials of flexible consumers and producers in commercial segments, households, communities and buildings
- Deliverable of Subtask 11: *Financial and maturity assessment of technologies for aggregating DG-RES, DR and electricity storage systems*
- Deliverable of Subtask 13: *Conclusions and Recommendations*
- Conference/Journal article about state of the art / projects in DR of participating countries

Dissemination of results

- Organisation of Public Workshops with industry and academics
- Publication of the "Workshop on DSM" Report on the IEA Website and a short description in the IEA DSM Spotlight.
- Contribution to Flexibility Roadmap (EcoFys/Copper Alliance) as a member of the 'Flexibility in Power Systems Advisory Panel'.
- Presentation of Task 17 and Demand Response on conferences, congresses and workshops.

Involvement of industry and other organisations

- Workshops to involve government in networking events.
- Experts involved in expert meetings are from network operators like Enexis and Stedin.
- National stakeholder groups (industry, utility) are informed by newsletters and in meetings.

Positioning of the Task – v.s. other bodies

- Bilateral meetings and conversations with other related implementing agreements and tasks. These are in particular:
- ISGAN – Annex 2
- PVPS – Task 14 – Integration of High PV Penetration
- EBC – Annex 58 / Annex 52
- ECES-DESIRE Annex
- HPP – Annex 42

Outreach of the Task – success stories

- Workshop on DR: Dream or Reality – IEEE Eindhoven
- Ongoing exchange with potential new participating countries
 - Contact with Australian Expert – Lecture on Task 17 / Joining highly possible
 - Contact with Serbia – no funding but high interest
 - Contact with experts from Finland à Highly probable to join in Spring 2015
- Member of the ‘Flexibility in Power Systems Advisory Panel’ for Ecofys study (Matthias) – Flexibility Roadmap published.
- Leonardo Webinar – Integrating renewables and enabling flexibility of households and buildings – IEA DSM Task 17
- Presentation at the Workshop DEMAND-SIDE FLEXIBILITY FOR ENERGY TRANSITIONS (EPFL Energy Center and International Risk Government Council)

Activity time schedule

Task 17 Phase 3 was launched in April 2014 and will be finalised in June 2016.

IEA-DSM TASK 17 – Phase 3	Q2 14	Q3 14	Q4 14	Q1 15	Q2 15	Q3 15	Q4 15	Q1 16	Q2 16
Subtasks									
Subtask 10 - Role and potentials of flexible consumers									
Subtask 11 - Changes and impact on the grid and market operation									
Subtask 12 - Sharing experiences and finding best practices									
Subtasks 13 - Conclusion and recommendations									
Expert meetings									
Biannual country expert meeting									
Workshops									
Workshops with stakeholders and experts									
Reports									
Subtasks reports									
Final report									

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ECI (sponsor)	X

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Task 24

Phase II: Behaviour Change in DSM – Helping the Behaviour Changers

Operating Agent: Dr Sea Rotmann, New Zealand

Co-Operating Agent: Dr Ruth Mourik, the Netherlands

Description

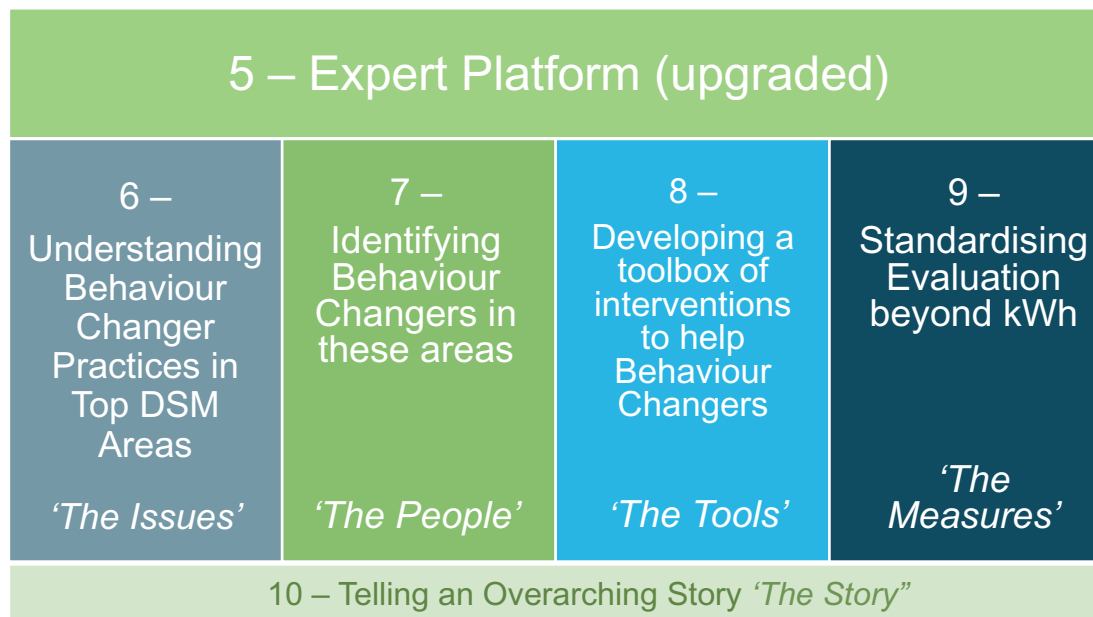
There is no behaviour change ‘silver bullet’, like there is no technological silver bullet that will ensure energy efficient practices. Designing the right programmes and policies that can be measured and evaluated to have achieved lasting behavioural and social norm change is difficult. We believe that this Task, and its extension, helped address these difficulties by developing guidelines, recommendations and examples of best (and good) practice and learnings from various cultures and contexts. We rely on a large, global network of sector-specific experts (researchers, implementers and policymakers) from participating and interested countries to engage in an interactive, online and face-to-face expert platform and contribute to a comprehensive database of a variety of behaviour change models, frameworks and disciplines; various context factors affecting behaviour; best (and good) practice examples, pilots and case studies; and guidelines and examples of successful outcome evaluations. This Task (Phase I) had several Deliverables, including the expert network and platform for continued exchange of knowledge and successes, the large-scale analysis of the helicopter overview and case studies, several reports, factsheets and guidelines on how to evaluate behavioural interventions and the country reports with specific to do’s and not to do’s, future research questions and re-iterated case studies following our best practice recommendations. Phase I of this Task is now finalised and Phase II (How to help the Behaviour Changers) has commenced.

