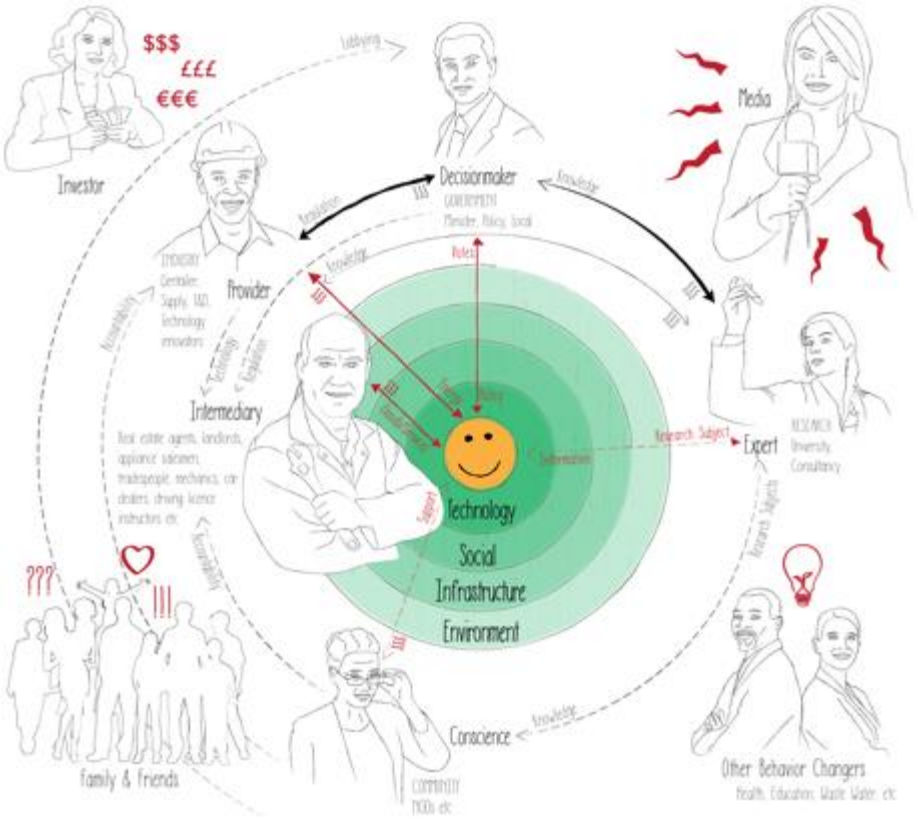
International Energy Agency

Energy Technology Initiative on

Demand Side Management Technologies and Programmes



Status Report the Netherlands

Task 24 – Phase II

Behaviour Change in DSM: Helping the Behaviour Changers

Executive Summary ST6 & 7

Contents

Note: This report was copy-edited by Dr Sea Rotmann, Task 24 Operating Agent. Content edits were not incorporated.

Introduction

The IEA Demand-Side Management Task 24 aims to share knowledge and develop policy recommendations about the influence of behaviour change on effective implementation of energy-efficiency policies. After a period of building the scientific framework and collecting practical cases (Phase 1), Task 24 is now in the phase of engaging actual 'Behaviour Changers' in a real live intervention, supporting them with evidence-based scientific approaches and practical experiences from various countries along the way. This summary contains a concise description of the progress of Task 24 Phase 2 in the Netherlands. The structure follows the activities covered in this period:

1) Subtask 6: Select the Dutch top-priority issues with high energy efficiency and behaviour change potential and low risk (technological, social, economic and political);
2) Subtask 7: Select an action research case, identify its *Behaviour Changers* their main mandates, stakeholders, restrictions and tools; then engage them in a real-life intervention , consisting of workshops, interviews, and feedback loops using the *Collective Impact Approach* as an overarching framework;
3) Subtasks 6&7: Collect and analyse examples on the selected top issue in the context of the *Collective Impact Approach* for further support and research, including potential pilots.

Detailed descriptions of the different elements are available in the NL Annexes Report. All definitions used in this Task are outlined in Mourik et al, 2015, p4-5.

For additional information, you can contact the Dutch expert team: Ruth Mourik, Sylvia Breukers, Dieudonné Cobben from Duneworks, and Antoinet Smits from the Dutch Government Agency RVO. [1]

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ST6: Selecting Top-Priority DSM Issues in the Netherlands

For several years, the *Energy Agreement for Sustainable Growth* (Energieakkoord voor Duurzame Groei, 2013), signed by more than 40 organisations, including Cabinet, employers, trade unions, environmental organisations, energy companies and local and regional authorities was a significant factor in the Dutch sustainable energy landscape. This agreement aimed to achieve an annual reduction in final energy consumption averaging 1.5%. It added to a variety of documents on Dutch energy efficiency potentials and policy instruments, and gave input to the identification, ranking and selections of the top priority Issue for a *Collective Impact Approach* Intervention in The Netherlands.

Following a decision-making process[2], the *outcome* of this exercise was the selection of ***Higher Education and ICT*** as the main sectorial focus for further intervention[3]. Considerations for this decision were:

- Dutch higher educational institutes have, in recent years, shown an increasing attention to sustainability issues. This raised the question of how this increased attention is translated into

[1] Ruth.mourik@duneworks.nl
[2] See Annex B – Selection of Top Priority issues
[3] To be able to draw lessons on more than one sub-sector, different foci were chosen in each country participating to the second phase of Task 24 (Residential/Renewables in New Zealand; Office Commercial Buildings in Sweden; Hospital sector in Canada/USA; Residential energy saving kits in Ireland and Policy evaluation of the energy efficiency law in Austria).

energy efficiency and energy conservation interventions, in practice. It is of interest with regards to their mix of old and new buildings, and the strong link between energy conservation and energy efficiency and information and communication technology (ICT). