IEA Technology Collaboration Programme on Demand Side Management Technologies and Programmes

Fifty First Executive Committee Meeting

Pre-Meeting Document (PMD) – Part 1

16-18 April 2018

Bergen, Norway

Contents

MATTERS FOR THE EXECUTIVE COMMITTEE

DSM TCP ExCo Steering Committee Report Document C – page 16

- Approve the Task Status Report

Proposal Task 17 – Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storages – Phase 4 – Responsive prosumer networks. Document D – pages 17-24

- Approve the Task Status Report

Concept paper: Global peer-to-peer observatory – Document E – pages 26-29

- Approve the concept paper and further development

Format of activity

It is proposed that this is a new format of activity distinct from a Task. It serves the function of drawing from the deep technical expertise of existing Tasks (17, 24 & 25) and focuses these around case studies as the unit of analysis. This raises two questions:

- Should this be independent – or integrated in an activity like Task 17?
- Should this be a Task in its own right?

Relationship with other TCPs

This has clear overlaps with other TCPs such as ISGAN. This raises three questions:

- Should this be primarily housed within the DSM TCP?
- How should reporting to other TCPs be handled (should the OAs attend the ExCos of other TCPs to report, if so how many TCPs are relevant to attend).
- As representatives of member nations – are the outputs of interest and relevance to your work?

Funding and participation

There is likely to be considerable commercial interest in the outcomes of this activity. This raises two questions:

- What conflicts of interest arise through introducing different companies into the work of the DSM TCP?
- Can funding structures be tiered according to the class of membership (different fees for participation by nations compared to companies)?

Task 16 – Phase 4 – Innovative Energy Services – Life-Cycle cost; 'Deep Retrofit'; Simplifies M&V; (Crowd)-Financing & Energy Services Taxonomy – Document F – pages 30-37

- Recommend the ExCo to approve the Task Status Update Report.
- Provide guidance on future work after June 2018 please, if desired by the ExCo, otherwise Task 16 will be terminated by end of June this year.

Task 25 – Business Models for a More Effective Market Uptake of DSM Energy Services – Document G pages 38-51

- Approve the Task Status Report and Phase 2 Work Plan

Task 24 – Behaviour Change in DSM: Helping the Behaviour Changers – Phase 2 Document H pages 53-59

- Approve the Task Status Report

Programme Visibility Report Document I – pages 60-63

- Approve the Status Report

DSM University Document J pages 64-75 ➢ Approve the Status Report
(To be presented during the ExCo meeting) **Task Zero** ➢ Approve the Task Zero Status Report
PMD Part 2: Financial Report 2017 and current financial status 2018 ➢ Approve the financial report 2017 and current financial status 2018
Strategic Communication Document K – pages 76-77 ➢ Comments
Strategy Work Plan – End of Term 2014-2019 and application for new Term Document L pages 79-81 ➢ Comments, additions to the discussion of the draft Strategy Work Plan

Document A

AGENDA

IEA Demand-Side Management Energy Technology Initiative
Fifty First Executive Committee Meeting
16 – 18 April, 2018 Bergen, Norway

Monday 16 April

09:00 – 15:30	DSM Day Workshop Clarion Hotel Admiral, C. Sundts gate 9, Bergen	
16:00 – 17:00	Operating Agents Meeting Visibility Committee Meeting	

Tuesday 17 April ***(***Clarion Hotel Admiral, C. Sundts gate 9, Bergen)

09:00 – 10:30 **1. GENERAL BUSINESS/WELCOME**

1a. Welcome – *Even Bjørnstad, David Shipworth*	
1b. **ExCo approval** of the Agenda	DOC A
1c. **ExCo approval** of the Fiftieth ExCo meeting Minutes – The Hague, Netherlands	Distributed earlier
1d. Status of the Implementing Agreement - Vote for 1 year extension	
1e. IEA Relations - Secretariat news	DOC B
- Contacts with possible sponsors/new participants – *Even Bjørnstad*	
- IA relations, BCG and ECG, – *Even Bjørnstad*	
- Report from the ExCo Steering Committee - *– David Shipworth*	DOC C
- Operating Agents meeting report – *Even Bjørnstad*	

10:30 – 11:00 **Coffee break**

11:00 – 12:30 **2. NEW WORK**

2a. Task 17 Phase 4 – Responsive prosumer networks Task Status Report and updated Work Plan *- René Kamphuis, TNO, the Netherlands*	DOC D
2b. Concept paper: Global peer-to-peer observatory *- David Shipworth – UCL Energy Institute*	DOC E

The proposed New Tasks discussion will aim at one of the following decisions:

1. Decide to initiate the new Task based on work done to date.
2. Decide to initiate the Task Definition for a new Task. Interested countries must be prepared to assign the appropriate expert(s) to participate in that process.
3. Decide that additional work is needed on the concept paper. Interested countries must be prepared themselves, or to assign the appropriate Experts to help further develop the concept.
4. Decide to pursue the subject in co-operation with other parties within the IEA or elsewhere
5. Rejection (or moth-balling)

12:30 – 13:30 **Lunch**

3. CURRENT TASKS – LOAD LEVEL CLUSTER

13:30 – 14:00	3a. Task 16 – Phase 4 – Competitive Energy Services – Task Status Report – *Jan W. Bleyl, EnergeticSolutions, Austria*	DOC F
14:00 – 14:30	3b. Task 25 Business models for a more effective market uptake of DSM energy services. Task Status Report – Task Status Report and Phase 2 Work Plan – *Ruth Mourik, DuneWorks, the Netherlands*	DOC G
14:30 – 15:00	**Coffee break**	

4. CURRENT TASKS – LOAD SHAPE CLUSTER

15:00 – 15:30	4b. Task 24 Closing the Loop – Behaviour Change in DSM: Helping the Behaviour Changers – Phase II. Task Status Report – *Sea Rotmann, SEA - Sustainable Energy Advice, New Zealand*	DOC H
15:30 – 17:00	**Future of the DSM TCP – afternoon discussion** • New topics	
19:00	Hosted dinner	

Wednesday 18

5. PROGRAMME VISIBILITY

09:00 – 9:30	5a. Programme Visibility Report – *Josephine Maguire*	DOC I
	5b. Development of the DSM University – *Hans Nilsson*	DOC J

6. ADMINISTRATIVE MATTERS

	6a. Task Zero, status report	
	6b. Financial Report 2017 – *Even Bjørnstad*	Part 2
	Accountax Status Report	Part 2
	Status of Common Fund payments	Part 2
	6c. Plans for the Fifty Second ExCo meeting October 2018 *(tentative offer from UK)*	
	6d. Plans for the Fifty Third ExCo meeting (April 2019)	
10:00 – 10:30	**Coffee break**	

7. END OF TERM 2014-2019 and APPLICATION FOR NEW TERM

10.30 – 12:30	7a. Strategic Communication	DOC K
	7b. Strategy Work Plan	DOC L
	7c. Discussion	

8. Other matters

12:30 – 13:30	**Lunch**	

APPENDIX TO THE AGENDA "Issues for the decisions and the process to reach decisions"

The delegates are URGED to prepare their responses to presentations carefully and primarily by contacting possible stakeholders before the meeting. The format for these proposed New Tasks will be a brief presentation that focuses on the:

• Motivation for the proposed work (what issues does it tackle?) what is it trying to achieve? Who is the target
audience?;
• Objectives;
• Approach to accomplishing the proposed work;
• Expectations/Results and Deliverables
• Dissemination plan – what will need to be done to get the results adopted? Who will do it?
• Required resources

Concept and Task Definition Papers (Process and phases)

Before a new Task is starting the concept has to be defined and presented in order to attain the interest of possible participants.

PHASE 1: IDENTIFY NEW ACTIVITIES

Resulting in a CONCEPT PAPER (2-5 pages) containing

- Motivation
- Objectives
- Approach
- Expectations/Results

PHASE 2: DEFINE NEW ACTIVITIES

Requiring an EXPERTS MEETING to propose

Table 1. Task Work Plan Resource needs: Task or cost sharing
Table 2. Dissemination, Task Information Plan

CONTENTS OF PROPOSALS FOR NEW WORK

The document that will propose the new work to the Executive Committee could be organized and have the
Following contents:
1. Background and motivation
2. Objectives
3. Issues for the new work (scope)
4. Structure (sub-tasks)
5. Management (responsibilities of the Operating Agent, Subtask leaders and Experts)
6. Deliverables (for whom, target groups)
7. Time Schedule and milestones
8. Funding and Commitments (Resources needed)
9. Meetings plan
10. Information activities
11. Co-operation with other IA's, the Secretariat and other interested parties
12. Country contributions to funding and Tasks

Annexes: Detailed description of Subtask

Document B

The IEA Secretariat report provides an overview of recent developments within the Energy Technology Network (ETN) and the IEA Secretariat that are of interest to all Technology Collaboration Programmes (TCPs). This report is designed to complement the information provided by your Desk Officer related to IEA analysis and projects (current and planned) of relevance to individual TCPs. If you have comments or questions, please forward to TCP@iea.org.

IEA SECRETARIAT NEWS

(December 2017)

2017 Ministerial

Under the Chairmanship of Ibrahim Baylan, Swedish Minister for Policy Co-ordination and Energy, the IEA 2017 Ministerial Meeting brought together Ministers from the IEA's 29 member countries, seven Association countries, partners and more than 30 CEOs from the world's leading energy companies. The theme of the two-day meeting was "Bolstering energy security for sustainable global growth." Ministers also unanimously endorsed Mexico as the next member of the IEA, expanding membership to Latin America and providing a major boost for global energy governance.
Ministers endorsed further strengthening of the IEA's role as the global clean energy hub, including its focus on technology, policy, and market design. As regards technology development and innovation, Ministers endorsed the new IEA Medium-Term Strategy for Energy Research and Technology 2018-2022 (available for download on the Forum), thereby supporting the enhancement of the TCPs to accelerate shared innovation priorities.
The IEA also announced a new Clean Energy Transitions Programme, a multi-year, EUR 30 million plan to support clean energy transitions around the world. Backed by many member countries committed to promoting the development of clean energy, the new Programme is intended to leverage the IEA's unique energy expertise across all fuels and technologies to help accelerate global clean-energy transitions, particularly in major emerging economies.
The new TCP on Clean Energy Education and Empowerment (C3E TCP) held a ministerial side event with participation from both governments and industry. Sweden, Italy and Canada are the TCP founding members, and a number of other countries are in the process of joining or considering doing so. Download the brochure.
For more Ministerial information see the Press Release, Chair's Summary, and Commentary from the Chair of the Governing Board.

Twenty-Third Session of the Conference of the Parties (COP23)

The twenty-third session of the Conference of the Parties (COP23), convened under the presidency of Fiji, was held in Bonn, Germany from 6-17 November 2017. The IEA had a strong presence, hosting or participating in over 20 events. Further information, including presentations, is available on the IEA workshop page.

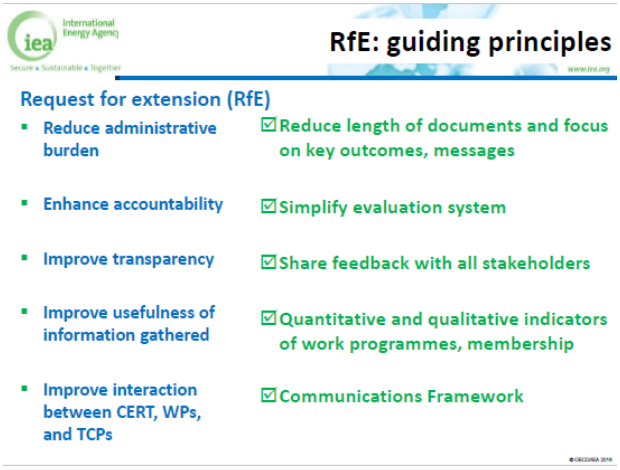
COMMITTEE ON ENERGY RESEARCH AND TECHNOLOGY (CERT)

TCP Universal Meeting 2017
The 2nd Universal Meeting of the Technology Collaboration Programmes took place on 9 October 2017 in Paris, back-to-back with a meeting of the CERT. It was attended by representatives from 31 TCPs, the CERT, Working Parties, partner countries, as well as by each the Clean Energy Ministerial and Mission Innovation Secretariat. A *Draft Action Plan for TCP Enhancement,* with specific, actionable recommendations, was presented. Based on feedback received, it will be revised and discussed again at the CERT meeting in February

2018.
The event was also an opportunity for networking, and on 10 October TCP representatives were offered the possibility to attend a cross-cutting brainstorming session, and to meet bilaterally with Partner Country programme managers, and the IEA legal office.

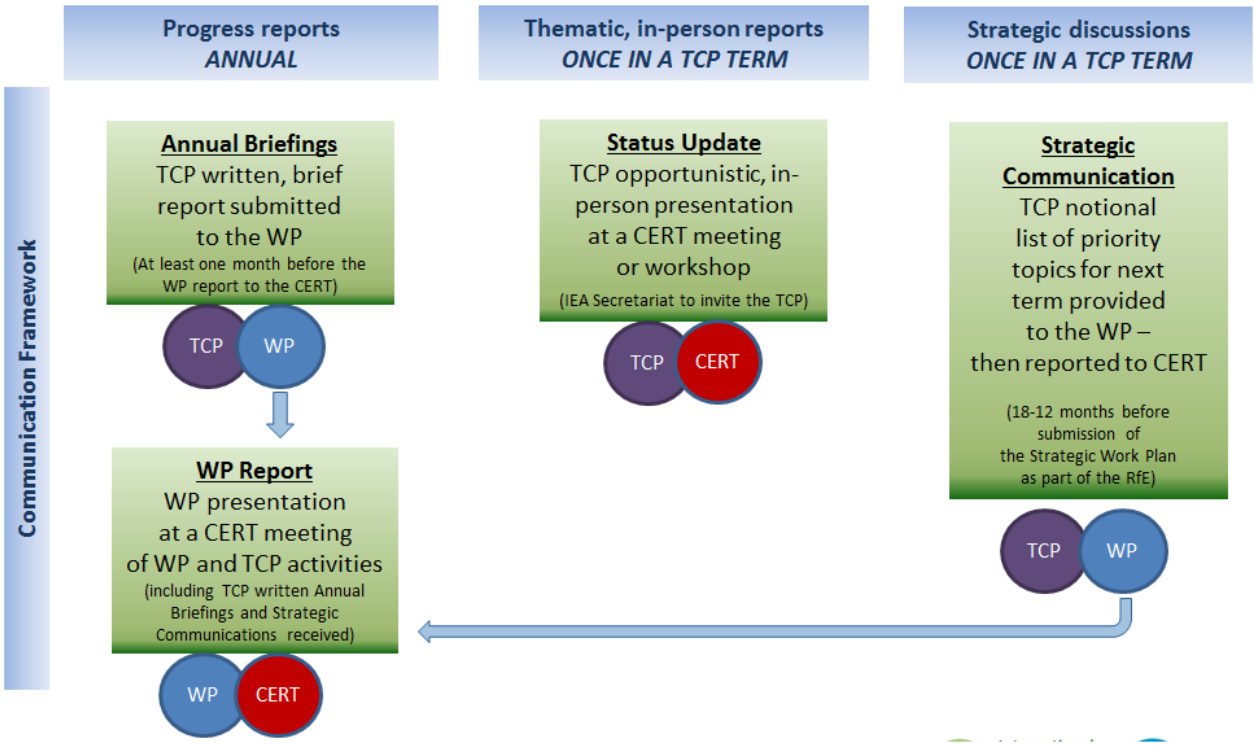
TCP workshop February 2018
CERT-TCP workshops provide an opportunity for TCPs to make an in-person oral report to the CERT through meetings or workshops, one of the four pillars of the new Communications Framework. The third of these yearly workshops will take place on 15 February 2018 following the CERT meeting on 13-14 February. The 2017 workshop focused on two of the Mission Innovation Challenges: Affordable Heating and Cooling of Buildings, and Smart Grids. The 2018 event will focus on the transport sector, and key stakeholders from Mission Innovation Challenge #4 on Sustainable Biofuels will be invited to attend.

Request for Extension: CERT guidelines
The CERT guidelines for a TCP Request for Extension (RfE), as revised in February 2016, are now applicable to all TCPs.
The RfE requires the following Supporting Documentation:
End-of-Term Report: Accomplishments over the past term with a focus on outcomes; 5 pages maximum (two-page Annual Briefs may also be attached).
Questionnaire: Qualitative (list of activities carried out during the period and lessons learned), and Quantitative (one page); should not exceed 6 pages.
Strategic Work Plan: Focusing on opportunities for growth and barriers, new work streams and membership; 2 pages maximum.
Detailed documentation and templates are available on the Forum under Requesting a Term Extension.



Communications Framework: CERT guidelines

The **Communications Framework** (CF) was adopted by the CERT in February 2016, and became fully applicable from June 2017. As a companion to the request for extension process, the aims of the CF are to:
Enhance communication between the CERT, WPs and the TCPs
Provide opportunity for discussions of TCP strategies
Strengthen the role of the Working Parties (WPs)
The CF consists of four parts:
TCP annual written briefings to the relevant Working Party (Annual Briefing)
TCP in-person oral report to the CERT meetings or workshops (Status Update)
TCP strategic communication with the CERT through the Working Party (Strategic Communication)
Working Party periodic oral report to the CERT (Working Party Report)



WORKING PARTIES

The September 2017 meeting of the **Working Party on Energy End-Use Technologies (EUWP)** included a joint meeting with the Working Party on Energy Efficiency (EEWP) and the International Partnership for Energy Efficiency Co-operation (IPEEC) on International co-operation on energy efficiency: gaps, overlaps and strategic opportunities. The next workshop and meeting of the EUWP will be hosted by the Austrian Federal Ministry for Transport, Innovation and Technology in Vienna on 20-22 March 2018.
The October 2017 meeting of the **Working Party on Renewable Energy Technologies (REWP)** was hosted by the National Laboratory for Energy and Geology (LNEG) in Portugal, and included a technical tour of Solar XXI, a Nearly Zero Energy Building. The next meeting of the REWP will take place in March 2018 in Paris, back-to-back with a joint REWP-EEWP workshop on aligning energy efficiency and renewable policies (exact dates to be confirmed).
The next meeting of the **Fusion Power Co-ordinating Committee (FPCC)** will take place at 24-25 January 2018 at the ITER site in Cadarache, France. Items on the agenda will include election of the Chair and Vice-Chairs, the FPCC Strategy 2018-2020, and a strategic session on "Fusion R&D, costs and benefits."
The June 2017 meeting of the **Working Party on Fossil Fuels (WPFF)** was hosted by METI in Tokyo, and included a technical visit to the J-Power Isogo power station. The following WPFF meeting takes place in Paris on 12-13 December 2017.

TECHNOLOGY COLLABORATION PROGRAMMES (TCPs)

TCPs on the IEA website

Work has begun to further increase TCP visibility on the IEA website, enhance accessibility of data and information on TCPs, and redesign individual TCP web pages. Further information is available in the presentation made by the IEA Head of Communication and Information Office at the recent TCP Universal Meeting.

Recent TCP closures

TCP on a Climate Technology Initiative (CTI TCP): While the CTI TCP closed on June 2017, the Private Financing Advisory Network (PFAN), the main activity of the TCP, has adopted a new organisational and governance structure. UNIDO, in collaboration with REEEP, will henceforth host PFAN.

TCP on Renewable Energy Technology Deployment (RETD TCP): Following the withdrawal of two members in 2016 and early 2017 due to budget constraints, it was considered impossible to continue with less than five member countries and so the decision to terminate the TCP on 30 June 2017 was made..

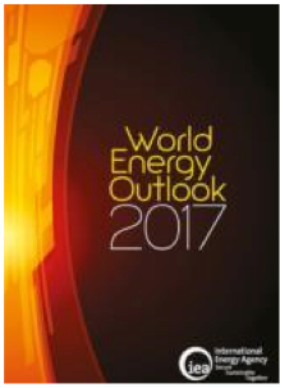
Best practice
Does your TCP have any best practice to share? Looking for ideas, inspiration, or tips? The Best Practice section on the Forum covers Management, Raising awareness, Funding mechanisms, Membership, Annual reports, and Requests for extension. A few examples include:
SHC TCP: Newsletter to ExCo members and task leaders, videos
4E TCP: Policy briefs in a variety of languages
HEV TCP: A system of pre-funding for projects to reduce lead time
A list of TCP webinars can be found on the IEA WEBSITE. If your webinars are not currently featuring on this page please advise TCP@iea.org.

Frequently asked questions
The short FAQ brochure on TCPs provides an overview of the IEA and TCPs. It is designed to support your efforts to reach out to new members. It may be posted on your TCP website (ExCo, annex/task, workshop, conference), sent to potential partners via email, or printed to hand out during TCP-sponsored workshops or conferences.

Use of the Technology Collaboration Programme (TCP) brand

The **Branding FAQ** posted on the Forum answers the following questions:
Why has the term 'Technology Collaboration Programme (TCP)' been introduced?
Does the term 'Implementing Agreement' still exist?
Do we need to update the name and/or references in our legal text?
When will the term TCP be used?
Should we use 'TCP' in our own communication efforts?
How can we implement the term TCP with our current title?
Why is there a short name and an acronym?
Will there be a new logo for the TCPs?
Should we still use a disclaimer to explain our relationship to the IEA?
Will we be receiving additional guidance on implementing the TCP name and brand?
Tips for communicating
In this era of information overload communicating quickly – and effectively – is more important than ever. The short presentation Tips for Communicating provides concrete examples of how to prioritise the information presented, synthesise key messages and to use the right social media depending on the goals you want to achieve. If you have any questions do not hesitate to contact TCP@iea.org.

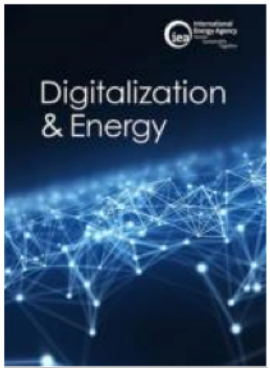
IEA PUBLICATIONS



World Energy Outlook-2017 –launched 14 November 2017
World Energy Outlook-2017 includes a full update of energy demand and supply projections to 2040 based on different scenarios. The projections are accompanied by detailed analyses of their impact on energy industries and investment, as well as implications for energy security and the environment.
The report this year includes a focus on China, which examines how China's choices could reshape the global outlook for all fuels and technologies. A second focus, on natural gas, explores how the rise of shale gas and LNG are changing the global gas market as well as the opportunities and risks for gas in the transition to a cleaner energy system.
Finally, the WEO-2017 introduces a major new scenario – the Sustainable Development Scenario – that outlines an integrated approach to achieving internationally agreed objectives on climate change, air quality and universal access to modern energy.
All purchasers are able to download the detailed projections provided in the Annex of the report in Excel format. Tables, figures and selected underlying data are also available for download in Excel format.
Press release; Chapter 1: Introduction and Scope; Launch presentation.
In addition, the WEO-2017 series features two special reports, released in October:
Energy Access Outlook 2017 – From Poverty to Prosperity
Assessing today's global picture for access to modern energy, the strategies and technologies that can enable

countries to achieve energy for all by 2030, and the ways in which reliable energy can help communities prosper.
Southeast Asia Energy Outlook 2017
Looking in depth at a region where infrastructure and investment have to keep up with rapid, sustained growth in energy demand. The report covers the particular challenge of providing secure, clean and affordable energy to small island systems and remote settlements.