Phase II of Task 24 takes the theory into practice. Building on the solid theoretical foundations of *Phase I*, we now look at the:

- What?
- Who?
- How?
- Why? and
- So What?

We use a *Collective Impact Approach* methodology and *storytelling* as the overarching language and bring together Behaviour Changers from all sectors (industry, government, research, middle actors and the third sector) with the end users whose behaviour they are ultimately trying to change.

The Subtasks of Phase II



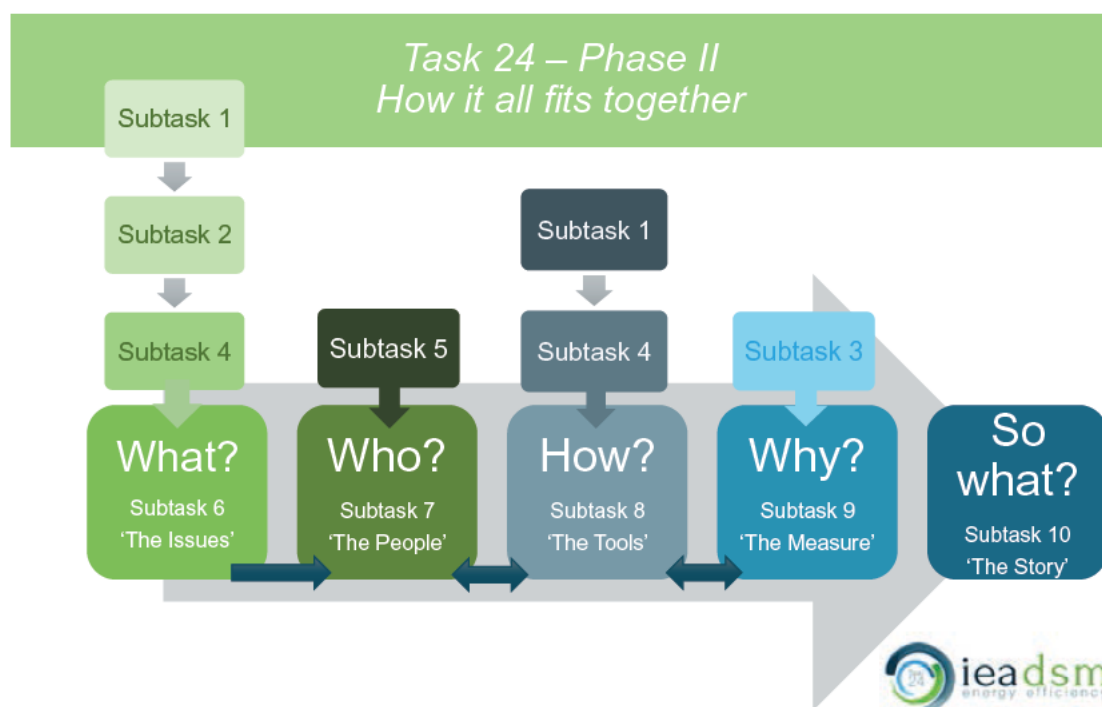
For more information, visit www.ieadsm.org



Task aim and objectives

The main objective of this Task is take good theory (from Phase I) into practice to allow ‘Behaviour Changers’ (from government, industry, intermediaries, research and the third sector) to:

- Engage in an *international expert network* (‘THE EXPERTS’)
- Develop the *top 3 DSM priorities* to identify the most (politically, technologically, economically and societally) appropriate DSM themes to focus on (‘THE ISSUES’)
- Identify and engage *countries’ networks in the 5 Behaviour Changers sectors* for at least one of the top 3 DSM themes to develop a collective approach (‘THE PEOPLE’)
- Use and test a *Collective Impact Approach* to develop shared methodologies, guidelines and a common ‘language’ based on narratives to aid Behaviour Changers’ decision making of how to choose the best models of understanding behaviour and theories of change (a ‘*toolbox of interventions*’) (‘THE TOOLS’)
- Standardise *how to evaluate behaviour change programmes* ‘Beyond kWh’ and ‘Beyond Energy’ including multiple benefits analysis (‘THE MEASURE’)
- Collate *national learnings into an overarching (international) story* to understand, compare and contrast the different behaviour change approaches, risks and opportunities and which recommendations can be universally applied (‘THE STORY’).



Subtask 5

Objectives

- Expert platform continually growing and getting used
- New content including presentations, videos and reports uploaded
- Continue publicising and dissemination of Task 24, including at international conferences

Deliverables

D6: Social network expert platform and meeting place for (invited) DSM and Behaviour Changers and implementers. This platform may in future be hosted on the DSM-IA Task 24 website.

D7: At least one international conference for all Behaviour Changers involved in Task 24.

Work carried out

Progress in the last year was satisfactory, we now have >235 experts on the expert platform and professional films from all presentations of the Graz and Toronto workshops online. All other final reports are on the IEA DSM website, which has been updated for both Phase I and Phase II. Google Analytics show continued utilisation of the Ning website, especially after broadcast emails with links to all new content are sent. We continue having great successes in matchmaking experts, with several spending time at each others' Universities, for example, or developing new research collaborations. We recently hosted Katy Janda, from Oxford University (our 'fairy godmother' of storytelling) in New Zealand, as well as Prof Malcolm McCulloch, also of Oxford University who partook in our NZ Task 24 workshop and Aimee Ambrose, our UK National Expert from Sheffield Hallam University. Our Subtask 2 Case Study Analysis for Austria has even found it's way into this Annual Report as the Austrian country story (p 23–26). In addition, we have implemented a Project Management Tool called TEAMWORK which helps share task lists and milestones among the national experts. We have secured the support of the 2016 BEHAVE conference to hold our international Task 24 conference the day before BEHAVE in September 2016 in Portugal.

