Draft Position Paper

Subtask I - Helicopter Overview

To read before Oxford workshop Oct 9-10, 2012

IEA DSM TASK XXIV: Closing the Loop -

Behaviour Change in DSM: From theory to practice

http://www.ieadsm.org

IMPORTANT NOTE

This position paper is intended as a 'living document' that will be changed and improved upon in the following months as a result of the feedback and input gathered from participants at several occasions (a stakeholder meeting in the Netherlands end of August; an expert meeting in Brussels on September 7th 2012, the Oxford Meeting on October 9-10, 2012 and a webinar with national experts end of October). After the October webinar we expect to have gathered sufficient input to arrive at a final version. Most likely, that final version will be highly interactive, easy to access and comprised of easily understandable formats such as infographics, podcasts, webinars, Pecha Kucha slideshows, you tube videos etc. So please keep in mind that while this version is rather text-based, later versions will be less so.

This version of the position paper is intended to explain the approach and terminology used *in the context of this IEA DSM Implementing Agreement Task and the policies of its participating countries*. We introduce the main terms and how we find these important. We discuss how we go about improving our inter-disciplinary understanding of behavioural change in relation to energy DSM in this task and provide some first illustrations to this. Please keep in mind that the target audience for this task is *not the energy end user*, but the *end user of behaviour change* ***research***. We therefore aim not at changing energy using behaviour *per se*, rather, help improve policymaking and programme design by intermediaries who have this goal, via on the one hand offering them better insights into how to turn good theory into practice and on the other hand provide research developers better insight into how to frame and develop research that is being seen as useful in practice and policy. Central to this support for intermediaries and policymakers are: an overview of behavioural models of understanding, frameworks and disciplines and their pros and cons when used in practical applications in various contexts; case material (programmes, projects, pilots and policies already underway) that clarifies the diverse contextual elements to consider when undertaking behaviour change interventions and how research can assist in dealing with these context issues; and the 4 case study themes that were selected by investors in this IEA task to focus on.

After the Brussels and Oxford meetings we will be able to add new insights and information to the draft position paper. We appreciate that this positioning paper may throw up challenges for certain disciplinary approaches and we would like to invite experts from such disciplines to add their specific insights to the paper (feel free to add comments on the side in the document, or send us an email with your concerns at sylvia.breukers@duneworks.nl, and drsea@orcon.net.nz or ruth.mourik@duneworks.nl). Certain approaches will fit certain problems better than others, and we do not believe that there is a one-size-fits-all 'behavioural silver bullet', as there is no technological silver bullet for energy efficiency. We furthermore understand that the definitions that we provide in this paper, and the slection of issues in itself are the outcome of a perspective and model of understanding. However, a discussion and a position has to start somewhere and we feel this as good as any starting point. We are ultimately aiming to be able to recommend the end users of this research with the most appropriate approaches to address specific behaviours, sectors, energy end uses and contexts.

Please keep these 3 main questions in mind when reading this positioning paper, since they drive all activities in the task:

1. *What can* ***research end users*** *(policy makers, DSM programme designers, research funders, intermediaries in industry, NGOs and technology developers etc) do with available theoretical knowledge on models of understanding*

behaviour, and how can they translate it into practice? What are the main barriers and drivers when translating the theoretical knowledge into practice?