Digitalization and Energy – launched 5 November 2017



This free report examines the impact of digital technologies on energy demand sectors, looks at how energy suppliers can use digital tools to improve operations, and explores the transformational potential of digitalization to help create a highly interconnected energy system. The report seeks to provide greater clarity to decision makers in government and industry on what digitalization means for energy, shining a light on its enormous potential and most pressing challenges, and includes a list of no-regret recommendations.
http://www.iea.org/publications/freepublications/publication/digitalization-and-energy.html

Other publications
A list of recent and forthcoming IEA publications can be found below. For publications for sale, TCP participants are entitled to a 30% discount on IEA publications (contact the IEA bookshop books@iea.org, with a copy to your Desk Officer), with your request and your role within the TCP.

Digitalization and Energy	Free	Available
Market-based Instruments for Energy Efficiency	Free	Available
Tracking Clean Energy Progress 2017	Free	Available
Energy Technology Perspectives 2017	For sale	Available
Global EV Outlook 2017	Free	Available
The Future of Trucks	Free	Available
International Comparison of Light-Duty Vehicle Fuel Economy 2005-2015: Ten years of fuel economy benchmarking	Free	Available
World Energy Investment Report 2017	For sale	Available
Market report series: Energy Efficiency 2017	Free	Available
Market report series: Renewables 2017	For sale	Available
World Energy Outlook-2017	For sale	Available
Technology Roadmap: Delivering Sustainable Bioenergy (update)	Free	Available
Market report series: Coal 2017	For sale	13 December 2017
Technology Roadmap: Cement (update)	Free	March 2018

TCP forum: www.iea.org/tcp/forum username Forum password network

Document C

DSM TCP EXCO STEERING COMMITTEE REPORT

The Project Preparatory Committee has changed names to: ExCo Steering Committee (ESC)

During the past six months 7 conference calls have been held.

Discussion topics have been:

Search for a new Chairman

- Someone from the ExCo – letter circulated to ExCo members
- Hire someone? – to be discussed with ExCo members

Extension Next Term

- Prepare EUWP report for 2017 (AB – Done)
- Review of renewal critical path
- Finalise Strategic Communication – submitted 1 February
- Strategic Work Plan
- End of Term report (5 pages);
- RfE questionnaire (qualitative and quantitative – 6 pages)

Strengthen TCP and TCP portfolio

- Get organisation in shape with Chair and 3 Vice Chairs
- Get other players involved
- New Tasks – ExCo driven
- Resolve status of Task 24

Next ExCo in Norway

- Our contribution to the DSM Day 16 April 2018

Any other business

- Collaboration TCP: Jeremy/Rob based on universal TCP meeting in Paris and FBF Singapore, including joint university
- Follow up new possible members (Germany, Argentina, Mexico, Hungary)
- Keep existing members on-board India, Austria, Spain and New Zealand
- Follow-up new possible members: Australia (re-join), GTC-Korea (sponsor?)

Document D

DSM TASK 17 INTEGRATION OF DEMAND SIDE MANAGEMENT, ENERGY EFFICIENCY, DISTRIBUTED GENERATION AND STORAGE – Phase 4 – *Responsive Prosumer Networks, Task Status Report*

René Kamphuis (TNO, the Netherlands)

TASK AIMS & OBJECTIVES

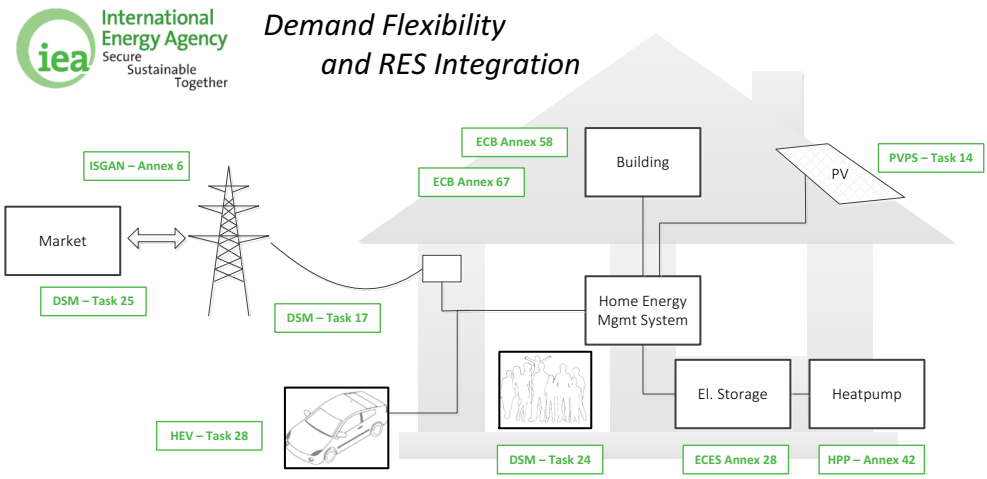
Task 17 will consider three aspects:

- Responsive. Responsive here reflects pro-activity and reactivity of the technological energy producing or consuming end-nodes but also of the (aggregated) users in providing responsiveness to different types of stakeholder requests in the energy commercial system and physical infrastructure.
- Prosumer. Prosumer, here, reflects part of the energy transition viz. the increased and, from a grid stability perspective, possibly disruptive production capabilities of small dispersed producers and also the increasing use of the electricity grid due to the increased electrification with HVAC (heat pumps) and electric mobility (EVs).
- Networks. The scope of networks considers the role of the physical grid, the aggregator and the, mostly rural, community/smart city dimension. Physical aggregation as well as virtual aggregation are considered.

The following subtasks further structure the activities to handle this emerging DG-RES and demand side challenge:

Subtask 14: Context analysis, use cases and SmartCity pilot positioning
Subtask 15: Metering, monitoring and coordination methods required to increase prosumer responsiveness
Subtask 16: Coupling to innovative user feedback, billing and transactive energy schemes
Subtask 17: Conclusions and recommendations

The picture below shows the interaction of Task 17 phase 4 with other IEA activities.



ACTIVITIES COMPLETED FROM OCTOBER 2017 TO APRIL 2018

Task 17 is awaiting definitive commitment from participating countries.

ACTIVITIES PLANNED FROM MAY 2018

Kick-off is planned for Spring 2018.

MEETINGS HELD FROM OCTOBER 2017 TO APRIL 2018

There have been a number of Webconferences with interested countries and organisations. A meeting with RVO and Dutch IEA-Tasks has been held. A meeting with the Belgian stakeholders and ExCo is planned for end of April in Brussels.

INVOLVEMENT OF INDUSTRY AND OTHER ORGANISATIONS

Experts involved in bi-annual meetings are from network operators (e.g. Enexis, Alliander and Stedin in NL) and aggregators.

DSM TASK 17 INTEGRATION OF DEMAND SIDE MANAGEMENT, ENERGY EFFICIENCY, DISTRIBUTED GENERATION AND STORAGE – Phase 4 – *Responsive Prosumer Networks, Revised proposal*

René Kamphuis (TNO, the Netherlands)

INTRODUCTION

Phase 3 of Task 17, regarding applying DG-RES, DR and storage in electricity grids, came with a set of conclusions and recommendations [1]. These pertain to new business models and roles of actors in a re-regulated electricity value chain, new tariff structures and transaction mechanisms and new ICT technology options that facilitate user and actor awareness of energy and electricity use.

The Paris treaty regarding reducing worldwide emission of greenhouse gases has accelerated the energy transition. The transition follows the “trias energetica” with first an increase of energy efficiency, moving to renewable generation and reducing emission for fossil fuels as the third option. The energy transition is also reflected by the European commission in November 2016 leading to the “winter package’’ of recommendations and directives for energy [2]. The window of opportunity for applying smaller scale resources (from the small commercial and end-customer segment) in the energy system can be seen to become wider in the near future although the existing grid accommodation capacity in some areas reaches its limit. Traditional retail and commercial consumers are in an evolution process to ‘prosumers’ and traditional electricity commodity retailers have to provide additional services in new business models to survive.

Phases 1-3 of task 17 have collected a valuable amount of information on technologies important for the current energy transition. Key energy transition components as demand response, distributed generation and storage technologies have been extensively analyzed and assessed from a technological perspective as well as from the perspective of operational or commercial electricity market usage in the grid. Cost/benefit models have been analyzed in several national contexts. However in all phases, it also was observed, only a part of the technical and economic potential can be uncovered. An acceleration is desired in line with the points addressed in the conclusion as to uncovering the full potential of demand side flexibility.

In the past five years Smart Cities concepts have been attributed a key role bringing together information and communication technology, urban planning and operation, optimization of energy and E-mobility related applications like comfort and energy management in buildings and mobility [3], [4]. Information and communication technologies increase aggregation possibilities and low-cost of IoT connected devices increase integration and valuation of the energy process information in the total system. On international and national levels, research programs have been defined and the first pilot projects already have been concluded. This development fits in key concepts in further uncovering the individual flexibility potential and to more powerful aggregation mechanisms and energy consumption/generation process integration levels, that can be validated and verified in the same way as large production facilities and or industrial DR resources.

Furthermore, transactive energy systems as a facilitator of Peer-to-Peer (P2P) trading between prosumers and consumers are coming-up as are the platforms for value-exchange without intermediary partners like blockchains.

Phase 4 in Task 17 builds further on the conclusions and recommendations of the previous phases and places them in an extended network perspective viz.

- The electricity system operational and commercial market network context.
- The community aggregation and ICT network context
- The prosumer/supplier/buyer transaction network context

In this project, valuation of aggregation mechanisms of small and intermediate scale PV systems, electric vehicles, electric and heat storage systems, heat pumps, micro-CHP in combination with energy management systems and first and second generation smart meters for implementing new transaction and tariff models will be assessed. Besides, the existing experience base of conducted and ongoing pilot projects, which combine these aspects, will be extended and analyzed. The application and realization of finalized projects in participating countries with respect to the specific regional differences and requirements are placed in focus.

PHASE 4

Scope

The October 2016 ExCo-meeting strategic discussion in the DSM-program did yield a clear requirement for an interdisciplinary approach between technological and behavioral scientists in an innovation eco-system context. Task 17 Phase 4 will try to follow this in the DSM-program portfolio by considering three aspects:

- Responsive. Responsive here reflects pro-activity and reactivity of the technological energy producing or consuming end-nodes but also of the (aggregated) users in providing responsiveness to different types of stakeholder requests in the energy commercial system and physical infrastructure.
- Prosumer. Prosumer, here, reflects part of the energy transition viz. the increased and, from a grid stability perspective, possibly disruptive production capabilities of small dispersed producers and also the increasing use of the electricity grid due to the increased electrification with HVAC (heat pumps) and electric mobility (EVs).
- Networks. The scope of networks considers the role of the physical grid, the aggregator and the, mostly rural, community/smart city dimension. Physical aggregation as well as virtual aggregation are considered.

Task subdivision

The following subtasks further structure the activities to handle this emerging DG-RES and demand side challenge:

Subtask 14: Context analysis, use cases and SmartCity pilot positioning
Subtask 15: Metering, monitoring and coordination methods required to increase prosumer responsiveness
Subtask 16: Coupling to innovative user feedback, billing and transactive energy schemes
Subtask 17: Conclusions and recommendations

Country Experts input:
Country experts are requested to provide specific information about ongoing country specific developments related to the objectives in each individual subtask. Furthermore they aid in organizing national workshops to inform stakeholders as to the progress of the project and the findings. Country expert activity is estimated to be 200-300 hrs for the 2-year duration of the project.

Operating Agent activities:

The operating agent organizes the events, structures the discussion and analyses the country specific inputs. Deliverable outlines and an overarching and detailed storyline is set. Contributions of participating

countries are joined into a consistent package with conclusions and recommendations. After the first and second year international dissemination meetings will be organized, if possible aligned to conferences in the field. Participant country specific activities will also be supported.

PHASE 4 SUBTASKS

Subtask 14 – Context analysis, use cases and Smart City pilots positioning

In modern societies, digitalization of all kinds of processes takes place at an increasing pace. This also holds for the electricity sector. Commercial value creation can be achieved with an increasing penetration level of small-scale energy monitoring. Also at the management and control level, using connectivity of customers to the mainstream internet, possibilities increase. Communicating, smart, meters generate power and energy measurements with 10 second and 15 minute resolution, that can be used for local and global commercial optimization. The potential of this metering infrastructure is only partially used. From a user perspective, small communication hubs to smart metering systems uncover the advantages of information becoming available to end users in new metering technologies increasingly (e.g. https://www.quby.com/). However currently observing user behavior is only limited to detecting patterns of energy consumption of home devices, leaving out the human behavior and motivation unexplored. There still there is a behavioral 'wedge'.

Instrumentation of MV-(Medium Voltage) grids allows more granular grid operation, based more and more on near real-time monitoring of data originating from lower voltage levels in the grid. To keep the electricity grid stable and allowing higher DG penetration levels, traditional SCADA (Supervisory Control and Data Acquisition) systems used for monitoring and control in DSO (Distribution System Operator) control centers are gradually extending their scope from the primary substation level (serving some 50000 customers) to the secondary substation level (1000 customers) and even the LV-transformer level (50 customers).

A key role in this transition is attributed to electricity flexibility and flexibility aggregation. ICT enables flexible aggregation topologies. Apart from self-consumption as an option, aggregation, in this sense, may be done (simultaneously) on the locational level, confined to a certain area, or on the global level, sharing certain optimization objectives like commercial portfolio optimization in the market or pairing renewable production and consumption in communities.

These technologies cannot be massively rolled out in one step. Pilot tests with Virtual Power Plants (VPPs), originally started 10-15 years ago within contexts of up to 50 to 100 customers. Scaling up at this moment takes place especially in Smart City contexts with support from overarching EU or DoE research programs and diverse national initiatives. Smart City concepts also stress the importance of integrating information and energy streams and also designs and lay-outs of physical grids in the context of DG-RES and energy storage embedding.

Detailed objectives of the work:

- Define the existing context views, common practices and state-of-the-art in the sector as-a-whole and on a per-country basis of the end-user/prosumer, commercial customer, the traditional stakeholders (commercial parties, system operators, aggregators, ESCOs)
- Make an analysis of the end-user behavioral characteristics and their relation to system operation. Classify and analyze behavioral changes that occur with customer energy transition, observed via metering and interviews.
- Analyze and refine the role and level of aggregator and aggregation in a set of common use cases from the analysis
- Derive the energy transition and Smart City context based on the EU and individual country perspective

Deliverables:
IEA-DSM-17.4.14: "Context analysis, flexibility aggregation and Smart City initiatives"

The operating agent number of person hours is estimated to be 320 hrs.

Subtask 15 – Metering, monitoring and coordination methods required to increase prosumer responsiveness

An important conclusion of the work in task 17 phase 3 was, that end-user tariff components only have a distant link to the impact of the consumption and production of electricity of the electricity system as a whole. The electricity market cost mapping mostly is calculated from synthetic profiles derived from a averaged set of electricity consumers or producers. In this way, end-user demand response actions, that generate flexibility, cannot be rewarded on an individual basis. Reconciliation using real measured profiles, based on the smart meter readings, makes it possible to map this price component more precisely on the actual power profile of the customer. In a number of countries, experiences with these types of reconciliation already exist.

For the transport and distribution components of the end-user electricity price also a similar mapping mismatch of real cost to tariffs occurs. Asset recovery based tariffs like connection capacity fees are common. Also tariffs, based on the maximum capacity used in a certain period, also hardly form a suitable component for rewarding end-user demand response. Distribution grids, previously having a one-design-fits-all-principle, with the current increased electrification of energy streams, are becoming more-and-more diverse. Functionality ranges from extended residential areas with high penetration of heat pumps to cities with large capacity requirements for (fast) charging of EVs. These changes require distribution tariffs with better opportunities to reward ''grid-friendly'' user behavior.

A third electricity price component are government energy taxes and subsidies. Several tax levying and subsidy schemes exist on the electricity commodity. At some occasions renewable infeed comes to saturation limits. On the market level, subsidized priority infeed of wind energy can lead to lower day-ahead prices that reduce the allocated amount of low-CO_2 fossil generators, Also, curtailment schemes for PV, needed for grid stability, are complex to implement due to loss of accompanying subsidies. In some cases this component has a different and even opposite effect in achieving the original, desired target. Priority infeed of wind and netmetering of PV need alternatives to reach their original objectives.

A considerable part of the increase of flexibility delivery will take place via automated controls operated via "soft" coordination algorithms and techniques (e.g. openADR) also establishing and maintaining the virtual power plant objectives and connections. The interaction of these information architectures with possible tariff scheme component modifications has to determined and evaluated. Uncovering flexibility was seen in Phase 3 to be largely dependent of the tariff structure. By automation it also was observed, that percentage of the total potential could be increased. Still, there is additional room left for further increase by studying the user or community behavior.

Detailed objectives:
- Develop a view on how to come to a better mapping of commercial tariffs on DR and DG customer behavior and the way the end user interacts. Analyze various types of commercial tariffs and characterize their influence on user's motivation, behavior, consumption patterns and responsiveness.
- Classify commercial tariffs in terms of energy savings and value creation for the user.
- Make inventory on current and future distribution grid asset management, operation modes and associated tariff scheme components
- Develop view on possible new tax and subsidy schemes that enables better adoption of DR
- Assess the relation to already existing and future automated control schemes

Deliverables:
IEA-DSM-17.4.15: "Metering, monitoring and coordination methods required to increase prosumer responsiveness"

The operating agent number of person hours is estimated to be 250 hrs.

Subtask 16 – Coupling to innovative user feedback, billing and transactive energy schemes

In the small commercial and end customer energy sector, depending on the volumes, financial transactions and accounting take place with monthly or in most cases yearly intervals. This creates a large feedback time. Currently, energy management apps on smart phones, in combination with smart meters allow instant, day-to-day feedback on energy usage. Currently these systems do not allow transforming this information into financial transactions. The Gridwise alliance, a consortium of energy service providers and technology developers in the US, has defined a transactive energy framework, that aims to split large overall transactions between stakeholders in commercial and grid operation into micro-transactions. The scheme enables multiple parallel transactions between actors in the electricity system to reconcile portfolio and grid management operations and services. In the Netherlands, the USEF (the Universal Smart Energy business Framework) consortium was designed a reference implementation, that is currently tested in the field. During the past years also block-chain based transactive energy models have been proposed. These allow more accurate mapping of liabilities and responsibilities of actors involved in electricity distribution and transactive schemes. The first of these scheme designs are currently in the testing phase. These schemes are expected to have a large impact on small scale renewable energy systems. In this task this translation, paralleling transaction schemes in the B2B-sector, are inventoried and assessed.

Detailed objectives:

- Make an inventory of existing feedback, reconciliation and billing systems for electricity
- Assess a number of pilots, that have been implemented on microtransaction-based approaches
- Analyze the influence of instant feedback and microtransactions on user behavior and responsiveness
- Develop common view on feedback and billing innovation

Deliverables:
IEA-DSM-17.4.16: "Innovative user feedback, billing and transaction schemes"

The operating agent number of person hours is estimated to be 250 hrs.

Subtask 17 – Conclusions and Recommendations

Conclusions and recommendations will be 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 suggested frameworks.

Deliverables:
IEA-DSM-17.4.17: "Conclusions and recommendations realizing responsive prosumer networks"

The operating agent number of person hours is estimated to be 200 hrs.

Collaborations and Dissemination
Collaboration with internal and external activities in the field will be continued.

IEEE-Standards Association, IEC and Cenelec

OAs currently are within the IEEE- IEC- and Cenelec Standards Association Industry Connections.

ISGAN

This task considers the end-user view of ICT technology and smart meters in energy grids. Synergy is to be expected with ISGAN TCPs 2 (SmartGrid case studies) and 7 (SmartGrid transitions), which consider the political considerations and strategies. Good connections already exist as one of the task 17 phase 3 OAs is the Austrian representative for ISGAN in TCP 2. These connections will be further extended and possibilities for joint dissemination events will be actively pursued.

National Stakeholder Groups

An essential pre-requisite is national dissemination of project results. Per participating organization stakeholders resonance platforms are active checked upon.

Other IEA-DSM Tasks

Task 16 Innovative energy services
Task 23 The Role of Customers in Delivering Effective Smart Grids
Task 24 Closing the Loop – Behaviour Change in DSM: Helping the Behaviour Changers
Task 25 Business models for a more effective market

Time schedule, budget and resources

IEA-DSM TASK 17 - Phase 4	Q1 18	Q2 18	Q3 18	Q4 18	Q1 19	Q2 19	Q3 19	Q4 19
Subtasks								
Subtask 14 - Context								
Subtask 15 - Metering, monitoring and billing								
Subtask 16- Billing and transactive								
Subtaks 17 - Conclusion and recommendations								
Expert meetings								
Biannual country expert meeting								
Workshops								
Workshops with stakeholders and experts								
Reports								
Subtasks reports								
Final report								

The estimated budget and resources needed are summarized below.
Management and feedback on OA-activities

	OA/hrs
Operating Agent bi-annual meetings with country experts	40
ExCo-meetings bi-annual	20
Number of occurrences	5
Travel and subsistence (800 Euro per meeting)	**7200**

Operating agent (cost shared)

OA-Activity	OA/hrs
Subtask 3.14	320
Subtask 3.15	250
Subtask 3.16	250
Subtask 3.17	200
Sum (hrs):	**1020 + 325**
Travel and subs.:	**7200**

The efforts for the operating agents are travel costs and personnel costs / resources necessary for editing and analyzing country specific inputs for the reports. Total cost of phase 4 is in the order of 160 k€ and will be covered by task fees per participating country. As in other tasks in the annex, the task fee is defined by

the number of participants and a measure of the size of the electricity system of the country. It is assumed that the minimum number of participating parties is 5.

With an increase of the number of countries, some extra coordination overhead is included.

Total operating agent costs per country				
Number of countries	5	6	7	8
Costs per country	32k€	30k€	27k€	24k€

REFERENCES

[1] "Task 17 – Integration of Demand Side Management, Energy Efficiency, Distributed Generation and Renewable Energy Sources." [Online]. Available: http://www.ieadsm.org/task/task-17-integration-of-demand-side-management/. [Accessed: 31-Aug-2016].