Subtask 6

Objectives

- Building on work from Subtasks 2 and 4, develop lists of common top 3 DSM *implementable* issues and their potentials in each country
- Use the *Collective Impact Approach* and the Task 24 Expert Platform to research and review current approaches and practices, nationally and internationally, on these top issues and provide feedback from the different disciplinary perspectives and their collaborative discussions and negotiations from available case studies and narratives that could illuminate some of the approaches (based on work in Subtask 1, 2 and 7)
- Feed these cases, and the ones analysed in Subtask 1 and 2 into a *Toolbox of Interventions* (ST 8)

Deliverables

D 8: List of top 3 DSM issues, including analysis of case studies elsewhere and their approximate contribution to each participating country's load management (economic, technological, political and societal potentials)

D 9: Continued collection and analyses of case studies and stories to add to the 'Monster' Wiki (ST 1 & 8)

Work carried out

Subtask 6 has been kicked off with workshops in Toronto in May and October, Stockholm in June, New Zealand in September and the ECEEE and BECC conferences in June and October, respectively. We have started collecting lists of DSM interventions and energy efficiency and behaviour priorities in each of these countries. We have discussed the top 3 issues in each of these countries during workshops. In addition, work on this Subtask has started in the Netherlands where top issues are being discussed and a selection is made to focus on ICT use in higher education buildings.

Subtask 7

Objectives

- Identify, with the help of the ExCo, National Experts and existing Expert Platform the most appropriate Behaviour Changers focusing on at least one of the top 3 DSM issues chosen by each participating country (can include the residential, business and transport sectors)
- Collect detailed information on their specific interests, organisations and past and current work, get each to tell their 'Sector Story'
- Use the *Collective Impact Approach* to initiate discussions between different disciplinary perspectives and sectoral contexts. An explicit focus will be on deepening the understanding of the political-institutional context Behaviour Changers are operating in and what it means for their capacity to take a more systemic approach to behavioural change
- Develop national Behaviour Changer dialogues in each participating country by holding (bi) annual workshops (1-2 days per country per year, all up maximum of 6 days per country - note some of this time includes work from ST 6 and 8)

- Foster mutual engagement, collaboration and shared learning amongst Behaviour Changers, enable them to build relationships on neutral, trusted ground
- Backbone support to set a common agenda, measurement systems, mutually reinforcing activities and on-going communication between the Behaviour Changers
- Evaluate Behaviour Changers' impressions on the effectiveness of the Collective Impact Approach and use of narratives as a common language to overcome barriers
- Collect examples of successful matchmaking stories.

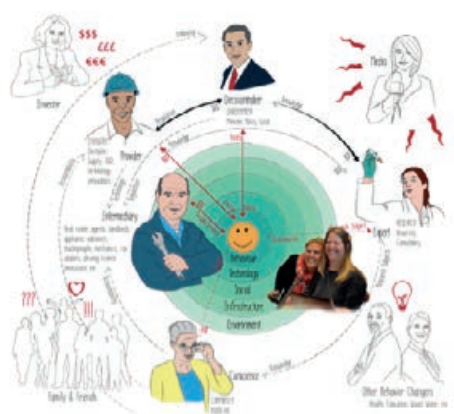
Deliverables

D 10: National networks of Behaviour Changers from all 5 sectors (government, industry, research, intermediaries, the third sector) in at least one of the top 3 DSM focus areas (chosen in ST 6); including workshop reports, videos, presentations, pecha kuchas, stories, blogs, Wiki etc.

D 11: Evaluation Report based on in-depth stakeholder analyses on the effectiveness of the Collective Impact Approach and use of narratives as a common language to overcome barriers

Work carried out

Behaviour Changers have been identified for the top issues decided on in Subtask 6 for Canada, Sweden and New Zealand. Their sector stories have been told during workshops and we have initiated deep discussions around relationships, mandates, stakeholders, restrictions and value propositions for each of the Behaviour Changers using the 'Behaviour Changer Framework'.



The Behaviour Changer Framework



Participants from the first workshop in Toronto in May

Subtask 8

Objectives

- Use the *Collective Impact Approach* to unite Behaviour Changers from all 5 sectors on a specific DSM issue (both chosen in ST 6 & 7) and develop, in collaboration, a common agenda, shared measurement indices, mutually reinforcing activities (a 'roadmap'), continuous communication and the backbone support function necessary to make it happen. Evaluate this approach continually via stakeholder analyses

- Collect information for a *Decisionmaking Tree* to pick the most appropriate case studies and models of understanding analysed by Task 24 (ST 1, 2 and 6) and test its usability with the Behaviour Changers
- Develop the *common language of storytelling* further and provide different examples of using storytelling and narratives in practice and how to best do it in the specific areas of focus and each of the Behaviour Changers' sectors
- Identify all the tools in each Behaviour Changer's *Toolbox of Interventions*, analyse their pros and cons, risks and opportunities, where they fall short and how another tool from another Behaviour Changer could overcome this deficit
- Continued testing and development of the *Evaluation Tools* (ST 3) that can prove if a (toolbox of) intervention/s leads to actual, on-going behaviour changes in practice. The Behaviour Changers will feed back on its potential applicability, risks and additional needs by working through (hypothetical or real life) examples chosen in ST 6 and using double-loop learning approaches to assess multiple benefits of interventions
- Collaborative development of a testable *Toolbox of Interventions* for each top DSM focus area, where each Behaviour Changer sector has clearly identified and measurable roles and responsibilities. This intervention may then be taken into a real-life setting and trialled in practice (either as ST 11 or outside of Task 24)
- The toolbox is built on *national and sectoral context specificities* but will be synthesised and tested (e.g. in the international conference (ST5)) for the general aspects that are of international validity (ST10 – the overarching story).

Deliverables

D 12: Testable toolbox of interventions of each country and their top areas of DSM focus. This includes:

- A description and evaluation of the validity and effectiveness of the *Collective Impact Approach* in the energy arena, possibly as a peer-reviewed paper (could be part of a special issue on Task 24, as envisaged in the continuation of ST5)
- A *Decisionmaking Tool* that enables Behaviour Changers to better utilise the findings of ST 1 and 2 without necessarily having to read all large Task 24 reports
- A peer-reviewed paper on the *impact of storytelling* in DSM
- A collection of *sector stories* from each Behaviour Changer in each country and DSM topic chosen in ST6, including analysis on how these stories can be used to aid collaborative DSM intervention design
- This includes a list of *behavioural intervention tools* each Behaviour Changer has at their disposal in each of their national and sectoral contexts
- Continued testing and development of *evaluation tools* created in ST 3
- *Testable toolbox* for national Behaviour Changers (when choosing to take part in ST11) and/or synthesis of internationally-validated tools to feed into the Overarching Story (ST10)

Work carried out

Some work on continued development of the evaluation tools from Subtask 3, Deliverables 3A and B has taken place. Storytelling in Task 24 has been published and presented, to a lot of acclaim, at the ECEEE summer study. We are currently working on a Special Edition Issue on Storytelling for the Journal of Energy and Social Science Research. The Task 24 monitoring and evaluation work was also presented at the ECEEE summer study and further evaluation work has been published in the *Energy Efficiency Journal*. Sector stories in Canada, New Zealand and Sweden have been collected as well as the Behaviour Changers' intervention tools in each of these sectors. Multiple benefits and metrics of the issue decided in ST 6 have been collected for Canada.