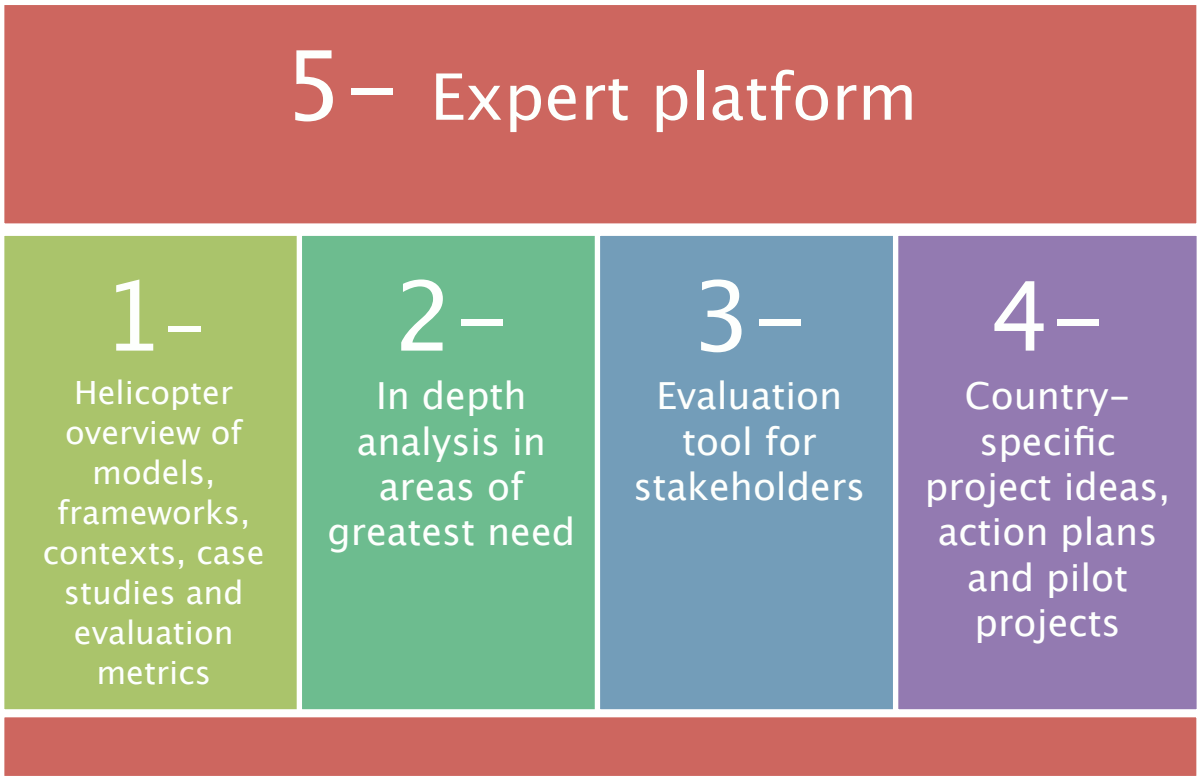
2. *What models of understanding **work best to tackle issues specific for each theme** (smart metering, building retrofits, transport, SMEs) and under which contexts (political, geographical, technological, legislative, cultural etc)?*
3. *How can we best **monitor and evaluate** improved energy use outcomes if these models are used in practice?*

Introduction to IEA Task XXIV

Recently, DSM programmes are increasingly acknowledging the untapped potential of changing the patterns of energy consumption by focusing on end-user energy demand reduction through behaviour changes. There are many excellent reports that have recently recommended behaviour change methods as superior public policy tools. However, it is also acknowledged that we are still, to date, failing to translate good theory into good practice and policy. Incorporating solid behaviour change understanding into policy-making and programme/project/pilot design can result in many co-benefits:

- Increased energy security
- Peak load management
- Reduced need for new generation
- Monetary savings
- Achieving climate change and emission reduction targets
- Improved health and comfort
- Social cohesion and altruism
- Bottom-up community engagement
- Role-modeling personal and corporate responsibility

This new task of the IEA DSM Implementing Agreement is aimed at developing an inter-discipinary framework that clearly links behaviour change research theory with successful policy implementation programme or pilot or project design and outcome evaluation. Figure 1 below sums up the 5 subtasks that this IEA Task consists of.