[2] European commission, "Commission proposes new rules for consumer centred clean energy transition," 30-Nov-2016. http://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition

[3] "Digital single market." . https://ec.europa.eu/digital-single-market/en/smart-cities

[4] Amsterdam municipality, "Smart cities." . https://amsterdamsmartcity.com/map

Document E

CONCEPT NOTE: GLOBAL PEER-TO-PEER OBSERVATORY

David Shipworth – UCL Energy Institute

CONTEXT

This proposal draws on the work in the Draft Strategic Work Plan, particularly the section under 'Emerging technology case studies'.
It is a proposal for a 'Global peer-to-peer observatory'. This will identify and examine existing and emerging demonstration and real projects in peer-to-peer energy trading throughout current and accession IEA member countries. It will have a substantial focus on the policy and regulatory enablers and constraints to the application of this this technology in the context of the business models and technology clusters deployed. It will be complementary to activities across the existing tasks of the DSM TCP and will seek approval of, and report into, ISGAN Annex 2.

This work is complementary to work now being instigated by the Digital Single Market Directorate, DG CONNECT, European Commission through which a European Blockchain Observatory has been established. While this is tracking developments in all applications of blockchains – what is proposed here is focused on peer-to-peer energy trading. While much of this will make use of distributed ledger technologies – it is not limited to this class of technologies. These initiatives are complementary and would seek to work together.

Objectives in the context of the DSM TCP:

- A targeted activity - focused on a specific application of an emerging technology with substantial behavioural sensitivities and with potential global impact.
- A cross-cutting activity - designed to complement existing DSM Tasks. Drawing from, and feeding into, the work of Tasks 17, 24 and 25.
- A strong policy and regulatory focus - identifying those factors acting to support uptake and deliver defined policy benefits.
- A strong analytical component - applying Systematic Review methods to identify common traits in the literature, and using Qualitative Comparative Analysis to draw generalised lessons from an international population of case studies.
- A multi-disciplinary case-based activity – focused on integrating from insights from analysis of all aspects shaping adoption and uptake of peer-to-peer models.
- A user-centred design activity – where the user is the policy maker/regulator. Elicitation of policy makers' evidence needs and policy epistemology.
- A IEA Global Exchange Platform activity - Outputs tailored for adoption on this platform.

BRIEF INTRODUCTION

Peer-to-peer energy trading is rapidly emerging as a potential solution to a range of challenges poised by the energy transition. The energy transition is closely studied and well documented in recent IEA publications. 'Tracking Clean Energy Progress: 2017' lists the macro drivers, noting four key technologies are on track to deliver the 2˚C goal of the Paris climate accord namely electric vehicles, energy storage, solar PV, and onshore wind. The International Renewable Energy Agency (IRENA) reports that the majority of capacity and investment in the global power sector in the last four years has been in renewable energy, with over 60% of investment being in renewables in the last 12 months. The economic opportunities this transition creates are considerable, with the World Economic Forum having estimated them at "... more than $2.4 trillion of value from the transformation of electricity over the next 10 years." Much of the value is being liberated through 'digitalisation'.

One of the key findings of the recent IEA report 'Digitalisation & energy' noted that "Investment in digital electricity infrastructure and software grew over 20% annually between 2014 and 2016, overtaking global investment in gas-fired power generation." (p.26). Digitalisation primarily refers to the creation of metering and control systems able to monitor and manage the complex bi-directional flows over smart grids. Several Technology Collaboration Programmes of the IEA are active in evaluating and facilitating research into the enabling technologies of the energy transition. ISGAN has played a global role in coordinating policy

learnings on smart grids, EBC has extensively addressed generation asset integration at the building and community scale, and DSM has addressed this issue in multiple tasks. Phase 4 of DSM Task 17 on the Integration of Demand Side Management, Energy Efficiency, Distributed Generation and Renewable Energy Sources is directly addressing Responsive Prosumer Networks; DSM Task 24 on Behaviour Change in DSM has analysed behaviour change in relevant case-studies; and DSM Task 25 on Business Models for DSM Energy Services has assessed business model characteristics applicable in the field.

The IEA has highlighted the potential role of peer-to-peer in two major recent reports: 'Digitalisation & energy', and 'Prospects for Distributed Energy Systems in China'. Both of these highlight the potential role for peer-to-peer in the context of distributed energy systems management and the balancing of bidirectional flows of energy between producers and consumers at the grid edge. Making this work as a market requires a transaction layer that can reduce the transaction costs to near zero. Developments in distributed ledger technologies, such as blockchains, are now making this possible. This is echoed in recent reports from the World Energy Council which conclude that "…blockchains seem to hold the key to an internet of things in energy with a promise of revolutionary system benefits." (World Energy Issues Monitor 2017)

It now seems highly likely that such local energy trading models will form a component of energy management in the global energy transition. In this context, an IEA TCP activity stream tracking the global development of this technology cluster seems justified.

MOTIVATION

Peer-to-peer energy trading can deliver a wide range of different social, economic, technical, and environmental benefits depending on how the schemes are designed. Policy makers and regulators in different regimes need to understand how the architecture of peer-to-peer schemes determines the outcomes they wish to achieve. They also need to understand the potential distribution impacts of such schemes to ensure that they do not generate any consequent adverse social or energy systems impacts beyond the boundaries of the scheme.

Project developers need to understand the factors that lead to successful uptake of schemes in different contexts, and in particular how the social, technical and regulatory regime will impact on the design of their project. They need the opportunity to work in a pre-competitive environment with others, including scheme developers, technology suppliers, energy suppliers and regulators to maximise mutual learning and identify developmental pathways that meet the requirements and constraints of all parties.

Researchers, in academic institutions, NGOs, and other non-commercial bodies, need to a forum within which they can collaborate internationally. They need to demonstrate a route to impact of their work, and use the prestige and impact of the IEA to can be used to increase their likelihood of receiving national funding. They also need to identify commercial organisations and regulators to work with to develop their trials.

AIM AND OBJECTIVES

- To conduct elicitation of policy maker's evidence requirements for regulatory change in support of wider deployment of peer-to-peer energy trading in different regulatory regimes.
- To conduct a systematic, OECD wide, study of the relationship between the design of peer-to-peer and other blockchain-enabled energy retail market structures and energy policy outcomes.
- To identify the factors leading to successfully uptake of peer-to-peer in different contexts.
- To develop a global community of researchers and practitioners working on peer-to-peer within a pre-competitive environment to share best practices and inform the development of policy and regulation.
- To bring new countries and companies into the DSM TCP
- To formally integrate related activities in the DSM and ISGAN TCPs, and to ensure alignment with related activities in EBC, PVPS, 4E and ECES TCPs
- Produce policy relevant outputs for the IEA Global Exchange Platform.

APPROACH

The work will consist of the following elements:
A systematic review of existing literature on peer-to-peer energy trading. This will cover the academic literature and grey literature, and will apply a theory-driven systematic review framework (Pawson & Tilley 1997). While outside the scope of the formal systematic review, alternative media sources such as podcasts, video, and social media will also be drawn upon. This work will be complemented where appropriate with use of expert elicitation (O'Hagan 1998) to help develop a more complete picture of developments in this rapidly changing field.

A set of global case studies of peer-to-peer energy trading. These will be conducted in all participating member states through primary field-work, and in non-participating states through secondary sources and interviews with participants where resources allow. Case studies will form the core of the work. These will be multidisciplinary and multi-method – drawing on expertise of teams in each country comprised of engineers, social scientists and policy analysists.

A synthesis of findings from these case studies. More general findings will be derived through application of the Qualitative Comparative Analysis of the multiple case studies. QCA is a method designed to fill the gap between the contextual richness and depth of individual case studies, and the need for general lessons learnt which is traditionally the realm of quantitative survey methods. QCA typically draws general influential factors from the analysis of dozens of individual cases, and allows for wider lessons to be learnt regarding the comparative importance of common contextual factors found in different cases regulatory or social environments.

As the number of cases develop, and the evidence base becomes more complete, the QCA will be used to develop graphical probabilistic models. These models have been used in many complex socio-technical areas to draw together the influence of different factors on the success of projects. They have an extensive history in areas like water and land resource management allowing integration of regulatory, social, environmental and technical factors into a single model of project outcomes. Over time, such models can start to quantify the likely scale of scale of consumer response, and to link the theoretical causal models implicit in them to users stated social values. It will compare these with current policy and regulatory objectives including factors such as energy market participation, affordability, distributional impacts, climate change mitigation, air quality improvement, and fuel poverty alleviation.

Research methods:
Theory-driven systematic review (Pawson & Tilley 1997). Systematic evidence review methods (Grant and Booth, 2009). Expert elicitation (O'Hagan 1998); graphical probabilistic modelling (Jensen 1996).

EXPECTED RESULTS

Expected outcomes

- A systematic review of the factors governing successful implementation of peer-to-peer energy trading in participating member states.
- A suite of case-studies of pilot or commercial peer-to-peer energy trading trials across the major world markets where they are being deployed. These will be written up in a standard format developed in conjunction with the IEA's Global Exchange Platform to ensure consistency of data gathered across cases, as well as the policy, regulatory and commercial relevance of the outputs.
- An International Qualitative Comparative Analysis of case studies across all participating countries to identify common success factors for deployment of peer-to-peer.
- Development of quantitative graphical statistical models of the comparative influence and interaction between factors governing uptake of peer-to-peer.
- Establishment of an international community of researchers willing to share learnings on peer-to-peer energy trading in a pre-competitive collaborative environment.
- Development of global metrics for tracking the uptake of peer-to-peer energy trading.
- Introduction of new countries and companies into the IEA DSM family

Ambition outcomes:

- Development of the graphical models in a form that is compatible with existing IEA modelling frameworks.
- Development of the graphical models in a form that is integrable with existing IEA modelling frameworks

MATTERS FOR THE EXCO

Format of activity.

It is proposed that this is a new format of activity distinct from a Task. It serves the function of drawing from the deep technical expertise of existing Tasks (17, 24 & 25) and focuses these around case studies as the unit of analysis. This raises two questions:

- Should this be independent – or integrated in an activity like Task 17?
- Should this be a Task in its own right?

Relationship with other TCPs

This has clear overlaps with other TCPs such as ISGAN. This raises three questions:

- Should this be primarily housed within the DSM TCP?
- How should reporting to other TCPs be handled (should the OAs attend the ExCos of other TCPs to report, if so how many TCPs are relevant to attend).
- As representatives of member nations – are the outputs of interest and relevance to your work?

Funding and participation

There is likely to be considerable commercial interest in the outcomes of this activity. This raises two questions:

- What conflicts of interest arise through introducing different companies into the work of the DSM TCP?
- Can funding structures be tiered according to the class of membership (different fees for participation by nations compared to companies)?

Document F

TASK 16 – INNOVATIVE ENERGY SERVICES PHASE IV – LIFE-CYCLE COSTING; 'DEEP RETROFIT'; SIMPLIFIED M&V; CROWD-FINANCING & ENERGY SERVICES TAXONOMY - Task Status Report

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SUMMARY

In Task 16 "Innovative Energy Services", energy service experts and partners from countries around the world join forces to advance know how, experiences and market development of performance-based energy services. We view energy services as a market-based 'delivery mechanism' in order to implement demand side 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 & international dissemination activities including the DSM University. Furthermore national & international stakeholder workshops are organized to discuss energy service topics relevant to the host country and to present and disseminate results of Task 16.

The Think Tank is the common research platform with previous publications such as 'Deep Energy Retrofits: Using Dynamic Cash Flow Analysis and Multiple Benefits to Convince Investors', the 'Integrated Energy-Contracting' business model, the 'Facilitator' concept ('Energy architect', mediator), 'Simplified Measurement & Verification' of energy savings, Comprehensive Refurbishment of Buildings ('deep retrofit') business models or. In Phase IV *"Life-Cycle Cost; 'Deep Retrofit'; Simplified M&V; (Crowd)-Financing & ES Taxonomy"*, which started in July 2015 and will end in June 2018, the Think Tank is working on Life-Cycle Cost appraisals, 'Deep Retrofit' of buildings; Simplified Measurement & Verification of savings (sM&V); (Crowd)-Financing for EE & RE projects and on energy services taxonomy.

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.

OBJECTIVES and ACCOMPLISHMENTS SINCE LAST REPORT

Subtask 19 – Energy Service Expert Platform

Objective: The platform is the internal and external communication hub of Task 16. It consists of the national experts, the operating agent, invited guests and cooperation partners. The platform hosts the internal experts meetings as well as public stakeholder workshops and other seminars.

Progress towards Subtask objectives

- A series of teleconferences with Task 16 experts was held to further delvelop a joint paper on life cycle cost benefit analyses of building deep energy retrofit in combination with Multiple Benefits
- A series of teleconferences with Task 16 experts was held in order to further delvelop a joint paper on simplified Measurement & Verification (sM&V)

Subtask 19 + 22 – Stakeholder workshops (national & international)

Objective: The expert platform hosts a series of public national or international stakeholder workshops. They are held either back to back with expert meetings or as national stand alone events to discuss energy service topics relevant to the host country of the meeting and to present and disseminate results of Task 16.

Progress towards Subtask objectives

- Presentation of Task 16 inputs for a national 'Facilitator' workshop in the Netherlands (www.rvo.nl/epc-facilitators), held on October 6th in Utrecht.
- Preparation and presentation of a 2nd opinion for the selection of an EPC pilot project for the Swiss Federal Office of Energy and its collaborating ministries
- Presentation of Life Cycle Cost motivational talk ("Lebenszykluskosten und was wir von Eisbergen lernen können") at the annual Energy Efficiency conference in Vienna, Austria
-

Subtask 20 - Think Tank for innovative Energy Services

Objective: Applied research, development and testing of innovative, performance-based energy service models and support tools => publication of the results.

Progress towards Subtask objectives

1. Further development of our paper on *Building Deep Energy Retrofits: Using dynamic cash flow analyses and Multiple Benefits to convince investors* for publication in the Energy Efficiency journal (the ECEEE paper was invited for publication in a special edition of the Energy Efficiency journal). Joint work together with all Task 16 experts and inclusion of cooperation with researchers from the Central European University, Hungary on valuation of Multiple Benefits on the microeconomic level.
2. Preparation of a DSM university on the above paper.
3. Some progress on our *Simplified Measurement and Verification Using Quality Assurance Instruments: A Proposed Concept for Energy, Water and CO_2-Saving Projects* paper: The manuscript was returned from journal 'Applied Energy' editor and invited for enhancement and re-submission for peer-review and (hopefully) publication to the journal. In close cooperation with EfficiencyOne, Nova Scotia, Canada.
   We also received an invitation for publication of the sM&V paper in the planned IPMVP journal which will be exclusively dedicated to measurement and verification topics.

Subtask 21 - Coaching of individual National Implementation Activities (NIA)

Objective: Support implementation of country specific national activities to develop know how and energy service markets

Progress towards Subtask objectives

- Implementation of the individual NIA plans to develop know how and energy service markets were followed up, the experts gave presentations and exchanged experiences and good practices during the last platform meeting and through teleconferences in between meetings
- Preparation and presentation of a 2nd opinion for the selection of an EPC pilot project for the Swiss Federal Office of Energy and its collaborating ministries

Subtask 22 – Dissemination and cooperation

Objective: Dissemination of Task 16 results and experiences through presentations, stakeholder workshops, publications, cooperation with other ES projects and the DSM University

Progress towards Subtask objectives

Publications and presentations at various national and international conferences and seminars were given, e.g.:

- Facilitator workshop Utrecht, the Netherlands (06. Oct. '17)
- Life cycle cost benefit calculation training for project developers and bankers in the Caribbean (Sept. '17) and Asia (Nov. '17)
- Integrated Utility Service (IUS) pilot phase for small island states in the Caribbean (in cooperation with GIZ and CARICOM)
- Life-Cycle Cost workshop for evaluation of energy efficiency and renewable projects – presentations (Vienna, Nov. 2017)
- Task 16 Leonardo ENERGY DSM University webinar "Building Deep Energy Retrofit: Using Dynamic Cash Flow Analysis and Multiple Benefits to Convince Investors" on 23. Nov. '17
- Co-operation with other ongoing energy service projects and institutions:
  - ECB Annex 61 => 'Deep retrofit' business models
  - Linköping University => ES taxonomy and other topics
  - FH Pinkafeld - applied science university and TU Vienna => Master class and lecture on energy services
- Presentation at the "Promouvoir la transition énergétique – Outils et technologies: Presentation at the " 7 ème Journée tuniso-allemande de l_'énergie, 29 novembre 2017 dans le cadre du Partenariat tuniso-allemand de l_'énergie

Subtask 23 - Management and Reporting

Objective: Project management and reporting

Progress towards Subtask objectives

- Regular management and reporting work. Preparation of Phase V (if initiated by ExCo)

Experts meetings/seminars/conferences held in past six months

Experts meetings

Date	**Place**	**# of Experts**	**Type of meeting**	Govern-ment	Industry	Academic
Oct. '17 – Feb. '18	Series of Telcos on DER+MB paper	4-8 (each)	Experts meeting	1 (each)	5-6 (each)	2 (each)
Oct. '17 – Feb. '18	Series of Telcos on sM&V paper	2-3 (each)	Experts meeting	0	2-3 (each)	0

Seminars/Conferences/Workshops

Date	**Place**	**Partcipants**	**Type of meeting**	Govern-ment	Industry	Academic
06/10/17	Facilitator WS, Utrecht	25	Workshop	5	18	2
06+07/11/17	Vienna, Austria (Seminars)	15	Seminar	2	13	-
04/02/18	TU Vienna (Lecture)	12	Lecture	0	12	-
Oct. or Nov. '17	Stakeholder WS, Switzerland	7	Presentation	6	1	-
28+29/11/17	Austrian Energy Agency (lecutres)	150	Conference	35	110	5
Dec. '17 - Jan. '18	FH-Pinkafeld, Austria (Lecturing)	38	Lectures	-	-	38
29 Nov. '17	Conference	180	Presentation	60	110	10

Publications/reports produced in the past six months

- *Building Deep Energy Retrofits: Using dynamic cash flow analyses and Multiple Benefits to convince investors.* Published and presented at ECEEE summer studies 2017 *(*in cooperation with IEA ECB Annex 61)
- Spotlight contributions

OBJECTIVES FOR THE NEXT SIX MONTHS

Subtask 19 – Energy Service Expert Platform

- Continue to hold expert platform teleconferences (e.g. on selected Think Tank topics such as Eurostat guidance note on accounting of "on-balance" and "off-balance" accounting treatment of investments)
- Preparations for the 21th experts meeting in spring 2018 (exact date and location tbd, possibly back to back with ECEEE industrial summer study 11–13 June 2018 in Berlin)
  The main agenda items will be presentation and discussion of national implementation activities, discussions on current Think Tank topics (Deep Energy Retrofit, Life cycle cost appraisals, Multiple Benefits) and dissemination activities => tbd after ExCo meeting.

Subtask 19 + 22 – Stakeholder workshops (national & international)

- Preparation of a Life Cycle Cost presentation for the "Energy in Hospitals" conference Austria (https://energieimkrankenhaus.at/programm/), to be held on May 18th in Vienna.

Subtask 20 - Think Tank for innovative energy service models and support tools

1. Finalization of our revised paper re-titled *Office Building Deep Energy Retrofit: Life Cycle Cost Benefit Analyses using Cash Flow Analysis and Multiple Benefits on Project Level* for publication in a special edition of the Energy Efficiency journal.
   Joint work together with all Task 16 experts and inclusion of cooperation with researchers from the Central European University, Hungary on valuation of Multiple Benefits on the microeconomic level.
2. Re-submission of *Simplified Measurement and Verification Using Quality Assurance Instruments: A Proposed Concept for Energy, Water and CO_2-Saving Projects.* Further development and follow-up of re-submission for peer-review and (hopefully) publication to the journal 'Applied Energy'. In close cooperation with EfficiencyOne, Nova Scotia, Canada
3. Review and preparation of the Facilitator paper to be published in a peer-reviewed journal

Subtask 21 - Coaching of individual National Implementation Activities (NIA)

- Continue implementation of individual NIA plans to develop energy service know how and markets.
- To follow up, experts will give detailed presentations and exchange experiences and good practices during the next platform meeting and through teleconferences in between meetings

Subtask 22 – Dissemination and cooperation

Publications, presentations or workshops planned:

- Integrated Utility Service (IUS) for small island states in the Caribbean: 2nd Utility strategy workshop and regulator workshop in Barbados (in cooperation with GIZ and CARICOM)_April 2018
- Life cycle cost benefit investment calculation training for project developers and bankers in Jamaica (May '18) and in Jakarta (July '18)

- Training on consideration of Life-Cycle Cost for procurement of energy technologies (China, planned for 2nd quarter 2018)
- Continue co-operation with other ongoing energy service projects and institutions:
  - Linköping University => ES taxonomy and other topics
  - TU Wien => Lecture on performance-based energy services
  - Fh Pinkafeld (University of applied sciences) => Masterclass on energy services
  - Fh Vorarlberg (University of applied sciences) => Masterclass on energy services

Subtask 23 - Management and Reporting

- Regular management and reporting activities + search for one or two more participating countries

Experts meetings/seminars/conferences planned in the next six months

Planned Experts meetings

Date	Place
ongoing	series of teleconferences
June '18	tbd (ECEEE Berlin 06/18?)

Planned seminars/conferences

Date	Place
04+05/05/18	Vienna, Austria (Seminars)
18/05/18	Hospital conference, Vienna
25-26/05/18	FH-Vorarlberg, Austria (Lecturing)

Reports/Publications planned for the next six months

- *Building Deep Energy Retrofits: Using dynamic cash flow analyses and Multiple Benefits to convince investors.* invited for publication in a special edition of the Energy Efficiency journal
- *Simplified Measurement and Verification Using Quality Assurance Instruments: A Proposed Concept for Energy, Water and CO_2-Saving Projects*: (hopefully) publication in the 'Applied Energy' journal
- Contributions to IEA DSM University, Spotlight and other shorter formats

OUTREACH OF THE TASK – SUCCESS STORIES

The IEA secretariat is continuing the Multiple Benefits activities and conducted a follow-up workshop on its famous 2013 publication in March 2018. Task 16 was invited to present its findings in the context of the *Building Deep Energy Retrofits: Using dynamic cash flow analyses and Multiple Benefits to convince investors* paper and also the 'Multiple Project Benefits' (MPB) methodology developed. The presentation was particularly well received. It is worth noting that the MPB approach (accounting for benefits on the project level vs. the macro level) was the only one of its kind at the IEA workshop and it was highly encouraged to continue this work.

In the Netherlands, RVO and the national expert are building an energy services Facilitator community and have organized a second 'Facilitator' workshop in Utrecht (06. Oct. '17), with Task 16 giving the key note. Compared to the first workshop the number of participants and potential Facilitators has grown notably (to around 20), which will support EPC project and market development in the Netherlands.

The IPMVP committee continues to be interested in the simplified Measurement and Verification work of Task 16.

IDEAS FOR NEW WORK

Please note, that Task 16 will terminate in June 2018, unless the ExCo decides to continue the work.