Subtask 9

Objectives

- The goal of this research is to develop and validate a set of tools and metrics that can be used consistently for the evaluation of behaviour-based energy programmes including but not limited to eco-feedback, home audits, information and rebate programmes, and social games
- An in-depth assessment of current (best) practice, cultural and disciplinary idiosyncracies, country drivers and needs and the best possible international standard (along the lines of psychometric tools like the IQ test - arguably not a perfect indicator of intelligence, but valuable in terms of enabling measurement and comparison).

Deliverables

D 13: An internationally validated set of tools and metrics for evaluating behaviour-based energy programmes 'beyond kWh'

Work carried out

Karlin (the Principal Investigator of this Subtask) et al have published a paper at the IEPPEC conference in August that outlines the basics of the Beyond kWh toolkit they are developing for ST 9. It is co-funded to the tune of US\$100,000 by PG&E and Southern California Edison and will be tested and validated in our Task 24 countries in 2017.

Subtask 10

Objectives

- Collate, analyse and distil all information collected in Subtasks 6–9. Develop an international, interactive handbook with guidelines and recommendations including:
- Evidence of the usefulness of following a Collective Impact Approach to solve complex whole-system, societal energy problems in practice.
- A decisionmaking tool from 75+ cases collected in Subtasks 1, 2 and 7.
- A practical guide on storytelling with the many examples and stories collected here.
- Overview of countries' and sectors' toolboxes of interventions, common findings and learnings.
- Overview of usefulness of the evaluation tools for each country and sector (as developed in ST 3 and ST 9).

Deliverables

D 15: Support on design, implementation, evaluation and iteration of national policies, programmes or pilots

Work carried out

This Subtask will not start until end of 2017

Activities completed in 2015

Phase I of Task 24 was finalised by completing the four outstanding reports from Austria (ST 2 & 4), Belgium (ST 4) and Italy (ST 4). Phase II was kicked off on April 15, 2015 and undertook significant work in ST 6, 7, 8 and 9. Many workshops, conference presentations, lectures and webinars were given and a lot of stakeholder and expert networking was undertaken. We now have over 45 publications on this Task, including our first primary literature paper in a highly impactful journal. At the end of 2015, Ireland also joined the Task. This means that both Canada and Ireland joined the DSM Programme explicitly due to their interest in Task 24.

Activities planned for 2016

Subtask 5

Continue attracting experts to the expert platform, update visual branding to new IEA DSM brand. Update Wiki with the latest case studies and disseminate. Use TEAMWORK project management tool to project manage national experts (ST 0). Work on special edition on storytelling and start organising two International Task 24 conferences, the first in line with the Energy Cultures conference in July in New Zealand and the second in line with the next BEHAVE conference in Portugal in September. Attend the ACEEE summer study for the first time, continue to present DSMU webinars on Phase I and Phase II. Continue giving lectures, as requested (several already lined up in New Zealand and Australia). Continue attracting financial participants, including from the UK, US, Canada, Australia and Portugal where we already have national experts with in-kind contributions on stand-by.

Subtask 6

Continue with issues definition including in countries we haven't started in yet (Austria and Ireland). Start writing issues reports and collate DSM lists in New Zealand, Sweden, Netherlands, Austria, Ireland and Canada.

Subtask 7

Will hold another at least another 5 workshops (New Zealand, Ireland, Netherlands, Sweden, Austria). Will pull together most relevant Behaviour Changers in each participating country. Workshop notes all written up, workshop protocol finalised, all Behaviour Changer Frameworks (BCFs) animated in prezis.

Subtask 8

Continue working on storytelling and evaluation guidelines. Start working on decision-making tree for Subtask 1 and 2 case studies and models of understanding behaviour. Provide multiple benefits list and factsheets to Task 26, as required.

Subtask 9

Continue working on 'Beyond kWh' toolkit, start testing it with funders in the US.

Subtask 10

Not until 2017.

Meetings, conferences, lectures etc. held in 2015

Outreach of this Task was highly successful and manifold. We had a very strong presence at the eceee summer study, presented at the Swedish Energy Agency on our storytelling work, at DECC with support of our UK Task 24 experts, helped the IEA Secretariat organise a behaviour change workshop and presented at it, gave more webinars and lectures, invited and hosted several Task 24 experts in New Zealand and made contact with 4E in Australia to discuss potential collaborations. We also ran a paid Task 24 workshop at BECC, the largest behaviour, energy and climate change conference with over 700 attendees. We had a Task 24 expert dinner there as well and lead the social media presence at BECC. The Task was also presented at the Bright Energy conference in Halifax.

Experts and stakeholder meetings

Date	Place	# of Experts	Meeting type	Govt.	Industry	Academic
17/2/15	Wellington, NZ	10	SHM	8	2	
27/05/15	Toronto, Canada	13	SHM	2	9	2
03/06/15	eceee summer study	50	Experts	10+	5+	30+
11/06/15	Stockholm, SE	8	SHM	3	4	1
14/06/15	London, UK	12	SHM	3	2	7
23/09/15	Wellington, NZ	12	SHM	3	6	3
19/10/15	Sacramento, US	15	Experts	2	4	9
21/10/15	Sacramento	31	Experts	4	9	18
26/10/15	Toronto, CA	15	Experts	2	11	2
05/11/15	Dublin, Ireland	50	SHM			
18/12/15	Brisbane, AUS	20	SHM	15	5	

Seminars/Conferences/Lectures

Date	Place	Participants	Meeting type	Govt.	Industry	Academic
21/1/15	Milan, Italy	100+	Conference			
14/1/15	DSMU	300	Webinar			
26/05/15	Toronto, CA	40+	Seminar	10	25	5
11/06/15	Stockholm, SE	20	Seminar	20		
13/05/15	DSM University	>100	Webinar			
02-06/06	Eceee summer study	500	Conference			
19/10/15	BECC	700	Conference			
20/10/15	Bright Conference	100	Conference			
28/09/15	Australia	20+	Lecture			
17/11/15	IEA, Paris	50+	Conference			
4/12/15	Eindhoven	125	Lecture			