2. Introduction to Subtask I

This position paper is part of Subtask I - Helicopter overview, and will address the following objectives of this subtask:

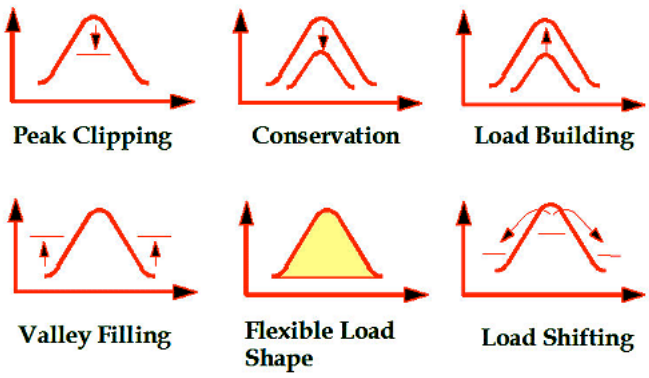
- To inventorise the range of behavioural models, frameworks and disciplines that have relevant insight into human behaviour and energy demand side management in a variety of end-use sectors.
- To understand the benefits and limitations of applying different models/approaches/ frameworks to different contexts
- To identify which models could be combined to address specific issues and questions.
- To select relevant models that can inform DSM initiatives that are focusing on particular topics of interest: smart metering, SMEs, renovation programmes and transport.
- To identify different available evaluation metrics and their usefulness for different stakeholders (e.g. policymakers, funders, end-users).
- A central element of this IEA task is the collective design of new advice and approaches with researchers, policymakers, practitioners, technology developers and other stakeholders in such a way that knowledge and experience are more effectively shared and the wheel is not reinvented in different domains, sectors and countries. This UKERC workshop is one of the pillars where this cocreation of relevant input for the IEA task is performed.

2.1 Definitions for this Task

Demand Side Management (DSM): DSM generally refers to changes that originate from the demand (energy user) side. DSM refers to policies, mechanisms and techniques designed to influence energy behaviour, and encompassing the entire range of management functions (planning, implementation, evaluation and monitoring). Note, we concentrate on all fuels, not just electricity in this Task. The intention of the influence may include changes in energy:

- **conservation** (overall reduction in energy use through economy, reduction of waste or rational use),
- **efficiency** (use less energy to provide the same level of service) and
- **load management** (shifting patterns of energy use).

The DSM goal is to achieve large-scale energy efficiency improvements and overall consumption reduction, usually (but not exclusively, we mainly focus on behaviour-driven efficiencies here) by deployment of improved technologies.



Energy- behaviour: Energy-using behavior refers to all human actions that relate to the use of externally acquired energy. It includes the non-individual process of **acquiring** energy-related technologies and materials and functions, their **maintenance** and **consumption** of energy as a system that is translated in practice. Or simply: what we do, with what and with whom we do it with. The behaviour can be **intentional** (e.g. investment in energy efficient technologies) or **routine** (e.g. switching off the lights when leaving a room), but this is not a clear distinction, rather a continuum dependent on the individual and their specific context and situation. And the behaviour can be viewed from the individual but also the collective or social perspective

A successful behaviour change outcome, in this Task, results in **improved energy use** by households and businesses. This does not necessarily focus solely on reduction in total energy use (although this is the medium to long-term goal), but on the *most efficient and environmentally friendly use of energy to derive the services that underpin societal and economic wellbeing* (e.g. comfort, mobility, entertainment, cleanliness, production etc). This means that we include case studies (on pilots, projects, programmes, issues or themes) and examples that may have had 'perverse' energy outcomes, e.g. due to rebound/prebound, or which may have had social or health drivers as primary focus for behaviour change interventions.What is defined as succesful outcome is very much dependent on different stakeholder perspectives, expectations, temporal issues and contexts and can refer to both the process and the outcome of the process. We will explicitly aim to be sensible to this situated definition.