As an input to the ExCos thoughts and guidance on possible future work, ExCo members, national experts

and operating agent have suggested the following topics and research questions for Phase V:

- **Multiple Benefits** (focus on project level => Multiple Project Benefits (MPB):
    - How to integrate MPBs into Life Cycle Cost Benefit Analyses?
    - How to make use of Multiple Benefits (MB) to promote EPCs?
- **On the role of the government as a 'Market Facilitator'** to promote performance-based energy services (c.f. Bleyl et al. 2013: *ESCo Market Development: A Role for Facilitators to play*): Collection of best practices and lessons learned for future policy implementation
- **Communication strategy:** How to better sell EPCs? Learning from good practice *(together with Market facilitator topic)*
- **Business model development for Energy Performanc Contracting (EPC):**
    - EPCs in SMEs e.g. Hotels and business parks
    - Tackling the landlord-tenant dilemma
- **Eurostat guidance note:** Demisitification of "on-balance" and "off-balance" accounting treatment of investments; Eurostat old and new rules for EPCs; Remaining outstanding questions/issues to be dealt with in expected practitioner's guide.
- **Demand Response Services:** Additional revenue streams for performance-based energy services? How to integrate in business model? Which end-use sectors?
- **Simplified Measurement & Verification (sM&V):** Application of the sM&V concept (c.f. Bleyl, Jan W. et al.: *Simplified measurement & verification + quality assurance instruments for energy, water and CO_2 savings. Methodologies and examples* 2014) in different end-use sector and its integration in performance-based business models. Furthermore, continuing the exchange with the IPMVP technical committee as well as examining compliance of the sM&V approach with ISO 50015 (Energy management systems - Measurement and verification of energy performance of organizations - General principles and guidance) Application of sM&V approaches for energy audits, compliance with ISO 50015 (in cooperation with Austrian Energy Agency (AEA).
- **Nearly Zero buildings:** Focus on added value of performance-based energy services (EPCs) during the operating phase. MBs like inside air quality (possibly in cooperate Annex 73, EBC)

ExCo members are requested to discuss and provide guidance on future work, if so desired.

FINANCE

An overview of the current budget situation (total budget, cumulative and %-spending as well as remaining budget) is displayed in the following table:

Subtasks *unit*	Total budget *EUR*	Cumulative spending *EUR*	% spent %	Remaining *EUR*
19 Energy Services Expert Platform	**22.000**	**18.920**	**86%**	**3.080**
20 Think Tank for innovative Energy Services	**73.920**	**69.520**	**94%**	**4.400**
21 Coaching of National Implementation Activities	**14.520**	**14.960**	**103%**	**-440**
22 Dissemination & Cooperation (international + national)	**15.840**	**14.960**	**94%**	**880**
23 Management & Reporting (to ExCo)	**37.840**	**35.200**	**93%**	**2.640**
Subtotals	**164.120**	**153.560**	**94%**	**10.560**
Travel costs	**14.700**	**13.377**	**91%**	**1.323**
Other costs	**2.880**	**2.100**	**73%**	**780**
Totals	**181.700**	**169.037**	**93%**	**12.663**

Budget and cost accumulation by item (in EUR excl. VAT as of 1 September 2017)

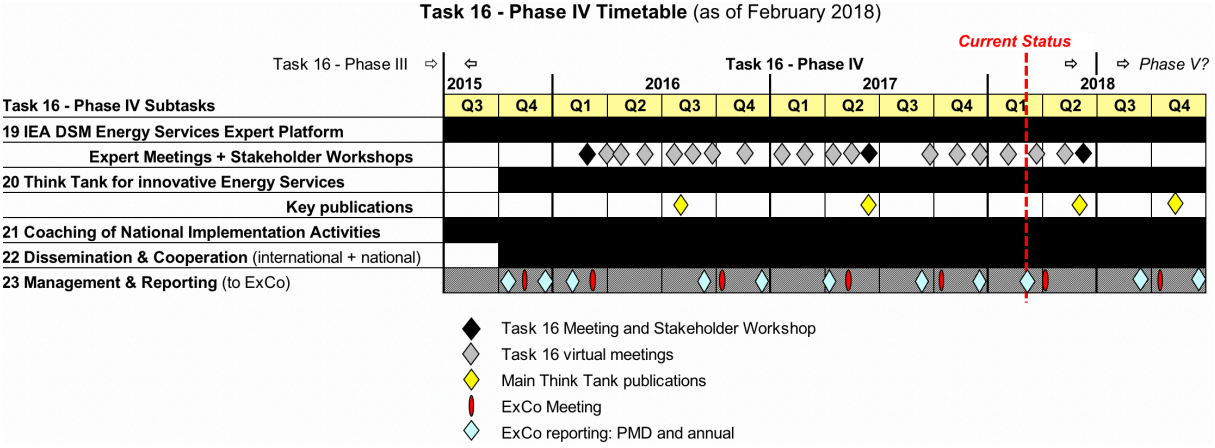
The current Task 16 – Phase IV budget is 181,700 EUR (comprised of 3 participants x 3 years x 15,000 EUR/year + Belgium for 2 years x 15,000 EUR + GIZ for 1st year only x 15,000,- EUR + surplus of 1,700 EUR from Phase III).

The spending of the last reporting period was 28,032 EUR adding to a total expenditure of 169,037 EUR, which equals 93% of the total budget.

The income during last reporting period was 30,000 EUR (against 45,000 EUR billed). This adds to a total realized income of 166,700 EUR (92% of total budget).

ACTIVITY TIME SCHEDULE

Task 16 Phase IV has started operation on 01 July 2015 and will end 30 June 2018



All scheduled events and reporting targets have been met. Publication of the "Office Building Deep Energy Retrofit: Life Cycle Cost Benefit Analyses using Cash Flow Analysis and Multiple Benefits on Project Level" paper in Energy Efficiency is foreseen for 2nd half of 2018.

MATTERS FOR THE EXCO

Recommend the ExCo to approve the Task Status Update Report.

Provide guidance on future work after June 2018 please, if desired by the ExCo, otherwise Task 16 will be terminated by end of June this year.

PARTICIPATING COUNTRIES

Belgium *(since July 2016),* EfficiencyOne Nova Scotia, Canada *(in kind)*; Germany *(in kind cooperation with Annex 61 (Deep Retrofit);* GIZ *(until April 2016)*; The Netherlands; Norway; Switzerland *(in alphabetical order, as of September 2017)*.

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TASK 25: BUSINESS MODELS FOR A MORE EFFECTIVE MARKET UPTAKE OF DSM ENERGY SERVICES - Task Status Report

Operating Agent
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SUMMARY

This Task 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.

OBJECTIVES FOR THE LAST SIX MONTHS

This Task phase 1 ended December 31st 2017 and was formally concluded at the ExCo meeting in The Hague October 2017

The activities we continued to undertake since the last Exco meeting in The Hague 2017 entailed further dissemination activities (finalising two academic publications and spotlight article), and many meetings and discussions with potential funders of phase 2 of the Task.

IDEAS FOR NEW WORK: Phase 2 of Task 25

See separate work plan for Phase 2 of Task 25

MATTERS FOR THE EXCO

1. Approval of Phase 2 work plan and start May 1st 2018
2. Discussing participation of Italy in the Task on the basis of a letter of commitment to put effort into finding funding for the task in 2019; but already start participation as of the start in 2018.

PARTICIPATING COUNTRIES

Phase 2

1. Sweden
2. Norway
3. Netherlands
4. Australia
5. Italy (conditional)

In addition we are still discussing potential interest from the UK, Ireland, Belgium

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IEA DSM TASK 25-PHASE 2 BUSINESS MODELS FOR A MORE EFFECTIVE MARKET UPTAKE OF DSM ENERGY SERVICES FOR SMEs AND COMMUNITIES – NEW TASK WORK PLAN PHASE 2

SUMMARISING PHASE 1

In 2014, the Demand Side Management programme (DSM) run by International Energy Agency (IEA) started this research project on new business models for energy efficiency services (IEA, 2014). This research is part of a growing body of research aimed at understanding what is causing the apparent lack of market uptake of Energy Efficiency. (IEA 2015) new business models for energy services are considered to be a key delivery mechanism for Energy Efficiency and savings. (Boons and Lüdeke - Freund, 2013). A growing understanding is that in many business models underlying Energy Efficiency services, the supplier perspective is dominant. Too little attention is given finding appealing values that go beyond financial savings and profitability, values only appealing to a certain number of people (Hienerth et al., 2011) (Arevalo et al, 2011) (Gentile et al., 2007; Vargo & Lusch, 2008). The premises behind this observation is that the current system (the established system) is technocratic and push oriented and a more user centered approach will be more effective in creating market uptake (Tolkamp et al 2017). This is directly related to the fact that service value is being co-created with the end user. No user means no service. Business models and energy services focusing on the customer perspective and their unique buying reasons for energy efficiency are considered to be the next step in creating a larger market uptake for energy efficiency (Nilsson et al 2012) (Hiernerth et al, 2011). The capability to identify user needs has been found to indeed correlate positively with profit generation and the increase in market share among other indicators, in other sectors (Janssen, 2015).

The key question guiding this work was, what if more user centered and service oriented business models and energy services were more effective in delivering energy efficiency than the many rather technocratic and technology push approach type of business models.? A second question was, do specific entrepreneur and service providers capabilities that allow for a focus on the customer perspective and tailoring of their services contribute to a more effective uptake of the product and service? While answering these two questions, Task participants are also investigated if a better alignment of the business model with context is helpful in delivering energy efficiency more effectively. A business model design is strongly influenced by context, for example, existing legislation and available subsidies, bottlenecks and constraints, and various players within the current energy production and consumption system.

The creation of a user centered business model and value proposition, the dynamic capabilities of the entrepreneur/enterprise in navigating the context and user related issues and finally, the context in which the business model and service is deployed were therefore at the core of our empirical analysis.
The Task's findings are based on an analysis of 46 business models in the Netherlands, Sweden, Norway, Austria, Switzerland and South Korea. The first step was to draw up a list of more than 350 Energy Efficiency propositions. The focus was on a mix of retrofitting, lighting, smart solutions and total solution (one-stop-shop) products and services. Based on initial information collected, the next step was to select propositions to further analysed to understand their business models, the accompanying entrepreneurial dynamic capabilities and their interactions with context. The selection allowed for comparison of similar smart service, retrofitting, total solution and lighting propositions, operating in different political, institutional, technological, and socio-cultural contexts.

Using the business model canvas and customer value canvas designed by Osterwalder and Pigneur, a total of 46 business models were analyzed. During this analysis of the business models workshops were organised in all but one of the participating countries with the entrepreneurs being analysed and other stakeholders from industry, academia and the policy arena to discuss our initial findings. To incorporate a more dynamic view on the business model Task participants investigated the entrepreneur's journey for each of the 46 propositions as well, which is a description of the business and how it has evolved over time, by interviewing with either the CEO of the company or the most relevant employee. Also, Task participants identified how the system influenced this development by performing a context analysis by

means of literature analysis of relevant material on the context, including grey literature such as websites (i.e., Eurobarometer, Eurostat), and or interviews with key representatives for industry, government, NGO, academia, business and other sectors.

Key Findings: Phase 1 & Outlook For Future Research And Activities: Phase 2

The findings in Phase 1 of the research of Task 25 are more or less general for many sectors:

- There are some major differences between a business model that is supporting a product compared to the business model that is supporting a service.
- Those companies that have made the adjustments towards service orientation report a better uptake, and thus are more successful than companies that have a product oriented business model.
- In order to conduct a service oriented business (deliver services instead of a product), an entrepreneur needs to have developed at least four capabilities at an acceptable level: sensing user needs, conceptualizing, orchestrating and scaling.
- The context the business model is operating in can be supportive, but also inhibit the growth and success of the business. Most incentives for example inhibit service oriented business models and do not focus on the use phase, an essential phase for services.

Four main strategies were identified consisting of business models, dynamic capabilities and the fit or stretch companies seek with respect to context.

a. Pushing Technology harder strategy
b. Reframing what you propose strategy
c. The pushing something else; user phase strategy
d. The servicing strategy

The importance of this research:

Phase 1:

- Provided new knowledge on how energy efficiency stimulation programs should be designed as well as which initiatives need stimulation.
- New knowledge was developed on how a business model should be assessed and can be adjusted in order to become more successful in the market both on a national and international level.
- Provided clear guidance on how the three levels of business model, entrepreneurial capability , and context fit or stretch are strongly interrelated and that in order to be successful, the entrepreneur has to improve on all these levels.
- Developed a tool named Fittoserve to help entrepreneurs do a quick scan of their business model, as most entrepreneurs seem to be more or less unaware of their options in this area.
- Provided a description of the service 'version' of the business model canvas, which has not been done before, and provides a new tool for business model analysis.

Outlook: the next phase

The Task's research in phase 1 was not comprehensive, but did allow for the exploration and identification of interesting business models and strategies for energy efficiency focused services and how these could be supported by policy and or other institutional arrangements. What the Task accomplished thus far is just the starting point for understanding what the business models delivering energy efficiency services need to do to be successful, which sectors need what type of models, and what is needed from policy makers or other institutional players in terms of support. In sum, much more research and other activities are needed. This is why a second phase is planned.

What will we do?

1. The contours of matches between the Task's four business model strategies and specific sectors are emerging. To increase this understanding and keep up with the emerging trends a focus will be on new categories of energy efficiency business models and further developing potential effective business model strategies for these categories:
    - Demand response energy services
    - ICT and data driven energy services

- New actors driven energy services such as community energy, community VPPs, peer2peer
- Sufficiency and or circular energy services including renewables

2. The role of agencies, governments (i.e., context players) in stimulating market uptake of energy services, especially for smaller companies and co-create potentially more supportive policies and strategies with them. Participants will conduct a comprehensive analysis of which kinds of policy support would best support the four models and strategies we identified in phase 1.

3. One key finding from phase 1 of Task 25 is that it is imperative to transfer the knowledge gained and the findings to the relevant actors in different countries and settings. And, simply communicating this information through a webinar or presentation is insufficient. This type of knowledge needs to be experienced and worked with in a real life setting, investigating real business models, real policies and real users. Therefore, the Task will set-up a strong training system, organize user centered business modelling interventions, involve end-users in a living lab setting, develop an online course (consisting of multiple webinars) in close cooperation with the DSM University as well as perform the more standard dissemination at conferences, in journals, etc.

Below is a more detailed description of the plan.

OBJECTIVES/SUBTASKS FOR PHASE 2

Subtask 2a: Increasing our comparison, including other categories of services.
In phase 1 of Task 25 we focused explicitly on the following type of business models: retrofitting (focused on residential sector and intermediaries delivering retrofitting solutions to residential sector); total solutions, again mostly focused on residential sector and some SMEs; lighting solutions, and smart services such as smart metering, home (energy) management systems. We started with a fifth category (heating), but due to lack of suitable cases in all participating countries we had to abandon this category.

As described above, the contours of matches between one of our four business model strategies and a specific sector are emerging. To increase our understanding and keep up with the emerging trends we propose to focus on an additional number of categories of energy efficiency business models.

The list below is the proposal after discussion with interested partners:

1. **Broadening the scope to understand how the framework (business model, capabilities, context) applies to other sectors, specifically:**

    a. **Demand Response energy service business models**

Successful demand response business models are necessary for a good operation of smart grids. At present, most research on these type of business models focuses on identifying the value and business opportunities for the different type of stakeholders. **Paradoxically, although by definition demand response services focus on the use phase, a critical element of success, namely incorporating the needs of the actual users or alternatively the providers of flexibility, is largely undervalued and user are often wrongly represented in the design creating important mismatches in use** (Breukers et al, 2017) (Sissini et al. 2017). Demand response services focused on both residential sector and larger building types such as hospitals, universities etc. are mostly designed from a technocratic and supply (utility or grid actors) perspective, having technological and system requirements lead instead of user needs. **Consequently, demand response services are not often combined with other (e.g. smart) and potentially more valuable services to end-users, e.g. combined with energy efficiency or multiple benefits.** An additional challenge is that the owners of the building are sometimes not the actual user of energy and thus the provider of the flexibility. We will be learning and identifying actual demand response models that work and aim to understand context and which technologies need to be in place to make the whole work. We will aim for a generalizable framework around demand response market and complement the case analysis with a literature review and interviewing.

b. ICT and (open) data driven energy service business models

ICT and open data are considered key drivers for future energy services around for example smart grids and smart buildings, and their transformative role is being investigated by multiple stakeholders, including even the world bank (2012). What lacks investigation however, is again how user centeredness can be incorporated in these type of business models, for example in innovative use of data to for example design neighbourhood energy management systems instead of home energy management systems, or virtual power plants, or in models where ownership of metered data remains with the end-users and they collaborate to aggregate that data and sell it.

c. Sufficiency and circular energy services including the use of renewables

In the business innovation field in general, but in the energy sector in particular there is a dire need for research on cases that explicitly focus on delivering more than just energy efficiency, but that help create systemic change. These type of models for example aim to combine energy efficiency, renewables but also aim for sufficiency and or circular economy. In addition this is where multiple or additional benefits find a place in the business model, and multiple value creation is at the heart of the model. These business models are a vastly understudied field in the energy field. It is imperative to understand these models and their implementation. Only a few authors focus on this element. Hiteva and Sovacool (2017) for example discuss how the justice approach can be used to innovate business modelling and also focus on value such as influence on decision-making, participation and fair process. Bocken et al. (2014) discuss new sustainable business models, where both stakeholder interests, societal and environmental needs are balanced. The research for this specific topic will lead to a deeper understanding of the underlying mechanisms in this specific type of business model. These include best practices, patterns in other (non-energy) sectors and their applicability to EE services.

d. New actors new business models: community energy or Virtual Power Plants, peer2peer,

Many new business models are emerging where users have new roles (other than client), but are also partner and sometimes users are even the main developers of the business model. This occurs for example when dealing with peer-to-peer or with community-to-business type of models where the users become aggregators. These new roles impact the business model profoundly. Not only the partner building block of the business model changes, with new roles, new interactions between provider and user/client, but it also impacts on the revenue model: e.g. business models using new payment schemes such as blockchain such as presented by David Shipworth at the DSM academy. And the resources block of the business models changes for example because of the use of (consumer) data as a primary resource and activity in the model. All these changes are profound in the business model innovation field focused on the energy sector and under researched.

2. Deepening our understanding about how the four different strategies relate to specific sectors.

ICT and automation are very different sectors compared to retrofitting or insulation, and different segments such as households, SMEs and commercial buildings might also benefit from different business models and strategies. So far we do see a pattern where retrofitting business models seem to be centered mainly on the second strategy (reframing what you push), whereas the smart service for example, are often a hybrid between the second and the third strategy (pushing something else), and we wish to increase our understanding of such matches.

3. Contributing to the development of new service business models for the energy sector.

One of the key outcomes of phase one is the service oriented version of the business model canvas. The most important differences with the product oriented version are a different focus on the client relation (continuous relation, with the transaction as a starting point), the revenue model and the partner relations. Phase 2 can continue to focus on these new, service business model building blocks and further contribute to the knowledge about such service business models and how their building blocks and accompanying capabilities and context fit or stretch can work.

4. **(optional) Deepening the understanding of the retrofitting sector.**

   All countries that participated in task 25 phase 1 reported a difficult, traditional and fragmented market for retrofitting. The market is dominated by small, very product oriented contractors and installers and as a result, the house owner is 'lost' and insulation and retrofitting does not take off (as the unmet potential shows). Despite various stimulation programs, like subsidizing the material. With the knowledge and insights of phase one (specifically: the need to take the use phase in focus, close interaction with the end user) phase 2 can zoom in on this specific sector and design the contours of a new and effective stimulation program, **this activity strongly interrelates with Subtask 3a**.

Subtask 3a: Deepening our understanding of the context actors and issues explaining the inertia of EE uptake

In this subtask we want to explicitly focus on the role of agencies, governments (i.e. context players) in stimulating market uptake of energy services, especially for smaller companies. Few authors are investigating the impact of particular policy instruments on the viability of specific business models (Al-Saleh and Mahroum, 2015) or how public support can help businesses become more service oriented (Plepys et al., 2014). Plepys et al. (2014) conclude that the current market is biased against forward looking business models that do not bring immediate benefits. Secondly, powerful market players oppose these business models because they challenge the competitive advantage of mass production.

But much more research is needed, especially in the energy related sciences. Questions such as: what would be effective programs to stimulate demand (insulation and retrofitting), how to solve the hopelessly fragmented market of contractors etc., are in dire need of investigation. This is essential in the success as well as the process of servitisation. In order to tailor such a program to a specific national context, this programme will be co-created with local agencies. Below we explain the above need in more detail.

Service orientation in a business model, and a focus on the use phase to allow energy efficiency to be experienced by a user, for example in terms of the comfort it provides, or control, or ease, are clear drivers for successful uptake of an energy efficiency service. Based on the analysis of the 46 cases in Sweden, the Netherlands, Austria, Switzerland, Norway and South Korea, we can conclude that those service oriented business models that indeed become big are able to become big thanks to a mother company.
This mother company, for example a well-established utility, a university, or holding company, provides them with the following elements:

- ✓ access to a well-established client base and relationship, and therefore also valuable customer data,
- ✓ branding,
- ✓ money, to set up adequate user sensing dynamic capabilities
- ✓ and perhaps most importantly patience and thus time.

A mother company is especially important when the services are explicitly not yet commercially viable and therefore need time to experiment, stretch, learn, adapt. It can indeed be witnessed that big players in the energy sector such as General Electric, Schneider Electric, but also many utilities are turning (part) of their business towards this service model approach. GE for example launched Current, a company that blends advanced energy technologies like LED and solar with networked sensors and software to make commercial buildings and industrial facilities more energy efficient and productive is already worth a 1 billion dollar in revenue.[i] These type of business models and players benefit from taxes but don't really need targeted policy support.
In most countries that we analysed however, most firms providing energy efficiency services are very small (often under 10 people). These businesses have a very hard time (because of lack of a mother company and thus money and time to experiment and truly sense needs and options) to become really service oriented, and to stretch the context and are not likely to follow the aware market changer or stealth changer strategy. These companies are forced to follow the smart matcher strategy. As mentioned earlier, many of these smaller businesses are very dependent on context elements such as laws, regulations, and

they need to develop dynamic capabilities on how to deal with the constantly changing and inherently complex and uncertain framework conditions, and to overcome internal organisation barriers (Smith and Raven, 2012; Chesbrough, 2010; McGrath, 2010). Most SMEs have hardly any capacity and resources to experiment and develop capabilities necessary to move away from a product and technology push approach. **What these smaller business need to be able to also move away from the product dominant logic, stretch and challenge the existing system and start becoming more service oriented types of models; is room to experiment.** The importance of experimenting is also evidenced by the finding that business models that constantly reinvent themselves in response to changing frameworks are more successful (McGrath, 2010; Mullins and Komisar, 2009; Chesbrough 2010; De Reuver, Bouwman, and Haaker, 2013). **This experimentation and or responsiveness is however not facilitated sufficiently by existing framework institutions such as public authorities. Public authorities should nurture energy efficiency entrepreneurs more.**

We have not yet performed a comprehensive analysis of which kinds of policy support would best support the four models and strategies, and thus this is the aim of the next phase of this Task 25. In the next paragraph we explore briefly what the different kinds of policy support are that are available and what might be potential valuable support for the four models. In phase 2 we would like to explore these hypotheses.

