



Guidelines and recommendations for the Netherlands

Task 24 – Phase I

Closing the Loop – Behaviour Change in DSM:
From Theory to Practice

March, 2015

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Do's and Don'ts for Dutch Behaviour Changers

| Intervention Phase | DO | DON'T |
|-----------------------------|--|---|
| DESIGN PHASE | <ul style="list-style-type: none"> - use models of understanding behaviour and theories of change to design interventions - spend some time pre-intervention researching your audience, its motivations, needs and heterogeneity - collaborate with other Behaviour Changers, especially researchers and intermediaries to design your interventions - segment your audience where you can as it will help tailor the intervention - design evaluation into the intervention up front, including the evaluation team (if different) - learn from mistakes and (re)iterate your intervention - put a lot of thought into dissemination and don't be afraid to use unusual means like social media, group learning and storytelling | <ul style="list-style-type: none"> - believe that there is one silver bullet model for behaviour change - always use the same model, neoclassical economics is a valid model that fits our socio-economic and political reality but it does not explain peoples' mostly habitual energy-using behaviour well enough - be afraid to mix models and create a toolbox of interventions - think you can design, implement, evaluate and disseminate a (national) behaviour change programme all by yourself - think all people are rational, utility-maximising automats, even in each household you will find very different attitudes, behaviours and motivations - think you can leave evaluation til after the programme is finished - just think in kWh and cost savings, most people don't think of energy in this way but of the services they derive from it |
| IMPLEMENTATION PHASE | <ul style="list-style-type: none"> - collaborate with other behaviour changers in rolling out the intervention - use trusted intermediaries and messengers - target your audience with tailored information and feedback that makes sense to them - keep learning during the implementation by evaluating ex durante - listen to peoples' stories and especially the nay-sayers and laggards - not underestimate the power of moments of change, use them wisely | <ul style="list-style-type: none"> - operate in a silo, you need help - stop looking in unusal places for allies - let your (conflicting) mandates stop you from working with other Behaviour Changers - let technology overwhelm the intervention, it is a means to an end - ever forget that you are dealing with people and their homes are their castles and their cars their steeds - think you know better than your audience how they should use energy - keep a successful intervention to yourself, share it widely |
| EVALUATION PHASE | <ul style="list-style-type: none"> - evaluate ex ante, ex durante and ex post - put 10-15% of your resources into evaluation, it's worth it - benchmark! - think of the most relevant metrics and indicators, not just for you but for your target audience and the other Behaviour Changers - use double-loop learning methods - provide strong, ongoing, targeted feedback to your audience | <ul style="list-style-type: none"> - think it's just about kWh, evaluate beyond it (eg health, comfort, safety...) - think you need to do all evaluation yourself, use your collaborators to evaluate the bits they know best - leave evaluation til the end or ignore its importance in showing that your intervention worked - just model, measure as well - ignore the pathway of behaviour change that led to a kWh change – ask people |
| (RE)-ITERATION PHASE | <ul style="list-style-type: none"> - (re)iterate your intervention often - learn from your mistakes - listen to your collaborators and end users | <ul style="list-style-type: none"> - ignore your evaluation - hide your mistakes and horror storries, they are often the ones we can learn the most from |
| DISSEMINATION PHASE | <ul style="list-style-type: none"> - understand your audience, collaborators and stakeholders, tailor your dissemination accordingly - tell stories, use social media and word of mouth - use trusted intermediaries to tell your story | <ul style="list-style-type: none"> - spend all your money on (social) marketing campaigns - keep doing the same thing, peoples' willingness or brand awareness doesn't usually translate to behaviour change - tell a boring story about kWh - think you know better, ever |

A summary of Task 24

Human behaviour is ‘the way that people act socially and in the environment and spans a number of scientific disciplines including psychology, sociology, (behavioural) economics and neuroscience’¹. It is estimated that there is about 30% energy efficiency potential in the so-called ‘behavioural wedge’, a lot of which is relatively cheap to access (e.g. changes in habits and/or purchasing behaviours), with some of the potential locked in more expensive, one-off investment behaviours. There are several different models of understanding behaviour (i.e. how human behaviour works) and theories of change (i.e. how to design interventions to change it)². However, 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, helps to address these difficulties and has a multitude of guidelines, recommendations and examples of best (and good) practice and learnings from various cultures and contexts. We relied on 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 different behaviour change models, frameworks and disciplines; various context factors affecting behaviour; best (and good) practice examples, pilots and case studies; and examples of evaluation metrics. The Task has several deliverables, including the expert network for continued exchange of knowledge and the large-scale analysis of the helicopter overview and case studies. We also tailor these country-specific reports with recommendations, outcomes and guidelines specifically to our funders’ needs.

Some numbers of Task 24

- **July 2012 - March 2015:** Official start and end dates
- **8 participating countries:** Norway, New Zealand, Sweden, The Netherlands, Switzerland, Belgium, Italy, Austria
- **9 countries gave in-kind (expert) support:** the UK, Spain, Portugal, UAE, France, Australia, South Africa (which was meant to join but didn’t do so in time), Canada and the US.
- **227 behaviour change** and DSM experts from **21 countries** participate in Subtask 5, the invite-only Task 24 Expert Platform (www.ieadsmtask24.ning.com).
- 15 successful expert workshops/webinars have been held to date³
- **137 videos and presentations** of these events on the [Expert Platform](#)
- 1000s of experts in 28 conferences and seminars have heard about Task 24
- **Over 30 publications** have been created and disseminated⁴
- **Almost 60 case studies** showing the successful (or not so successful) use of diverse models of understanding behaviour in the areas of transport, SMEs, smart meters and building retrofits have been collected to date from **16 countries** in a [Wiki](#).

The Dutch Involvement in Task 24

The Netherlands joined Task 24 at the start in 2012. Co-Operating Agent Dr Ruth Mourik acted as national expert in light of the Dutch Government lacking finances for the national expert. The Dutch contribution was funded by [RVO.NL/Netherlands Enterprise Agency](#) with contact person and Executive Committee representative Rob Kool.

Many Dutch research institutes, technology developers, policymakers and practitioners were considered to be the audience for the Netherlands (see Table 1 for an overview). The Netherlands,

¹ UK The Parliamentary Office of Science & Technology (2012). Energy Use Behaviour. Number 417.

Described in detail in Darnton, Andrew (2009). GSR Behaviour Change Knowledge Review. Reference Report. 83pp.

³ See Appendix 1 for all workshops, conferences and seminars that Task 24 organised and partook in

⁴ See Appendix 2 for a list of all reports and publications

through Ruth Mourik, participated in workshops in The Netherlands, Switzerland, Belgium, and the Netherlands. The Netherlands also organised and hosted several stakeholder workshops and EXCo workshops in Utrecht in 2012 and 2013.

The Netherlands contributed with the following 7 case studies:

- SMEs: The project De Groene Daad
- Transport: Spitsmijden, a peakshifting mobility intervention and Het Nieuwe Rijden
- Retrofitting: The Blok voor Blok project and the Energy Label case
- Smart metering: The PowerMatching City, and Jouw Energie Moment

The PowerMatching City project was selected as a project for in-depth study for Subtask 2 and resulted in "[Power to the People Report](#)" by Ruth Mourik.

The Operating Agents submitted a proposal for a suggested extension of the Task 24 project to the RVO.NL in 2014, and this proposal was favourably evaluated, leading to an extension of three years.

Table 1. Dutch stakeholders involved in Task 24

| Private companies | Research organisations | Non profit and administrations |
|-----------------------|-----------------------------------|--------------------------------|
| Enexis | Hanze Hogeschool Groningen | Gemeente Lochem |
| Liander | Technische universiteit Eindhoven | Gemeente Eindhoven |
| Netbeheer Nederland | Universiteit Twente | Gemeente Arnhem |
| Essent | TU Delft | Ministerie BZK |
| DNV kema/DNVGL | Raad voor de Leefomgeving en | Platform |
| Bovenkamers EnergyGo | Infrastructuur | 31/EnergieSprong |
| Greeniant | ECN | RVO |
| Flexicontrol | Wageningen Universiteit | Woonbond |
| Ideate | Universiteit Groningen | VacPunt Wonen |
| ATO | Universiteit van Amsterdam | Milieu Centraal |
| Homeautomation Europe | TNO | Klimaatverbond |
| ICT office | Ecofys | Natuur en Milieu |
| Atos | | Milieu federaties |
| Microsoft | | Eigenhuis.nl |
| Energieambassade | | Aedes |
| Shiff | | Meer met minder |
| Smart Homes | | Kies groen licht |
| 033 Energie | | De woonschakel |
| EnergieAmbasssadeurs | | Team nudge |
| Debbie Mous advise | | Vastgoedbelang |
| EuropeanClimate org | | |
| Innovaders | | |
| Aurum forum | | |
| Domotica | | |
| Plugwise | | |
| Quby | | |
| Koppenvastgoed | | |
| ICY | | |
| Aarde-werk | | |
| Tabularasa | | |

The Dutch Country story (wider energy culture and contexts)

The Dutch Country Story is largely based on the description of the Netherlands from the 2014 Annual Report of the IEA DSM IA (Appendix 3). The Dutch story goes as follows⁵:

Geography: The Netherlands is a flat and small country surrounded by the sea, Belgium and Germany. The Netherlands means 'low country' which refers to the fact that 50% of the land is barely above sea level, and parts are even below it.

Socio-economics⁶: The Netherlands is a small and densely (406 people per square km) populated country. The population almost reaches 17 million.

Energy supply: The IEA DSM Annual report 2014 states that the Dutch Energy System is built mainly on fossil fuels. The IEA review of the Dutch energy policy blog (2014) mentions that the Netherlands has the largest gas share in the fuel mix of IEA countries, major coal and oil ports and many refineries. The Netherlands, however, increasingly feels the need to start thinking about a future with less gas production now that the Dutch gas reserves are declining and the Netherlands in the future will become a gas-importing country. In 2000, renewable energy accounted for just 1.4% of total Dutch energy consumption; by 2013 this was 4.5%. In 2020, this percentage must have risen to 14%. The Dutch government explicitly mentions that this increase must take place in an economically responsible manner, and must not result in excessive costs. The policy of the European Union is the deciding factor in the national policy. The IEA⁷ states that the Dutch electricity sector is currently in good shape. Prices are average, the customer switching rate is high and power outages are low.

Energy politics: The Government wishes to support the transition to more renewables in the energy system by promoting innovation, among other things through the renewable energy incentive scheme (SDE+). In November 2013, two important policy papers were published: the *Energy Agreement for Sustainable Growth* and the *Climate Agenda*. The Energy Agreement for Sustainable Growth (*Energieakkoord voor duurzame groei*), is intended to give a major boost to investment and employment and help the faltering economy get back on track as quickly as possible. The Climate Agenda outlines a climate approach focused on assembling a broadly-based coalition for climate measures and on a combined approach to climate adaptation (by designing a resilient physical environment and preparing society for the consequences of climate change) and mitigation (by reducing greenhouse gas emissions). In the recently adopted Energy Agreement decentralised generation of renewable energy by people themselves and by cooperative initiatives is identified as being key. To that end, starting 1 January 2014, a tax relief of 7.5 eurocents per kWh is introduced for renewable energy generated by a cooperative or by an association of owners if the energy is then also utilised by small-scale consumers, and if the members of the cooperative or association and the installations are located within a "postcode rose" (a four-digit postal code plus adjoining postal code areas). Additionally, in 2014 an indicative label, based on a uniform method applying to the whole country, became available to be assigned to all houses in 2014 and 2015. This label indicates the home's energy performance and serves to raise awareness.

Institutional: The Annual report states that government considers innovation to be a necessary gateway to enable renewables to compete with grey energy in the long term (2050). The Dutch government furthermore funds research regarding demand-side management and how incentives and motives can be influenced.

Consumption: Residential electricity consumption by final uses (lighting, cooking, heating etc.) in the Netherlands is described in Table 2. Households account for 20% of the electricity consumption in the Netherlands. And a study from Utrecht University (Tseleki 2011) estimates that about 8% of the total electricity consumption is related to standby appliances (entertainment (57%) I, T (34%), cooking (7%), miscellaneous equipment (2%).

5 <http://www.energypost.eu/iea-review-dutch-energy-policy-real-work-still-lies-ahead/> and <http://en.wikipedia.org/wiki/Netherlands> And <http://www.energypost.eu/iea-review-dutch-energy-policy-real-work-still-lies-ahead/>

6 <http://en.wikipedia.org/wiki/Netherlands>

7 <http://www.energypost.eu/iea-review-dutch-energy-policy-real-work-still-lies-ahead/>

Energy Culture: The Dutch are described as an [egalitarian](#), individualistic and modern people. The Dutch tend to view themselves as honest, modest, independent and self-reliant. They value ability over dependency⁸. The Dutch always talk about the weather. Older generations are known for their need for a warm indoor environments and the habit of putting on a sweater when cold is only now slowly emerging amongst the young, with campaigns such as 'Warme Truien Dag' (Warm Sweater Day) in February becoming more and more a success.

Table 2 adapted from Deliverable 2.1 UseITSmartly project

| | Netherlands ³ |
|---|--------------------------|
| Total final electricity consumption 2011 – all sectors (TWh) | 107.473 |
| Residential final electricity consumption 2011 (TWh) | 23.690 |
| Residential sector 2011 (share of total final electricity consumption, %) | 20.0% |
| Average electricity consumption per dwelling 2011 (kWh/dwelling) | 3,183 |
| Year (data collection) | 2011 |
| Lighting | 14% |
| Heating, cooking & white goods | 56% |
| Cooking | 5% |
| Heating (space & water) | 16% |
| Air conditioning | - |
| Ventilation | 5% |
| Fridge/freezer | 15% |
| Washing machine & dryer | 11% |
| Dishwasher | 4% |
| IT & Electronics | 19% |
| TV | 7% |
| Video & Audio | 5% |
| IT (PCs, laptops etc.) | 7% |
| Miscellaneous | 10% |
| Source | (ECN 2012) |

⁸ <http://en.wikipedia.org/wiki/Netherlands>

The phases of Task 24 and behaviour change interventions

THE DESIGN PHASE

One of the most important phases to ensure successful behaviour change interventions is the design phase. This is where Behaviour Changers chose a model of understanding behaviour (usually based on the disciplines of economics, psychology or sociology), one or more theories of changing it and, hopefully, think about what to evaluate to measure success, and how. Our first Subtask looked at this phase in particular, by analysing best (and not so great practice) from over 40 case studies from 16 countries.

The main advantages of a “helicopter overview” like the one provided in Subtask 1 are:

- ✓ the easy general understanding and overview it provides, together with
- ✓ a good representation of the different models of understanding behaviour that various disciplines bring to the topic of energy efficiency
- ✓ a snapshot of the current international best and substandard practices in the field
- ✓ a good platform to do some quality storytelling around what works and what doesn't.

It does not, however:

- ☒ represent an in-depth review of all available literature
- ☒ give a strict disciplinary or sectoral approach in any way
- ☒ present in a very usable format, which is why the Wiki was created.

Subtask I - ‘The Monster’

45 case studies have now been analysed (with another 12 to be added) and a 160pp ‘Monster’ report and Wiki (www.leadsmtask24wiki.info) have been developed. A short storybook version of the ‘Monster’ report is also available. The different models of understanding behaviour and theories of change, as well as some examples for intervention design can be found in Appendix 4. In summary, the case studies in the ‘Monster’ show:

- That conventional approaches (providing information and financial incentives) towards energy behavioural change often fail to achieve a strong, lasting impact but are still widely used.
- That there are many promising experiments with end-user and context-tailored approaches that move beyond changing the individual into more societal, lifestyle and practice changes.
- That current experiences are very scattered and there is no overarching method to evaluate success (nor are there commonly agreed-upon metrics) and that this makes it difficult to replicate success elsewhere, which is why we need to investigate a more coordinated approach.
- That we need more empirical and in-depth case studies (including field research) in order to investigate how such a coordinated, whole-system approach could work in practice, in different (national) contexts.
- That there are still gaps in social science knowledge, for example, the use of narratives is being promoted, especially by marketers, but has not been researched in depth in the energy field.
- That there is still limited interaction between different relevant stakeholders and disciplinary and sector silos, due to their different mandates and system-imposed restrictions, which keep them from collaborating effectively.