A model of understanding, framework or discipline includes all disciplinary and interdisciplinary **theoretical approaches and insights** to investigating, assessing, influencing or intervening in, and measuring energy-using behaviours in individuals and society. Models of understanding can refer to actual models, such as e.g. Energy Cultures, an inter-disciplinary model from New Zealand. A framework can relate to a wider theory, eg Attitude Theory, which provides a framework of understanding energy-using behaviours. And a discipline can refer to the wider academic distinctions of e.g. environmental psychology vs behavioural economics. We have created a template to collect information on approaches from all these areas in this Task. The template aims to collect information about issues that are deemed relevant to understand the interaction between a model and an energy practice and its context.

Contexts affecting behaviour change: To meet the complex behaviour change challenge, approaches that point out the importance of the **direct and wider context** or environment in which DSM efforts are situated, have been developed. If this environment is not supportive of changing behaviour towards more efficient energy use, then it is very difficult (sometimes even impossible) for individuals to uphold these new behaviours after the support of a DSM programme has finished. To achieve ongoing, effective DSM outcomes, individuals as well as their social, institutional, physical, technological, economic and cultural contexts (see Table 1) need to be targeted. We aim to collect information on context factors that have been assessed in pilots, programmes and policies; and that form important parts or foci of various models of understanding.

Table 1

Context 'factors'	How they affect opportunities towards lasting behavioural change
People	Behaviours are affected by the people around us: direct peers like family, friends, neighbours, colleagues. In order to reach long-lasting behavioural changes, it is important that peers also support or take up these new behaviours. Moreover, people learn best from other people so building social networks is important in DSM interventions. Stakeholders on a more distant level are important as well, e.g. policy actors who facilitate or inhibit change through policy support; or banks providing finance to new initiatives; energy companies.
Norms & Values, Culture	Practices are underpinned by norms which are socially-shared among smaller or larger groups of people. Changes in practices need to be supported by changes in social norms which provide the changed behaviours' legitimacy. Opportunities for change are affected by (local, regional, national) cultures, but cultures can of course also change due to changes in practices (over longer periods of time). Factors influencing cultural differences: learning culture; tradition and upbringing; risk attitude; prior experience of community engagement with similar projects and/or project developers; social cohesion/ interpersonal relations; individual vs. group involvement; community trust; attitudes to new technology; privacy
Political factors	History of civic democratic engagement; types of government policies; stability of national policy; partisanship or collaborative governance (political culture); centralisation or federalisation of national government; tradition of top-down vs bottom-up initiatives; regulation and legislation.
Physical infrastructure	Urban and spatial infrastructure can inspire, encourage, constrain or even inhibit the uptake of more sustainable lifestyles. In cities, the uptake of healthier travel behaviour is not always supported by pedestrian-friendly or bike-friendly infrastructure. Physical infrastructure refers to all sorts of technologies, applications and products that are part of our daily lives and ways of doing (e.g. the short lifecycle of products limits possibilities to use these products sustainably).
Technology and Material 'Culture'	What technology is available and rolled out; the scale of a DSM project (large or small, centralised or decentralised, radical or incremental); technological flexibility and advancements; how technology fits into existing infrastructure. Also, energy-related materials and technology's direct influence on energy practices, eg ability to change heat settings, complexity of its operation, convenience of use.
Geography	Options to behave more energy efficiently are constrained by climate, land availability, rural vs urban locations etc
Socio-Economy	The overall economic situation affects peoples' daily lives, and ways of doing – and hence also opportunities for behavioural change (e.g. the need to save money may be a first trigger to change practices). Availability of natural resources and social acceptability of their exploitation; energy prices; technology and other input prices; perception of foreign investment; importance of energy independence; security of supply; interest in local employment and job creation; nationally-competing technologies and innovators.
Policy and implementation	Policy support is crucial and can either support or inhibit DSM interventions in several ways and on several levels. How is DSM implemented (community/local, regional or national level); organisational strength and make-up of policymakers and implementers

An end user of behaviour change research includes actors and stakeholders on various levels of DSM:

1. **Intermediaries who work directly with energy users to implement energy behavioural change programmes** (e.g. local NGOs, ESCOs, transition town initiatives, technology developers and implementers to DSOs etc)

2. **Policymakers who design, implement and measure policies aimed at improving energy use at** local, city, regional, national, EU, international (OECD) levels

3. **Funders/investors/social entrepreneurs** who are interested in financing energy DSM initiatives, and who are interested in learning how to evaluate and judge existing and new projects and initiatives.