The traditional ways public authorities can nurture SMEs is through education, information and awareness creation; regulatory and fiscal frameworks[ii]. The push harder/unaware market changer model and strategy's biggest barrier is their own lack of awareness on where they are positioned on the product-service shift, and these type of businesses' capability to sense user needs is underdeveloped and they experience a mismatch with what many potential clients need. For this type of entrepreneurs, information and awareness raising campaigns about the paradigm shift, targeting the entrepreneurs would be valuable (Mont & Lindquist, 2003). These entrepreneurs would also benefit from self-assessment information tools such as the one we developed into a beta version in Phase 1. But public authorities can of course also use other policy interventions such as business support schemes that focus on building up the necessary entrepreneurial dynamic capabilities such as sensing user needs, conceptualising and orchestrating. The Energy Agencies involved in this project did indeed organise such workshops with entrepreneurs and these workshops received positive feedback from the entrepreneurs stating that they were now much more aware of the business they are in, and their position on the paradigm shift and what that entails for their business model and necessary dynamic capabilities.

The reframing what you push/smart matcher model and strategy is well able to get to the transaction moment, selling their product and service combination. Their awareness about how to create a longer term relationship with their clients, into the use phase, and thus maximise the potential for energy efficiency and savings is less developed. These type of entrepreneurs need resources to be able to experiment with conceptualising, cocreating with clients to find out what value exists in the use phase. Policy support for this type of entrepreneur can take the form of subsidies for SMEs supporting co-creation or other sensing activities, or grants or subsidies to allow for experimentation with the delivery of multiple value and more collaborative and sustainable type of business models. But support can and should also take the form of training in dynamic capabilities such as conceptualising in incubators or in chamber of commerce type of networks. Public private partnerships such as KiCInnoEnergy have an important role to play here as well, not only delivering business modelling training and support, but with a clear focus on delivering service and value in the use phase.[iii]

The third model and strategy aimed at pushing something else and being aware market changers might yet be more supported with other policy instruments. What these type of entrepreneurs face is need for well-developed orchestration skills, and experimental space to learn about user needs. These entrepreneurs could be helped with policy support that opens up customer relations and quantitative and qualitative data on customers that can help businesses identify valuable customer segments. Many public authorities have very relevant open data about labels, infrastructure etc. that SMEs can use to perform a first sensing of user needs, for example finding out which homes might be in dire need of insulation. Policy instruments that might be used to support the development of the orchestration skills these entrepreneurs need are for example collaboration platforms focused on linking businesses with consumer organisations, governmental agencies, NGOs and with other businesses. These can be used to help the smaller businesses find suitable partners to create bundled services which then naturally are able to more easily provide multiple (also non-energy) value. Facilitating partnerships across sectors and including public private partnerships with for

example NGOs creating trust by endorsing a type of service (brand independent), certification (when it is standardised and provided by trusted institutions) could potentially also be powerful market changers supporting this third type of businesses. Yet another type of support from public authorities that could potentially be helpful to this third type of businesses is the purchasing power of public authorities. They could be launching customers for SMEs focused on delivering services where energy efficiency is experienced in use. These contracts should then be opened up to serve as demonstration sites for others to learn from and experiment in. Metcalfe and others have stated that in fact, (innovation) policy is about creating conducive context for organizations to engage in experimentation (Metcalfe, 1995; Metcalfe and Miles, 2000). Janssen (2015:120) makes an even stronger statement and states that: "In this respect, one cannot assume this is simply a matter of having the right funding instruments and framework conditions in place; weak innovation capabilities constitute a systemic failure that is detrimental for the processes of novelty creation within markets…. The observation that many firms lack dynamic capabilities and competences to realize new services (Sundbo, 1997), can be regarded as a strong justification for policy intervention." Authors such as Janssen (2015) and Rubalcaba et al. (2010) therefore argue that policy interventions such as the provision of business services aimed at enhancing these entrepreneurial capabilities of sensing user needs, orchestration, conceptualising, scaling and stretching would therefore we appropriate policy responses.

The fourth model and strategy hardly needs support, except potentially support in creating market pull, for example through more focus on multiple benefits of energy efficiency. The role that public authorities could play in creating more focus on the use phase needs much more research. There are several avenues for research. For example, regulation of feedback on energy consumption, improved and more frequent billing and Energy Performance Contracting for the residential sector. Other interesting foci are the internalising of externalities in the electricity or gas price for example, revisiting the system where the price of electricity decreases with increased use, the sharing economy, regulations with respect to healthy indoor climate, both residential and for buildings in general, regulation about reducing sick leave for companies through better work environments (lighting, heating, acoustics, ventilation).

The activities of this subtask entail:

- An analysis of several regulations, incentives, subsidy schemes, financing instruments with respect to how much they support of more service oriented type of business.
- Setting up a dialogue on a national scale between relevant stakeholders on their role and mandate in supporting a more service oriented approach to the energy transition. This dialogue will have the form of a larger workshop and is conditional on the support of the national energy agencies or other stakeholders funding the Task.

Subtask 4a: Training, engaging and disseminating

One key experience in phase 1 of Task 25 is that it is imperative to transfer our knowledge and findings to the relevant actors in different countries and settings. And simply communicating through a webinar or presentation is insufficient. **This type of knowledge needs to be experienced and worked with in a real life setting, investigating real business models, real policies and real users.**

Therefore we will

- set up a strong training system based on subtask 3 toolkit and workshop format; and to do roadshows with participating countries and or other relevant organisations in the countries identified by the participating countries (e.g. business development agencies, advisors) to train policymakers, entrepreneurs and other relevant stakeholders in more service oriented business modelling and the necessary ecosystem changes.
- Organise at least one user centered business modelling intervention per country with selected business developers, using a living lab approach where the users of the services would participate and be allowed to cocreate the business model. Which means we organize interaction between business model/ energy service developers and actual (potential) end-users to experiment with end-user centered business models.
- We also propose to help set up a MOOC based on the task, in close cooperation with Leonardo academy/DSM university. This is conditional on the availability of a platform such as DSM university or the Leonardo Academy willing to undertake this activity with the task providing the content.
- Of course this activity would also entail a continuation of the more standard disseminating and communicating activities such as conference participating, journal paper writing, newsletter pieces,

policy brief and proactively target other technical driven implementing agreements and offer them Task25-tools and cooperation.

DETAILED WORK PLAN FOR PHASE 2

The second Phase of Task 25 will continually contribute to its earlier set objective of identifying existing a variety of service and use phase oriented business models providing EE and DSM services to SMEs and residential users (individuals and communities), analysing promising effective business models and services for different sectors, identifying and supporting promising national energy ecosystems in which the most promising business models can succeed, providing 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 benefits for the participating countries and for the DSM TCP will encompass:

- **Overview of existing business models and best practice strategies** in the participating countries on demand response, ICT data driven energy services, circular or sufficiency energy services and new actor type of energy services such as community energy, community virtual power plants, peer2peer services.
- **Training and exchange of valuable knowledge and learnings** between EE business developers, service providers, researchers, policymakers and clients within and between participating countries;
- **A national dialogue between context players about their role in facilitating more service oriented business models and entrepreneurs.**
- **Capacity building of relevant business developers and other relevant stakeholders.**
- **Access to relevant stakeholders, documents, and state of the art in the research field** through participation in a new network of expertise and participation of this network;
- **Best practice guidelines for policy makers and institutional stakeholders** on how to support the uptake and creation of promising business models for energy services that effectively achieve load reduction at SMEs and residential communities. | actionable and tested programme for agencies as well as other context players to stimulate the uptake of EE services in their country.
- **Developed and tested framework for effective business model development in co-creation with users, for demand response/circular/data driven and peer2peer type of services**
- **New knowledge on the working mechanisms of the service oriented business model:** how to develop most effective add on-services; how to co-create and co-operate with multiple stakeholders etc.

The principal deliverables for Task 25 Phase 2 will be:

- D7: visual and pragmatic overview of business model strategies (business model, entrepreneurial capabilities and context stretch or fit actions) for each investigated sector or type of business, including a comparative analysis across countries; in addition a more detailed report will be provided.
- D8: Overview of the different types of policy and institutional support available to the different types of business models, where relevant country context and sector context sensitive.
- D9: Training road show and living lab interventions
- D10: Outreach and dissemination material, including at least 2 academic/journal publications, potentially a MOOC, and other outreach material highlighting the Task's work.

Subtask 1: Task Management
Start date: month 1, end date month 24

Activities

- Overall project coordination and management, including contact relationship management
- Attendance of ExCo meetings, conferences and reporting to IEA DSM ExCo

Description of activities and timing

Subtask 1: Management of the task	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
1.2 Exco meetings												
1.3 Overall project management and financial and administrative duties												

Deliverables

- Half-yearly task status reports
- Annual reports

Subtask 2a: Increasing our comparison, including other categories of energy services
Start date or starting event: Month 1, End date: Month 18

Activities

1. Developing an overview (case analysis, literature review and interviewing) of existing energy service business models in the participating countries for the chosen categories, including all the deepening questions listed in the text earlier
2. Create customer journey and interaction points overview wrt end-users to provide insight in technology and people interface for the different topics.
3. Comparative analysis of business models in different countries. Further testing our hypothesis on the four strategies for both business model and context interaction, including all the deepening questions listed in the text earlier
4. Organising one country workshops with business representatives and other relevant stakeholders to discuss the cases.
5. Creating an international report for each type of business model investigated, comparing the national cases.

Description of activities and timing

Subtask 2a	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
1. Identifying and selecting business models in participating countries												
2. Creating customer journeys												
3. In-depth comparative analysis												
4. Country workshop												
5. Reporting results												

Deliverables

- D7: overview of business model strategies (business model, entrepreneurial capabilities and context stretch or fit actions) for each investigated sector or type of business, including a comparative analysis across countries;

Subtask 3a: Deepening our understanding of the actors and issues explaining the inertia of energy service uptake
Start date or starting event: Month 1, End date: Month 22

Activities

1 Investigating the different kinds of policy support are that are available and what might be potential valuable support for the four models
2 Organising a dialogue on a national scale on the system innovation failure and the role of different context stakeholders in setting up a more conducive context for service models.
3 Developing sector and business model type sensitive recommendations for policy makers and other institutional stakeholders where relevant.

Description of activities and timing

Subtask 3a	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
1. Investigating policy support types												
2. Developing sector and business model type sensitive recommendations												

Deliverables

- D8: Overview of the different types of policy and institutional support available to the different types of business models, where relevant country context and sector context sensitive. Including a national dialogue.

Subtask 4a: Training, engaging, disseminating

Start date or starting event: Month 1, End date: Month 24

Activities

1. Set up a training road show, with one training event per participating country and a training of participating country to enable them to give the training themselves.
2. Developing a MOOC, on condition that the platform is provided by a third party such as Leonardo Academy or DSM university
3. Set up an business model intervention involving real end users in a living lab setting
4. Traditional dissemination to external stakeholders and academia

Description of activities and timing

Subtask 4	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
1. Set up a training road show												
2. Developing a MOOC												
3. Set up an business model intervention involving real end users												
4. Traditional dissemination												

To travel to conferences and relevant workshops, to publish in academic journals and to develop dissemination and outreach material a travel budget of 20k is reserved.

Deliverables

- D9: Training road show
- D10: Outreach and dissemination material, including at least 2 academic/journal publications, MOOC, and other outreach material highlighting the Task's work.

THE OPERATING AGENTS AND THE EXPERT TEAM

Dr. Ruth Mourik: Operating agent.
Ruth Mourik has ample experience with running and or contributing to tasks for the IEA DSM IA (Task 24 and Task 25). In addition Ruth and her team at Duneworks (www.duneworks.nl) are expert in the field of DSM and the sustainable energy transition. Her specialisation on a wide variety of end-user themes will add valuable knowledge to the field.

MA. Renske Bouwknegt: Cooperating Agent.
Renske is a service innovation specialist with extensive experience in designing energy services, e.g. the "Neighbourhood Power" (Buurkracht) https://www.buurkracht.nl/ service rolled-out in the Netherlands for a DSO. She has experience in strategic marketing, innovation and service design. Renske is partner of Ideate, a service innovation consultancy. Ideate designs service propositions from a human perspective. Ideate contributes to research on design for behavioural change, business models and social innovation.

National experts
Just as in phase 1, the national experts have an important role to play in balancing the project between an academic perspective and competence and knowledge of the specific field of energy services. The project team has a strong interdisciplinary (research) focus and the national experts will therefore be key in providing access to knowledge and experience from the field of energy services within the within the different countries. The country experts will thus be actively involved in the work, and will also serve as facilitators and multipliers in their countries. It will be valuable if the experts/participants in the task have experience from practical application of energy efficiency (service) implementation and developing business models to deliver these EE services.

FINANCING PARTNERS OF TASK WORK PLAN AND OTHER COLLABORATIONS

Task 25 has been running since November 2014 and its first phase yielded valuable knowledge on new business models in the energy efficiency field, the entrepreneurial capabilities needed, the ongoing paradigm shift from product to service orientation of both policy and business, and policy issues related to upscaling. The first plans for phase 2 were presented at the Exco meeting in Dublin, May 2017 and Task 25 was asked to submit a proposal for phase 2.

Countries/organisations that expressed concrete interest and or commitment for participation in phase 2:
1. Sweden
2. Norway
3. Netherlands
4. Australia
5. Italy

Collaboration with other IEA DSM tasks and IAs
In phase 1, Task 25 explicitly included 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. We will continue liasing with these partners.
In addition, Task 25 created ongoing collaboration with 4E EDNA (Steve Betelich)
This task will continue to seek collaboration with the other ongoing tasks in the IEA DSM TCP.

BUDGET

Contribution total per country = EUR. 40.000,- excluding VAT to be paid at the start of the project

Staff costs with 4 participating countries	140000
Travelling + outreach materials	20000
TOTAL TASK BUDGET	Euro 160000

350 hours for the country specific activities and 50 hours comparative analysis and management per country

Task 25 Task sharing overview

In addition to the cost sharing to the OA budget, participating countries are encouraged to:

Provide resources in the form of a national expert time of approximately 240 person-hours total.

This includes:

- Undertaking part of the research and or writing work for selected parts of task 2 to 4
- Attending at least 1 national expert meeting of the Task and preparing for them
- Hosting a maximum of two country specific meeting/workshop during the lifetime of the Task
- Carrying out the national dissemination activities and training in close cooperation with the OAs

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[i] http://www.greentechmedia.com/articles/read/ge-launches-1b-energy-services-company-current. It is unclear how this 1 Billion translates into kWh savings being realised.
[1] Also see the toolkit for policymakers developed by the Ellen MacArthur Foundation (2015)
[i] http://ise.innoenergy.com/

Document H

TASK 24: PHASE II: BEHAVIOUR CHANGE IN DSM. HELPING THE BEHAVIOUR CHANGERS

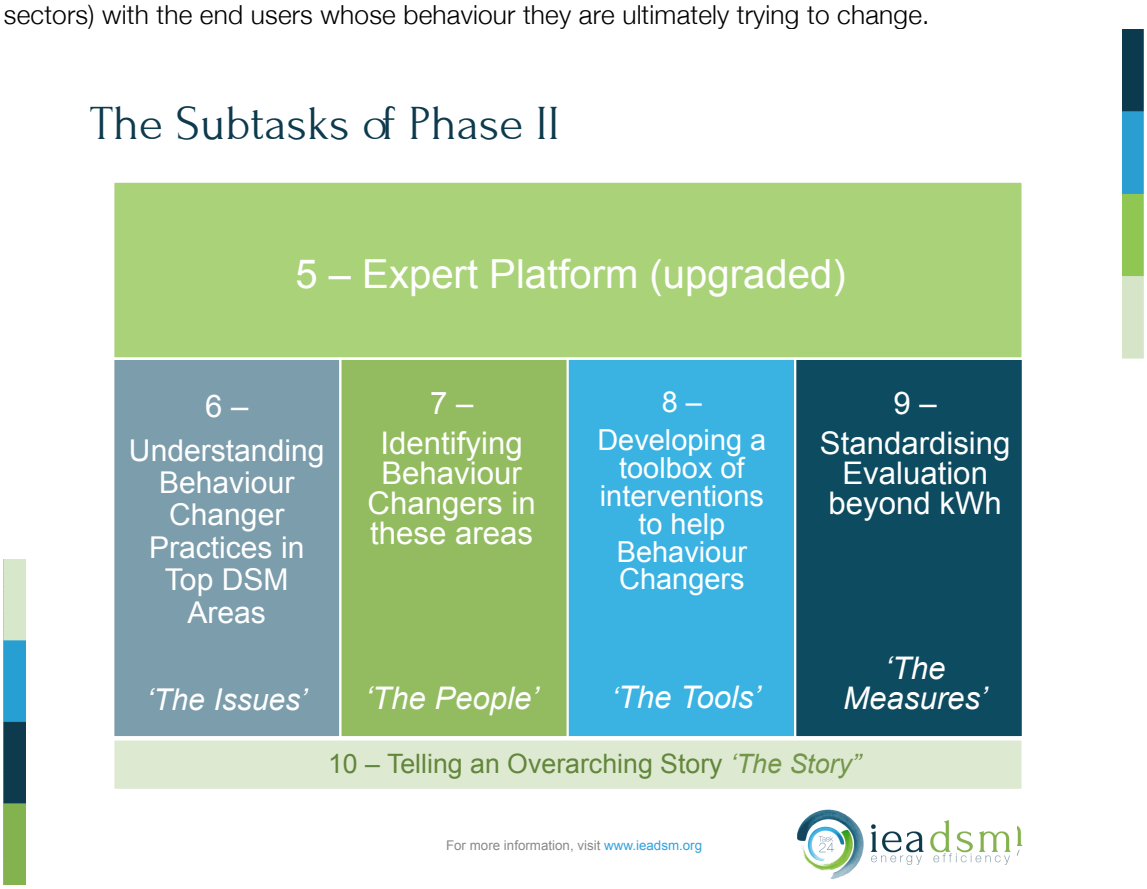
SUMMARY

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 insights 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. Phase I of this Task has been finalised in 2015 and Phase II (How to help the Behaviour Changers) will finalise end of 2018.

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, service and the third sectors) with the end users whose behaviour they are ultimately trying to change.



OBJECTIVES FOR THE LAST 6 MONTHS

Subtask 5 – Expert Platform

Objectives

- Continue publicising and dissemination of Task 24, including at international conferences

Progress towards Subtask objectives
The usefulness of the Ning Expert Platform has come to a natural end, as most information is now on the IEA DSM Task website and expert collaboration is undertaken via emails or in face-to-face or skype meetings. We use the IEA DSM Events page to advertise workshops and conferences now. All final and draft Task reports are on the IEA DSM website, which has been updated recently. We continue having great success in matchmaking experts, spending time at each other's Universities, for example, or developing new research collaborations. The Task is widely known and enjoys a great reputation for this matchmaking role among behaviour change experts.

The dissemination and publicising of the Task is going extremely well, we have recently published a big report on "Subtask 11 - CHS case study: Designing a successful behaviour change programme for hospital building staff" which showed just how useful the Task 24 approach was in a real-life application. The now-largest hospital network in North America (renamed Atrium Healthcare) is tracking for US $4million p.a. in avoided energy costs, in part thanks to the *Energy Connect* behaviour change programme for building operators, co-developed and evaluated by Task 24 and an international expert panel. An IEA DSMU webinar was also presented, in collaboration of Task 24, Atrium Healthcare and ACEEE, on December 21, 2017. In addition, this exciting work is currently written up for publication at the 2018 ACEEE Summer Study, and Atrium Sustainability Director Kady Cowan has been nominated, and won several prestigious awards for it.

The two peer-reviewed papers for a Special Issue in the high-profile Journal of *Energy Research and Social Science* (ERSS), which Dr Rotmann also co-edited have been cited 7 times in the last 6 months and viewed almost 7,000 times. The ERSS Special Issue on "Storytelling and Narratives in Energy and Climate Change Research", the largest-ever Special Issue for this publication, has drawn some rave reviews, including by Paul Stern who said it was "a fascinating collection, pointing toward ways to connect narratives with more standard scientific approaches to energy and climate change analysis, leading to better informed choices. In short, this issue suggests interesting and important directions for doing things like informing decisions in the energy and climate arenas. Kudos and thanks to its editors!"

Task 24 was invited as steering and social group member and presented at the Behavior, Energy and Climate Change (BECC) conference in Sacramento last October. Dr Rotmann is also part of the technical steering committee members for the next BEHAVE conference in Switzerland in 2018, where the third and final international Task 24 expert workshop will be run.

In addition, we published the Austrian final report, a more detailed report on the Austrian case study to its funding agency (in German) and the Austrian Policy Brief. We are also about to publish another technical report on Green Leasing in Sweden and an international cross-country case study comparison for the Irish Energy Saving Kit Programme. The latter will also be presented as a conference paper at the 2018 BEHAVE conference.

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)

Progress towards Subtask objectives

Subtask 6 has now had almost 30 workshops, in NL, NZ, CA, SE, IE, US, AT and at the ECEEE summer study (twice) and Energy Cultures, BECC and BEHAVE conferences. Another 4 workshops will round out this Subtask. We have started collecting lists of DSM interventions and energy efficiency and behaviour priorities in most of these countries and have created a report template, which has been finalised for Austria. We have discussed the top 3 issues during workshops and have decided on the following main topics, some of which have led to real-life interventions:

- *Powering tomorrow's neighbourhoods* via smart grid sharing and *Home Energy Audit Toolkits (HEAT-kits)* in New Zealand;
- *Supporting building management operators in hospitals* to produce better documentation and communication of energy savings in Canada (on hold as the funding didn't eventuate);
- *Empowering building operators in hospitals to re-set BAS set-point overrides* in Charlotte, North Carolina (participant of Subtask 11);
- *Landlords and tenants co-designing green leases in commercial buildings* in Sweden;
- *Promoting better use of ICT in universities* in the Netherlands;
- *Using libraries as Middle Actors to distribute energy-saving kits* in Ireland; and
- *Including better evaluation regimes into the new Austrian EE legislation and*
- *How to improve uptake in shared mobility platforms with the goal to reduce fine air pollution,* both in Austria.