These general findings directly led to the development of the [Task 24 extension work plan](#) which addresses many, if not most of these issues.

In the (RE)ITERATION PHASE section of this report we will look at the Dutch case studies from the 'Monster' and assess the recommendations from each of the domains, and how the individual cases may be 'redesigned' to lead to potentially more effective behaviour change outcomes with these learnings.

THE IMPLEMENTATION PHASE

This is where theory turns into practice, and where it usually becomes quite apparent if an intervention has been designed well and based on the right model of understanding the particular audience and their particular behaviour that is meant to change and the right theory/ies of changing it. By looking at each country's in-depth case study (different for each country report), we can provide some '20/20 vision in hindsight'.

Subtask II – In-depth case studies

Several case studies for Subtask 2 have been collected, and more are on their way. These offer a way to:

- ✓ drill deeper into specific cases that are of particular interest to the Task
- ✓ focusing on the importance and impact of country-specific contexts in the design of programmes and initiatives
- ✓ offering some insights into cross-national potential
- ✓ standardising the analysis across countries and contexts.
- ✓ collect different points of view.

However, the case study analysis is not:

- ☒ in-depth, as it focuses on only one issue per country
- ☒ a literature review, as it is built on interviews and points of views of several stakeholders
- ☒ available to countries that provided in-kind expertise only.

The proposed Subtask 6 of the Task extension will offer more of these case studies as well as expanding on already existing ones.

PowerMatching City

Background

The *PowerMatching City* project is described in-depth in the [Subtask 2 case study](#) analysis. The Dutch PowerMatching City (PMC) project is a living lab in Hoogkerk and Groningen (Netherlands) to test an integral smart grid with innovative technology and appliances in real life circumstances. PMC was set-up by a consortium of complementary stakeholders: an energy retailer, a Distribution System Operator (DSO), a technology company, an ICT company and knowledge organizations and institutes. The first participants were recruited by the participating partners, and as such very motivated early movers, eager to learn about the technological issues. The first (technical feasibility) phase of the project ran between 2007 and 2011. PowerMatching City offered a real life experiment, using technology such as solar panels, micro CHP, smart appliances to test the feasibility of this future scenario on a small scale. PowerMatching City works with variable energy prices, coupled to decentralised generation. The dynamic tariffs used consisted of updated energy prices on an hourly basis, based on a fictive modelled spot price. Although this project does describe the end user as a 'Homo economicus'⁹, the consortium partners understood that households potentially need more than merely financial rewards as an incentive to shift demand.

Many meetings were organised with the participants in this first phase, to inform them about the project and its progress. An important aspect of the PowerMatching City project was that the consortium of PMC decided that comfort was a very important value of a home and should be at

⁹ DNV KEMA Energy & Sustainability, PowerMatching City, October 4th 2012, PowerPoint presentation

least maintained and preferably even increased, such that the new energy installations would then become an addition compared to the old situation. PowerMatching City had therefore one important criterion: to maintain or preferably increase comfort levels of the home for end users. This led to a situation where providing immediate service to residents when technology failed was a priority to the consortium, to ensure their comfort levels would not be influenced negatively by the project.

The second phase of the project focused on developing propositions and evaluating the behavioural issues and ran from 2012 to mid 2014. In this second phase the feedback devices and propositions were developed in co-creation with all end-users, both the participants from the first phase in Hoogkerk, as well as the new Thomsonstraat in Groningen. The process in this second phase became much more participatory and aimed to understand which products and services were of interest to residents, and which drivers drove their interest in and commitment/participation to the project and its technologies. Different methods were used, compared to the first phase which mainly used a few information evenings. Workshops and informative meetings were held, but also test groups and sessions with a selection of residents who assisted in designing and provided feedback on the first designs of the feedback display. A game was developed to elicit the residents' worries and priorities and future perspectives on energy and energy use in a changing energy system.

The propositions were accompanied with end-user feedback given through an In House Display referred to as the Energy Monitor. The Energy Monitor shows how much energy is used and produced at any time. Also, it shows what that implies in terms of cost or the share of locally produced energy. For example, it shows whether laundry was done at a relatively cheap or expensive time period, and whether a heat pump started on the moment PV panels were producing electricity (Essent, 2013). The residents of both Hoogkerk and the Thomsonstraat were randomly assigned to one of the two propositions (sustainability or cost-driven), irrespective of their motivation or attitude. This random assignment was the result of the research questions of the consortium in this second phase, which was to learn about the reaction of a diversity of residents to both propositions.

Key lessons

How to start and keep going: Communities matter

- When you start with an existing community, make sure your proposition fits their goals and ambitions
- Make sure your technology can keep up with needs of the community members
- When people already meet in the street they need an online community that provides what the street encounters do not

Scalability starts with making it more than me and my machine

- Green minded community minded people need physical interaction, me and my system is not enough
- Belonging to a community creates more connection to the technology everyone is using
communities offer scalability

Trust is key, make it a non-issue

- Knowing the team creates trust: make it personal
- Commercial interests and trust do not get along well
- Participants in a pilot have more patience towards the technology, as long as they are not blamed for failures
- Be transparent about the assumptions designed into the system: make participants as knowledgeable as they want to be
- Building up trust is also about demonstrating you understand the WIFM of participants

Residents are humans too...

- People usually do not use energy just to be able to waste it
- Propositions need to match what motivates to get people to behave accordingly
- To change behaviour, technology needs to fit real life
- Do not ask people to accept a higher energy bill for the sake of the project
- Even the most willing participant has a family...
- Comfort is not only non negotiable, the need for comfort can even grow...
- Even greens place home or ' me' first, society second

Engage and share control: wwhat you want is partnering, not engagement: partner not consumer

- People want to be a partner, not a passive consumer
- Shared decision making also creates a bigger potential to create a system that actually fits in the daily life and existing home installations
- Partnering entails accepting that participants are experts on their own homes and behaviour
- Investigate the potential of creating a sense of partnering during mass-rollout using open innovation
- Engagement is time consuming and can hurt (spouses): acknowledge this investment
- Beware you make as efficient use of participants' time as possible
- Don't push too hard for engagement: it might pollute your results
- Lasting engagement is key to changing behavioural routines

The Right Team and Methods

- Build-up a personal relationship: know your participants
- Create a one-stop shop contact person
- Different phases, different project team competencies
- Different phases require different methods
- Engage the silent voices, spouses or children. These are the next best thing to mass-market representatives.
- Being technical about it is OK
- Monitor, or your participants will and be frustrated about it
- Allowing feedback creates engagement
- Direct response to concerns strengthens the feeling of being in a partnership

THE EVALUATION PHASE

Surely one of the most important, yet often most neglected phases of a successful behaviour change intervention. In best practice, about 10-15% of the total cost of an intervention should be spent on evaluation and it should be undertaken ex ante, ex durante and ex post. In real life, these numbers hardly ever add up and there is no standard way or data collection in the literature of evaluating how a behaviour change has led to a change in eg kWh before and after an intervention¹⁰. To complicate things even more, different stakeholders (and the end user) have different perceptions of what should be a successful behaviour change outcome and there are many different metrics of how these can be measured¹¹. We address all these issues in our Subtask 3 [reports](#) and [factsheets](#) and will go much further into an actual, standardised tool design in ST 8 and 9 of the extension.

¹⁰ See Karlin et al's 'Beyond kWh' Methodological Review for Subtask 3

¹¹ See the different evaluation metrics in the 'Monster'

Subtask III - Evaluation ‘Tool’

Task 24 recognises evaluation as one of the most important parts of any type of behavioural intervention, and it is regarded in this Task to be:

- ✓ in great demand from decisionmakers and those funding behavioural interventions
- ✓ very important as it is the only way to truly show that an intervention has had actual impact on behaviour changes that last
- ✓ one of the most difficult issues to evaluate
- ✓ largely dependent on models, approximations and estimates rather than actual measurements
- ✓ a collection of different metrics beyond kWh and even beyond energy
- ✓ a methodological review of behavioural interventions in the residential building and feedback sectors
- ✓ an overview of how different disciplines monitor and evaluate behavioural interventions
- ✓ an overview of definitions used in monitoring and evaluation in this Task
- ✓ an in-depth discussion of the many challenges facing Behaviour Changers
- ✓ a recommendation of switching from single- to double-loop learning and providing
- ✓ examples of how to do so in the building retrofit domain.

However, it is not:

- ☒ fully possible in the scope of Phase I of Task 24
- ☒ an easy thing to do, as there is no good existing or standard methodology for doing it, especially once different needs and expectations of various Behaviour Changers and end users are taken into account.

Developing a behavioural evaluation tool with concurrent methodology will be part of the focus of the Phase II of Task 24 (Subtasks 8 and 9).

Even though we have not yet a fully completed evaluation ‘tool’ that can be applied to all possible combinations of intervention tools in different domains, we have developed some fact sheets based on the insight that, instead of only undertaking ‘single-loop learning’, we also need to delve more deeply into the ‘double-loop learning’ process (see Figure 1 below for explanation). This is especially the case in more systemic, collaborative interventions, as promoted by this Task (after analysis of the case studies in Subtasks 1 and 2 showed how successful such interventions were, compared with siloed, individual, top-down approaches).

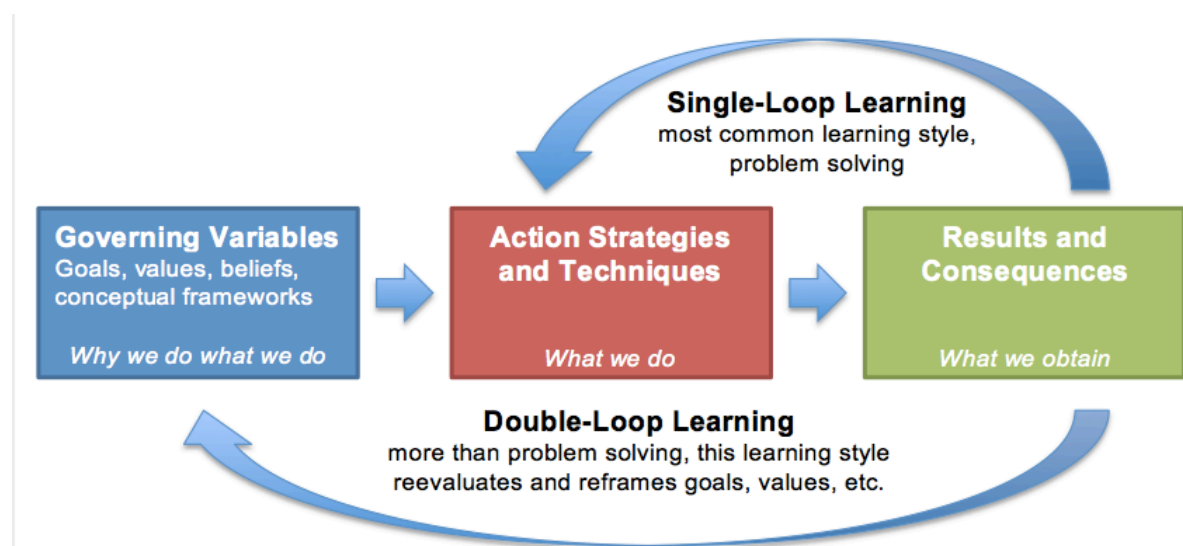


Figure 1: double vs single loop learning. Retrieved from <http://www.afs.org/blog/icl/?p=2653>

The template of questions that need to be addressed in both single- and double-loop learning (and which the individual fact sheets examining specific tools are based on) can be seen here:

Table 3. Different learning types, indicators, questions and metrics for monitoring & evaluating behaviour change programmes

| Learning type | Indicators | Questions for M&E | Metrics (examples) |
|----------------------|---|---|--|
| Single-loop learning | <u>Efficiency indicators:</u> <ul style="list-style-type: none"> • Cost-effectiveness • Lowering the total energy consumption | <ul style="list-style-type: none"> • Was the intervention cost effective? • Are the goals reached within the time and within the allocated budget? | <ul style="list-style-type: none"> • Costs and benefits (eg RoI or NPV) • Pre-set goals • Available time and time needed • Budget and costs |
| | <u>Effectiveness indicators:</u> <ul style="list-style-type: none"> • Reaching the intended goals • Lowering the total energy consumption | <ul style="list-style-type: none"> • Are the goals reached? • Is the total energy consumption lowered (per household? by sector?) | <ul style="list-style-type: none"> • Energy savings • Energy consumption before and after intervention |
| Double-loop learning | <u>Process indicators:</u> <ul style="list-style-type: none"> • Realising a network of a heterogeneous set of actors with different definitions of success • Interaction and participation by the target group (so that they can learn about their own behaviour and consequences for energy consumption) • Interaction and participation with a diverse set of stakeholders since the design phase • Learning as an explicit aim of the intervention • Record new lessons for future interventions • Making use of lessons that are learned during previous interventions • Perspectives of intermediaries before and after a intervention • Changes in assumptions, norms and beliefs | <ul style="list-style-type: none"> • To what extent is a network of a heterogeneous set of actors developed in which they all participated and interacted with each other since the design phase? Did this lead to different definitions of success? • How was interaction and participation by the target group allowed in the programme? And to what extent did end-users learn about their own behaviour and consequences for their energy consumption? • How was learning during and after the intervention ensured? • How did the perspectives, assumptions, norms and beliefs of intermediaries and other stakeholders change during the programme? | <ul style="list-style-type: none"> • Diversity of actors that are involved in the design and implementation of the intervention • Definitions of success that were co-created and used • The way end-users were involved in the design and implementation of the intervention • Perceived self-efficacy • Perceived impact and benefit of the intervention • Learning strategy • Perspectives, assumptions, norms and beliefs of stakeholders before, during and after the intervention |
| | <u>Content indicators:</u> <ul style="list-style-type: none"> • Alignment of the expectations of the stakeholders • Reflection upon the function of evaluation/monitoring together with stakeholders • Learned lessons during the intervention are translated into (re)designs • Improving the capacity of own or similar organisations to perform successful DSM interventions • Creation of new networks and institutions that support the newly formed behaviour and its outcomes • Lasting changes (behavioural or practice change) | <ul style="list-style-type: none"> • To what extent were the expectations of stakeholders aligned? How is this done? • How did reflection upon the function of M&E with stakeholders take place? • Which lessons learned during the intervention are translated into (re)designs? • Is the capacity of own- or similar organisations improved to perform successful DSM interventions? • Are new networks and institutions created that support the newly formed behaviour and its outcomes? • Did lasting changes take place? | <ul style="list-style-type: none"> • Collective impact approach to co-develop metrics to measure this • Main lessons learned by different stakeholders • Perceived success of collaboration and intervention design and implementation • Short- and long-term effects |

THE (RE)ITERATION PHASE

During this phase, after we have designed, implemented and evaluated a behavioural intervention, we sometimes get the chance to reiterate current policies, programmes or projects with the results of our analyses. Often, evaluation happens only after a programme has been completed and the results can get lost (also an issue when e.g. losing corporate knowledge). This phase is hugely important in order to ensure that previous learnings and lessons have not been lost, but been used to improve future behaviour change interventions.

Subtask IV: Country-specific recommendations

The function of this part is to demonstrate some country-specific recommendations based on the country contexts and stories detailing interventions that worked (or did not). Each country will have a set of recommendations tailored to its specific context – though there will be similarities and cross-country transferability. A country-specific list of recommendations is:

- ✓ a main drawcard of Task 24, providing specific recommendations to countries depending on their contexts
- ✓ a collection of country-specific contexts, based on the country stories
- ✓ different for each of the countries
- ✓ but with some similarities and overall, global conclusions (eg the do's and don't's)
- ✓ based on input from the country experts and their specific knowledge

However, it is not:

- Conclusive
- Entirely objective, some sector or disciplinary views may be missed
- Available to countries that are not financially participating.