Meetings planned for 2016

Experts meetings

Date	Place
January 2016	Wellington, NZ
February 2016	Eindhoven, NL
March 2016	Stockholm, Sweden
April 2016	Dublin, Ireland
April 2016	Oxford, UK (if funding is found)
May 2016	Graz, Austria
May 2016	Toronto, Canada (if funding is found)
May 2016	San Francisco, US (if funding is found)
July 2016	Wellington, NZ
September 2016	Coimbra, Portugal
September 2016	Amsterdam, NL
October 2016	Dublin, Ireland
October 2016	Stockholm, Sweden

Seminars/conferences

Date	Place
March 2016	IEA DSM Stockholm, Sweden
May 2016	DSMU
July 2016	Energy Cultures, NZ
August 2016	ACEEE summer study, US
September 2016	BEHAVE, Portugal
October 2016	IEA DSM Amsterdam, NL
November 2016	DSMU

Publications produced in 2015

- 3 IEA DSM Spotlight Issues
- Filmed presentations and minutes from Graz and Toronto conference and workshops
- Oxford workshop official UKERC report
- Four ST2 country case study reports (SE, NO, CH, AT)
- Three ST3 reports (Deliverables 3, 3A and 3B)
- Six ST4 reports (NZ, NL, SE, BE, IT, AT)
- 2 eceee peer-reviewed papers
- *Summary presentation* of all collected findings and recommendations of Task 24
- EEIP Magazine article on ESCO Facilitators
- IEPPEC report on Subtask 9
- Energy Efficiency Publication
- Workshop Notes Report
- Behaviour Changer Framework film and prezis
- Energy System film
- Final Phase I flyer and Phase II flyer

Publications planned for 2016

Storytelling special issue, ACEEE summer study paper, BEHAVE paper, Energy Cultures presentation, ST 6 report on country issues, additional workshops reports, Spotlight articles, ST 7 report on Behaviour Changer Framework, blogs.

Dissemination of results

Everything will be available on the new IEA DSM website and Task 24 Wiki, as well as the Task 24 Ning site. We have widely disseminated our Task results online:

- via @IEADSM on twitter (also @DrSeaRotmann and @RuthMourik), IEADSM linkedIn and facebook groups; ECEEE and EEIP columns and various energy and behaviour linkedIn groups. Tweets by @DrSeaRotmann sometimes have weekly audience reach of over 100,000.
- Weekly publication of [Behaviour Change & Energy News](#) by Dr Sea Rotmann. The paper has 60 subscribers and been viewed over 6000 times.
- Expert platform www.ieadsmtask24.ning.com - 235 members from 21 countries.
- Mendeley (www.mendeley.com) Task 24 Group and bibliography database of >400 behaviour change and energy publications
- Task 24 dropbox (www.dropbox.com) to share templates and collected models etc

- Task 24 wikipedia (www.ieadsmtask24wiki.info)
- Task 24 youtube channel (<http://www.youtube.com/user/DrSeaMonsta/videos?flow=grid&view=0>)
- Task 24 slideshare (<http://www.slideshare.net/drsea>) Our slideshare channel with all of our presentations has been viewed and downloaded over 10000 times.

Involvement of industry and other organisations

A number of industry players, NGOs, intermediaries and consultants are actively participating in Task 24, including providing case studies, being represented on our expert network and coming to Task 24 workshops. PowerCo, NZ second largest lines company, sponsored the NZ ST2 report and is co-funding the NZ participation for the Task 24 extension. The Netherlands worked with the retailer Essent, and industry parties such as DNVGL, KEMA and smaller industrial partners also contributed with their case study PowerMatching City. Several industry organisations expressed great interest in the EScO Facilitators report for Task 16 which was translated into German and showcased on DENA's website. It has also been published by the EE-IP, the largest energy efficient industry social network. Opower came to the Milan workshop and expressed interest to continue providing case studies for the Task 24 extension. The UK's Energy Savings Trust and Sheffield University Hallam have bid for Horizon 2020 proposals with Task 24 participating in dissemination work packages. PG&E and Southern California Edison, some of the largest utilities in the US, are considering cofunding the US participation to the Task 24 extension and already co-fund Subtask 9. Energy Efficiency Nova Scotia is actively participating in the Canadian work to date (not yet funded), as are University Health Network, Toronto; Toronto Cycling; University of Toronto; in Sweden the Arlanda Airport is involved as is the largest collection of commercial building landlords; in New Zealand we also have Flick and Zen Energy; Solar City Nelson and NERI as well as the Smart Grid Forum involved. More Behaviour Changers from Industry and the Third Sector will be involved in future research.

Positioning of the Task vs other bodies

Task 24 plans to support the new Task 26 on Multiple Benefits Analysis. We just supported the IEA Secretariat in forming the agenda and presenting at their Behaviour Change in Businesses Workshop in Paris, November 2015. We are in talks with the Secretariat to co-write a report on behaviour at some stage in the future or to feed into eg Energy Technology Pathways and other publications. We are in close contact with the Australian Annex of 4E and are meeting with various Australian Behaviour Changers, potentially fostering a collaboration around 'the internet of things'. We will also aid Matthias Stifter with the IEA workshop in Austria in May 2016. Several 'Nudge Units', including the American, Canadian and British one are interested, and actively participating in workshops of our Task.

Outreach of the Task – success stories

The Behaviour Changer model of understanding the energy system, which is used to run workshops in the Task 24 extension has received highly positive feedback by academics, policymakers and industry representatives around the world. At BECC, the largest behaviour change conference in the world it was publicly referred to as ‘the magic carpet’. It has even been called ‘revolutionary’. We receive extremely positive feedback from all of our workshops by participants. Our use of narratives and story-telling in its many different forms is being regarded as something of a trailblazer and has been copied by highly reputable experts in research and industry. We often get told that our work and our workshops are a lot of fun and people enjoy taking part in the Task as they can be creative and bring their various interests and expertise to the table. The Task is very inclusive and brings highly reputable, experienced experts together with young students just starting out in the field. One of the greatest successes of this Task is the many examples of successful matchmaking where we have brought people from all over the world, different sectors and disciplines together to work outside of Task 24, and build strong friendships, collaborations and alliances. We have some highly committed experts (who are not the national experts in most parts) who have done 100s of hours of in-kind work for the Task. Without all of them, this Task would not be what it is.