Looking at the wide spread of sectors and behavioural issues above, we have shown that our tools and approaches are widely applicable to all domains we have studied in Phase 1 (building retrofits; smart technology; SMEs; transport) – and we added a few new sectors: hospitals, universities, office buildings and libraries. We have also undertaken some in-depth case study reviews on some of these interventions: the Dutch ICT case in higher education was contrasted with another Dutch University and Cambridge, UK; green leases in Swedish office buildings were compared with green lease insights in the UK, Australia, Ireland and Norway; and energy saving kit programmes using libraries as Middle Actors were compared between New Zealand, Australia, the US, Canada and Germany (about to be published). The US hospital case study was supported by an international expert panel comprising 4 countries (NZ, US, CA and UK). All this work will feed into Subtask 10 – overarching country comparison.

Subtask 7

Objectives

- Identify, with 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
- Use the Collective Impact Approach to initiate discussions between different disciplinary perspectives and sectoral contexts.
- 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 ongoing 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.

Progress towards Subtask objectives

Behaviour Changers have been identified for the top issues decided on in Subtask 6 for Canada, Sweden, Ireland, the Netherlands, Austria, US 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' during workshops. Subtasks 6 and 7 go hand-in-hand and will be reported on together. A 180+ page Workshop Minutes document is available to all project funders.

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, ongoing 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 trialed 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).

Progress towards Subtask objectives
The Special Issue on Storytelling for the Journal of *Energy and Social Science Research* provides a very detailed and in-depth overview of cutting edge research on storytelling, including our own use of the fairy tale story spine. Our 'Behaviour Changer Framework' collaboration tool was published at the ACEEE summer study and the BEHAVE conference and won an award at the ECEEE Summer Study last year. We have successfully trialled design charettes to co-design a pilot intervention in the 2nd largest hospital network in North America, CHS, as part of Subtask 11. The Decision-making Tool has been drafted by Duneworks and we are collecting insights on multiple benefits of interventions in each of our country workshops. An overarching report on the usefulness of the Task 24 toolkit will be available mid 2018.

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 idiosyncrasies, 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).

Progress towards Subtask objectives
Karlin (the Principal Investigator of this Subtask) et al. have published papers at the IEPEC conferences in August 2015 and 2016. These peer-reviewed papers outline the basics of the *Beyond kWh* toolkit they are developing for Subtask 9. The results from the psychometric testing were published by the IEA DSM Task 24. This work was co-funded to the tune of ~US$100,000 by PG&E and Southern California Edison. As it stands, the tool will not be able to be validated in each of the participating countries as only 3 countries paid to contribute (instead of the 4 needed for the contract). However, the tool has been tailored and tested on the highly-relevant residential energy-savings kit trial in Ireland. Early results are promising. In addition, a version of the tool was adapted for the Swedish office sector pilot with the Swedish Energy Agency, although it was not used in the end.

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 decision-making 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).

Progress towards Subtask objectives
This Subtask will slowly be collated into a draft report, based on the outstanding country reports from Subtasks 6&7, the 4 remaining workshops and final toolkit report. A draft will be available to funders by mid 2018.

OBJECTIVES FOR THE NEXT 6 MONTHS

Subtask 5
ACEEE Summer Study paper, BEHAVE conference Task 24 workshop and paper.

Subtask 6
Finalise issues reports and collate DSM lists in NZ, NL, SE, IE and US. Write policy briefs for each country.

Subtask 7
We will hold another 4 workshops in next 6 months in New Zealand, California and BEHAVE conference). Workshop notes will be all written up, workshop protocol finalised, evaluation of tools fed into toolkit.

Subtask 8
Draft toolkit report by mid 2018.

Subtask 9
Analysis of Irish beyond kWh data, including triangulation with qualitative data from focus groups, surveys and interviews and cross-country comparison with NZ energy saving kit programme. Paper for BEHAVE conference and possible technical, peer-reviewed paper on statistical methods in 2019.

Subtask 10
Draft report by mid 2018.

OUTREACH

Outreach of this Task was successful and manifold. Two more papers and another international expert workshop will be held and presented at the ACEEE summer study and BEHAVE conference. Two H2020 research programmes and several non-state actors from industry, local government and the third sector, have engaged with, or built on our Task work. Several international awards were won for work based on this Task.

Experts meetings/seminars/conferences held in past six months
Seminars/Conferences/Lectures

Date	Place	Partcipants	Type of meeting	Government	Industry	Academic
Oct 2017	Sacramento	700	Conference			
Oct 2017	Australia	>20	Lecture	5	5	10+
Mar 2018	Charlotte, NC	40	Summit		35	5

Experts and stakeholder meetings

Date	Place	# of Experts	Type of meeting	Govern-ment	Industry	Academic
Mar 2018	Charlotte	30	SHM		25	5
Apr 2018	San Francisco	20	SHM	1	17	3

IDEAS FOR NEW WORK

Task 24 has previously put forward a concept paper for how to 'do behaviour change from A-Z', together with our project partner, SEE Change Institute. This was discussed at the 50th ExCo meeting but its scope which went beyond usual Task format, was considered too broad. A survey for ExCo, based on their feedback was developed in December 2017. However, it was unfortunately never sent, on advice by the Vice Chairs. The current draft strategy, even though clearly informed by Task 24 work, does not seem to have made room for a specific Task 24 extension.

We have many ideas of what other work could be done, either as extension or new Task (a full proposal has even been developed on Energy-Saving Kits but it did not receive enough support in the short time left before this meeting). There is also still a possible need for another "Behaviour Change Advisor", similar to the ExCo Advisor and funded out of the Common Fund, who can help scope out the wider behavioural work streams and possible new Operating Agents and Project Partners, as signalled by the draft strategy. The Task 24 Operating Agent has by far the widest international network of such possible loyal experts and OAs and could help scope and develop the wider connections, e.g. with G20 who now have a behavioural focus, other IEA TCPs, the Secretariat and other international research networks focusing on this "human-centered energy system". We trust that the ExCo considers the value of this Task and its networks to bring the ambitious new strategy to fruition.

ACTIVITY TIME SCHEDULE

We are currently still on track to finish in mid-2018 with most country ST 6&7 reports and the ST8 toolkit, as well as a draft ST10 report. However, we have finally managed to overcome the political issues surrounding official US participation in the Task and received a letter of participation for funding Year 3. This funding will be paid by the Consortium for Energy Efficiency, encompassing 186 US utilities with a combined several billion dollar funding for energy efficiency programmes and interventions. Seeing that Austria and the Netherlands also did not fund the full rate of Phase 2, and that the US has been involved and co-funded (in kind, to the tune of almost USD200,000) Subtasks 3, 9 and 11, I ask the ExCo to agree to extend the final reporting (only for the US ST6&7 and final ST10 cross-country comparison) to end 2018.

FINANCE

We have invoiced and received payment from all countries, and are expecting payment from the US for Year 3. Budgets are on-track.

MATTERS FOR THE EXCO

Please accept this Status Update.

PARTICIPATING COUNTRIES/PARTNERS

Austria (only 2 years), New Zealand, Sweden, The Netherlands (only 2.5 years), Ireland, US (last year and in-kind co-funding of ST3, 9 and 11)

Document I

IEA DSM PROGRAMME VISIBILITY COMMITTEE REPORT

Submitted by Josephine Maguire and Anne Bengtson

ANNUAL REPORT

The 2017 Annual Report, including a Theme Chapter on "**What is the benefit of collaboration for your country in the DSM TCP?** " was made available electronically to Executive Committee members, Operating Agents and the EUWP and EEWP by the end of January 2018 and was uploaded to the IEA DSM website. It was decided at the ExCo meeting in Stockholm, March 2016 that printed copies will not be available any longer, however the IEA would like to be able to print on demand and Anne Bengtson has confirmed that a printable pdf version from the desktop publisher is already/will be provided every year. Executive Committee Members and Operating Agents were told to ensure that links to the report are distributed widely to all interested parties.

WEBSITE

The new website has been updated and has been operational since July 2015. It has undergone annual maintenance and upgrades. All ExCo delegates and Operating Agents are strongly encouraged to review the whole website regularly, particularly areas relevant to their activities. It is very easy for information to become out-dated and it is particularly important to upload any new reports and publications as soon as they come out (also include them as headline news items by ticking the appropriate box). Operating Agents are expected to keep their own Task areas up to date, but other feedback, reporting of functions that appear not to work and suggestions for further improvements should be made via Anne Bengtson anne.bengtson@telia.com and/or the Visibility Committee. In particular, we would be interested to know how useful the social network links are.

STATISTICS

Website traffic from September 1 2017 to March 1 2018:

4,630 Sessions with 2,909 unique users
Averaging 25.5 hits per day
Average time spent on site: 2:44
84.4% New visitors

Table of Traffic and User Engagement by Country:

Country	Users	New Users	Sessions	Pages / Session	Avg. Session Duration	Report Downloads	Downloads
United States	359	352	495	2.02	0:02:01	23	4.65%
United Kingdom	193	186	279	1.76	0:01:59	3	1.08%
India	182	179	219	1.93	0:02:25	6	2.74%
Netherlands	148	135	249	2.43	0:02:36	18	7.23%
Germany	133	131	173	2.24	0:01:26	10	5.78%
Australia	132	130	236	3.22	0:03:52	14	5.93%
France	130	125	288	1.83	0:01:51	11	3.82%
South Korea	125	123	155	4.94	0:06:48	12	7.74%

Italy	101	98	123	2.35	0:02:22	4	3.25%
Sweden	91	83	282	3.33	0:04:08	15	5.32%
China	77	74	158	1.42	0:00:57	1	0.63%
Canada	76	76	160	2.14	0:01:13	2	1.25%
Spain	75	75	92	2.76	0:02:35	3	3.26%
Austria	68	60	183	2.14	0:03:58	17	9.29%
Belgium	55	53	68	2.46	0:02:17	5	7.35%
Portugal	49	49	65	1.97	0:01:50	3	4.62%
Indonesia	47	47	49	1.08	0:00:05	0	0.00%
Switzerland	46	43	60	2.37	0:01:46	4	6.67%
Norway	45	41	103	2.38	0:03:24	8	7.77%
New Zealand	45	40	152	1.77	0:02:21	14	9.21%
Other	750	732	1,029	2.09	0:02:18	0.79	4.40%
Total	**2,937**	**2,842**	**4,630**	**2.4**	**0:02:44**	**237**	**5.12%**

Of note is the spike in engagement from Australia, who for this period have the 5th most visits. Australia also show longer than average session duration at just under 4 minutes, with 5.93% of users downloading at least one report.

South Korean users spent significantly longer on-site than average at 6min 48 seconds and showed strong engagement with 7.7% of users downloading a report.
Of the top 20 countries visiting the site, Austria and New Zealand showed the most interest in publications with 9.2% of users downloading files.
Users from the UK, despite providing the 2nd most traffic showed low engagement, with an average session time of just under 2 minutes and 1% of users downloading a publication.

Report Downloads for Tasks - Report and other Publication downloads are up, with 403 downloads since September 1 (up from 258).

The top 5 topics for report downloads were:

Topic	Downloads
Task 25	73
Task 24	72
EGRD	46
Participation Information	21
Legal Text	19

MAINTENANCE

The hosting charges have slightly increased and the outstanding costs have now been paid. The maintenance contract for the website will be up for renewal in June.

Issues
Members should review the website regularly and update their own work/interests, especially reports, any filmed workshops for YouTube, presentations for slideshare etc. The website is only as good as if there is frequently updated content available. Most updates are from Task 24 and the IEA DSM Secretary.

SPOTLIGHT NEWSLETTER

In the past 6 months, two DSM Spotlight newsletters have been published:

Articles in Issue 66/September 2017:

- Chairman's note
- DSM University
- US: What are the acutal costs of saving energy
- Ireland: SEAI report, "Behavioural insights on energy efficiency the residential sector"
- IEA global conference on energy efficiency
- Task 24: paper in ERSS Special Issue, "Storytelling and narratives in energy and climate change research"

Articles in Issue 67/December 2017:

- The Final Liberation of Adam Smith
- Task 17 New partners welcome in new Phase of DSM, DG and storage integration work
- Peer-to-Peer Energy Trading using Blockchains
- DSM University
- India: Perform, Achieve and Trader (PAT): An innovative programme to promote industrial energy efficiency
- New reports now online

The next dates for submission to the Spotlight Newsletter issues are:

Issue 68/March 2018
Issue 69/June 2018 – articles due May 1
Issue 70/September 2018 – articles due August 1
Issue 71/December 2018 – articles due November 1

The Spotlight Editor Pam is looking for articles on DSM work in different countries and other work Operating Agents and Executive Committee members are involved in. The Programme has tremendous news to share so please continue to think about, suggest and submit future articles. The Editor is happy to work with you on an article in any form – completed article by you or someone else, information for an article that you would like for the Editor to write, a conference paper that the Editor can convert into a newsletter article or just an idea that you think would make an interesting article. If you have an article to contribute, please email it to Pam Murphy [pmurphy@kmgrp.net]. We are also looking for a country highlight for the December issue.

Issues
Four newsletters will be published in 2018.

BROCHURE

The brochure and inserts have been updated with the new logo and branding.

TASK FLYERS

Task flyers are up to date.

KEY PUBLICATIONS

During the past six months several publications have been added to the website:

Task 25 – Conference paper: Mind your business: entrepreneurs, their dynamic capabilities, context and new business models for energy efciency services
Task 24 – Policy Brief
Task 25: Effective business model design and entrepreneurial skills for energy efficiency services
Task 25 – Swedish context analysis
Task 25 – Swiss context analysis
Task 25 – Dutch context analysis
Task 24: Designing a Behaviour Change Programme for Hospital Facilities Staff
Results and outlook Task 25
Task 24 – Final Report Austria
Task 25: Overview of cases and strategies per country
Task 25: Deliverable 2: report Korea
Task 25: Deliverable 2: Report Austria
Task 25: The 4 strategies to effective delivery of energy efficiency services
Task 25: Deliverable 2: Report Sweden

See latest key publications: http://www.ieadsm.org/publications/key-publications/

Executive Committee members and Operating Agents are reminded that it is up to them to nominate publications to become "key" to the ExCo Secretary while waiting for the third Vice Chair to be appointed.

SOCIAL MEDIA

The Implementing Agreement is getting more traction on social media. We now have a presence on:

- Facebook (IEA DSM Group) with 203 members and growing. Even though most posts are by Anne Bengtson, Rob Kool and Hans Nilsson, there are regularly posts and questions by other participants;

- LinkedIn (IEA DSM Group) closed as it was not utilised.

- Twitter (@IEADSM) with 529 followers and 1555 tweets. This is the fastest growing social media platform and has fostered a lot of great engagement, re-tweets and mentions. Especially the Academic and Industry sectors seem to respond to this medium. Dr Sea Rotmann is posting for this group.

- IEA DSM Youtube Channel with 66 videos – 35 are Task 24 videos and 31 are DSM University webinars. We need more content from other Tasks. If we start filming some Executive Committee workshops, this would be a great channel to distribute visual information fast.

- Slideshare IEA DSM Programme Bengtson: static at 142 slideshares. Unless Operating Agents send their slides to the Secretary to upload with specific instructions to do so, the slides will become outdated.

- Templates have been developed for reports and power points, please use them and make sure to use the ones with correct fonts (NOT HelveticaNeuSt).

COMMUNICATIONS PLAN AND DISSEMINATION STRATEGIES

A new Communications plan for the DSM Technology Collaboration Programme (DSM TCP) has been drafted in line with the Strategy for the next five years.

Josephine Maguire with support from Anne Bengtson

Document J

IEA DSM UNIVERSITY

The DSM University develops largely according to plan and in a steady pace where we can deliver in a way that creates confidence from users and interested parties. The “Heartbeat” of the DSM-U is the webinars that are delivered once a month.

The concept has attracted some interest from the IEA TCP family.

OBJECTIVES FOR THE LAST SIX MONTHS

Webinars

There has till 2018-03-22 been arranged 39 webinars.

Leonardo changed the platform for administering all webinars where all webinars are announced (http://www.leonardo-energy.org/calendar) and it looks as if this has given us a wider audience (see attachment).

The webinars are recorded and both slides and supporting material is made available for registered users. There has been produced a flyer (http://www.ieadsm.org/wp/files/DSMU-flyer-December-2016-corr.pdf) that provides data on past webinars and on where material can be found for registration and downloading from Leonardo and from YouTube..

Contacts with the IEA Secretariat and IPEEC has been particularly fruitful and will be further developed. The Secretariat has been approached for the opportunity that the DSMU material in any of its forms could be used for the training activities that has been set up but still with no success.

Some voices were raised that the IEA should have is own facility for webinars but it looks quite obvious that the cooperation with the Copper Institute benefits our outreach. The latest 14 webinars has attracted registrations from 124 countries (see attachment 1)!

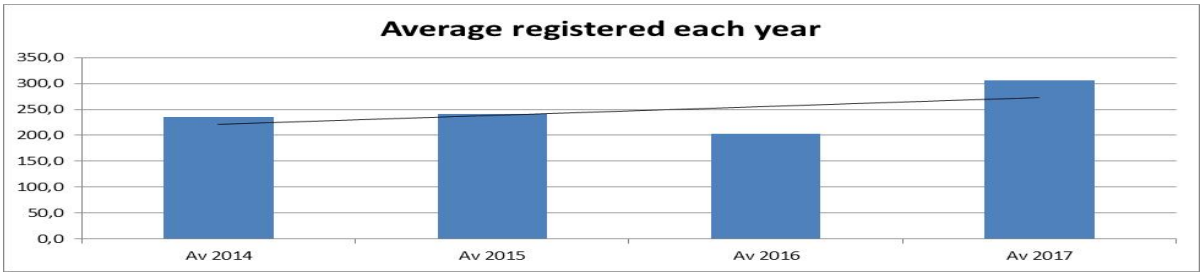


Figure 1: The interest in the webinars seems to be slowly rising

The interest in the webinars is of course also dependent on the subject/theme of each webinar and to which extent we manage to address different categories of stakeholders.

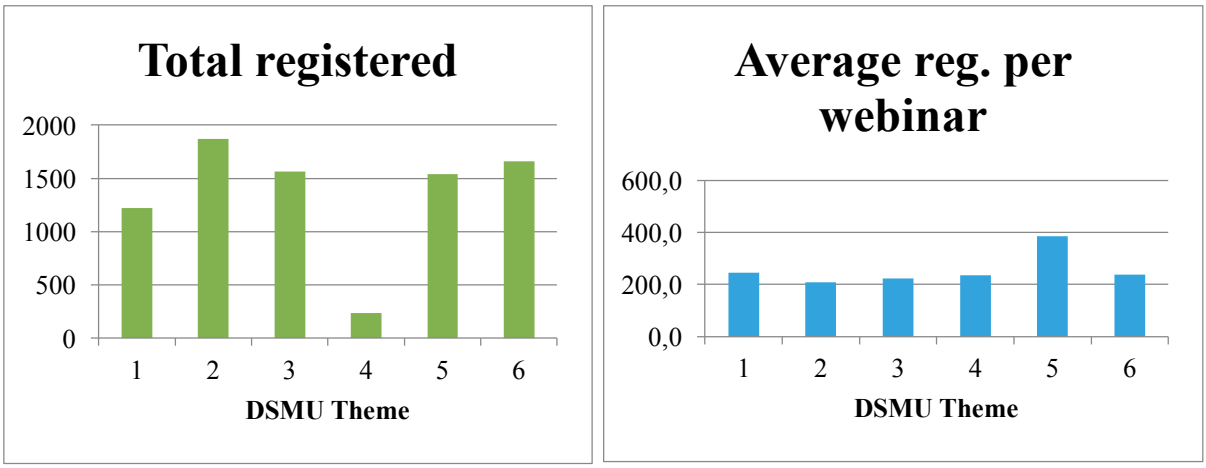


Figure 2: It seems as if the webinars related to "integration" has the biggest interest. The theme on load shape is clearly interesting for the audience but we have had only a few of them (3 out of 39) and 2 where made before statistics were established.

The facility to download webinars is a good complement that also reveals that such downloading happens with a steady pace of some 10-15% growth per 6 months. The figures for 2017 are however heavily distorted by webinar 33 (Blockchain applications for peer-to-peer community energy trading.)! It has up till today more than 6500 downloads compared the average of some 200! ☺

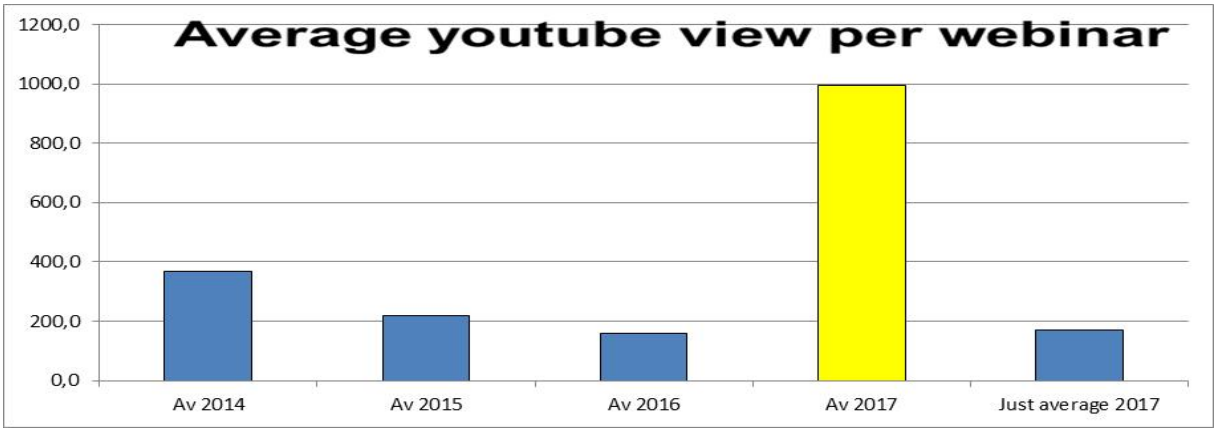


Figure 3: The webinars are available to be revisited and it looks as if this opportunity is used fairly well

OBJECTIVES FOR THE NEXT SIX MONTHS

Webinars

The webinars will be arranged and announced in a rolling 6 months plan.