Dutch case studies – guidelines and recommendations

On finalising the Task, we are providing country-specific recommendations and to do's/not to do's from in-depth stakeholder analyses collected during workshops, from our National Experts and during case study analyses.

Building retrofits

Project: The Dutch Blok voor Blok project

Blok voor Blok is a policy-initiated programme to encourage energy saving in existing housing stock. There are currently 14 cities in which a Blok voor Blok project is under development. The goal is to achieve energy savings in at least 1500 to 2000 Dutch households by means of extensive retrofitting. Eventually, the market should be able to adopt the concept to spread projects to other regions. The programme aims to learn from different types of implementations and find success factors to be applied broadly in later stages. Blok voor Blok uses segmentation and a tailored approach. Several cities offer different energy-saving packages, suitable for different types of consumers. Consumers have the ability to decide and participate in the process. In Blok voor Blok, housing corporations, contractors, installers, and municipalities all work together. Some municipalities offer facilitating measures such as low interest loans for energy-saving investments. Knowledge exchange between the various projects is pursued to gain insight in successful factors and training in knowledge exchange is provided for the consortium members. Finally, the programme monitors and evaluates several processes: the approach of residents, satisfaction of residents and the reason of their (decline of) participation. The results will also be used to search for best practices in the follow up of the programme. Blok voor Blok is based on theories of behavioural economics (which incorporate social psychology learnings into classical economic theory).

Please note, that in the Tables that follow, a blue table indicates investment behaviours, and a green table, habitual behaviours as targets.

Dutch Blok voor Blok project
Domain: Building Retrofits
Target: Communication & Participation
Individual Investment Behaviours

| Recommendations | What the programme did | What the programme could do better |
|---|---|--|
| 1. Focus on the social side | Blok voor Blok aimed to use social norm by targeting whole neighbourhoods at once. The designers hoped that a "neighbour effect" would take place, but the financial incentives were not sufficient enough to create this social norm effect, and potentially did not appeal enough to more social or altruistic motivations. The approach used segmentation. Consumers had the ability to decide and participate in the process. Several cities offered different energy saving packages, suitable for different types of consumers. It focused on the technological and/or infrastructural environment that can encourage behavioural change. | Blok voor Blok focused only on one-off investments, not on routine behaviour. Thus, the problem of potential rebound effect was present. The project also missed the opportunity to use renovation as a gateway into the life of people. No attention was given to use of the measures of installations. And no measuring was offered to make sure the energy savings were achieved. To be truly effective, DSM programmes have to go beyond the (granted, very high potential) one-off investment behaviours like insulation and clean heat and change smaller, frequent purchasing behaviours, use and maintenance of technology and habits and routines as well. |
| 2. It's not just what we buy, it's what we do | In Blok voor Blok the focus was only on the one time 'doing' of house owners, being the buying of energy efficient measures. Home owners that submitted a request for funding were asked to provide an enormous amount of paper work, technical information and they had to prefinance the retrofitting. This was almost a paradox given the fact that Blok voor Blok used economic theories and the information deficit model to inform their interventions. This implies that lack of information and lack of financial means had been perceived as main barriers to get house owners to act. | In addition to providing incentives and information, a deeper investigation could have been done to study how the house owners perceived energy, and how their energy behavior could be further influenced. |
| 3. Change lifestyles not just light bulbs | The project did not try to influence peoples' behaviors directly, it was merely meant to inspire them to a more sustainable lifestyle. The function of the use of energy in the life of end-users was not a significant part of the project. The programme aimed just at installing a technology that is largely invisible and seems to needs no further change from the householder. | It did not target a direct change of lifestyles, attitudes and values. It merely was meant to inspire the tenants to a sustainable lifestyle. Programmes that focus on lifestyle implicitly or explicitly acknowledge that end-users would benefit from an approach that focuses on the function of the use of energy in the life of end-users instead of on the use of energy. The focus on lifestyle does require a cross-thematic approach. Thus, the Blok voor Blok programme could have taken a more systemic approach, and focus on the actual function of the use of energy in participating homes. And then attempt to start discussing this function and possibly providing alternatives. |
| 4. Think of the benefits of the end user as well | Blok voor Blok did attempt to prescope what other benefits might be, but in the end only focused on the financial benefits, not even explicitly the comfort increase benefit. | In the programme comfort was identified as a need of homeowners, but the intervention did not focus on this aspect. Performing research to find out about homeowners' needs and preferences prior to implementation is thus only conducive to success when the needs that were identified are actually then also targeted in the intervention. |
| 5. Focus your messaging, use trusted intermediaries | Blok voor Blok was a voluntary retrofitting programme, initiated by the government and governmental agencies. The programme simply offered a financial and informational incentive to interested parties, and therefore was less challenged to make the programme tailored to the needs of end-users. | It could have educated their own personnel and environmental ambassadors working with the project, making them well-informed and engaged. One comment was that they participants faced great difficulty in selecting trusted information sources. This could have been an important added value that might have led house owners to act. Some might have been impeded by the effort of identifying the right information and source. |

| | | |
|---|--|---|
| 6. Be a one-stop-shop | As mentioned earlier, in an evaluation of the programme one of the key problems households faced was that they were unable to decide whether the information they searched for on the internet (their preferred source of information) was correct and trustworthy, which made it difficult for them to make a well-informed decision. The programme did take away a lot of potential burden on the side of participants by providing a one-stop-shop for the actual implementation phase. | The programme might have been more effective if it would have offered a full package for all phases, including the provision of assistance with filling in all the forms, providing prefinancing, and perhaps even, such as was done in the UK in the Kirklees region, acknowledge that lack of participation might be the result of other reasons such as e.g. fear of inconvenience and hassle, age of home owners (elderly people might not feel targeted), distrust of installers etc. |
| 7. Use a toolbox of interventions and go beyond kWh targets | The Blok voor Blok programme did not aim for a mixed intervention or beyond kWh targets. | If the programme had provided other interventions such as labelling, auditing, energy ambassadors the impact might have been much bigger, and might have gone beyond kWh, also focusing on healthy lifestyles, social cohesion, urban regeneration. |
| 8. Don't box people in too much | The programme did apply some segmenting, mainly based on the financial situation and the specifics of the home. A more tailored approach was lacking. | People were in a sense indeed boxed in since the programme focused on implementing a technology, not a change in routine behaviour. The drawback was that people did not feel targeted personally, and as a consequence also saw the intervention as a mere technological one, not one that impacted on their life permanently. As such the programme was a missed opportunity to maximise the potential savings. At least the project could have provided home visits to make sure the measures functioned as they should and provided the savings as projected. |
| 9. Benchmark your heart out, measure not model | In the Dutch Blok voor Blok programme, pre-scoping was performed. However, not all results were actually translated fully in the intervention, and the programme remained mainly focused on resulting financial benefits. It is also an exception: monitoring and evaluating at intermediate moments was undertaken as part of their social learning strategy. | It could have been more sensitive to the non-economic aspects of behavioural change and aim to match the intervention to the actual behaviour that needs to be changed (e.g.), or the motivation that needs to be targeted. To undertake such outcome-based monitoring qualitative methodologies (surveys, observations, interviews) could have been used. The goals claim energy savings but this is not metered. Reliable data regarding changes in energy usage were lacking. |
| 10. Learn from the unwilling | The programme was best practice in evaluating issues and outcomes that are more relevant to end-users, e.g. the opinion of residents and the reasons for (not) participating, the way in which residents are approached and by whom, and how they feel how they have been approached, the satisfaction of residents participating in the project and reporting on increased level of comfort and warmth. A focus on this type of evaluation allows to create more effective future programmes because important aspects other than economic and informational barriers are potentially identified, e.g. trust, comfort, warmth, wellbeing etc. The programme is designed to learn from different types of implementations and find success factors to be applied broadly in later stages. It works with voluntary participation and allows 14 participating cities to adjust the implementation to home owners' needs. Social learning between the programme developers and implementers is explicitly aimed for, incl knowledge exchange between various projects to gain insight into success factors. | The project did explicitly aim to learn from the unwilling and unsatisfied participants. |

Project: Spitsmijden congestion project

Spitsmijden (rush hour avoidance) is a national programme, initiated by business, several universities and national government¹². It ran from September 2010 to September 2012. Research was conducted on how to circumvent city centers during rush hour. Four ways were identified: travel on a different moment of the day, choose another route, avoid travelling (working at home) or choose another travel modality. Two types of incentives are used to achieve these behaviour changes: a price incentive for every avoided drive in the city and information supply through a hand computer in the form of navigation and suggestions for other modalities.

The specific case in Noord Brabant (Eindhoven and Den Bosch) adds another incentive to the national Spitsmijden program, which is the construction of a 'personal avoidance plan'. The purpose of this plan is to determine when and how the rush hour is avoided. The initiators of the pilot gave feedback to the avoidance plans of the participants. After the pilot was finished, the economic incentives were removed and feedback mails were used to continue the behavior. Furthermore, former participants were asked through questionnaires how they experienced the project. Positive reactions were used in publications, on the website and in feedback mails after the pilot. The avoidance plan was based on the principle of commitment and consistency by Cialdini¹³.

| THE DUTCH CONGESTION SPITSMIJDEN PILOT | | |
|--|---|---|
| Domain: Transport | | |
| Target: Individual Habitual Behaviours | | |
| Recommendations | What the programme assumes to do | What the programme could do better |
| 1. Don't take away their wheels | Spitsmijden did not aim to take away the wheels, just using them at a different time or less use. It used the power of providing information thought to be lacking to participants so they could avoid rush hour. Practical issues such as the costs of taking a longer route or paying more for public transport, or the lack of information about alternative routes were tackled through economic incentives and information. Additional steps were taken in terms of visualising the behaviour and goal behaviour. Research was conducted on how to circumvent city centres during rush hour. | Other areas could have been of focus in addition to the financial incentive. The focus might also have been on what is meaningful to drivers, and that probably will not be the environment or traffic accidents, but their health, wellbeing, comfort, health of their car, safety, their status, and feelings of power. |
| 2. Cars reflect lifestyles | Spitsmijden demonstrates the importance of focusing on lifestyle to change the consumption behaviour. During the project most of the participants still used their car, but drove on different routes and/or times. Only 4% shifted to bicycle or public transport. | The project stated nothing about the car being an important part of your life or a reflection of lifestyle. To actually get people to change the behaviour of using a car, more is needed than information provision and commitment, e.g. infrastructural changes, allowing for a better connection between bus and work or train and work, |
| 3. Risk messages can be risky | No risk messages were used in the project. | The trial did not highlight the safety in driving outside of rush hours, or the health benefits accompanying avoidance of rush hour stress or riding public transport compared of cars. |
| 4. You're never alone when you are driving | This was not addressed in the Trial. The project targeted only the individual participants. | The project would have benefitted from involvement of the social environment, e.g. the employers and fellow employees might be needed to allow for different working hours, or more remote work from home, or free train subscriptions. |

12 D&B Applied Behavioural Sciences, *Verdieping gedragsonderzoek Spitsmijden in Brabant*, March 2013

13 Cialdini, *Influence; the psychology of persuasion*, Collins 1993

| Recommendations | What the programme assumes to do | What the programme could do better |
|---|---|--|
| 5. You need more than one tool to fix a car (or its driver) | One of the effective ways the project used multiple tools was the use of the avoidance plan. This plan aimed for commitment and consistency. Consistency is socially desirable and seen as a personal quality. Moreover, it is a shortcut to avoid complex considerations. Many communication strategies are based on this idea to persuade people in conducting the target behaviour. Two additional types of incentives were used to achieve these behaviour changes: a price incentive for every avoided drive in the city and information supply through a hand computer. Participants were monitored through measuring devices that were built in the car. The majority of the participants did not use them, because they already had a computer on board, the device did not function or the routine drives did not require it. Feedback on the personal avoidance plan described which intended rush hour was actually avoided and which was not. | The trial did put the main burden on the participants. In addition, another intervention could have been done to reduce congestion by teaching drivers how to drive their cars in a more environmental manner. Urban design and decadal infrastructural decisions such as roading and town planning can be a real obstruction or a big opportunity. The creation and in particular the sustaining of a new behaviour and a new norm need the accompanying institutionalisation of this new norm and associated changes in the infrastructure and technologies. This was not addressed at all in the project. |
| 6. Trust is everything | Since the trial used the financial and informational incentive to get the inhabitants out of their cars completely, it did not address the way people drive their cars at all. No intermediaries or coaches were used. | It could have been advised to use trusted trainers eg in the companies that people worked in, to teach about eco-driving behaviours as well. |
| 7. Be smart, drive smart | This was not addressed at all in the Trial, no analysis of the driving behaviour of the participants took place, and reasons for the driving during rush hour were not analysed. | There is little as habitual as driving and travelling patterns. Training is essential. The programme would have benefitted from prescoping to understand where the drivers' behaviour came from. Then the goals could have been tailored to that behaviour and relevant stakeholders could have been involved, such as employers that would have to allow flexible working hours or home work. |
| 8. A new car/licence is a great place to start change | This was not addressed at all in the Trial. | The project might have chosen the timing differently, e.g. new year, to maximise goal setting and commitment by connecting it to an already existing culture of setting goals around new year. |
| 9. It's about much more than just the car | The project did not focus on the context of use of the car. | The cost-efficiency of a programme is often the evaluation metric to assess the effectiveness of an intervention, but this is an unfair metric. The costs of campaigns are not the only cost. In general only costs on the supply side are calculated. But the individual drivers themselves potentially have additional costs in terms of lost time, problems with getting negative comments or associations... |
| 10. Money ain't everything | Feedback (iemails) was provided to participants on the effectiveness of their avoidance plans. The feedback reminded and reaffirmed participants to be consistent with their personal avoidance plan. After the termination of the project, feedback was used to remind former participants of the desired behaviour. The participants could also provide feedback as questionnaires. Providing feedback helped to perpetuate rush hour avoidance through self-persuasion. Self-persuasion can be seen as a way of complying with earlier statements. This computer-aided form of visualising proved very effective, even when the pilot was finished, and the economic incentives were removed. | Since this was the main incentive used, one can be quite critical of the trial. Other methods and incentives such as social norms could've been used additionally. |

Pilot: The Jouw Energie Moment project

The Dutch project *Your Energy Moment* runs in three neighbourhoods in the Netherlands. In Your Energy Moment participating residents receive a smart meter, an energy computer, solar production and a smart washing machine/dryer/heat pump. Participants can indicate what their preferences are for consuming electricity. These smart machines will turn on automatically when conditions are favourable (e.g. when the sun is shining or when the electricity tariff is low). With feedback and feed forward on the display of the energy computer, participating residents can shift other appliances as well. To stimulate consumers to shift their demand, a variable tariff is used. The project is performed with neighbours collectively to encourage participation.