Activity time schedule

Task 24 Phase I started in July 2012 and was finalised in April 2015. Phase II started in April 2015 and will be finalised in April 2018.

Based on 4 participating countries

Subtasks	2015		2016		2017		2018
Subtask 0 Admin							
Subtask 5 Platform							
Subtask 6 Issues							
Subtask 7 People							
Subtask 8 Toolbox							
Subtask 9 Measure							
Subtask 10 Story							
Subtask 11 Pilots							

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Task 25

Business Models for a More Effective Market Uptake of DSM Energy Services

Operating Agent: Dr Ruth Mourik, DuneWorks, the Netherlands

Co-Operating Agent: Ms. Renske Bouwknegt, Ideate, the Netherlands

Description

This Task will focus on identifying existing business models and customer approaches providing EE and DSM services to SMEs and residential communities, analysing promising effective business models and services, identifying and supporting the creation of national energy ecosystems in which these business models can succeed, provide guidelines to remove barriers and solve problems, and finally working together closely with both national suppliers and clients of business models. The longer term aim of this Task is to contribute to the growth of the supply and demand market for energy efficiency and DSM amongst SMEs and communities in participating countries.

Task aims & objectives

Subtask 0: Prescoping

Subtask objectives

The focus of this task was on making a first inventory of issues of common interest regarding business models and Service Value propositions on Energy efficiency. The main objective of this subtask was to map valuable knowledge, identify country specifics and general objectives.

- O1: Writing work plan, in close cooperation with team (DuneWorks, Ideate, TU/e) and interested countries
- O2: Performing a quick scan of country specifics (relevant policy and regulation, research, business models. energy targets etc.).
- O3: Attendance (virtual) of ExCo meeting in 2014

Subtask deliverables

- D0: draft work plan

Work carried out

All activities have been completed.

Subtask 1 Management

Subtask objectives

- Overall project coordination and management, including contact relationship management:

- Attendance of ExCo meetings, conferences and reporting to IEA DSM ExCo
- Set-up Task Advisory Board (AB) of stakeholders (ExCo, IEA, intermediaries from research, industry, government, community sectors)

Subtask deliverables

- D1: Advisory committee of stakeholders from ExCo, IEA, research, commercial, community, policy and end user sectors providing strategic guidance.

Other deliverables:

- Four half-yearly Task status reports
- Three annual reports
- One End of term report (if applicable)
- One Final report (compilation of subtask deliverables)
- Task management report
- IEA DSM Spotlight articles
- Two Task flyers

Work carried out

- Overall project coordination and management, including contact relationship management: ongoing
- Attendance of ExCo meetings, conferences and reporting to IEA DSM ExCo
 - Participation and presentation of work progress at the two exco meetings this year: South Africa and Canada
- Set-up Task Advisory Board (AB) of stakeholders (ExCo, IEA, intermediaries from research, industry, government, community sectors)
 - Stakeholder lists set up for each country, and in each country, if deemed relevant a group of experts is set up to reflect on the work.
 - In addition the Exco members and national experts are considered to be the most important expert group.
 - We have decided to do a more informal and wide approach at the advisory board issue, and send out newsletters and ask for feedback from the market.

Subtask 2: Identify proven and potential business models for energy services

Subtask objectives

There are many energy service business models “out there” and often they are closely linked to existing market structures and policies. In other words, business models are often country and context specific. We will start with an inventory of different existing business models, both in the participating countries and also including global examples of successful business models. In the different participating countries we will analyse what business models exist, and what frameworks (market and policy) accompany them.

- Identifying country specific suppliers, clients, and their stakeholder networks and trying to establish national advisory expert networks to continue working with throughout the task: stakeholder lists are being set up and will have been completed before the EXCO meeting in Canada.

- Narrowing down the focus of both services, target groups and typology of business models in close cooperation with national experts and other relevant stakeholders: initiated and translated into what information to collect in longlist, narrowing down took place during first expert workshop March 9-10th 2015.
- Clarifying how the different parameters of success of business models and services will relate to each other in the analysis – economic profitability, scale of impact and real savings, business creation, growth rate, synergies with other values, adoption rate etc. Discussed during workshop March 10th, and through literature review being conducted.
- Developing a task specific typology or categorisation of business models and services for EE.
- Developing an overview of existing energy service business models in the participating countries and their frameworks/ecosystems and how they meet and incorporate client needs.
- Reviewing global existing business models and their frameworks/ecosystems with a clear focus on quantifying and qualifying effectiveness (e.g. amount of customers reached, market share, savings aimed for, other outcomes, ROI).

Subtask deliverables

- D2: report with typology and description of existing services and business models in each participating country and their framework/ecosystem;
- D3: report with review of global business models and services in non-participating countries and their framework/ecosystem;
- D4: report with comparative analysis and key factors for success, including overview of success parameters to assess effectiveness of business models and services.

Work carried out

- We identified country specific suppliers, clients, and their stakeholder networks for the Netherlands, Sweden, Switzerland, Austria and established were relevant, national advisory expert networks.
- The focus of both services, target groups and typology of business models was narrowed down, and how the different parameters of success of business models and services will relate to each other in the analysis was clarified. A selection criteria toolkit was developed concordantly.
- A longlist overview of existing services and business models *completed* for all countries except Norway (joined later)
- A shortlist overview of services *completed* for all countries except Norway.
- A global analysis was performed by CREARA, hired by the ECI partner.

An individual analysis of all shortlisted cases is being performed, as well as the global analysis.

- D2 is being drafted for each country, using a format or template developed in close cooperation with all national experts,
- D3 is finished and ready for publication as soon as D2 is ready.
- D4 is to be finalised in the first six months of 2016

Subtask 3

Subtask objectives

When the key factors that make services (and their vendors) succeed have been identified in the different countries we will need to start applying this knowledge to help creating a mass market for energy services. This will be achieved through the co-creating of potential effective business models and services with national stakeholders, in addition we will contributing to the setting up of piloting activities in each participating country and define guidelines for policymakers to allow a more effective upscaling of proven business models and services.