Behaviour change interventions (policies, programmes, projects, pilots) refer to **designed attempts to achieve improved energy use**. They will be used to demonstrate how various models of understanding, frameworks and disciplines have been utilised in the past, intentionally or implicitly . To collect this information, we have created two templates (one for programmes, one for policies). We aim to get insights and learnings into the role of the individual, role of the energy practice, role of social context, role of technology, actors and institutions, behavioural change processes, social change, relevant conditions and factors affecting behaviour change, context particularities and monitoring and evaluation that has been undertaken in real-life examples. To differentiate:

Policy measure: A specific type of political action or market intervention designed to persuade energy consumers to improve energy use and encourage market parties to promote energy-efficient goods and services.
Programme: An organised set of projects targeted towards defined market parties over a specific time period to achieve increased end-use energy efficiency or reduced use of energy services. A package of selected policy measures is used. This selection is based on a programme theory.
Project: An organised set of activities to create output(s).
Pilot: A smaller study (often called feasibility study) conducted in advance of a planned project.

Evaluation and monitoring of interventions: Because DSM projects/programmes/pilots/ policies demonstrate great diversity of goals, scope, participants, resources etc (necessary to meet the diversity of implementing environments), developing a generic evaluation and monitoring framework is problematic. There is an enormous diversity in terms of aims, goals, scale, scope, sort of participants involved, modes of involvement/engagement, management structures, involvement of other stakeholders, availability of locally committed participants with relevant skills (e.g. social, technical, political) and possible metrics used to collect data to evaluate change. Many energy DSM projects include goals relevant to different stakeholders, for example goals for both policymakers (energy-related goals i.e. energy savings and carbon reduction) and end-users (e.g. improved health, comfort, financial savings, social cohesion). In addition, both the process and the outcome of a policy/ programme/project/pilot can be monitored and evaluated and the description of the process or outcome can differ depending on the stakeholder doing the description. This diversity requires the tailoring of projects to the particular contexts in which they are implemented. To ensure the success of the project and increase its potential for mainstreaming, criteria for success for different stakeholders need to be met to gain the essential support from these stakeholders. Finally, there is no collectively designed set of indicators and methods to assess the successfulness that is sensitive to the above challenges.

Problem 1: It seems to be a waste of effort if the DSM programme and policy implementers do not know how well their intervention has achieved what it set out to achieve (and/or what else it might have achieved). Without this learning, interventions will replicate previous unsuccessful interventions and slow up progress towards the goal of improving energy use in households and businesses.

Problem 2: Many interventions set out to achieve changes in energy use but either

(a) don't set out to evaluate whether the intervention achieved what it intended, or
(b) do carry out an evaluation but it is poorly done (e.g. not rigorous enough to stand scrutiny, evaluates the wrong things, fails to account for change occurring from other sources, is not long enough to show ongoing change), or
(c) do carry out an evaluation but are unable to compare it with anything else so have no sense of relative effectiveness of the intervention.

Problem 3: It is very difficult to show a simple, linear relationship between an intervention and actual changes in energy-using behaviour. The longer or more complex an intervention is (and a 'toolbox' of interventions has often been shown to be most effective in changing behaviours), the more difficult it is to measure direct impact.

This Task, therefore, sets out to develop means to **evaluate ongoing successful behaviour change outcomes** (leading to improved energy use), in a way that makes sense to the actor or stakeholder who initiated an intervention. We need to collect and understand a variety of evaluation metrics and examples that have been used to assess (un)successful behaviour change outcomes in the past. We also want to know which evaluation methods are best suited to various models of understanding.