The project is (implicitly) built on the **Design with Intent (Dwl)** Toolkit and explicitly built on insights from a previous pilot called '*Smart Wash*'. A combination of theories and models further implicitly underlie the pilot and the project, most of them derivatives and interpretations of the Expectancy Value Theory (EVT). EVT assumes that the sum of positive and negative beliefs and the strengths of those beliefs about a certain behaviour, determine the attitude towards that behaviour. Attitudes – among others - result in behavioural intention, which leads to actual behaviour. Energy consumption is habitual behaviour and information about it is indirect and obscured.

| Dutch TIME OF USE Your Energy Moment TRIAL Domain: Smart Meters/Feedback Target: Individual Habitual Behaviours | | |
|--|--|---|
| Recommendations | What the programme assumes to do | What the programme could do better |
| 1. Time isn't always money | This project did assume both a financial and environmental incentive. It aimed to shift electricity demand. Participating residents received a smart meter, an energy computer, solar production and a smart washing machine/dryer/heat pump to stimulate behavior change. Participants could indicate what their preferences are for consuming electricity. With feedback and feed forward on the display of the energy computer, participating residents could shift other appliances as well. | The key indicator for the project was load shifting, not energy saving. Since dynamic tariffs were 'virtual' and thus the financial reward is as well, the trial could possibly also have focused on additional benefits of energy saving, such as financial but also control, ease etc to ensure full engagement for real life benefits. The project might also have benefitted from understanding the 'soft' costs of participants of shifting their demand to other times, to understand potential irresponsiveness to load shifting requests. |
| 2. Technology isn't everything | Technology isn't everything, but Your Energy Moment makes explicit use of the notion that technological design can create, limit, direct, or avoid specific behavioural patterns. The only non-technological approach in that sense was the aim to use neighbours as participants to encourage participation. This might not even be the result of an explicit engagement strategy but be the result of logistical efficiency. And, given the voluntary participation/self-selected participation this aim could not be effectively built into the design. | The project was all about technology, and innovative technology at that. Although the approach of self-selection was beneficial to achieving a good engagement, the project might have benefitted from an approach including the explicit building of a sense of community, training the participants as peer-to-peer recruiters and/or energy ambassadors who could motivate and support participants to maximise their load shifting capacity and competencies. In addition this approach might have generated added benefits beyond kWh and the environment. |
| 3. Make sure there is clear value for the customer | This project consisted of a trial, with multiple stakeholders and as such it logically addressed a broader set of issues, such as the consequences for grid loads, matching demand and supply, the reliability of the grid and satisfaction of consumers. As such the value and benefit for the customer was just one of many values aimed for. | The project did provide the household with direct feedback on their electricity consumption. This was the main targeted added value. The financial gain was minimal and irrespective of the actual load shifting behaviour (a fixed remuneration). But other values became apparent, such as insight, control, ease, feeling good about oneself etc. These could have been targeted more explicitly. Then the project might have generated valuable lessons for future projects in terms of how to balance and communicate the different value flows for different stakeholders. Potential business models underlying future roll-outs could have also received explicit attention. |

| Recommendations | What the programme assumes to do | What the programme could do better |
|---|---|--|
| 4. Automations don't teach as well as real people | The project did not make use of trainers or peer to peer education or discussions. Feedback was only provided through automations. In that sense it was a technology push project. | Information that isn't coupled with active or shared learning won't work as well as information that comes from real peoples' stories or word of mouth from trusted sources such as family and friends. The project might have benefited from organising explicitly shared learning amongst the residents. |
| 5. Find and convince the 'luddites' that your technology will work for them | Households agreeing to the project received the product, declining households were not questioned further as to their reasons for declining. | More explicit focus could have been put on understanding the motivations of the non self-selected participants in the trial before starting. Surveys and interviews could have been used explicitly to segment potential participants and uncover any 'luddites' or 'cynics', understanding their reasoning. There is also an issue of avoiding the 'Hawthorne effect' (the field research itself changing the behaviour of participants). |
| 6. The home and the household dynamics hold your key | The intervention did target the home and its technologies, and not the dynamics between household members rather than just individual householders behaviors. | Additional tools to facilitate a household discussion on energy use, differences between household members and what would be needed to establish new household routines around load shifting might have yielded valuable results. In addition, to maximise added value to the participants, and possibly to optimise energy use to facilitate load shifting the project might have provided e.g. personalised audits including some tailored education around the how the home and its technologies uses energy (in)efficiently. |
| 7. Social cues are more powerful than technology | The project explicitly built on an earlier pilot that was very much an action research, exploratory-type project, grounded in theory. In Smart Wash, several lessons were translated into the design of Your Energy Moment. The analysis of Smart Wash led a.o. to the conclusion that the participants missed the social norm aspect. | It is unclear which intermediaries have been used when installing and explaining the new technology and feedback mechanisms. Were they trusted by the homeowners? The project was however carried out by researchers, assuring that no commercial interests were involved. |
| 8. My home is my castle and I know what I'm doing | Energy use of a home is one of the least visible values that a home has to its owner. Making energy use visible is thus a good step, and by doing this with this project, energy has a better chance of becoming a visible resource. | It is unclear if the project explicitly delved into the services the home owners derive from its energy-using appliances and whether the project reassured them that the aimed for load shifting will not reduce the quality of service. People like to feel capable and smart in the way they use resources, and this strong underlying value needs to be supported by the feedback. |
| 9. Focus not on individuals but their practices | The project did appreciate the need to understand why people are motivated and behave the way they do, and qualitative research using interviews/ questionnaires was used. The results were used to better adapt the technology to the local context. The feedback given here was related only to overall kWh and patterns of energy usage during different times of day. | Feedback specific to particular practices or behaviors might be much more meaningful than abstract feedback on kWh changes over time. |
| 10. Participation is key | The householders were self-selected. The design was based on a field study to gain understanding of the individual household's load shifting flexibility and motivations. | There was insufficient co-development or shared learning aspect to this intervention, which would have improved engagement. The project should have enabled more shared learning (eg via workshops, social media, storytelling). |
| 11. No one likes waste | The feedback showed consumption and when it was financially or environmentally efficient, but it did not refer to "wastefulness". | Talking about wastefulness, also on a systemic level, rather than only saving money or the environment could be more effective in the feedback. |
| 12. Tell me how I'm doing compared to my neighbours | The normative feedback as to how a household was doing compared with their neighbours was missing. | Use normative feedback (eg Cialdini's studies) to show how well they are doing not only in comparison to their own load shifting, but also that of their neighbours |

SMEs

Project: *De Groene Daad*

The Dutch *Green Deed* project, initiated by Liander, DSO for gas and electricity, was inspired by ideas from a **Nudge** database, set up by the Dutch Nudge Community¹⁴. In this Nudge-based intervention, SMEs were stimulated to come up with simple energy saving measures, called deeds. A 'deed' is a nudge to facilitate or stimulate the energy saving behaviour (using post-its as a reminder for example). The project started October 10th 2011 and lasted for five weeks. In total, 76 offices participated and 3500 deeds were executed. The goal was to stimulate actions to reduce energy consumption, typically a change in behaviour such as taking the stairs instead of the elevator or turning off the lights. Taping the buttons of an elevator to stimulate people into taking the stairs is an example of making the alternative behaviour less attractive.

| Dutch Green Deed 'De Groene Daad' PROJECT Domain: Small to Medium Enterprises Target: Individual Investment Behaviours | | |
|---|--|---|
| Recommendations | What the programme did | What the programme could do better |
| 1. It can't all come from the top or the bottom | The goal of the Green Deed was to stimulate actions to reduce energy consumption, typically a change in behaviour such as taking the stairs instead of the elevator or turning off the lights. This applied to all employees and in combination with the competition element, a lot of employees will have participated in the effort. | It is unclear how the 'deeds' to be undertaken were decided or chosen. Involving all employees will work best if they can choose the deed they want to undertake and then commit to it to the rest of the staff. If the technical, infrastructural or physical environment of the business and its processes is to be changed to support and sustain the changes in behaviour it is important to involve key staff such as facility managers, financial managers etc. |
| 2. Benchmark your heart out | The project was to get at least 100 SMEs to participate in the contest and that 70% of the participants would perceive themselves as more green or sustainable than before the project. Evaluation showed that merely 43% of the SMEs perceived themselves as more green or sustainable than before the project. The low score was partly ascribed to the already planned or ongoing transition of participating SMEs towards a more sustainable office environment, independent of the project. | The project did quite well in benchmarking, through the website where the SMEs had to identify the current practice and then upload pictures or other media demonstrating the changes. And benchmarking allowed to nuance the result of only 43% of participants perceiving themselves as more sustainable after the intervention . |
| 3. It's all about the people | The Dutch Green Deed project had a short time span of 5 weeks, concluded with an award ceremony, but after that the project was discontinued, even the website where the different deeds were described was terminated. | This is not only a pity because the lessons learnt could no longer be shared amongst the participating SMEs, but also because the created momentum was not used for further spreading of the initiative and it did not match with one of the project goals, namely to sustain saving behaviours in offices. The project might have aimed for establishing practices that would sustain the changed behaviour even after the project was terminated. Especially small businesses are often more people-focused and it is important to identify, and target the champions in the organisation. Even though there is often more competition in this sector, peer to peer learning is also hugely important especially if it can be provided by a trusted intermediary in a 'safe' setting. Such organisational changes might have contributed to a long-term success of the project, certainly given the fact that behaviour changes need to be sustained for a period of several months before becoming embedded. |

| Recommendations | What the programme did | What the programme could do better |
|---|--|---|
| 4. I want what you want, so let's do it | Unfortunately, the programme does not state any clear goals about mobilising towards shared goals. SMEs were rated dependent on the size and amount of deeds. The ratings of all SMEs were published on the website. Liander awarded prizes for the best scoring SMEs, ranging from additional advice on energy saving measures to electric scooters. | Shared goals, including for reforms or industry-wide changes need to be identified (eg collaborative shared learning workshops). The Collective Impact Approach, which will be trialled in the Task 24 extension could be the right framework to ensure this is managed well. In addition, it is unclear whether or not the awarded prizes were tailored to the needs and goals of the receiving participants. |
| 5. Don't be afraid to lose the nay-sayers | The project did not undertake surveys to understand the reasoning behind SMEs who did not respond to or take up any audits. | Change can be scary and it is important to listen to people in the organisation or organisations who are against it, they may have good reasons. Do not to get disheartened by losing some of them as it may entrench social norms in the businesses that stay and the Diffusion of Innovation curve will mean the laggards will ultimately be engaged. It is in the early and late majority that most of the potential lies. |
| 6. Nudging is what it is: a nudge, not a life saver | The project used the element of competition to nudge the participating SMEs to really make an effort. With this competition, implicitly, the SMEs individually became a social community that could position themselves against other social communities. The competition required that every deed should be captured using a photo or a video and uploaded on the webpage. By uploading, credit points were added to the score of the SMEs. The ratings of all SMEs were published and this functioned as social comparison, further motivating the participants. At the end, the winning SME was announced and awarded prizes. Contests and social comparison can be valuable additions in a nudge approach, long-term results will disappear once the reward is gone. Therefore, contests are potentially most effective as an early incentive to familiarise the public with a (social) innovation and start up initial behaviour. | Nudges used as external stimuli to make it easier for SMEs or their employees to embed changes are a good idea but not too much importance should be put on their effectiveness on the long term. Strong interpersonal support from the top, staff champions and the implementer in an organisation, as well as continued mentoring and involvement with a trusted intermediary and other peer organisations will be more valuable to change norms and practices sustainably. |
| 7. Show who's a leader | Winnign SMEs were awarded prizes, but since the website was discontinued no long-term leadership could be appropriated. | Showing successful organisations' impacts and changes to their peer groups would also be an important aspect, and extending the competition to include leaderboards and yearly prizes could have sector changing effects. An additional element could be demanding of participants to implement all deeds the peer group winner implemented and then needing to top that would include an incremental growth to the changes and engage participants beyond the duration of a single competition year. |
| 8. Tailoring is essential | Tailoring was achieved in terms of the deeds available to different classes of SMEs. And the the award winners were also established based on their capacity and context. | Tailoring was done well, allowing SMEs to choose deeds that fitted their specifics. |
| 9. They lead - others follow | The programme did not report whether companies were able to learn from other companies within the programme. | Supporting innovators is very important, either by celebrating them/awards or further financial support, if needed. This happened. Shared learning was only targeted through the competition. |
| 10. Consultants don't care as much as your staff | No consultants were involved. | The project was performed by employees, no external parties were involved, allowing this to become an employee carried intervention. |
| 11. Trust is everything | Trust was not an issue in this project. | Given the need to provide continuing support and mentoring by trusted advisors to embed practices and habits across an organisation, building up trust between external facilitators and participants could have been an added value of the project, allowing impact beyond this short-termed intervention. |

Possible Pilots and Research Questions for each Domain

All the research questions collected during workshops and from the Subtask 1 analysis of the case studies can be found in Appendix 7. In the last Task 24 workshop in Graz (October 2014) we discussed the main areas of focus the Task extension should drill into in each of the four domains. The national experts (and three ExCo members) came up with the following problems which are globally regarded as major behaviour change issues (see also NZ stakeholder feedback) that have not been successfully tackled as yet. We will propose possible pilots, based on our learnings collected so far, in each of these areas and will discuss this in more detail during workshops in our Task extension (Subtask 6).

Building Retrofits:

How to deal with the Split Incentives/Principal Agent issue in rental properties?

SMEs:

How to deal with the Split Incentives/Principal Agent issue in a chosen SME segment?

Smart Metering/Feedback:

How to link smart meters to better feedback, using ICT?

Transport:

How to get people out of their cars and into healthier and/or more environmentally friendly modes of transport?

In addition, the Dutch workshop stakeholders highlighted the following areas of research for our work in this task (see also Appendix 5 for more stakeholder feedback):

- How can social media support Energy DSM?
- How to address end-user acceptance issues, e.g. if part of the control of smart meters is automatic and/or from distance?
- What do end-users or consumers want, need and understand related to the smart meter?
- How should technology developers address and deal with end users in technology development and application?
- What can we learn from existing pilots and success stories in the Netherlands and abroad?
- How far are we in practice with smart meters in pilots; where we are going; what are the roles of different stakeholders going to be?
- How can investment behaviour and routine behaviours reinforce each other?
- How do lifestyles and behaviours relate to systemic change/transition?
- How to support national policy in learning how to support municipalities, housing corporations, intermediaries, technology developers and citizens to collaborate in addressing behavioural issues.
- How to facilitate ongoing discussion between researchers, consultants, practitioners and policy makers to learn about each other's ideas about good design, monitoring and evaluation.

In terms of piloting the stakeholders formulated the following idea:

- A financed real life (pilot) project should eventually become part of the Dutch effort, for this would enable the participants to invest more time in the joint development of a design, monitoring and evaluation framework and in doing this, discussions between the different types of stakeholders could provide a great opportunity for learning.

THE DISSEMINATION PHASE

A huge part of an intervention's ongoing success lies in its dissemination - both of (tailored) feedback to its intended behaviour change targets (the end users) and a wider audience of Behaviour Changers who can benefit from the learnings. Storytelling as a methodology for both

kinds of feedback is very, very powerful and will be discussed below. Social media and networking is also very powerful to foster relationships and shared learning but has its pitfalls. The expert platform described below forms an important part of the dissemination phase of the task. It is:

- ✓ a good place to 'collect' experts and information on the Task
- ✓ a great broadcasting tool with all the news, reports and events, reaching many more people more directly than eg traditional academic publishing
- ✓ a good way of measuring Task impact (via Google Analytics)

However, it is not:

- ☒ a silver bullet to make people talk or engage online
- ☒ a way of making busy experts use social media or social networking
- ☒ a way of easily managing files, which is why we have created the Wiki.

Subtask V - The Expert Platform

The [expert platform](#) has been an invaluable tool to invite interested experts to the Task and provide them with a safe platform to share and discuss learnings. However, it has not been as successful as expected in terms of creating engagement, face-to-face workshops, conferences and meetings have been shown to be imperative to foster true engagement and trust. The social media aspects of the platform are mainly used by one of the Operating Agents and it provides a very good platform for broadcasting to its members. It is also a good way of collecting members' bio, interests and details and to ensure their privacy (eg when filming interviews with them or presentations at workshops). However, the platform will be assessed and potentially slightly changed when going forward with the extension. It is particularly important to enable easier file sharing, although the new IEA DSM website, plus the Task 24 Wiki may be sufficient to do so.

We currently have 35 members from The Netherlands on the expert platform (4 Government officials, 17 researchers, 11 industry members, 2 NGO representatives and 1 support person). It is obvious that there is very large interest in the Task through all sectors of Behaviour Changers.

Storytelling Methodology

One of the main outcomes of the task is the development of a form of storytelling methodology for task findings dissemination. Due to its simple structure and focus on the most important aspects of a theory or intervention, it is:

- ✓ a good way to break down silos between disciplines or sectors and the every-present tendency towards jargon
- ✓ a valid social science tool, using narratives
- ✓ something innately human, we all understand and tell stories well
- ✓ fun, engaging, social and most importantly: memorable
- ✓ a way of removing 'bias' due to complexity?