Activities

1. Develop frameworks for potentially effective business models and services in co creation with national stakeholders, e.g. suppliers and clients. We will do so in face to face workshops, with the national experts and other relevant stakeholders.
2. Creating policy guidelines with necessary policies and strategies of different stakeholders, and their timing, to encourage market creation and mainstreaming of selected business models in participating countries
3. Contributing to the setting up of piloting activities in each participating country. This activity will be initiated on the basis of the lessons learnt that we would like to turn into practice. The aim is to support one or two relevant stakeholder in the participating country to set-up a business model and service for EE based on the key success factors identified in this task, and support the set-up of a pilot or deployment strategy for this service and business model.

Subtask deliverables

- D5: report with repository of potentially effective business models and services in each country
- D6: Country specific reports identifying potential barriers and opportunities for upscaling or mainstream selected potentially effective business models with guidelines/roadmaps for different stakeholders, i.e. policy makers, EE service suppliers and business model developers.

Work carried out

Not yet started

Subtask 4 Dissemination and expert engagement

Subtask objectives

This subtask is about creating effective means to disseminate, engage, collaborate and share learnings with the experts and stakeholders from participating or contributing countries and the wider community.

It is both important to disseminate the findings about effective business models and energy services for EE as widely as possible to contribute to a market uptake of EE services, though without the country specific recommendations and foci; and to learn as much as possible from other stakeholders and countries and collect as many relevant best and bad practices as possible.

The connection to existing IEA expert platforms and dissemination channels is aimed to create a learning culture and social network among the experts from various countries, disciplines and stakeholder groups and to foster collaboration within and outside this Task.

Activities

We will disseminate, engage, collaborate and share learnings through two activities:

1. Set up a stakeholder communication and engagement plan
2. Traditional dissemination to external stakeholders and academia
3. Creating and facilitating a good connection to existing digital and off-line expert platforms within the IEA, e.g. the expert platforms of Tasks 16, 24 and other relevant tasks and the expert platforms for other Implementing Agreements. This connection is meant to provide a 'matchmaking' service to enable trans-national, inter-disciplinary teams of experts and end users to collaborate and learn.

Subtask deliverables

- D7: progress report on dissemination activities and outreach activities.
- D8: outreach and dissemination material, including at least 2 academic publications, professional journal publications, animations and other outreach material highlighting the Task's work.

Work carried out

See the dissemination and stakeholder engagement activities

Activities completed in 2015

Subtask 1

- Overall project coordination and management, including contact relationship management: *ongoing*
- Attendance of ExCo meetings, conferences and reporting to IEA DSM ExCo
 - Participation and presentation of work progress at the two exco meetings this year: South Africa and Canada
- Set-up Task Advisory Board (AB) of stakeholders (ExCo, IEA, intermediaries from research, industry, government, community sectors)
 - Stakeholder lists set up for each country, and in each country, if deemed relevant a group of experts is set up to reflect on the work.
 - In addition the Exco members and national experts are considered to be the most important expert group.
 - We have decided to do a more informal and wide approach at the advisory board issue, and send out newsletters and ask for feedback from the market.

Subtask 2

- We identified country specific suppliers, clients, and their stakeholder networks for the Netherlands, Sweden, Switzerland, Austria and established were relevant, national advisory expert networks.
- The focus of both services, target groups and typology of business models was narrowed down, and how the different parameters of success of business models and services will relate to each other in the analysis was clarified. A selection criteria toolkit was developed concordantly.
- A longlist overview of existing services and business models completed for all countries except Norway (joined later)
- A shortlist overview of services completed for all countries except Norway.
- A global analysis was performed by CREARA, hired by the ECI partner.

An individual analysis of all shortlisted cases is being performed, as well as the global analysis.

- D2 is being drafted for each country, using a format or template developed in close cooperation with all national experts,
- D3 is finished and ready for publication as soon as D2 is ready.
- D4 is to be finalised in the first six months of 2016

Activities planned for 2016

Subtask 1 Task management

- Overall project coordination and management, including contact relationship management
- Attendance of ExCo meetings, conferences and reporting to IEA DSM ExCo
- Set-up Task Advisory Board (AB) of stakeholders (ExCo, IEA, intermediaries from research, industry, government, community sectors)

Subtask 2: Identify proven and potential business models for energy services

1. In-depth comparative analysis of around 4 similar business models in different countries and around 12 per country. Determining patterns, drivers and pitfalls. *Already Started.*
2. Identifying key factors that make services (and their vendors) succeed in the participating countries through an in-depth analysis of country specific markets and policies for energy services and their influences on business models; *Already Started.*
3. Organising first country workshops with service providers and clients. *Already Started.*
4. Creating a draft report with all the national examples, the best practices and the analysis including useful tips and tricks etcetera. *Already Started.*

Subtask 4 expert platform

- Link to DSM website and experts and maintain a section for Task 25. Started

Meetings held in 2015

Experts meeting/seminars/conferences

Experts meetings

Date	Place	Type of meeting	Total	Government	Industry	Academic
January 8th 2015	Online	XM Webinar for national experts	8			
March 10–11th 2015	Eindhoven-The Netherlands	Xm= SHM National expert meeting	11		3	
Ongoing	Many teleconf and skype meetings with individual experts	XM Process monitoring and training				

XM = Experts meeting

SHM = Stake holder meeting

Seminars/conferences

Date	Place	Type of meeting	Total	Government	Industry	Academic
30-03-2015	Cape Town	SHM	>100	>20?	>40?	>40?
October	Halifax Canada	SHM	>40	40		
October	Netherlands, Amersfoort	SHM TKI Energy conference	>20			
November	Online Webinar	SHM	>200	33%	33%	33%
November	Paris	IEA conference on SMEs and EE/behavioural change	40	15	10	15
December	Stockholm	SHM with presentation first findings for Swedish stakeholders	14	7	5	2

Meetings planned for 2016

Experts meetings/seminars/conferences

Experts meetings

Date	Place
January, first stakeholder workshop Task 25 Switzerland	Bern Switzerland
January, first stakeholder workshop Task 25 Austria	Graz Austria
March Exco second stakeholder workshop Task 25 Sweden	Sweden
February, first stakeholder workshop Task 25 Netherlands, tbc	Netherlands
April, first stakeholder workshop Task 25 Norway, tbc	Trondheim, Norway
May, full internal national experts workshops	
September, second stakeholder workshop Task 25 Austria, tbc	Austria
September, second stakeholder workshop Task 25 Switzerland, tbc	Switzerland
September, second stakeholder workshop Task 25, Netherlands, tbc	Netherlands
September, second stakeholder workshop Task 25, Norway, tbc	Norway