DSM U-#	Title	Task	Operating Agent/Presenter	*1- The Logic of DSM*	*2 – Gover-nance*	*3 - Energy efficien-cy - Load level*	*4 - Flexibili ty (load shape)*	*5 - Integra-tion*[1]	*6 – Bus-iness models*
34	**Innovative Business Models for Scaling up Energy Efficiency**	EESL India	Saurabh Kumar						*Sep 28*
35	**PAT – An Innovative Programme to Promote Industrial Energy Efficiency**	TERI India	Ajay Mathur		*Oct 20*				
36	**Building Deep Energy Retrofit: Using Dynamic Cash Flow Analysis and Multiple Benefits to Convince Investors**	16	Jan Bleyl						*Nov 23*
37	**How to design, implement and evaluate behaviour change interventions in a sector that is often overlooked but has huge energy efficiency potentials: hospitals**	24+ ACEEE	Rotman, Sussman, Cowan			*Dec 21*			
38	**Installer Power: unlocking low carbon retrofit in private housing**	Universi-ty of Leeds	Catrin Maby						*Feb 22*
39	**Key findings from the IEA's Energy Efficiency 2017 report**	IEA secr.	Joe Ritchie			*Mar 22*			
40	**Energy Efficiency for Municipalities**	Nova Scotia	Kaelan Keys					*Apr 19*	
41	**Better Homes a cooperative business solution (Danfoss, Grundfos, ROCKWOOL & VELUX)**	Better-Home	Niels Kåre Bruun						*May 24*
42	**Transferability of policies ?**		Peter Warren		*June 21*				

Other guest opportunities
a) Guest TCPs: 4E, ISGAN
b) Policy issues: Club of Rome (Wijkman), Municipalities (Mayor NN), EE in buildings (Adrian Joyce)
c) Planning and integration follow up on DSMU 31: Peter Lund (Helsinki University)
d) Address flexibility (Demand response) and VPP more explicitly
e) Use of Behavioural Economics for shaping incentives

[1] *(with RES and distributed generation)*

Attraction-knowledge
Problem: High quality content remains underexploited.
Solution: develop short policy briefs (~2 pages) post-webinar to re-promote content.
A "test" package of past webinars have been composed and sent to some universities as a teaser (Attachment 2)

"Tracks, programmes and Certification"
Tracks: DSM for regulators, DSM for utility engineers
Future: Organising webinars into learning programs leading to certification
DSM 101: Basic elements of DSM and energy effiency explained in short presentations that can be downloaded at any time.

OUTREACH

The next issue is to find "outlets" willing to engage in making use of the material and put it into use in their regular activities. The organisations mentioned above have all shown interest but could be prompted further in particular now when our substance mass has reached some maturity.

The webinars will be more actively promoted on Facebook and LinkedIn.

IDEAS FOR NEW WORK

Steps on the ladder
From this first step follows two more that successively builds the DSMU

1. Platform (to share)

Presently there have been 32 webinars most of them based on material from tasks that have been performed and some ongoing. This makes the platform for the DSMU and it has been shared with organisations that have similar objectives such as ISGAN, eceee, IPEEC, RAP and S3C (an EU project). Thereby the outreach is widened and the DSMU made relevant for bigger audiences.

The webinars are recorded and available both on LEONARDO and on YouTube. The Leonardo source also contains slides from presentations and extra material such as task-publications and articles/papers of relevance.

2. Substance (themes)

Next step, creating a substance of texts-presentations that can be replicated and used by interested parties according to their own wish, is in preparation. It goes under the workname "DSM 101" and will be a series of internet-based short courses (20-30 minutes each) on the themes for DSM:

- The logic of DSM
- Governance
- Energy efficiency - Load level (technical issues)
- Flexibility - Load shape (technical issues)
- Integration (with RES and distributed generation)
- Business models

1. **The Logic of DSM,** in which motivations and overview is presented in particular to decision makers and people who wants to see how issues connect to each other
    a) **Strategies for DSM**
    b) **The role of Efficiency and flexibility in systems (IDSM)**
    c) **Actors, and their roles/relations, to make DSM a reality**
    d) **DSM potential and costs (including rebound)**
2. **Governance (or DSM Management),** in which incentives, cost/benefit, planning, evaluation and regulation are dealt with but also institutional behavioural issues such as barriers and biases.
    a) **Incentives (carrots and sticks)**

   b) **Evaluation**
   c) **The plethora of benefits (and for whom)**
   d) **Planning and regulation**
   e) **Barriers and biases**

3. **Energy use (Load Level),** technologies and measures to promote load level changes including strategic shifts of energy use to reduce carbon emissions.
   a) **Obligations and certificates (applications and practice)**
   b) **Network and grid issues**
   c) **Equipment**
   d) **Calculation**
   e) **Business models**
4. **Flexibility – (Load shape),** technologies and applications in DR systems and as regards customer benefits and participation
   a) **Incentives (Pricing to reflect capacity needs)**
   b) **Demand response practices and market segments**
   c) **Technologies**
   d) **Market models**
5. **Integration,** putting energy efficiency, storage and RES together to systems
   a) **Preparing for integration**
   b) **Practical examples**
   c) **Incentives**
6. **Business models,** to deliver energy services
   a) **Empowering users**
   b) **ESCOs and EPCs**
   c) **Municipalities**
   d) **Market Transformation**

Consolidation

Finally there is a need for consolidation so (a group of) participants can rely on that the information provided has stability and is meaningful in communication. This may call for a system of examination and that there is a responsibility for maintenance and updating. Preferably this will be established in cooperation with a university or an organisation that has reputation in the field of energy efficiency.
Several of our operating agents for different tasks have such roles and might serve as “midwifes” for this final step.

FINANCE

There is a need to consider how the DSMU can be better used and integrated in the outreach of the TCP once the new strategy is set and the organisation has come to order. It could be useful to start with the old budget (see below).

	3m	6m	9m	12m	15m	18m	21m	24m	Budget (days)
Developing Products									
A. **Webinars.**	One every month (Scheduling by Chairs and secretary)								Moderation and communication by ECA (32)
B. **1. Task reports.** **2. WEB-casts**	Exists								
			1	1	1	1	1	1	Duty of OAs (6)
C. **Issue-reports.**		1	1	1	1	1	1	1	Editing (7)
D. **Theme-Summaries.**			2	2	2	2	2	2	Compilation (12)
E. **Blogs.**	1	1	1	1	1	1	1	1	Writer (8)
F. **Key messages.**			1	1	1	1	1	1	Writer (6)
G. **E-learning.**						x	x	x	-
H. **Expert advice.**						x	x	X	-
I. DSM-U Café.	1	1	1	1	1	1	1	1	Moderation (8)

Management	2	2	2	2	2	2	2	2	(16)
Reporting	2	2	2	2	2	2	2	2	(16)
SUM									**111 days at 1k$**

MATTERS FOR THE EXCO

'Recommend the ExCo to approve the Task Status Update Report' and to discuss how the DSMU should develop.

ATTACHMENT 1: WHERE ARE THE CUSTOMERS TO THE DSMU

	DSMU 25	DSMU 26	DSMU 27	DSMU 28	DSMU 29	DSMU 30	DSMU 31	DSMU 32	DSMU 33	DSMU 34	DSMU 35	DSMU 36	DSMU 37	DSMU 38
Theme	2	3	1	2	6	2	5	3	5	6	2	6	3	6
Afghanistan								1					1	
(AE) United Arab Emirates					2	1	4	2	1		1	1	1	1
Argentina							4	1	2					
(AL) Albania	1	1	1		1									
Argentina										2	1			1
(AM) Armenia	1									1				
(AT) Austria	4	2	2	2	3	6	5	10	14	7	2	5	1	1
(AU) Australia		1	1	1		1	2	3	11	1	2	2	3	1
Azerbaijan								1						
(BD) Bangladesh	2	1	2		1	1	3	1		2		1		
Belarus						1								
(BE) Belgium	32	29	31	32	22	22	28	27	22	9	6	12	11	16
(BH) Bahrain	1	1		1				1		1	2	1	5	1
(BO) Bolivia, Plurinational State Of	1						1	1		1		1		1
(BA) Bosnia And Herzegovina					1						1			1
Botswana											1			
(BF) Burkina Faso			1				1	1				1		
(BG) Bulgaria		2	2	2	1		2	2	1	2	2	3		4
(BR) Brazil	1	5	6	21	2	16	17	9	8	12	7	10		3
Cameroon							2				2			
(CA) Canada	7	6	4	10	7	7	15	15	18	10	8	15	22	4
Central African Republic									1					
Côte d'Ivoire									1					
(CH) Switzerland	4	3	4	4	1	9	11	8	14	7	2	8	4	4
(CL) Chile	1		2	2			6	5	3	1		2		
(CN) China	1		1			3			1	1	1			1
(CV) Cape Verde	1	1		2	1	1	2	1		1			1	
(CZ) Czech Republic				1	1	1	1	2	1					
(CO) Colombia	3	2	2	1	1	3	6	5	5	1	3	3	1	2
Cyprus									1		1	2	1	2
(CW) Curaçao					1									
Gambia										1				
(DE) Germany	8	9	10	5	4	14	23	25	56	27	8	20	10	11
(DK) Denmark	4	4	3	4	4	4	7	9	7	3	2	7	3	3
(EC) Ecuador					1	1	3	4	4	3	1	2	1	1
Ethiopia						1				1				
(EG) Egypt	2	1					1					1		
(DO) Dominican Republic	1													
Democratic Republic of the Congo								1						

(DZ) Algeria			2	1		1	2	2	2		1	1		
(ES) Spain	11	7	9	5	5	4	22	17	39	7	2	10	5	4
(FI) Finland				1	5	1	7	6	10		1	1	1	
(FR) France	8	7	8	5	6	11	16	19	28	13	12	13	8	7
(GB) United Kingdom	8	6	12	13	4	24	25	26	55	15	7	17	14	12
(GE) Georgia		1												
(GH) Ghana	1	1				3	2	1			1		1	
(GR) Greece	1	4	1	3	4	3	4	8	6	4	3	4	4	3
(GT) Guatemala	1						1	1	2	1	1	1	1	
(HN) Honduras		1		1			2			1				
(HR) Croatia	2	2	1	1	2	1	6	4	4	2		4	1	1
(HU) Hungary	2	1	2			1	3	3	5	3		3		1
(ID) Indonesia			1				1	2		1		1		
(IE) Ireland	1	1	5	3	4	2	7	5	13	4	1	6	4	6
(IN) India	4	8	7	5	14	11	24	28	14	108	24	15	9	5
(IL) Israel			1		1	1	1		1				1	
(IM) Isle Of Man			1											
(IR) Iran, Islamic Republic Of			1				2	3	2					1
(IT) Italy	8	8	8	5	7	6	14	14	14	7	5	9	8	1
Jamaica							1							
(KR) Korea, Republic Of		1				3	3	3	1	4	1	1	1	1
(KZ) Kazakhstan		1					1							
(JP) Japan	1		1	1		2		1	2					
(KE) Kenya				1					2				1	
Lebanon							2				1		1	
(LK) Sri Lanka	1	1	1	1		1		1			2			
(LT) Lithuania					1					1				1
(LY) Libya			1											
(LU) Luxembourg	1								1	1		2		
Malawi									1	1		1		1
Malaysia							3		1				2	
(MA) Morocco	2	1			1	1	4	1						
(MK) Macedonia, The Former Yugoslav Republic Of	1	1	1		1	1	1	1				1		
(MN) Mongolia	1	1		1					1	1		1		
(MT) Malta			1	1			2	1	1	1		2	1	1
(MX) Mexico	3	3	2	3	3	5	25	6	6	10	3	4	4	3
Monaco								1	1			1		
Micronesia (Federated States of)							1							
Montenegro						1								
(MY) Malaysia	2					1		3						
Morocco						1								
(MZ) Mozambique	1													
Niger						1								
(NG) Nigeria	2	3	3	1	1	3	6	2	4	3	5	4	2	1
(NL) Netherlands	8		8	4	5	1	6	18	24	4	2	8	2	2
(NO) Norway		1	1				1		3	1	1	1	1	

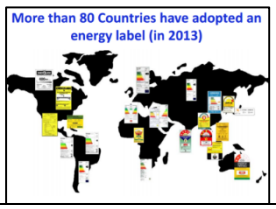
Oman							1	1						
(NZ) New Zealand	1								1	1		1	2	
Panama							1							
(PE) Peru	2	2	2	1	1	2	4	3	1			2	1	
(PH) Philippines	1					1	3		1			2	1	
(PK) Pakistan					1			1	2				2	1
(PL) Poland	2	1	1	2		3	4	5	2			6		1
(PT) Portugal	5	6	10	7	7	7	13	20	11	12	8	16	3	5
(RO) Romania	1	1		1	2	1	4	2	1	2		3		3
Rwanda										1				
(RS) Serbia	1	1					1	1	3	1	2		1	
(RU) Russian Federation		2	2			1	2	1	1	3	1			
Saint Lucia						1			1		1			
Saudi Arabia						1		1				2		1
(SD) Sudan		1				1							1	
Senegal						1	1	1	1	2			1	
Slovakia								1	2	1	1	2	1	1
(SE) Sweden	4	5	6	8	10	3	15	5	12	5	1	7	3	3
(SG) Singapore		1	2			1	3	1	1		1			
Somalia							1							
(SI) Slovenia	1	1			2	1		5	3	2	1	2		
(SV) El Salvador	1				1			1	2	1	1	1		
Suriname											1	1		
Syrian Arab Republic							2	1	1			1		
Swaziland							1							
(TG) Togo					1									
(TH) Thailand	4	1	2	2	1		1	2	2	2	2	1	2	2
Trinidad and Tobago							5			1		1		1
(TN) Tunisia	1	1	1		1	1		1	2	1	2	3	1	1
(TR) Turkey	2		2	2	1	1	1	6	6	4	1	2	5	2
(TW) Taiwan	2	2	1	2	1								1	
(UA) Ukraine		1	1	2		1	4	1	1	1		2	1	
(UG) Uganda				1		1	4			1		1		
(US) United States	11	3	11	7	6	28	21	18	30	28	3	12	27	8
(VE) Venezuela, Bolivarian Republic Of		2					3	3	1					
(UY) Uruguay	4		1	1		4		1		3	2	3	2	
(ZA) South Africa		1	2	1	1	1	5	3	4	7	2	4	2	2
Vietnam							1							
(ZM) Zambia			1				1	1	1			1		
(ZW) Zimbabwe		1		1										1
Registered	**188**	**161**	**195**	**182**	**152**	**242**	**441**	**397**	**507**	**366**	**156**	**284**	**193**	**141**
Sum countries reg	**56**	**54**	**53**	**47**	**47**	**62**	**76**	**73**	**71**	**63**	**53**	**66**	**52**	**49**
Sum countries abstained	**68**	**70**	**71**	**77**	**77**	**62**	**48**	**51**	**53**	**61**	**71**	**58**	**72**	**75**

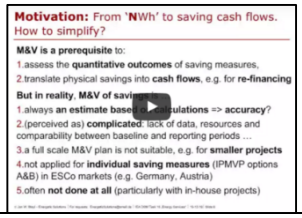
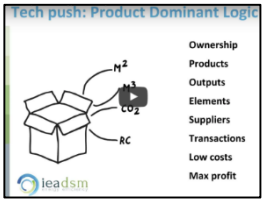
ATTACHMENT 2: DSM TODAY AND TOMORROW. A SELECTED PACKAGE FROM THE DSM UNIVERSITY

The IEA DSM-Programme has been active since 1992 and has seen, and shaped, the development of Demand Side Management practices worldwide. To further disseminate the experiences made in the work we have formed the DSM University in collaboration with the European Copper Institute. The vehicle for this is to arrange monthly webinars and together with these provide reading material for users who want to dive deeper into the matter.

One of the questions often asked is where is DSM heading? In particular now when a great part of the world have embraced the idea that there is an urgent need to transform the energy systems and to find ways to ensure that the energy use is made efficient.

We have gathered some of the webinars in a package that can give an input to answering the question. How can we address the issues for next century (1), what can be done in the companies that use energy (2), how can efficiency be communicated for everyday purposes (3), selling verified energy services (4) and how can (must) business models be adapted (5). Please find a short description below.

Title	What is it about
1. DSM for the 21st century http://www.leonardo-energy.org/resources/898/dsm-for-the-21st-century-58456f6ba065f 	DSM (Demand Side Management) has changed since it was first introduced in the 1980s as an active policy instrument to make energy systems perform better and more economically. In the years since and primarily in the early years of the new millennium technology has provided new opportunities with smarter applications, decentralised power making use of local renewable sources and with a booming IT for management. We rather talk about Integrated DSM (IDSM). Policy challenges to make energy systems sustainable and reduce (prevent) climate change has been more pronounced with the Paris accord as the ultimate example. Still market uptake is slow and well beyond expectations (and needs). It is time for DSM to shape up and deliver!
2. Energy efficiency: a profit center for companies http://www.leonardo-energy.org/resources/110/energy-efficiency-a-profit-center-for-companies-a-strategic--57a83f643e70f 	Investments in energy efficiency not only result in a reduction of energy consumption —the energy benefit— but they also entail non-energy benefits such as improved product quality, reduced production time or improved comfort in sales area. Non-energy benefits significantly improve the business case of energy-efficiency investments in the business sector by raising their strategic character. Within this context, the aim of this webinar is to discuss a methodology to describe and analyse the industrial non-energy benefits of energy efficiency. Linking energy, operational, strategic and financial aspects, this new conceptual framework enables to move away from the common view of energy as a commodity (where the only goal is to save kilowatt-hours) to adopt a new perspective on energy and energy services as strategic value for businesses.
3. A brief history of energy efficiency labelling http://www.leonardo-energy.org/resources/106/a-brief-history-of-energy-efficiency-labelling-57a839e8e62c3 	Energy Labelling has progressively become a must-have in the energy efficiency policy toolbox. When implemented with care, energy labelling presents a face that energy efficiency –also known as the invisible fuel- often misses. Energy labels help end-use consumers to make more informed decisions when purchasing a product, equipment or system. Fascinating too is to see how energy labels facilitate and shape market transformation strategies when combined for instance with fiscal or financial scheme. What lessons can be learned from the implementation of the European energy labels? What are the possible options for consolidating such high -visibility policy instruments in the future? The presentation will recall the conditions of the elaboration of the first European labels, discuss achievements and share views to reinforce existing schemes.
4. Simplified Measurement & Verification for Energy,	Measurement & Verification (M&V) is a prerequisite to assess the quantitative outcomes and performance of energy, water or CO_2 saving

Water & CO2-Savings http://www.leonardo-energy.org/resources/102/simplified-measurement-verification-for-energy-water-co2-sav-57a1d73662f4c)  	measures and to translate 'NWh' into savings cash flows for financing and other purposes. Task 16 proposes simplified M&V approaches for electricity, heat, water or CO_2saving measures in combination with so called quality assurance instruments to verify the functionality and quality of ECMs, but not necessarily their exact quantitative outcome. We would like to introduce the concept and discuss applicability and limitations of these approaches.
5. What job is Energy Efficiency hired to do? A look at the business models http://www.leonardo-energy.org/resources/101/what-job-is-  energy-efficiency-hired-to-do-a-look-at-the-prop-57a1d59d9eafd)	This webinar focuses on first results of Task 25, a project aimed at learning about new business models and propositions that actually contribute to the market uptake of Energy Efficiency. We will discuss what type of business models and propositions work when, where and why. We will concentrate on learnings about the influence of user centric business development, the role of entrepreneur and his/her skills and the impact of wider context. Examples in retrofitting, smart energy services, heating, and lighting will illustrate the presentation.

ATTACHMENT 3: CONTENT STRUCTURE

	Business models	Integration	Flexibility - Shape	Energy Efficiency - Level	Governance	Logic
1. Evaluation					X	
2. Communication			X			
3. Procurement	X			X		
4. Planning					X	
5. Marketing	X					
6. Promoting DSM					X	
7. Market	X					
8. DSM Bidding			X		X	
9. Municipalities	X					X
10. EPC	X					
11. TOU Pricing			X		X	
12. Standards					X	
13. DR Resources			X			X
14. White Certificates	X			X	X	
15. Networks				X		
16. ESCO	X	X				
17. Integration		X				
18. DSM and Climate					X	X
19. Micro DR			X			
20. Branding	X					
21. Calculation of				X	X	
22. EEO	X			X	X	
23. DSM and smart grids			X			
24. Behavioural issues			X	X	X	X
25. Business models	X					
	Priority (4 and 6)					
	Obsolete ???					
	Priority 10 and 16)					
	Priority ????					
	Priority (10 and 22)					
	Priority (19 and 23)					

Obsolete material
Closely related
Closely related
Never started
Closely related
Closely related
Not likely to finsih

Document K

STRATEGIC COMMUNICATION – TECHNOLOGY COLLABORATION PROGRAMME ON DEMAND SIDE MANAGEMENT (DSM TCP)

STATUS OF THE TCP

The current term of the DSM TCP will end 28 February 2019. The long-standing Chair, Rob Kool (Netherlands), retired at the end of 2017. The Executive Committee (ExCo) is exploring nominations, with the intent to elect a new Chair by the next Executive Committee meeting in April 2018. In the interim the DSM TCP is being managed by two Vice Chairs from Executive Committee members in the United Kingdom and Norway, with support from the appointed DSM advisor, DSM Executive Committee secretary and IEA Desk Officer for the TCP.

STRENGTHENED STRATEGIC FOCUS

We are in a time of dramatic changes in the global energy system. *Technology innovations* (renewables, digitalisation and smart systems, energy storage and flexibility, electric mobility, etc.) have evolved in parallel to *structural innovations* (urban planning, building design, transportation systems, etc.) and *social innovations* (market design, new types of market actors and business models, new policies and regulations, etc.).

Enabled by the technological, social and structural changes above, the end user is becoming a far more active and dynamic participant in the energy system moving beyond being a mere consumer. Understanding the demands and rationales of end users, together with other key actors along the different energy service supply chains, and how they interact with technology, is key in the process of shaping the energy system for the future. For these reasons the end-user will continue be the strategic focus of the DSM TCP going forward. With this in mind, the concept of demand side management could be described as:

Policies and programmes intended to influence end use energy demand in ways that serve societal objectives including improving energy security, reducing energy cost and reducing environmental impacts.

Indicative activities to address this strategic focus are described below.

KNOWLEDGE GAPS AND RESEARCH FOCUS

A major part of the proposed future work programme is to continue to research the behavioural aspect. The energy end-user will be central in this work, but also other groups of actors potentially influencing end-user choice will be included. A behaviour change approach will be at the core of all future tasks and DSM TCP will collaborate with other TCPs to help them incorporate a focus on behaviour in their work programmes. To do so, DSM TCP will build on learnings from previous activities focussed on behaviour change, including:

- Behaviour Change in DSM (Task 24): Phase I of this activity focused on human energy-using behaviour, looking at the individual, societal and whole-system perspective of energy use. Review and evaluation of theories on energy behaviour is an important contribution of this Task. Building on this Task, the TCP intends to explore the practical sides of behavioural interventions.

- The Role of Customers in Delivering Effective Smart Grids (Task 23): This is the first project with an explicit end user perspective in this TCP. Recognizing the mismatch in focus between technology and end-user behaviour, Task 23 analysed the role of customers in delivering effective smart grids.

- Business Models for a more effective market uptake of DSM energy services (Task 25): The DSM TCP investigated whether the design of business models could be a barrier for the market uptake of

energy efficiency technologies. The distinction between a traditional technology push Business Model and a more service-oriented and end-user focused school of business models is at the core of this Task. The business models link up to several relevant DSM technologies. Looking ahead from these initial research efforts within an end-user perspective, the DSM TCP ExCo is now in a process of identifying and developing research themes to address further knowledge gaps and barriers, and concrete tasks that reflect and respond to the strategic focus of this TCP. Further activities will focus on the following main themes:

UNDERSTANDING AND ALIGNING ENERGY ACTORS' MOTIVATIONS AND INCENTIVES

- Further development of energy behaviour change theory and tools, evaluating their applications in different contexts, providing policy relevant outputs applicable in different countries and expanding the range of innovative policy instruments of relevance to DSM.