However, it is not:

- ☒ a reason to bypass 'proper' analysis.

Storytelling is a very powerful social science methodology to ensure recall, engagement and interest. The initial impetus to use storytelling in Task 24 was created in our largest, [Oxford workshop](#). The story of Task 24 is told [here](#) (at the March 2014 NERI Conference as Pecha Kucha) and [here](#) (at the last workshop in Graz, October 2014). There is also a presentation on the different ways we use storytelling as our main dissemination methodology [here](#). We are telling:

- The stories of the Task and our workshops (ST1 & 5)

- Our participating countries' stories to get overview of country-specific contexts for ST4
- Sector stories to be able to workshop specific issues of specific sectors (ST 1 & 2)
- Different types of stories based on Janda and Moezzi's (2013) definition: hero, learning, love, horror stories (ST 1)
- Stories based on how the models of understanding behaviour would be perceived by the end users (ST 1)
- Personal energy stories of our experts (ST 5)
- Telling DSM stories in different genres (ST 5)
- Telling the 'human' story of the Energy System (Extension)

We will continue to flesh out and develop our storytelling methodology in the Task 24 extension. It will be important to start measuring and testing the impact of storytelling, which is rather difficult but will be an important part of our evaluation tool.

So... what's the story of Task 24 so far?

- ✓ There is no silver bullet anywhere, but the potential for behavioural interventions remains huge
- ✓ Homo economicus mostly doesn't exist (in energy)
- ✓ This is largely because energy use is invisible, not high on our list of priorities and largely habitual
- ✓ Habits are the most difficult thing to break
- ✓ This means we have to get even smarter and embrace the complexity we are facing
- ✓ We are at a crossroads and shouldn't turn back to the old ways
- ✓ We need to look at whole-system, societal change, not just the individual
- ✓ This can't be done in isolation by one sector, collaboration between Behaviour Changers is key
- ✓ Social media and social networks are (theoretically) quite good for it
- ✓ But nothing beats face-to-face interactions and real, strong professional relationships built on trust
- ✓ It is hard to find the right people in the different sectors to build these relationships with
- ✓ Every one of them has an important piece of the puzzle, yet we need all of them to fit it together
- ✓ We need a shared learning and collaboration framework that works, everywhere
- ✓ That also means we need a shared language we all understand, based on narratives.

➔ **The most important finding of Task 24? IT'S ALL ABOUT THE PEOPLE!**

The Task 24 Extension

The Netherlands' involvement going forward

The Netherlands was the first country to agree to join the Task 24 extension, and we have commenced our work on Phase 2 with Dutch stakeholders.

Appendix 1

Task 24 Expert Workshops, webinars and stakeholder meetings

| Date | Place | # of Experts | # of Countries | Type of meeting | Government | Industry | Academic |
|--------------------|-------------------------------|--------------|----------------|-----------------|------------|----------|--------------|
| 10/4/12 | Utrecht, NL | 23 | 4 | XM | 4 | 9 | 10 |
| 10/4/12 | Graz, AUT | 5 | 2 | SHM | 4 | 1 | 1 |
| 11/4/12 | online | 13 | 6 | XM | 2 | 2 | 9 |
| 3/5/12 | online | 6 | 5 | XM | 1 | 1 | 4 |
| 30/8/12 | Utrecht, NL | 20 | 1 | SHM | 2 | 12 | 6 |
| 7/9/12 | Brussels, BE | 24 | 8 | XM | 3 | 8 | 13 |
| 9-10/ 10/12 | Oxford, UK | 65 | 9 | XM | 3 | 13 | 39 |
| 26/10/12 | online | 6 | 5 | XM | | 2 | 4 |
| 12/11/12 | online | 6 | 5 | XM | | 2 | 4 |
| 17/12/12 | Wellington, NZ | 10 | 1 | SHM | 8 | 1 | 1 |
| 20/12/12 | Utrecht, NL | 22 | 1 | SHM | 1 | 14 | 7 |
| 7/2/13 | online | 6 | 5 | XM | | 2 | 4 |
| 15/2/13 | Wellington, NZ | 50 | 4 | XM | 15 | 15 | 20 |
| 22/5/13 | Graz, AUT | 10 | 2 | SHM | 9 | 1 | |
| 27-29/5 | Trondheim, NO | 20 | 8 | XM | 1 | 3 | 17 |
| 15/6/13 | Milan, IT | 15 | 2 | SHM | 14 | 1 | |
| 17/6/13 | Dubai, UAE | 30+ | 3 | SHM | 5 | 15 | other (kids) |
| 21/8/13 | Wellington, NZ | 6 | 1 | SHM | 4 | 1 | 1 |
| 10/10/13 | Stockholm, SE | 12 | 2 | SHM | 4 | 1 | 7 |
| 15/10/13 | Luzern, CH | 30 | 9 | XM | 3 | 12 | 15 |
| 17/10/13 | Brisbane, AUS | 12 | 2 | SHM | 10 | 2 | |
| 17/12/13 | Wellington, NZ | 40 | 1 | SHM | 30 | 4 | 6 |
| 17/03/14 | Wellington, NZ | 55 | | XM | 25 | 15 | 15 |
| 05/09/14 | Oxford, UK | 18 | | XM | 2 | 3 | 13 |
| Feb & July 2014 | Wellington, NZ | 5 | | SHM | 3 | 2 | |
| 12/5/14 | Brisbane, AUS | 12 | | SHM | 10 | 2 | |
| 3/10/14 | Milan, Italy | 10 | | SHM | 7 | 2 | 1 |
| 13-14/14 | Graz, Austria | 40 | | XM/SHM | 20 | 5 | 15 |
| 24/10/14 | London, UK | 12 | | XM | 5 | 2 | 5 |

XM = Experts meeting

SHM = Stakeholder meeting

In green = national expert workshops and webinars

Seminars and conferences Task 24 was presented at

| Date | Place | Total # Experts | # of countries | Type of meeting |
|-------------|-------------------------|-----------------|----------------|--|
| 8/5/12 | Linköping, SE | 20 | 2 | Presentation to University |
| 29-31/8/12 | Basel, CH | ~300 | 15+ | Task Presentation at 3rd Intl Sustainability Conference |
| 19/9/12 | Helsinki, FI | 20 | 3 | Task Presentation to Finnish Experts |
| 20-21/9/12 | Helsinki, FI | ~250 | 15+ | Task Presentation and session chairing at BEhavE conference |
| 24-25/10/12 | Berlin, GER | 100s | 10+ | Attendance at EEIP 'Energy Recovery in Industry: Opportunity for energy efficiency' conference |
| 13-14/2/13 | Wellington, NZ | 100+ | 6 | National Energy Research Institute conference 'Energy at the Crossroads' |
| 13/3/13 | Paris, FR | 30+ | 28 | Presentation to IEA Secretariat Behaviour Workshop 'Choices, Decisions and Lifestyles Roundtable' |
| 24/4/13 | Utrecht, NL | 50+ | 12 | DSM Workshop 'The NL Polder Model', 2 presentations |
| 7/6/13 | Hyères, FR | 450+ | 45 | IEEE summer study, 1 presentation, 3 informal sessions |
| 8/7/13 | Nisyros, Greece | 100+ | 10+ | Task 24 presentation by Swiss expert at ELCAS |
| 7/10/13 | Copenhagen, DE | 100+ | 15+ | IEEE ISGT conference - also leading Consumer Behaviour panel |
| 16/10/13 | Luzern, CH | 30+ | 10+ | IEA DSM Workshop |
| 8/10/13 | Stockholm, SE | 8 | 2 | Presentation at Technical Institute Stockholm |
| 11/10/13 | Brisbane, AUS | 25 | 2 | Skype lecture to Qld University energy efficiency course |
| 20/11/13 | Sacramento, US | 500+ | 15+ | BECC Conference presentation |
| 20/11/13 | Sacramento, US | 25+ | 6 | Transport panel at BECC conference |
| 2/12/13 | Flanders, BE | | | Smart Grid conference |
| 12/12/13 | Bonn, DE | | | Expert Roundtable on Energy Efficiency & Behaviour in Developing Countries, German Development Institute |
| 18/3/14 | Wellington, NZ | >100 | 12 | NERI conference |
| 12/5/14 | Brisbane, AUS | 15 | 2 | Lecture at International Energy Center |
| 9/8/14 | Washington DC, USA | <100/10000 | >25 | APA conference |
| 4/9/14 | Oxford, UK | <300 | >20 | BEHAVE conference |
| 11/9/14 | Berlin, GER | 180 | >15 | IEPPEC conference |
| 10/10/14 | Brisbane, AUS | >10 | 2 | IEC Skype Lecture |
| 23/10/14 | Sheffield, UK | >40 | 2 | Seminar at Sheffield Hallam Uni |
| 21-22/1/15 | Milan, IT | | | ESCO lecture |
| 14/1/15 | DSM University (online) | | | Task 24 webinar |

Appendix 2

Task 24 Publications, films and reports

- IEA DSM Initial Positioning Paper on Behaviour Change*
- IEA DSM Task 24 Final Workplan*
- IEA DSM Spotlight Issues (6 stories so far)*
- IEA DSM Task Flyer 24 (updated)*
- IEA DSM website Task 24*
- Positioning paper and minutes from Brussels workshop*
- Positioning and definitions paper and UKERC report from Oxford 2012 workshop*
- 25 minute [professional film](#) summarising Oxford workshop
- [Template](#) for Models of Understanding Behaviour via Case studies in 4 domains
- IEA DSM Task 24 Pecha Kucha presentation (powerpoint/film)^
- 6 participating countries' Pecha Kucha presentations (powerpoint/film)^
- Interviews of experts' own energy stories (film, over 30 so far)^
- NZ World Café report-back (film/presentations/documents)^
- ECEEE summer study (2013) paper on Task 24 by Rotmann and Mourik*
- ELCAS (2013) paper by Carabias-Hütter, Lobsiger-Kagi, Mourik and Rotmann (2013)*
- BECC (2013) presentations on Task 24 and transport behaviour^
- Overview of definitions and how they were derived (powerpoint)*
- Overview of models of understanding behaviour (powerpoint/film)^
- NL, Swiss and NZ stakeholder analyses (Excel)^
- Implementation bloopers (powerpoint/film)^
- 10 presentations on various aspects of behaviour change models (powerpoint/film)^
- Interview with www.energynet.de (podcast)
- Analysis of Subtask I (160pp report, wiki)*
- The Little Monster storybook (booklet)*
- Green Growth Article (2013)*
- [Presentation](#) to Energy Savers Dubai, UAE June 2013
- Presentation and 3 informal workshops at eceee June 2013
- Task 24 presentations at RSE (Milan, Italy); Leeds University (UK); Linköping University (Sweden); Stockholm Technical Institute (Sweden); Grazer Energy Agency (Austria); Energy Efficiency and Conservation Authority and Ministry of Business, Employment and Innovation (both New Zealand); UCLI (USA); International Energy Center (Australia); Queensland Government (Australia); Sheffield Hallam University (UK)^
- Conference and workshop presentations at Utrecht DSM workshop (NL); eceee (France); ELCAS (Greece); IEEE ISGT (Denmark); Luzern DSM Workshop (CH); BECC conference (US); BEHAVE conferences (Finland and UK); Espoo DSM Workshop (Finland)^
- [Energy Expert Stories](#) short film
- Filmed presentations from Storytelling workshop in Wellington ([youtube](#))
- ESCo Facilitators report and 5 page summary for Task 16*
- Articles for Energy Efficiency in Industrial Processes Magazine (<http://www.ee-ip.org/>)
- Evaluation Paper for IEPPEC*
- Six ST2 country case study reports (NL, NZ, SE, NO, AT, CH)*

* indicates reports that are on the [IEA DSM Task 24 website](#)

^ indicates presentations and films etc found on the invite [online expert platform](#)

Online sharing and administration of Task 24

- Widely disseminated via @IEADSM on twitter (also @DrSeaRotmann and @RuthMourik), IEADSM [linkedin](#) and [facebook](#) groups; ECEEE and EEIP columns and various energy and behaviour linkedIn groups

- Weekly publication of [Behaviour Change & Energy News](#) by Dr Sea Rotmann
- Expert platform www.ieadsmtask24.ning.com
- Task 24 dropbox (www.dropbox.com) to share templates and collected models etc
- Task 24 wikipedia (www.ieadsmtask24wiki.info)
- Task 24 youtube channel
(<http://www.youtube.com/user/DrSeaMonsta/videos?flow=grid&view=0>)
- Task 24 slideshare (<http://www.slideshare.net/drsea>)

Appendix 3

Dutch DSM interventions (from 2014 IEA DSM Annual Report)

DSM Developments and Priorities in The Netherlands

The Dutch energy policy is strongly interrelated with the climate change policy and concentrates its efforts in three areas: increase of renewable energy, improved energy efficiency and security of supply.

The main types of renewable energy in the Netherlands are wind, solar, biofuel and geothermal. In 2000 renewable energy accounted for just 1.4% of total Dutch energy consumption; by 2013 this was 4.5%. In 2020 this percentage must have risen to 14. This increase must however take place in an economically responsible manner, according to the Dutch Government, and must not result in excessive costs. Three sustainable energy sources seem to have the best credentials for future prospects for a sustainable Dutch energy supply: bio-fuels, and onshore and offshore wind power. Innovation is necessary to enable renewables to compete with grey energy in the long term (2050 onwards). The Government wishes to help, not by offering expensive and ineffective operating grants, but by promoting innovation, among other things through the renewable energy incentive scheme (SDE+).

In November 2013 two important policy papers were published: the Energy Agreement for Sustainable Growth and the Climate Agenda: resilient, prosperous and green. The Climate Agenda: resilient, prosperous and green, outlines a climate approach focused on assembling a broadly based coalition for climate measures and on a combined approach to climate adaptation (by designing a resilient physical environment and preparing society for the consequences of climate change) and mitigation (by reducing greenhouse gas emissions). Within the EU the Cabinet is pressing for at least a 40% reduction of emissions in 2030 compared with 1990. The European Commission will distribute the non-ETS goal across the member states in 2016, after setting down the Energy and Climate Package.

The Cabinet is considering setting approximate sectoral goals for 2030 in accordance with the 'Cabinet Approach to Climate Policy on the road to 2020' published in 2011. This Climate Agenda builds further on the Energy Agreement for Sustainable Growth and focuses on 2030, which has been chosen as a reference point towards 2050 for the forthcoming international climate action negotiations. The agenda also addresses some sectors not covered by the SER agreement, such as agriculture and other greenhouse gasses, and formulates measures that overarch sectors. In the Energy Agreement for Sustainable Growth (Energieakkoord voor duurzame groei), more than forty organisations have laid the basis for a robust, future- proof energy and climate policy enjoying broad support. They include central, regional and local government, employers' associations and unions, nature conservation and environmental organisations, and other civil-society organisations and financial institutions. This agreement offers long-term prospects with arrangements for the short and medium term, creates trust, and thus reduces investment uncertainty among both individuals and businesses. The agreement will give a major boost to investment and employment and help the faltering economy get back on track as quickly as possible. It will also minimise the burden on households and businesses.

The purpose of the Energy Agreement is to express the Government's aim of achieving, within an international context, a wholly sustainable energy supply system by 2050. The parties to the Energy Agreement will strive to achieve the following objectives:

- a saving in final energy consumption averaging 1.5% annually. This is expected to be more than enough to comply with the relevant EU Energy Efficiency Directive;
- in this context, a 100 petajoule (PJ) saving in the country's final energy consumption by 2020;
- an increase in the proportion of energy generated from renewable sources from 4.4% currently to 14% in 2020, in accordance with EU arrangements;
- a further increase in that proportion to 16% in 2023;

- at least 15,000 full-time jobs, a large proportion of which will be created in the next few years.