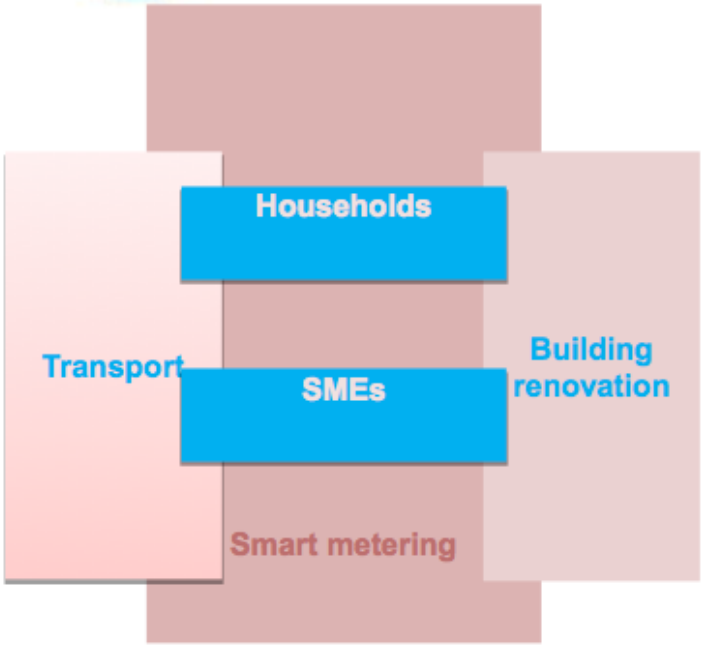
Mainstreaming best behaviour change practice: Mainstreaming depends on the **success of best practice to diffuse** amongst the micro-contextual level of households and from this micro-context to the meso level of society, facilitated by (changes in) the macro (wider, global) level. To achieve lasting and mainstreamed changes in behaviours we need to understand what is happening on all levels, from individual to systemic; from the micro to the macro level and all the various interconnections. In order to provide optimal support to research end users, insights into the different levels and how to affect them with interventions, have to be provided. The table below clarifies the different levels to consider.

Micro-level	DSM interventions can trigger behavioural changes and social innovation that are still niches or experiments, in the early stages. New rules and norms are not yet institutionalised, but flexible and unstable. However, the 'old' ways of doing have partially been replaced by 'new practices'.
Meso-level	The meso-level constitutes the context of 'normal' practices. Thus, the challenge is to accomplish that 'new practices' become normal in the course of time. This level entails systems of provision, which enable and constrain choices and behaviours. They are built up over a longer period of time, and they do not change overnight.
Macro-level	The macro-level is the wider background setting for social innovation, enabling and constraining opportunities for meso-level change (socio-economic, demographic, political and international developments; e.g. wars or environmental disasters). This layer is difficult to influence and usually changes quite slowly.

3. Four main themes in the IEA Task

The participating countries have indicated 4 main topics as being of special interest for Task XXIV. These topics fall under two end users (households and SMEs) and two sectors (transport and buildings), with smart meters as an overarching technology. We hope to

collect intervention examples, and more in-depth case studies from each of the topics on both, routine and intentional behaviours. However, some of the case studies may overlap among themes, for example, building retrofits and smart meters in SMEs; smart meters and transport; transport and SMEs etc.



The table with examples below is intended to keep track of whether we are collecting cases that cover all four themes and different behaviours (e.g. efficiency & curtailment; or investment & routine behaviours). We know they are sitting on a continuum, rather than being black & white delineations.