- Using behavioural approaches in research on all technology tasks undertaken within the DSM TCP, so that an end-user view is incorporated into research findings and solutions.

- Behavioural economics and experimental game theory, which promise deeper insights in a range of policy applicable mechanisms for improving end-user acceptance of technologies.

IDENTIFYING VALUE CREATION THROUGH DIGITALIZATION, NEW TECHNOLOGY CLUSTERS AND NEW SERVICE PROVISION

- Responsive Prosumer Networks: This extends the work of Task 17, with its focus on integration of DSM, Energy Efficiency, Distributed Generation and Renewable Energy Sources, by looking into issues of distributed networks in the context of smart city infrastructure – including metering, monitoring, feedback and billing requirements to support such business models.

- Big Data: Harnessing digitalization at scale to drive energy efficiency; end-user value creation and business models; and to develop and support new tools for detailed planning of systems.
  3) Building business models from these data and technologies

- The continued work of Task 25 will focus on creating country specific business models and guidelines for up-scaling, as well as developing an expert platform to support this work.

- Capturing the external economic and financial benefits of improved energy efficiency to strengthen business models, and improve alignment between private and societally optimal behaviours.

POLICY AND REGULATION TO SUPPORT THE ENERGY TRANSITION

- Outcome based policies and principles based regulation frameworks for effective energy policy.

- Energy security in the 21st century: Expanding energy security beyond traditional availability to include sustainability, resilience, and reliability in the digital age.

- Accelerated diffusion of energy innovations: Deployment and innovation that makes use of the market learning which would enhance performance and reduce costs of new technologies.

EMERGING TECHNOLOGY CASE STUDIES

In addition to the four indicative and more overarching themes above, the DSM TCP will also conduct short, focused case studies to identify best practice in specific emerging technologies across the IEA

member country regions. This will entail the use of applied research, through engaging with end-users, energy service providers, technology providers, market makers, policy makers and regulators surrounding the specific case study technology. Outputs will be tailored for distribution via the IEA Global Exchange Platform, to provide input to other DSM Tasks, as well as producing benchmark reports on global best practice in technology deployment for Executive Committee member National governments. Collaboration with other TCPs will be integral to the subjects targeted and research tested.

Examples of upcoming case studies include:

- **Peer-to-peer energy trading:** This will identify and examine existing and emerging demonstration projects in peer-to-peer energy trading throughout current and potential IEA member countries. It will focus primarily on the policy and regulatory enablers and constraints to the application of this this technology in the context of the business models and technology clusters deployed. It will be complementary to activities across the existing tasks of the DSM TCP and also to ISGAN.

- **Mobility as a Service:** This will study application of consumer-focused transport service provision business models based around monetising transport data, and electrification of multi-modal transport systems in cities.

Document L

STRATEGIC WORK PLAN (2019 – 2024) FOR THE IEA DEMAND SIDE MANAGEMENT TCP

THE CONTEXT

The energy system is undergoing an unprecedented period of change. The World Economic Forum have estimated that this will generate over $2.4 trillion of new value in the electricity sector across all forms of demand over the next decade. The IEA have identified digitalization as a key driver of this value. The DSM TCP believes that energy will become more intermittent; flexibility will become more valuable; capital costs will rise; and marginal operating costs will reduce, become more variable, and often fluctuate to near zero. Operating value will shift from selling energy - to trading flexibility, selling energy services and monetising digitalised energy related data. New, highly capitalised market entrants such as Amazon, Google and Tesla will focus on end-user value, driving rapid changes in demand and helping put consumers at the heart of the energy system. In this context, DSM grows social, policy, business and energy system importance. End users are fast becoming the most important stakeholder in this new energy paradigm. The clean energy package for Europe has put the consumers at the centre of the energy system, and we can see this shift in thinking being replicated globally. This will require a user-centred approach to the design of energy products and services - beginning with the energy consumer – and will entail both engaging and potentially ceding substantial control to them. At every point along the energy service provision supply chain, actors make choices about technologies that ultimately shape both how much energy is needed to deliver such services - but also change technology and service provision expectations over time. These infrastructural lock-in and societal norms are powerful constraints on energy-using behaviours. Within this socio-technical context, decisions are also influenced by economic factors; policies, regulations, standards and interoperability requirements; but also include cultural expectations, individual knowledge, personal values and motivations. Energy policy must address all these issues – i.e. it must drive *structural innovation* (e.g. in buildings, transportation and energy infrastructure); along with responding to, and fostering, *social innovation* (e.g. new ways of social interaction, sharing economy, new business and living models, the circular economy, new policy influence, etc.).

The DSM TCP broadly understands demand side management as follows: *Policies and programmes intended to influence end use energy demand in ways that serve societal objectives including improving energy security, reducing energy cost and reducing environmental impacts.*

KNOWLEDGE GAPS

This vision of the future energy system draws attention to gaps in the existing knowledge base. Task 24 has delivered two Phases focused on translating largely qualitative academic social research theory into practice, and then developing tools through which this can be applied. To complement this, new Tasks will be commissioned drawing on this and other theories (e.g. behavioural economics; game theory) and methods (e.g. randomised control trials; longitudinal survey designs) that produce outputs of a type and scale suitable for evidence-informed policy making.

Task 17 has delivered three Phases focusing on collecting information on technologies important for the current energy transition. In this context demand response, distributed generation and storage technologies have been extensively analyzed. The rapid evolution of digitalization technologies now makes possible new roles for prosumers and their capacity to deliver demand response within smart grid networks. Unlocking demand response and other end-use smart energy services requires value creation through digitalization and hence analysis of big data. Big data is also essential for energy system planning dynamic system balancing. Further research on data acquisition, management and analysis is required. Task 25 has delivered knowledge on existing business models and customer approaches providing EE and DSM services to SMEs and residential communities. Important gaps in the knowledge remain regarding how to harness the multiple benefits of energy efficiency in business models and cross-sectorial learnings. The IEA Digitalization report identifies cyber security risks as a new component in the energy security debate. In this context, there is a knowledge gap around issues like end-user data protection, security updates of distributed energy technologies and ‘secure at all depths’ models. These have cross-sectorial important policy and regulatory implications around data privacy and the European GDPR. Further research is also needed on accelerating technology diffusion and market learning models, including design of policies to encourage innovation in development, demonstration and diffusion.

Transdisciplinary knowledge gaps also lie at the intersection of TCP areas and can be addressed through cross-TCP collaboration. The key areas of focus are in the End-Use sectors of Electricity, Buildings, Industry and Transport. Within End-Use: Electricity, synergies exist between DSM and ISGAN Annexes 2, 3, 4 & 7.

Work in these areas will help the DSM TCP deliver on its mission to: *Develop and deliver insights and instruments that are readily applicable for stakeholders in crafting and implementing effective demand side policies and measures.*

FUTURE RESEARCH

The focus of the DSM TCP is on how end-users can be empowered, inspired and supported in achieving energy efficiency in businesses, homes and across society. This will be enabled through delivering the transition to secure, reliable, efficient, accessible and affordable low carbon energy systems.
In this context, aligning and incentivising actors to deliver policy outcomes is critical. This, in turn, relies on value creation for these actors which will be driven by many factors including digitalisation and the provision of energy services. This therefore entails a focus on: a) understanding actors' motivations and interests; b) understanding how data and the services deliverable through combinations of new technologies can be used to create value that aligns with the motivations and interests of these actors; c) understanding how business models can be built using these data and technologies that creates the incentive for new entrants to the energy sector to create and deliver this value to energy system actors; d) understanding how policy and regulation can be adapted to both promote and accommodate these new business models while still maintaining broader social objectives such as energy system reliability, equity, affordability, security, and environmental goals. The future research priorities of the DSM TCP are structured under these four categories.

1. Understanding and aligning energy actors' motivations and incentives.
Task 24 – Phase III: This includes further development of energy behaviour change theory and tools, evaluating their applications in different contexts, providing policy relevant outputs applicable in different countries and expanding the range of innovative policy instruments of relevance to DSM.
New Area – Behavioural economics. Behavioural economics provides a wealth of policy applicable mechanisms for improving end-user acceptance of technologies. These range from design level interventions of user interfaces (selecting low energy defaults), through to the design of and timing of programmes to maximise end-user engagement and application.
Cross-TCP Collaboration: The 2018 Buildings Co-ordination Group meeting identified 'understanding occupant behaviour' as a topic required for systemic understanding of issues related to building envelop and HVAC. EBC, DSM, HPT, 4E and SHC expressed interest in this systemic cluster.

2. Identifying value creation through digitalization, new technology clusters, and new service provision.
Task 17 – Phase IV: Responsive Prosumer Networks. This extends the work of Task 17 to address issues of distributed networks in the context of smart city infrastructure – addressing metering, monitoring, feedback and billing requirements to support such business models.
New Area – Big Data: Harnessing digitialisation at scale to drive energy efficiency; end-user value creation and business models; and to develop and support new tools for detailed planning of systems.
Cross-TCP Collaboration: The 2018 Buildings Co-ordination Group meeting identified big data as an area of cross-TCP collaboration between ISGAN and DSM focused on "Digitalization and Big Data for Energy Efficiency". In addition, a cluster of interest around 'City and District Scale/Grid Storage and Renewables Interaction' was identified as requiring the study of big data and was of interest to DHC, DSM, EBC, ECES, HPT, 4E, ISGAN and SHC.

3. Building business models from these data and technologies
Task 25 – Business models: The continued work of Task 25 will focus on creating country specific business models and guidelines for upscaling, as well as developing an expert platform to support this work.
Task 17 – Phase IV: This will address business models for responsive prosumer networks.
New Area – Capturing external benefits: Capturing the external economic and financial benefits of improved energy efficiency to strengthen business models, and improve alignment between private and societally optimal behaviours.
Cross-TCP Collaboration: This area aligns with the interests of ECBS.

4. Policy and regulation to support the energy transition.
Outcome based policies and principles based regulation frameworks for effective energy policy.
New Area – Energy security in the 21st century: Expanding energy security beyond traditional availability to include sustainability, resilience, and reliability in the digital age
New Area – Accelerated diffusion of energy innovations: Deployment and innovation that makes use of the market learning which would enhance performance and reduce costs of new technologies.
New Area –Eliciting policy makers' evidence needs for socio-technical interventions: Understanding what forms of evidence (qualitative, quantitative, empirical, modelled, etc) and on what subjects (economic, environment, health, social equity, etc) are most effective in constructing evidence-informed arguments for new socio-technical energy policies.
Cross-TCP Collaboration: This area aligns with the interests of ISGAN Annex 4.

EMERGING TECHNOLOGY CASE STUDIES
These will be targeted, cross-cutting activities designed to complement DSM Tasks through drawing on their expertise to study and identify best practice in specific emerging technologies across the IEA member country regions. They will thus draw from, and actively support, existing Tasks in the TCP. Where gaps are identified, they will also conduct their own research, engaging with end-users, energy service providers, technology providers, market makers, policy makers and regulators surrounding the case study technology. They will output content tailored to the IEA Global Exchange Platform, provide input to other DSM Tasks, as well as producing benchmark reports on global best practice in technology deployment for ExCo member National governments. They will require the same ExCo approval as Tasks, but will be expected to raise matching funding from industry to support their activities. They will also be required to secure the approval of, and report findings to, at least one other TCP.

New DSM Case Study: Peer-to-peer energy trading. This will identify and examine existing and emerging demonstration projects in peer-to-peer energy trading throughout current and potential IEA member countries. It will have a substantial focus on the policy and regulatory enablers and constraints to the application of this this technology in the context of the business models and technology clusters deployed. It will be complementary to activities across the existing tasks of the DSM TCP and will seek approval of, and report into, ISGAN Annex 2.

Another potential DSM Case Study is 'Mobility as a Service' - This will study application of consumer-focused transport service provision business models based around monetising transport data, and electrification of multi-modal transport systems in cities.

MISCELLANEOUS

Action items resulting from the Fiftieth Executive Committee meeting

5-6 October, The Hague, The Netherlands

WHO	ACTION	WHEN
India Spain	Pay Common Fund invoice for 2015	ASAP
India Spain	Pay Common Fund invoice for 2016	ASAP
	Pay Common Fund for 2017	On-going
Anne Bengtson	Keep reminding those who have outstanding payments to the Common Fund	
ExCo members	Let Joe Miller and Anne Bengtson know when an invoice is paid	On-going
David Shipworth Even Bjørnstad	Maintain contacts with China (NDRC), Thailand (EGAT), IBM (Germany), Australia, Portugal and Chile.	On-going
Hans Nilsson Hans de Keulenaer	Move forward with the DSM University according to plan – as well as continue to plan/hold webinars the first weeks of every month	On-going
Operating Agents	Update a more clear definition in Legal Annex text of their Task	ASAP
Matthias Stifter Markus Bareit	Further proposal for a Task on big Data and present at the next ExCo meeting	On-going
Anne Bengtson Even Bjørnstad	Prepare administrative details for the Fifty First Executive Committee Meeting in Bergen, Norway	ASAP
Anne Bengtson	Send out invitations first week of February	February 2018
ExCo members	Review website regularly and suggest further developments	On-going
ExCo members	Suggest topics for the Spotlight Newsletter and provide input for those articles to Pam Murphy	On-going
All	Follow Visibility recommendations to update the website	On-going
Operating Agents	Prepare Task Information Plans and include in each Task Status Report.	On-going
Pam Murphy	Distribute issues of the DSM Spotlight Newsletter	December 2017 March 2017
Operating Agents	Include 1-2 slides in Task presentation, highlighting the main findings to date in respective Task(s).	Present at next ExCo meeting

Hans Nilsson	Task Zero: Prepare Task Status Report and send to Anne Bengtson for inclusion in the Pre-Meeting Document.	Friday 16 March 2018
Hans Nilsson Hans de Keulenaer	Prepare Status Report on the development of the DSM University and send to Anne Bengtson for inclusion in the Pre-Meeting Document (PMD).	Friday 16 March 2018
Jan Bleyl-Androschin	Prepare a Task Status Report for Task 16 Phase 4 and send to Anne Bengtson for inclusion in the Pre-Meeting Document (PMD).	Friday 16 March 2018
Matthias Stifter René Kamphuis	Prepare Status Report for Task 17 Phase 4 and send to Anne Bengtson for inclusion in the Pre-Meeting Document (PMD).	Friday 16 March 2018
David Shipworth Even Bjørnstad	Prepare ESC progress report and send to Anne Bengtson for inclusion in the Pre-meeting Document (PMD).	Friday 16 March 2018
Sea Rotmann	Prepare Task Status Report Task 24 Phase II and send to Anne Bengtson for inclusion in the Pre-Meeting Document (PMD).	Friday 16 March 2018
Sea Rotmann	Prepare a status report How to 'do' behaviour change in DSM – The A to Z model of behaviour change and send to Anne Bengtson for inclusion in the Pre-Meeting Document (PMD).	Friday 16 March 2018
Ruth Mourik	Prepare Task Status Report for Task 25 and send to Anne Bengtson for inclusion in the Pre-Meeting Document (PMD).	Friday 16 March 2018
Even Bjørnstad Anne Bengtson	Prepare Financial Report and send to Anne Bengtson for inclusion in the Pre-Meeting Document	Friday 16 March 2018
Sea Rotmann	Prepare Visibility Committee Report for inclusion in the Pre-Meeting Document.	Friday 16 March 2018
Weber Web	Provide statistics for every Task every six months and send to Sea Rotmann/Anne Bengtson for inclusion in the Pre Meeting Document.	Friday 16 March 2018
Anne Bengtson	E-mail pdf file of Pre-meeting Document for the Fifty First ExCo meeting to the Executive Committee members and Operating Agents.	Monday 26 March 2018

PARTICIPATION

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GLOSSARY

Abbreviation	Explanation
APEC	Asia-Pacific Economic Cooperation
BCG	Buildings Co-ordination Group (consists of 7 Implementing Agreements)
CERT	Committee on Energy Research and Technology in the IEA
CIGRE	International Council on Large Electric Systems
CTI	Implementing Agreement on Climate Technology Initiative
DHC	Implementing Agreement on District Heating and Cooling
DSM	Implementing Agreement on Demand-Side Management
EC	European Commission
ECEEE	European Council for an Energy Efficient Economy
ECES	Implementing Agreement on Energy Storage
ECI	European Copper Institute
EEWP	Energy Efficiency Working Party in the IEA
ENARD	Electricity Networks Analysis, Research & Development
EOT	End of Term
ESD	Energy Services Directive in the European Commission
ETE	Energy Technology Essentials (3-4 page briefs)
ETSO	European Transmission System Operators
EU	European Union
EUWP	End-Use Working Party in the IEA
FBF	Implementing Agreement on Future Buildings Forum
GHG	Green House Gas
HPC	Implementing Agreement on Heat Pump Centre
ICLEI	International Council for Local Environmental Initiatives
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ISGAN	International Smart Grid Action Network (ISGAN)

JFS	Japan Facility Solutions (Japanese Sponsors participating in Task XVI)
KEA	Korea Energy Agency
KIER	Korea Institute of Energy Research
NEET	New and Emerging Environmental Technologies (IEA networking project - Gleneagles G8)
NDRC	National Development and Reform Commission, China
PMD	Pre-Meeting Document
PVPS	Implementing Agreement on Photovoltaic Power Systems
REEEP	Renewable Energy and Energy Efficiency Partnership
SANEDI	South African National Energy Development Institute
SANERI	South African National Energy Research Institute
SHC	Implementing Agreement on Solar Heating and Cooling
TSO	Transmission System Operators

If you would like to add to the glossary send your suggestion to anne.bengtson@telia.com

PARTICIPATION TABLE

Participant	In force						Proposed Tasks/ extensions	
	17 Phase 3	24 Phase 2	25		16 Ext. Phase 4			
	Integration of DSM, Distributed generation, Phase 3	Behaviour Change in DSM – Helping the Behaviour Changers	Business models and the effective market update of DSM Energy Services	DSM University	Competitive Energy Services Phase 4			
Australia				🙋				
Austria	X	X	X		🙋			
Belgium			🙋	🙋	X			
Finland			🙋					
India	X							
Italy				🙋				
Korea			X	🙋	🙋			
Netherlands	X	X	X		X			
New Zealand		X		🙋				
Norway			🙋	🙋	X			
Saudi Arabia								
South Africa								
Thailand								
Spain				🙋				
Sweden	X	X	X					
Switzerland	X		X	🙋	X			
United Kingdom		🙋	🙋					
United States	X	u		🙋				
RAP *				🔈				
European Copper Institute*	🔈		🔈					
Efficiency One		u	u	u		u		
OPERATING AGENT (OA)	René Kamphuis	Sea Rootmann	Ruth Mourik	Hans Nilsson, Hans de Keulenaer	Jan W. Bleyl-Androschin			

X = participant
🙋 interested
* = Sponsors
🔈 = in-kind

LIST OF EXECUTIVE COMMITTEE MEETINGS OF THE IEA DSM ENERGY TECHNOLOGY INITIATIVE

(table excludes the European Union)

Meeting #	Date	Country	Participants	Countries on ExCo
interim	1 –2 April, 1993	Stockholm, Sweden	14	14
1	28 – 29 October, 1993	Kerkrade, Netherlands	13	14
2	24 – 25 March, 1994	Madrid, Spain	12	14
3	13 – 14 October, 1994	Washington D.C., USA	14	15
4	23 – 24 March, 1995	Schaffhausen, Switzerland	15	15
5	19 – 20 October, 1995	Fukuoka, Japan	14	15
6	21 – 22 March, 1996	Paris, France	14	15
7	31 Oct – 1 Nov, 1996	Sydney, Australia	12	15
8	10 – 11 April, 1997	Helsinki, Finland	14	15
9	10 – 13 September, 1997	Oslo, Norway	9	15
10	25 – 27 March, 1998	Seoul, Korea	10	15
11	7 – 9 October, 1998	Chester, United Kingdom	12	15
12	14 – 16 April, 1999	Copenhagen, Denmark	12	17
13	28 – 29 October, 1999	Amsterdam, Netherlands	14	17
15	3 – 6 April, 2000	Ankara, Turkey	12	17
16	12 – 13 October, 2000	Athens, Greece	13	17
17	3 – 4 May, 2001	Eskilstuna, Sweden	12	17
18	3 – 5 October, 2001	Barcelona, Spain	13	17
19	18 – 19 April, 2002	Milan, Italy	15	17
20	3 – 4 October, 2002	Graz, Austria	15	17
21	8 – 10 April, 2003	Canberra, Australia	9	17
22	14 – 15 October, 2003	Paris, France	15	17
23	15-16 April 2004	Trondheim, Norway	16	17
24	13-15 October 2004	Atlanta, United States	13	17
25	20-21 April 2005	Saariselkä, Finland	15	17
26	October 2005	Madrid Spain	14	17
27	April 2006	Copenhagen Denmark	14	17
28	October 2006	Maastricht Netherlands	9	17
29	April 2007	Seoul Korea	10	18
30	11-12 October2007	Brugge Belgium	15	18
31	2-4 April 2008	New Delhi, India	11	19
32	October 2008	Milan Italy	13	19
33	April 2009	Vienna, Austria	11	20
34	September 2009	Chester, UK	11	20
35	April 2010	Paris, France	11	19
36	October 2010	Stockholm, Sweden	9	19
37	April 2011	Washington, USA	8	18
38	2 – 4 November 2011	Jeju Island, Korea	14	18
39	18 - 20 April, 2012	Trondheim-Tromsø, Norway	10	15
40	September 14-16 2012	Espoo, Finland	10	16
41	24 - 26 April, 2013	Utrecht, The Netherlands	11	17
42	16 – 18 October 2013	Lucerne- Rigi, Switzerland	11	17
43	17 – 21 March 2014	Wellington, New Zealand	9	16
44	15-17 October 2014	Graz, Austria	9	16
45	25 – 27 March 2015	Cape Town, South Africa	9	16
46	22 – 23 October, 2015	Halifax, Nova Scotia	9	17
47	17 – 18 March, 2016	Stockholm, Sweden	11	18
48	11 – 12 October, 2016	Brussels, Belgium	11	18
49	11 – 12 May 2017	Dublin, Ireland	13	18
50	5-6 October 2017	The Hague, Netherlands	8	18

No's of Executive Committee meetings held in each country

Netherlands	5	Australia	2	Japan	1
Sweden	4	Denmark	2	Turkey	1
Austria	3	Italy	2	South Africa	1
France	3	Switzerland	2	Nova Scotia	1
Finland	3	UK	2	Ireland	1
Korea	3	Belgium	2		
Norway	3	Greece	1		
Spain	3	India	1		
USA	3	New Zealand	1		