The arrangements for saving energy focus both on the built environment and on increasing energy efficiency in industry, agriculture, and the rest of the commercial sector as well as for mobility and transport. This objective is linked to two evaluation points: by the end of 2016 at least 35% will have been achieved and by the end of 2018 at least 65%. Should it appear that we are not likely to achieve the agreed objectives, then additional measures will be put in place. These may be more binding and/or tax-related measures, or other measures – voluntary or non-voluntary – to make the aim of saving 100 PJ more likely. Like the measures specified in this agreement, the package of measures will focus on the end-user and therefore not on the supplier. Since January 2014 a National Energy Savings Fund (NEF) is operational: it holds €300m, of that the government provided 75 m euro, while two commercial banks put in €225m. House owners can get an attractive loan from this fund for implementing energy savings measures. In the summer of 2014 a subsidy of €400m for investment in energy savings measures in social housing started for the period 2014–2017.

In 2014, an indicative label, based on a uniform method applying to the whole country, became available to be assigned to all houses in 2014 and 2015. This label indicates the home's energy performance and serves to raise awareness. Industry, agriculture, and the commercial sector as a whole see increased energy efficiency as an opportunity to boost the competitiveness of energy-intensive businesses, to create employment, and to achieve climate objectives in a cost-effective manner. The energy-intensive sector of industry aims to become an international leader in energy efficiency. The large energy-intensive companies, those covered by the ETS, will join with government in endeavouring to supplement the Long-term Voluntary Agreement on Energy Efficiency [MEE-convenant] with a framework of company-specific (i.e. one-to-one) agreements in progress in 2014. These will focus on improving the energy efficiency and competitiveness of the companies concerned. There is broad support for an ambitious programme to save energy in the greenhouse horticulture sector. This sector, the authorities, and the environmental organisations have agreed that an improved CO₂-system for this sector should take effect no later than 1 January 2015.

Agreement has been reached with the sector that – in addition to the current policy – an energy saving of 11 PJ will be achieved by 2020. In 2014 the number of CHPs in industry and horticulture continue to decrease, and it is expected that this process will continue. Traffic and transport should become more efficient and mobility more sustainable. The parties have agreed on ambitious targets, namely a 60% reduction in CO₂ emissions by 2050 (compared to 1990), with a reduction of 25 Mton (-17%) in 2030 en route to attaining that target. In order to achieve this, the parties have drawn up a green agenda for growth setting out long-term prospects and short-term measures. Steps will be taken in twelve key areas. In 2014 the parties produced a shared overall strategy concerning the future fuel mix, public-private partnership in preparing the market, source-specific policy and Dutch leadership, and arrangements regarding the public infrastructure for charging electric vehicles. Other important topics will also be dealt with, including the use by the transport sector of a uniform measuring method for reducing CO₂. In the context of the targeted energy saving of at least 100 PJ energy (final) for the economy as a whole, the parties have agreed that the transport and mobility sector will contribute by saving an expected 15 to 20 PJ by 2020, assuming that this corresponds to a reduction of 1.3 to 1.7 Mton compared to the trend-based forecasts for 2020. Renewable energy by people themselves and by cooperative initiatives. People will be given more options for generating renewable energy themselves, with local and regional initiatives being supported – where necessary and possible – by municipalities, provinces, and central government.

With effect from 1 January 2014, tax relief of 7.5 eurocents per kWh is introduced in respect of renewable energy generated by a cooperative or by an association of owners if the energy is then also utilised by small-scale consumers, and if the members of the cooperative or association and the installations are located within a "postcode rose" (a four-digit postcode plus adjoining postcode areas). The fourth basic component of the Energy Agreement deals with energy transmission network and ensures that the energy transmission network is ready for a sustainable future. The parties have agreed that they will prepare thoroughly for this changing future so that changes can

be made quickly when they are necessary and desirable. Measures that will make the energy system (gas, electricity and heat/cold storage) more flexible include the following.

- The development and introduction of smart grids and the introduction of demandside management in order to shift the pattern of demand.
- The development of storage capacity, for example by continuing to encourage electric transport and the infrastructure of charging stations it requires. Another possibility is to convert electricity into gas, which can then be stored. Such measures could make power-to-gas and/or dual firing more attractive (the choice for electricity or gas would depend on the price of energy).
- It is crucial to conduct experiments to study the impact of these innovations on the energy infrastructure. Such experiments should be aligned as closely as possible with the government's policy on key economic sectors.

In the context of European cooperation, the Dutch government, energy companies, grid managers and businesses have committed themselves to:

- Closer international cooperation within the pentilateral Energy Forum (Benelux, Germany, France, Austria and Switzerland), with other countries in the North Sea region (United Kingdom, Denmark, Norway, Sweden and Ireland) and bilaterally with Germany. Such cooperation is needed to properly coordinate national plans for the large-scale generation of renewable energy and the related commercial and grid development.
- Promoting an effective, supportive regulatory EU framework that will provide for a sound investment climate in Europe. That will require the scrupulous implementation of measures under the EU's Third Energy Package. TenneT and Gas Transport Services will take up this challenge where possible in ENTSO-E and ENTSG respectively.
- An effective regional approach towards integrating the electricity and gas markets. The investments needed in production facilities and grids will also require the efficient deployment of capital and resources and a large enough return on investment to attract investors.
- Transparent procedures in international projects, in particular when issuing permits and inviting tenders for large-scale offshore wind farms and the construction of crossborder grid infrastructures. The focus on a more European regulatory framework will encourage more coherence in investment and a more effective cost-benefits analysis per investment.

Appendix 4

Examples of different models and interventions

'Models of behaviour help us to understand specific behaviours, by identifying the underlying factors, which influence them. By contrast, theories of change show how behaviours change over time, and can be changed. While behavioural theory is diagnostic, designed to explain the determinant factors underlying behaviour, change theory is more pragmatic, developed in order to support interventions for changing current behaviours or encouraging the adoption of new behaviours. While the two bodies of theory have distinct purposes, they are highly complementary; understanding both is essential in order to develop effective interventions.'¹⁵

In the [Subtask I analysis](#) we added a short narrative demonstrating what approaches based on various theories and models actually tell the end-user. The storyline from an end-user's perspective is based on the following questions that an end-user would ask when confronted with an intervention:

- o How am I motivated or approached or seduced to respond or change my behaviour?
- o Why should I do this?
- o What do I need to do and what will others do?
- o What will it take or what will it 'cost' me?
- o Will I get help?
- o What behaviour needs to change and how much will I need to change?
- o Will it be difficult?
- o What will I gain? What is in it for me?
- o Will I get feedback that I understand/ trust and that tells me what the result of my actions was?

Influence of economic theories on building retrofit intervention design

The programmes based (explicitly and implicitly) on economic theories usually translate into approaches that:

- focus mainly or even solely on individuals
- focus (indirectly but mainly) on generating biggest benefits for the supply side when based on subsidies and technological innovations
- regard individuals as instrumentally/economically rational creatures ('Homo economicus') that aim at maximising financial benefits and act largely in a self-interested manner
- regard information deficits as an important cause of 'non-rational' behaviours (and consequently view information provision, along with financial incentives, as imperative to enable economically rational choices by individuals)
- focus often on short and one-off financial incentives
- focus on extrinsic motivations mainly
- do not tailor their approach to the individual characteristics, except for (sometimes) some financial or technological tailoring
- lack flexibility and room for engagement, co-creation and participation
- monitor mainly quantitative aspects and work with calculated or modeled savings
- Behavioural economics-based approaches also include insights from social psychology, and for instance focus on the power of nudging people into different behaviours through their infrastructural, institutional or design environment.

¹⁵ Darnton, Andrew (2008). GSR Behaviour Change Knowledge Review. Reference Report: An overview of behavioural models and their uses. 83pp.

A Story on an economic theory-based approach in retrofitting

Money makes the world go round

You need to change your home's energy use and we will help you by paying (part of) its retrofitting

By the way, you need to pay up first and it might take a while before we pay you back

The info we need from you will teach you all you need to know

You only need to make a one-off decision to invest

We have the technology you need, contractors or installers (you need to find/choose) will put it in and that's it!

If you do not understand the technology, just don't touch the buttons...

You will save money for a nice weekend to the Bahamas

You only need to give us a bill from your installer, we probably won't check how much energy you actually saved

What counts for us is how many m2 are insulated, how many homes are retrofitted or how much money is spent. Oh yes, and how many kWh are saved of course!

We will do the number crunching, don't worry, we do not need to know what you actually saved, we will use models to calculate all energy savings

But if you want to know how much energy you saved, buy a metering device.

A Story on an behavioural economics (Nudge) approach in retrofitting

Money **still** makes the world go round

By the way, you **still** need to pay up first and it might take a while before we pay you back

The info we need from you will teach you all you need to know

You have many choices **but we will design choice architecture to ensure you make the right one** to retrofit your home

You only need, **not only for yourself but for the sake of everyone**, to make a one-off decision to invest

And to do so, we have the money and technology you need and **we will design rules, regulations, institutions, or infrastructure that will nudge you in the right direction**

You will save money, **or the environment or whatever matters to you**

You only need to give us a bill from your installer, we won't check how much actual energy was saved

What counts for us is how many m2 are insulated, how many homes are retrofitted or how much money is spent. Oh yes, and how many kWh are saved of course!

We will do the number crunching, don't worry, we do not need to know what you actually saved, we will use models to calculate all energy savings

But if you want to know how much energy, **CO2, trees or polar bears** you saved, buy a metering device.

What are the upsides of this economic approach?

Even though we have made some strong criticism of the most-commonly used economic approach here, they obviously have some positives as well:

- They do well within what they intend to do and fit well within the current economic and political system and way of thinking
- The programmes are relatively easy to evaluate in quantitative terms and often show good results
- The retrofitting market can grow
- Subsidies are often used up to the max
- Many homes do get insulated
- Behavioural economics does manage to nudge a certain percentage
- Free riders upgrade their plans and retrofit more comprehensively
- Sometimes even a new norm seems to be emerging.

Influence of other theories (psychology and sociology) on building retrofits design

They:

- focus on collaboration and institutional capacity building
- focus on building trust in market parties and information sources
- target end user needs and multiple benefits
- use multiple definitions of success
- perform pre-scoping
- allow for engagement and participation
- allow for flexibility and iteration of programmes
- focus on institutional change
- focus on lifestyles
- use the power of social norms

A Story on a more system-based approach in retrofitting

Together we will make the world go round

You embody what we need to know and change: do, feel, learn

We will help you understand and use the technology, and train those that install and sell it to you

We will create a supportive material, institutional and social environment

Your needs are important so we need to do this together, as if this were your kitchen or bathroom

Your life will change

It's all about us now, and our grandchildren and their future

Quality matters and we will keep learning and sharing

If we need to be flexible we will

This is only the start of a long way and your home is the first step

We will monitor, calculate and report on energy, money, health, welfare, comfort, wellbeing

And learnings based on qualitative and quantitative inputs will be shared (with you)

We will help you figure out what your impact is to be able to make sure you get where we collectively want to!

What are the downsides to this more whole-system approach?

This approach' storyline sounds more appealing to most and its systematic approach makes inherent sense. Also, the participants of such programmes often report more satisfaction with being engaged in this way.

However, as there is no silver bullet, if we want to tell a learning story:

- These types of interventions are very complex with many partners who have different mandates, needs and restrictions
- They cannot be driven by policy alone, need all levels collaborating
- Not everyone wants to change everything or their lifestyle
- Not everyone wants to engage but it is important to ensure that the naysayers are not becoming the over-riding voice
- The flexibility of changing goals, aims and interrelatedness of issues etc makes it difficult to evaluate

Influence of psychological theories and models on the design of transport interventions

Many of the psychological theories underpinning (explicitly or implicitly) transport interventions can be described to result in the below listed design characteristics of interventions. We have made one list for all psychological theory-underpinned interventions because the theories more or less contain these elements with differences in emphasis.

- focus on needs and the meaning attribution of the car (use)
- prescoping = essential
- focus on concrete actions, capacity building, not sustainability guidelines
- targeting and visualising the information deficit
- leveraging moments of change
- Nudging: creating supportive institutional and infrastructural environments
- focus on lifestyles
- use social norms and commitment

A Story on value Action Gap informed transport interventions

You can make the wheels of your car go round more efficiently

You are good driver and should be proud, but you can become the best!

You only need the right attitude and the motivation to act, we know you will want to act as soon as you see what you can do

We will pull down the barriers you experience, may they be social, individual or institutional

We know you also experience constraints such as lack of time, money, information, encouragement, facilities or whatever

We will help you take responsibility and do away with your laziness or lack of interest, or lack of trust and the feeling that you cannot be efficient at changing your behaviour

So we will make sure a peer you respect and trust will show you how to drive more efficiently

Don't worry, only your driving will change, you and your car will still be cool

It's all about you and your car and your driving and of course your money

We will monitor your driving, we got really cool gadgets to do that

You will see how easy you can save money, fuel and become an even better driver!

A Story on Theory of Planned Behaviour informed transport interventions

You can make the wheels of your car go round more efficiently

You can become the proud owner of a fuel efficient or even electric vehicle, you only need to intend to do it, want to join the others already ahead and feel that you can do it!

We know you will act as soon as we remove whatever makes you feel you cannot do the right thing

And of course what makes you feel you cannot do is due to money, lack of information or lack of availability of the fuel or car, so we will tackle that for you!

We know you also experience constraints such as lack of time,, encouragement, facilities or whatever

As soon as we give you and your peers more information you will of course all want to go get a green car! Right?

Don't worry, only your car will change, nothing else needs to change

It's all about you and your car and of course your money and what you know

We will only monitor the sales figures, we do not need to know if your driving is ok, or if you use the car right or even if you need a car at all....

You will see you can save money, fuel and nothing else changes!

A Story on Murray & Sachs descriptive theory informed transport interventions

We know your car makes your world go round

And it still can, but slightly differently, and guess what, you will be even more in control than before!

You just need to rethink if the way you drive really is the best way to treat your car...

We know you will act as soon as we train you and show you how to take even better care of your beloved car

Do not worry about those other drivers, they form the 99.9% that are really bad at driving, do not compare yourself to them..

You know, there are really cool ways to find out how good this new driving is for your car, its engine and your wallet too!

Don't worry, only your driving will change, the car stays the same, you might even pimp it with the savings you yield!

It's all about you and your car and of course your money

The environment and road safety? Oh well, you will contribute to that as well, sorry about that...

You can do all the monitoring, and even compete with yourself or pals on the road. Do not worry we will not touch your car, we know what it means to you!

If we want to know what your impact is we will use boring stats such as traffic accidents (not saying you caused them before) or emission reductions (that is good for the kids with asthma)

A Story on Norm Activation Theory informed transport interventions

We know you care about your wheels, but you also care about the planet/other drivers/your boss/your kids...

You like to help, even if there isn't any money in it for you

You like to feel that you are doing the right thing, and some of that you may have learned from others in society

You may even feel guilty if you don't do the right thing

We can activate your altruistic nature by making you aware of the consequences of your own actions for others

But you will weigh up the personal costs of acting, which may stop you from taking responsibility

A Story on Cialdini's Social Psychology informed transport interventions

We know you care about your wheels, but you also care about the planet/other drivers/your boss/your kids...

You like to help, even if there isn't any money in it for you

You like to feel that you are doing the right thing, and some of that you may have learned from others in society. **Some of that is what you feel ought to be done.**

If other drivers around you are speeding, you may do the same. If you see a police car up ahead, he will probably reduce your speed.

If we tell you how much the 'average' driver consumes in fuel, it should make you want to change. However, if you use a lot less fuel you may be inclined to increase your use!

Norms can mediate between your own identity and that of a group. But your car as a status symbol may over-rule social motives and instead make you feel more powerful and better than others

Influence of economic theories on smart metering interventions design

Several of the analysed interventions were informed by economic theories such as neoclassical economics and or behavioural economics. The design characteristics of such programmes were already mostly discussed under the theme of retrofitting. Specific smart meter issues were:

- Time is money
- Strong technology push focus
- distributional issues

Influence of psychological theories on smart metering interventions design

The design characteristics of programmes based on psychological theories such as value action gap theory were already discussed under the theme of transport. Smart metering specific design characteristics of interventions based on psychological theories are as follows:

- visualising behaviour and information deficits
- targetting the behaviour in context from smart metering to meaning attribution of living in one's home
- social norms are key
- segment, tailor, motivate, act!