Seminars/conferences

Date	Place
March. DSM day before Exco meeting	Stockholm, Sweden
April, stakeholder workshop Task 25 with Copper Alliance, Brussels, tbc	Brussels, Belgium
May, webinar DSM University, tbc	Online
May, Smart Grid conference, IEA roadshow, tbc	Linz, Austria

Publications produced in 2015

- Task 25 website on the IEA DSM website <http://www.ieadsm.org/task/task-25-business-models-for-a-more-effective-uptake/>
- Literature review user centric design in business models <http://www.duneworks.nl/project-en/iea-dsm-task-25/>
- First Task 25 newsletter <https://ieatask25.wordpress.com/>
- Global analysis of business models, longlist and shortlist (confidential for now, distributed amongst partners only)
- Toolkits for analysis of case studies (confidential for the moment)
- Factsheet Task 25
- Spotlight Issue 52
- Spotlight Issue 56
- Presentation at the IEA workshop on SMEs and behavioural change, November 2015
- Webinar for DSM university, November 2015
- Presentation at the Domestic Use of Energy Cape Town, South Africa, March 2015

Publications planned for 2016

- Article on Task 25 in the Swedish magazine Energy Efficiency
- Draft Review report subtask 2
- Spotlight issue on results of analysis
- Other national publications in sectoral journals
- We plan to disseminate a newsletter every month or two to a group of several hundred stakeholders internationally.
- Together with the Leonardo Academy we have decided to create a series of web presentations for the different business models we investigate.

Dissemination of results

Dissemination took place through a variety of activities and measures. Webinars for both national experts and other stakeholders, a newsletter/blog, dissemination on the website of the IEA DSM, the DuneWorks website and the Ideate website.

Involvement of industry and other organisations

The Industry partners are explicitly represented in our Task, we involve them in the analysis (they are our unit of analysis), in the dissemination (they represent the majority of stakeholders for our newsletters), and in our workshops they are a key stakeholder.

Positioning of the Task – v.s. other bodies

ClimateKIC

We collaborated with ClimateKIC through the placement of Fiona Tutty, an ESCO entrepreneur. Fiona spent several weeks with us working on the analysis of the BAS Path to Zero business case and a user analysis for this business model. This cooperation was very fruitful and has led to consolidated cooperation plans with Ireland.

This Task aims to seek collaboration with Task 16, 24 and 26 to make sure the results build upon the work done

Other DSM IA Tasks

As the OA for Task 25 is also cooperating agent of Task 24 behavioural issues around business models and energy services on both the level of households and SMEs are organically fed into the Task work. In addition Ruth Mourik aims to make duo presentations of Task 24 and Task 25 demonstrating how they are complementary in their focus on the supply and demand side.

We will aim for a shared publication with Task 24 at the Behave conference or the ECEEE 2017. In addition, Task 25 will not set-up its own expert platform as a stand-alone platform, but try to provide input to the platforms set-up by other tasks.

Collaboration with other Implementing Agreements

This type of collaboration is key for the success of the IEA DSM and for this task.

Task 25 explicitly includes an expert from one of the ISGAN tasks, Prof. Dr. Geert Verbong, from the Eindhoven University of Technology (TU/e) as one of the team members. The IEA PV Power Systems programme is also attended by Prof. Geert Verbong and Dr. Boukje Huijben and as such good transfer of results is accomplished by them.

In addition, one of the planned stakeholder workshops, in Brussels in 2016 will explicitly invite representatives from ISGAN and other potentially relevant IAs such as the International Energy Agency's Energy in Buildings and Communities Programme.

In addition, in May 2016 a cooperation day is likely to be organised in Linz, Austria, where operating agents will meet and discuss cooperation together with national experts.

Outreach of the Task – success stories

This year was very much focused on developing a good analysis framework and developing a conceptual framework that allows for a perspective on the energy transition and the servitisation transition as well. We received very good feedback from the interviewed entrepreneurs, stating that our interview in itself already generated relevant learnings for them.

The entering of Norway was a clear example of the increasingly clear benefit of participating in our project. Korea, Canada and Ireland are now also discussing participation, which is clear evidence of the good outreach and promising results we deliver.

The placement of Fiona Tutty from ClimateKic was a very useful transfer of knowledge project, which has led to consolidated cooperation with relevant players in Ireland.

Finally we received several hundred hits on the first blog for our Task and many email queries following that blog post.

Activity time schedule

The Task entered into force on 1 November 2014 and shall remain in force until 1 November 2017.

The planning for Task 25 has not yet experienced delays. However, the later participation of Norway and the potential participation of even more countries will demand an extension to allow a good catching-up and dissemination. At the Executive Committee meeting in Canada this extension was granted until November 2017.

Overview planning

Subtask 1: Management of the task	Nov-Dec 2014	Jan-Feb	Mars- May	June- July	Aug- Sep	Oct- Nov	Dec-Jan 2016	Feb- Mars	Apr- May	June- July	Aug- Sep	Oct- Nov
1.1 Set-up of an advisory board (AB)												
1.2 Annual Advisory Board (AB) meetings, ExCo meetings												
1.3 Overall project management and financial and administrative duties												
Subtask 2												
2.1 Identifying relevant stakeholders and establishing national advisory expert networks												
2.2 Narrowing down the focus												
2.3 Clarifying parameters of successful business models and services												
2.4 Developing a typology of existing energy service business models												
2.5 Identifying existing business models and frameworks in participating countries												
2.6 reviewing global business models and services and frameworks												
2.7 In-depth comparative analysis												
2.8 Identifying key factors on national level												
2.9 organising regular workshops												
2.10 reporting results												
Subtask 3												
3.1 Developing potentially effective business models/services for each country												
3.2 creating policy guidelines/ roadmaps for policy makers and stakeholders												
3.3 contributing to setting-up piloting activities												
Subtask 4												
4.1 Design of a Stakeholder Engagement Plan												
4.2 Dissemination to academic journals, participation in conferences, creation of outreach material												
4.3 Connection to and utilisation of IEA expert platforms												

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