	Households Efficiency behaviour	Households Curtailment behaviours	SMEs Efficient behaviours	SMEs Curtailment behaviours
Transport	eg fuel efficient vehicles	eg switching to biking or walking	eg fuel efficient vehicles	eg switching to fewer trips, consolidating
Transport Smart Metering	eg EVs connecting into a smart grid, smart house with smart appliances	eg using fuel consumption feedback device to drive more effectively	eg EVs connecting into smart grid	eg using GPS and fuel consumption feedback to encourage smarter driving
Building renovation	eg installing insulation	eg removing the bathtub and installing a shower	eg Installing efficient HVAC system	eg removing number of lifts to encourage staff to use stairs
Building renovation Smart Metering	eg installing smart metering and feedback displays	eg ripple control	eg installing smart building management system	eg providing feedback clues to encourage conservation behaviour (eg green light when to open window)

3.1 Smart metering and consumer feedback devices

We take the widest scope of 'smart metering' in order to collect projects and case studies in this task - smart grids, smart meter technology and feedback displays - as long as they have means and ways to affect energy using behaviour. Smarter metering here consists of all sorts of feedback systems that allow for a tailored information feedback to end-users and customers and home energy management. Smart meter devices have the potential to support a shift of use by end-users as well as a reduction of energy usage. As such they can support behavioural changes towards enhanced energy efficiency and demand reduction.

3.2 Building renovation/retrofits

Since renovations are moments of change, these can offer windows of opportunity to address energy behaviours (both investment and routine behaviours). We look at all types of building retrofits (residential, single-housing, apartments and commercial buildings), but they may fall under either the 'household' or 'SME' sector in the collected case studies and examples.

3.3 SMEs

'SME' stands for small and medium-sized enterprises – as defined in EU law. The main factors determining whether a company is an SME (also in the sense of this Task) are:

1. **number of employees** (medium <250; small <50) and
2. either **turnover** (medium <€50m; small <€10m) or **balance sheet total** (medium < €43m; small <€10m)[1].

Next to households, schools and public buildings, SME's offer a huge potential for energy saving through behavioural change. But problems include (a) energy often being such a small element of their whole outgoings that its not seen as worth addressing and (b) huge diversity in the sector and thus very hard to address across the board (far more diverse in types of energy used than households).

3.4 Transport

Transportation in this Task refers to: 1. Any device used to move an item from one location to another. For simplicity, we will concentrate on 4-wheel transport (unless we discuss mode-shifting, see below) here. 2. The process of shipping or moving an item from point A to point B. We will look at case studies that involve fleet/vehicle and fuel purchases; mode shifting (eg driving to walking and biking); and fuel-efficient driving behaviours.

4. Goals of this (Sub)task

Currently too little use is being made of existing behavioural change models by policymakers and DSM implementers. An explicit aim of the Task is to **improve and better understand the interaction between models, projects (pilots, cases) and the impacts/outcomes of these**. We have made a start to collaboratively review a wide variety of models of understanding behavioural change in relation to Energy DSM aimed at energy consumption reduction. A wide variety of experts is involved in this and one way of collecting knowledge is by inviting them to fill in templates regarding particular models of understanding and regarding specific case studies and experiences. The collected material will be made available by means of a Wiki - to which others can add and/or comment. The process of reviewing models and collecting case studies is also intended to result in several easy-to-understand visualisations for research end users, which then show how different models etc can help to:

[1] http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm

- Understand behavioural change in relation to the particular themes that are focus in this IEA task, namely Smart Metering; Building Renovation; Transport; and Small to Medium Sized Enterprises (SMEs);
- Understand how contextual conditions that characterise different countries (cultural, political, institutional, economic, geographical, physical, technological) affect options to achieve behavioural changes;
- Articulate and clarify questions, issues, problems that have particular relevance in the different countries;
- Make models, their usefulness and relevance understandable and actionable for practitioners and policy makers in various contexts (e.g. as a support to start up DSM projects; as support to enable evaluation of DSM projects - based on which policy may decide to lend support or not).

This is done in a collaborative effort, whereby we move from theory to case-material and back in an iterative process of learning about both the models, current practices and directions for improvement. We sincerely appreciate your help and interest in this Task.