Influence of design theories on smart metering interventions design

Design with Intent (Dwl) is a theory by Dan Lockton which states that through the design of products or services, behaviour is designed as well. Lockton created a toolkit for designers to adapt the design in order to influence and steer behaviour. It is a composition of various findings from several (psychological) disciplines. The combination resulted in 101 suggestions in the form of questions ('did you take ... into account?') to steer behaviour. Suggestions vary from strategic positioning of the design to decoying alternatives. According to Design with Intent, technology and architecture can contain scripts; it has the ability to steer users towards a certain behaviour. And the use of norms and values to influence behaviour is proposed, for example motivators as 'guilt', 'expert's choice' and 'social proof' can be used to change behaviour. The (implicit or explicit) use of design theories result in several design characteristics for smart metering interventions:

- electricity meters and home displays need to visualise energy and thus make energy use more understandable to the common person
- Feedback should be delivered in the household's central locations, to create an awareness of electricity consuming household activities
- keep engaging your end users, feedback often gets boring quickly

A Story on Design Theories informed smart metering interventions

We will design a product or technology which will also design your behaviour

Don't worry, in most cases this doesn't mean we will blatantly manipulate you in order to get data or other valuable information for utilities or to push a technology on you that's pretty useless to you!

Trust us, we know what is best for you and the economy. Oh, and the planet of course!

So, we may need to stop thinking like engineers cause then we only design for other engineers - you may not be as interested in graphs or kWh as we are

We know you like design that is clean, easy to understand, engaging and fun

The more fun it is, the more you will engage with it and the more energy you will save

Energy doesn't need to be boring or invisible anymore, a key goal is to show you when you are using energy and how (much)

Feedback needs to be in a prominent position, so the design of the feedback system will impact on where it is located in the house - we need to design something you want to have hanging on your best wall

And we need to make sure you will want to keep checking it automatically and alter your behaviour, even after its initial fun factor has worn off

If we could only design something as clever and engaging as Apple products - everyone would love saving energy then, right?

Influence of collaborative learning theories on smart metering interventions design

Projects using elements of collaborative learning theories have the following distinct characteristics:

- piloting and building on previous experiences
- participation matters

A Story on collaborative learning approaches in smart metering interventions

This will only work if you actively participate and engage with us on the project

We want to make sure that we build on your learnings, so we're trying to keep you open-minded so you can see the learnings and past mistakes and don't repeat them

It is important that you trust us and the other people you are learning with so you are happy to share the good and maybe not-so-good stories

The 'horror stories' are often the ones we can all learn the most from but no one likes to look like a fool... especially not public servants!

Trust us - we're not trying to patronise you, we are really interested in hearing what you say, think, feel

We can make you change your habits easier in a group setting - by freezing and unfreezing them

Learning from your peers can be both good and bad, competition with your neighbours can be healthy... or really annoying!

We don't need all the fancy technology to create learning opportunities - it is much more important that we involve your whole household, your kids and your neighbours

You'll be a significantly tougher nut for us to crack if you are not already motivated to save energy or the environment. But we'd be smart to make sure we at least learn from your misgivings or issues with our project

We understand that you have too much other important stuff to deal with than to have time to learn about energy efficiency, which is why it's up to us to design it so it's fun for the whole family

The influence of Nudge on SME interventions

SME-specific design characteristics of interventions based on behavioural economics, nudge theories and approaches:

- from nudging to nudgers: get high level involvement
- losing some, winning some
- Intervening in the specific decision-making context
- Energy or the environment might not be the magic words to nudge people...
- Nudging needs continuity
- Nudging is what it is: it is a nudge, not a life changer

Influence of using social norms approach on SME interventions

SME-specific design characteristics of interventions based on social norms theories and approaches:

- Institutionalising social norms
- Even social norms need to take account of specific implementation context
- Distributional issues and social norms
- Competition and social comparison creates committed communities, at the start

Influence of the Energy Cultures approach on SME interventions

SME specific design characteristics of interventions based on the energy cultures approach:

- Energy cultures differ from company to company

A Story on Energy Cultures in SMEs

We know that there are different Energy Cultures in each SME and that someone coming from the outside, telling you what to do according to some generalist scheme, is not going to go down well

You may like the way you do things and think you are doing them in a rather capable manner already

Or you may be stuck in a way of doing things because that's how all other SMEs in your sector are doing it

So, it is important that you help us understand how your business works by listening to you and your staff

We can then use a framework to explain the different elements that need to work together

There are external drivers including commercial pressures, technology networks and supply firm interventions which you can't do anything about

But there are also internal drivers, how you use energy ("practices"), your physical technologies and infrastructure ("material culture"), and mental models of what is normal or appropriate ("norms"), which tend to become self-reinforcing

The best way to break through these locked-in Energy Cultures is to bring in trusted outside expertise and to find a CEO who is willing to take a risk and be an innovator

Then we also need someone capable who can introduce the new technology or process into the business

There may need to be some money in it for you in order to nudge you to do it

Or there may be some competitive element, that you simply want to be the first or the best

Influence of using Collaborative learning approaches on SME interventions

SME-specific design characteristics of interventions based on a collaborative learning approach:

- Building collective capability
- Getting the right intermediary in place to lead the group learning
- Shared learning needs time
- Shared learning requires connected goals
- Anchoring and owning the learnings
- Shared learning is only really successful once sharing takes place again

Table 1. Example of interventions (both regulatory and non-regulatory) available to policymakers when trying to change light bulb purchasing behaviours¹⁶.

¹⁶ From the UK's Parliamentary Office of Science & Technology (2012). Energy Use Behaviour. Number 417.

Box 2. Ladder of Interventions^{1,6}

| | | Interventions | Illustrative examples to encourage energy saving light bulbs |
|---|--------|---|---|
| Regulation | | Eliminate choice | Prevent the use of conventional, inefficient light bulbs |
| | | Restrict choice | Stop selling conventional light bulbs (current policy ⁷) |
| Fiscal measures | | Guide through financial disincentives | Increase tax on conventional light bulbs |
| | | Guide choice through financial incentives | Reduce tax or subsidise energy saving light bulbs |
| Non-regulatory and non-fiscal measures | | Guide choice through non-financial incentives or coerce through non-financial disincentives | Offer a reward, e.g. entry into a prize draw, for buying energy saving light bulbs |
| | | Persuade individuals using argument and coercion | Persuade people that improving energy efficiency is important and that energy saving light bulbs help save energy whilst reducing bills |
| | Nudges | Guide choices through changing the default policy | Supply energy saving light bulbs in new light fittings and lamps |
| | | Enable choice by designing or controlling the physical or social environment | Make energy saving light bulbs the most prominent type at the point of sale |
| | | Use social norms and salience, provide information about what others are doing | Use adverts to show how many people are buying energy saving light bulbs |
| | | Provide information to educate and increase knowledge and understanding | Explain how energy saving light bulbs work and how they save energy |
| Do nothing or monitor the current situation | | Track sales in different types of light bulb | |

Appendix 5

Dutch Stakeholder Feedback

Several rounds of stakeholder feedback were collected in the Netherlands. The detailed feedback from the stakeholder analysis is summarized below.

The results of the inventory are presented as follows:

- Motivation for stakeholders to participate
- Stakeholder needs and key questions
- Stakeholder identification of potential risks for Task 24
- Stakeholders commitment and contribution to Task 24
- Stakeholder recommendations for Task 24

Summarised, the stakeholders wanted to participate because of three reasons:

- Opportunities to share knowledge and learnings, to network and to position themselves.
- The rise in the national policy interest in behavioural issues related to energy efficiency in the built environment
- Shortcomings of current DSM pilots that could benefit from findings from task 24

In detail, these were the reasons given for being motivated to participate:

- Opportunities to share knowledge, expertise and experience
- Learn more about what is going on and who does what in the broad field of Energy DSM and behavioural change
- Learning from other knowledge domains
- Opening up one's own perspective
- Jointly creating new insights
- Expanding networks (domestically and internationally)
- Positioning oneself
- Seeking opportunities for work or future collaboration
- Current pilots often lack good design and evaluation
- There is limited sharing of knowledge and insights on pilots with as a result
- Duplication of efforts
- Less learning than could be the case
- Too little attention for the end-user
- Too little attention for the complexity of technology for households (smart meters)

The following key questions that could be addressed by Task 24 were formulated by the stakeholders:

- How can social media support Energy DSM?
- How to address end-user acceptance issues, e.g. if part of the control of smart meters is automatic and/or from distance?
- What do end-users or consumers want, need and understand related to the smart meter?
- How should technology developers address and deal with end users in technology development and application?
- What can we learn from existing pilots and success stories in the Netherlands and abroad?
- How far are we in practice with smart meters in pilots; where we are going; what are the roles of different stakeholders going to be?
- How can investment behaviour and routine behaviours reinforce each other?
- How do lifestyles and behaviours relate to systemic change/transition?
- What are the remaining gaps are in our theoretical understanding of energy behavioural change?

- We have pilots and local successes but how to upscale these? What are suitable policy instruments to support this?
- How can we avoid the risk that DSM technology is being rejected/not accepted?
- Which instruments can help us to activate intermediaries at the local level and can we measure effects of these instruments?
- How can we better design the pilots that we do - thereby also facilitating proper evaluation?
- How does a sound design What are the specific context barriers for very specific behaviours, e.g. changing lights, insulating the house, lowering the thermostat?
- What are the experiences of end-users on very specific behavioural change (see above)?
- How do people think about investment and Return on Investment and what are the adequate communication channels and content to address these people?
- What strategic alliances are necessary to achieve successful DSM projects?
- What privacy issues exist and how can they be dealt with?
- What is the role of the end-user and or producer in relation to the smart meter and smart grids?
- What segmentation can be used to achieve successful DSM?
- In terms of what pilots look like, what are the basic requirements for a sound evaluation framework and what are the different perspectives on this issue?
- How can we improve the evaluation of long-term effects and how to reach lasting behavioural change.
- How can we arrive at a proper evidence basis regarding the long-term effectiveness of interventions and instrument on energy saving behaviours?
- How to get and keep policy makers involved?
- How to measure displacement of behaviour (load shifting)?
- How to measure the potential of behavioural change for DSM (conservation, and shifting)?

The following needs were expressed:

1. Need for better evidence on what works and what not
2. Need for better design, in order to make proper monitoring and evaluation possible
3. Need for defining what is good design? – Scientific considerations (which ones?) or practical ones?
4. Need for evaluation of qualitative effects of DSM (e.g. self-esteem, social cohesion etc). Avoid risk of too much emphasis on quantified evidence which creates false certainties.
5. Need for evaluation of specific interventions such as testimonials, feedback, tailored advice.
6. Need for insight in trust that people have in communication outlets such as websites of professional organisations versus fora on DSM and EE

Practitioners (in technology development and intermediaries in Energy DSM projects) biggest worry was that Task 24 might focus too much on social science and run the risk of outcomes with little practical value. In addition the translation of knowledge from social science and from TASK 24 to business, entrepreneurs, technology developers, practitioners and education needs to be addressed carefully:

Basically it is about translation between three groups with their own jargons and blind spots: research, companies (communication, consultancy, technology development) and government... and the need to find a shared language to enable dialogue between these groups.

- Stakeholders were committed to: attend meetings, participate in the online community, share knowledge, contacts
- Stakeholders were committed to invest (unpaid and therefore limited) time to: help monitoring the Task process and outputs, contribute to research and read reports and contribute to the improvement of design, monitoring and evaluation frameworks

- Stakeholders strongly recommended to start a project/pilot within this task and would then get involved

Task 24 stakeholders recommended us to focus on networking and knowledge exchange:

- Take care that it is not becoming a closed club for social scientists – by inviting all participants to critically monitor the task.
- Organise regular meetings with and for the Dutch stakeholders
- Support the need for networking, knowledge exchange and learning because the Dutch field of Energy DSM (both technology and behaviour oriented work) is highly fragmented.
- Maintain broad involvement of diverse set of stakeholders– including the envisaged end-users of the outcomes
- Invite people to participate in the online community and invite them to international meetings supports them in expanding their networks internationally.
- Invite large commercial companies that are active in the field of behavioural and lifestyle change (social marketing; Unilever; Coca Cola).
- Ensure easy ways of information sharing between participants (online, database)
- Improve the sharing of knowledge between pilots
- Support national policy in learning how to support municipalities, housing corporations, intermediaries, technology developers and citizens to collaborate in addressing behavioural issues.
- Practitioners should be part of discussions because they know best what is feasible.
- Facilitate ongoing discussion between researchers, consultants, practitioners and policy makers to learn about each other's ideas about good design, monitoring and evaluation.
- Pay due attention to the translation issues and inquire into the possibilities of finding a 'shared language'
- Address the translation of knowledge and outcomes of Task 24 to education
- Keep participants involved, informed and committed through:
 - a. Transparency on process and budgets
 - b. Regular updates (email and live)
 - c. Fast sharing of (in-between) results
 - d. Concise and attractive formats ('not one long report at the end of the project)
- Focus on end-user behaviour.
- Focus on design and evaluation. Monitoring and evaluation needs to be seen as a means, not a goal.
- Write a research agenda with research questions that have not yet been answered and should get priority.
- Support the process of finding a good balance between scientifically sound results and practicability (which is the outcome of a negotiated process between diverse stakeholder participants)
- Take care not to overburden ourselves in this task (strike a healthy balance between ambitious and realistic) in order to maintain credibility
- National policy needs to provide funding to facilitate the Netherlands becoming frontrunner in the development and application of e.g. smart meters and home energy management systems

Last but not least:

A financed real life (pilot) project should eventually become part of the Dutch effort, for this would enable the participants to invest more time in the joint development of a design, monitoring and evaluation framework and in doing this, discussions between the different types of stakeholders could provide a great opportunity for learning.

Appendix 6

Detailed recommendations for each domain (from the 'Monster')

Building Retrofit Recommendations:

Key DSM retrofitting interventions lessons and questions for further research. The lessons below are tailored to policymakers, intermediaries or other initiators of DSM retrofitting interventions.

1. Focusing retrofitting interventions on the level of individuals and individual households ignores the need of individuals to be part of a social group or society. Addressing the collective level of e.g. home owner associations can upscale the impact and create more lasting changes. Rather than thinking in terms of technology (which is a means) think about and inquire into end-user needs and their way of life so that these form the point of departure and make use of peer to peer education or the neighbour effect. It's not only about the houses, but first and foremost about the people who live there. Involve, engage and target multiple members of a social group, at the collective level, not only at the level of the individual. FOCUS ON THE SOCIAL SIDE.
2. Subsidies and incentives focus mainly on investment behaviour and alter the home but do not address the use of the building and its installations or appliances. Focus on both investment and habitual behaviour to avoid bad and unnecessary rebound effects. IT'S NOT JUST WHAT WE BUY, IT'S WHAT WE DO.
3. Programmes that have a more systemic perspective as starting point acknowledge that retrofitting can be a 'gateway' into other more habitual behaviour changes around for example lighting and appliance use and even domains beyond the energy domain such as waste and transportation behaviour. Use insulation as a gateway, not a one-off. CHANGE LIFESTYLES NOT LIGHTBULBS
4. An approach focused on incentivising and subsidising individuals to invest in technologies and measures actually benefits mainly and mostly the supply side (economically and on the short term). Beware if only the supply side or the implementer of the intervention seems to benefit. THINK OF THE BENEFITS FOR THE END USER AS WELL
5. Providing information only works if relevant stakeholders agree on the truthfulness of the information e.g. through a trusted consortium of societal and policy stakeholders. Trusted messengers are everything. FOCUS YOUR MESSAGING.
6. When a project aims to solve an information deficit, it should not request this information from the end-users, but arrange for training or intermediaries to help the end-users find this information. And when targeting the individual need for money and financial support, do not ask for prefinancing. PAY THE SUBSIDY UPFRONT.
7. Targeting the individual need for maximising financial benefit ignores that comfort and other benefits often rank higher on the priority list. Focusing first on financial rewards might create serious barriers for (follow-up) interventions also aiming at getting the bigger message why it is an important social or a global issue will likely fail. Cooperation between multiple parties - from governmental agencies to landlords and NGOs such as district health boards - can result in more tailored and context-sensitive programmes. Cooperation between multiple parties can also result in a more diverse set of instruments being deployed, from more segmented financial incentives to certifying contractors, enhance building codes quality, installer trainings, and TV marketing campaigns, and including instruments targeting outcomes that are not directly related to energy efficiency, e.g. health improvements. Tailor to your end users' needs which may not be about kWh savings. Cooperate widely and make it about more than money. USE A TOOLBOX OF INTERVENTIONS AND GO BEYOND kWh TARGETS.
8. Pre-scoping to analyse the problem to be solved can allow for a more broad or integral approach focusing also on other, e.g. health, comfort and social benefits. However. performing research to find out about homeowners' needs and preferences prior to implementation is only conducive to success when the needs that were identified are also targeted in the intervention. Pre-scope to find out what is most important to end users. IF YOU KNOW WHAT THEY WANT, MAKE SURE YOU TRY AND GET IT FOR THEM.

9. Programmes that focus on lifestyle implicitly or explicitly acknowledge that end-users do not live according to sectoral divisions, even when governmental agencies do. They allow for an approach that focuses on the function of the use of energy in the life of end-users instead of on the use of energy. DON'T BOX PEOPLE IN TOO MUCH
10. Metered instead of modelled saving calculations are necessary to assess the real impact of the measures on energy consumption. Benchmarking and monitoring of the actual impact of the measures on the energy use, living quality, reduced costs, improved health etc should be part of the programme. It should not be left to the individual to buy and install metering devices to meter the actual impact of retrofitting. BENCHMARK YOUR HEART OUT, MEASURE, NOT MODEL
11. 'Decliners' or opt-out households are potentially as valuable to survey as those engaged. LEARN FROM THE UNWILLING

Transport Recommendations:

The key lessons below are tailored to policymakers, intermediaries or other initiators of DSM transport interventions.

1. Creating new meanings for the car might allow for more sustainable driving behaviour and purchasing behaviour. Focus on what is meaningful to drivers, and that probably will not be the environment or traffic accidents, but their health, wellbeing, comfort, health of their car, their status, feelings of power. Cars mean everything to many people, be careful how you approach them. DON'T TAKE AWAY THEIR WHEELS.
2. Focusing on lifestyle and the role of the car is key but do not forget that life is also very much about the technological thing called car. Allow for the same meaningfulness but in a more energy-efficient manner by producing and providing things from which people derive meaningfulness in an energy- efficient manner. An energy efficient car can be sexy (see the Tesla!). CARS REFLECT LIFESTYLES.
3. Focusing on lifestyles also implies that multiple interventions are necessary to address behaviour in its many complex interrelated contexts. Use a toolbox of interventions that work together. YOU NEED MORE THAN ONE TOOL TO FIX A CAR.
4. Used trusted and respected peers to deliver the message and show the alternative. Active coaching by trusted peers is key. TRUST IS EVERYTHING. There is not much as habitual as driving and traveling patterns. It is truly embodied in seasoned drivers and very often we shift gear or take a look in the mirror on a very unconscious level. Training is essential. Prescope to understand where the drivers behaviour comes from. Set goals and visualise the gap between the actual and the goal behaviour and confirm when the gap is closed. Focus on concrete actions, capacity building, not sustainability guidelines to change the behavioural routine. PRE- SCOPE AND TRAIN, VISUALISE THE GAP BETWEEN ACTUAL AND GOAL BEHAVIOUR.
5. Driving is an individual but also a very social activity, so it is important to demonstrate how normal the desired behaviour is and get people to commit to it and become proponents. Reward good behaviour with a diploma or license, or making them driver of the week, to reaffirm the new behaviour. Make smart driving the social norm. BE SMART, DRIVE SMART.
6. Leverage change moments to normalise the desired behaviour. The New Year/new car/new licence is great place to start! SOMETHING CHANGED, SO I THINK ABOUT HOW I TRAVEL.
7. Urban design and decadal infrastructural decisions such as roading and town planning can be a real obstruction or a big opportunity. The creation and in particular the sustaining of a new behaviour and a new norm need the accompanying institutionalisation of this new norm and associated changes in the infrastructure and technologies. Change the institutional and infrastructural environment! IT'S ABOUT SO MUCH MORE THAN JUST THE CAR.
8. When you use the social norm as a lever, do not forget to also involve the social environment of your target (family, friends, coworkers). Create a sense of community amongst drivers in an intervention and use social based marketing. YOU'RE NEVER ALONE WHEN YOU'RE DRIVING.
9. Beware that the use of risk messages is a very difficult matter with many potential unexpected impacts, e.g. people can feel that cycling is life threatening when you require

them to wear a helmet for safety reasons. Beware of perverse outcomes. RISK MESSAGES CAN BE RISKY.

10. Money might not do the trick or create lasting change, but economic incentives can play a strong role play in starting and emphasising the social desirability of a new social norm and accompanying behaviour. Money is a good start but not enough in the long run. MONEY AIN'T EVERYTHING.

Smart meter/feedback recommendations:

The lessons below are tailored to policymakers, intermediaries or other initiators of DSM retrofitting interventions.


2. Projects based on neoclassical or behavioural economics assume that people react 'rationally' when stimulated with the right triggers, and financial benefits or threats are such triggers. However, in many instances it is clear that economic gains or losses are not necessarily the only trigger necessary. TIME ISN'T ALWAYS MONEY
3. Smart metering projects are, by definition, projects that push a technology. But, a smart meter is not necessarily a meaningful device for household members. Often households do not (feel they) need it. Usually the only two challenges identified for smart metering projects are its adoption, and the education of people of its economic benefits. The successful implementation of smart metering is dependent on the creation of an intervention that goes beyond acceptance and aims at creating multiple benefits through the introduction of a smart meter. TECHNOLOGY ISN'T EVERYTHING
4. The issue of distribution of costs, risk and rewards and benefits is key but not very often addressed. End-users can start to feel that the distribution of costs and benefits actually benefit the utilities and DSOs more (in terms of customer loyalty, avoided investments in the grid, more information on customers) than the end-users themselves. Who benefits and who pays (eg with assumed loss of privacy)? MAKE SURE THERE IS CLEAR VALUE FOR THE CUSTOMER
5. Automated feedback on actual energy use and potential for changing one's energy consumption behaviour is at the core of most smart metering projects. This stems from the assumption present in almost all economic and psychological theories or models that increased knowledge and know-how about energy and energy consuming behaviour will lead to a reduction of energy. It is mainly when information provision is coupled to active learning, coaching and shared learning through peers, that this approach can indeed be effective. Information isn't everything - it needs to be coupled to active or shared learning. AUTOMATONS SHOWING kWh DON'T TEACH NEARLY AS WELL AS REAL PEOPLE AND THEIR OWN STORIES
6. Beware the self-selecting participants, they cloud results on acceptance and acceptability of smart meters. If they want it, they're already convinced it's a good idea and not your main target. FIND AND CONVINCING THE 'LUDDITES' THAT YOUR TECHNOLOGY IS GOOD FOR THEM
7. Smart metering targets the home, its inhabitants and their electricity and gas, and sometimes water consumption. The behaviours that should therefore target habitual actions AND investment behaviour (including retrofitting actions). Smart metering projects, however, usually target the behaviour of people, not of the home. The home and its technologies are left untouched. Tailored advice should also take into account the impact of the house on the capabilities and capacities of households to change the use patterns and its impact on the energy bill. Don't just tackle the behaviour of people, but also of their home. HOUSEHOLD DYNAMICS HOLD YOUR KEY.
8. The devil is in the detail: the personalities of installers can have an influence on the understanding of clients about the technology, and on their "happiness" regarding the technology. Small differences are found to be key explanatory variables. Beware of the strong effect of personalities when using intermediaries, champions or advisors. SOCIAL CUES ARE MORE POWERFUL THAN TECHNOLOGY - FOR GOOD AND BAD.
9. People do not invest in their home but live in them, and the home means different things for different people and means different things at different times. One fairly constant meaning the home often has is comfort. A home is not where energy is used, it is where people live (comfortably, thanks to energy). MY HOME IS MY CASTLE.

10. Seeing is doing. Specially trained "Energy Masters", volunteers within the groups that motivate, supervise monitoring and provide material, such as 'DIY energy audits' can be a key to success. Use trusted champions and advisors. SEEING IS DOING.
11. Technological maturity of a region or target group needs to be matched to the ambitions of a project. The technology solution needs to match the technology literacy/maturity of the target. DON'T SELL IPHONES TO PEOPLE WITH NO POWER
12. Providing feedback on particular behaviours or practices rather than on the more abstract level of overall electricity consumption facilitates the identification of particular behaviours that are 'wasteful'. Focus not on individuals but on their practices. IT WILL TAKE A LONG TIME TO CHANGE 7 BILLION PEOPLE INDIVIDUALLY
13. Participation can be a key success factor. Co-development can have a strong impact on satisfaction levels. Engage your customers through multiple channels. PARTICIPATION IS KEY
14. Talking about "wastefulness" in interventions may be more effective than talking about saving money. Being wasteful can be worse than spending money. NO ONE LIKES WASTE
15. Social norming information about the consumption of others is engaging and interesting. Potentially disaggregated social norming information could encourage energy reduction. It is important to provide detailed feedback in hourly or half-hourly consumption, and in graphs which display peaks and troughs to enable users to identify high-consuming energy practices. Regular emails displaying users' own recent consumption over time, and access to personalised websites are a useful complements to real-time energy monitors. I wanna know what others are up to and where I stand. TELL ME IF I'M DOING BETTER THAN MY NEIGHBOUR

SME recommendations:

The lessons below are tailored to policymakers, intermediaries or other initiators of DSM SME interventions.

1. Interventions focused on changing employee behaviour need a very active support or even involvement of the management level, implementation level, staff and even from clients. Top-Down, middle and bottom-up is needed, plus some external validation. IT CAN'T ALL COME FROM THE TOP OR THE BOTTOM.
2. For a better evaluation comparing successes between SMEs a more detailed analysis of different enterprises and their future plans need to be undertaken, and the data comparability with all enterprises has to be up to date. Compare and celebrate successful companies and interventions. BENCHMARK YOUR HEART OUT.
3. Target the key staff or champions or champion nudgers in an organisation and work with them. Economics as an approach is not sufficient to deal with the often implicit power plays and personal relationships in an office and between different layers of staff. Creating ownership amongst relevant staff is therefore key. Find your champions in your organisation and work with them. IT'S ALL ABOUT THE PEOPLE.
4. Mobilising towards shared goals can help increase internal support for reforms or organizational changes. If you have shared goals, you're halfway there. I WANT WHAT YOU WANT, SO LET'S DO IT.
5. In SMEs a multitude of people work, in different roles, and not everyone will feel comfortable with changes in the company, or with required changes. It is natural to 'lose' some along the road, and potentially this self-selection will strengthen the new social norms emerging amongst those that stay. The 'laggards' can have a powerful negative effect on your staff. DON'T BE AFRAID TO LOSE THE NAY-SAYERS.
6. Nudges do not necessarily act on the internal motivations, the attitudes or the intention to change behaviour. They are external stimuli to facilitate or discourage certain behaviour. Nudges can thus support people as reminders about their motivations and attitudes but more (e.g. changing social norms, institutionalisation of norms) is needed to change attitudes and motivations. NUDGING IS WHAT IT IS: A NUDGE, NOT A LIFE SAVER.
7. The creation of a dedicated institution or intermediary por label/certification such as the Ecolabel (EU) and the Dutch 'MKB prestatieladder' (SME performance ladder) can be key to successful



implementation in a certain branch of SMEs. Validate where possible. SHOW WHO'S A LEADER.

8. There are many competing demands when addressing SME energy consumption behaviour. individual visits and tailoring leads to actionable goals and recommendations. Tailor to each SME, they are not all the same. TAILORING IS ESSENTIAL.
9. The equitable distribution of burdens and costs and the continued use of the same subsidy rules is key to creating movement amongst SMEs. Be fair, support innovators. THEY LEAD SO OTHERS CAN FOLLOW.
10. Whereas energy efficiency efforts are often a matter of external consultants coming and going (along with the knowledge) equipping companies with the capability, methods and tools to themselves take control of and reduce their energy use through a collaborative learning approach might be more effective. Build your own capability if you want to share learnings. CONSULTANTS DON'T CARE AS MUCH ABOUT YOUR COMPANY AS YOUR STAFF DO.
11. Getting the right intermediary in place to lead the group learning is key. Industry associations, e.g. provide a more homogenous group of SMEs that can more easily benchmark each other against their progress. Go to trusted intermediaries. TRUST IS EVERYTHING.

Appendix 7

Future research questions collected in Task 24

Building Retrofits

1. Can ambitiously set programmes create technological innovations and even professionalise a market, including the accompanying job growth? And do interventions aimed at retrofitting at the comprehensive level of the house generate more impact on the market, than e.g. simple insulation measures?
2. Does institutionalised longer-term support help to foster new markets and provide clarity and security/certainty for both end users and market parties? (e.g. setting quality standards for contracting service providers, building codes, training schemes for installers, performance contracting schemes, energy label for homes or low interest bank loans)
3. Is involving all relevant stakeholders in the form of diverse partnerships conducive to the creation of a new social norm? Has their interaction, and their often diverging needs and key performance indicators demanded alignment of interests with the potential for social learning?
4. Has social learning through building on previous programmes resulted in more effective programmes? And is this key to successful mainstreaming of retrofitting initiatives?
5. Should 'free riders' (people who would have taken measures without the subsidy) be welcome too? Can incentives actually motivate towards even better or more comprehensive retrofitting than planned without the incentive?
6. What is the potential of un-orchestrated collective learning? What could be the impact of seeing your neighbours retrofitting their home with the aid of a financial incentive?
7. With overly extrinsically motivated interventions, will the bigger message why it is an important social or a global issue, get lost and ignored, thus enhancing the changes of rebound? One could also ask whether programmes potentially veer towards appealing to self-interest because otherwise they drown in a sea of marketing encouraging consumption practices that work against altruistic motivations?

Transport

1. Many of the intended outcomes, e.g. changes in the symbolic meaning attributed to a car or a bike, or increased positive perceptions of urban traffic, can only be assessed by qualitative inquiries making use of e.g. surveys or interviews. Changing the meaning attribution can, however, be a very effective way to change driver behaviour. What methods are best to assess the changes in meaning attribution of the car?
2. It is very difficult to monitor the actual change in driving behaviour on the individual level. Mobility DSM is not deployed in a laboratory situation, or in the confined space of a home, so other (changing) conditions always interfere with the intervention. How could a comprehensive monitoring regime look like that focuses on both the individual and societal level and on quantitative and qualitative changes?
3. The costs of transport campaigns are most likely not the only costs of interventions. Generally, only costs on the supply side are calculated. But the individual drivers themselves potentially have additional costs in terms of lost time, problems with getting negative comments or social stigma, but these costs can hardly be calculated. How can the costs of transport interventions incurred on the end-user side be calculated and weighted?

Smart Metering/Feedback

A key design challenge is to create a smart metering system that keeps engaging with the household members. Changing the messages and feedback in the course of time following energy literacy can be key. Information should thus be dynamic over time. What designs work well for whom?



SMEs

1. How to evaluate the savings (energy, CO2, cost) or increased productivity of the earlier (due to the intervention) implementation of already-planned measures?
2. Concerning the application of Nudge it would be interesting to see if a specific approach applied to the specific context of a single SME is more effective rather than a general policy measure aimed at all SMEs.
3. Are competitions potentially most effective as an early incentive to familiarise the public with a (social) innovation and start up initial behaviour?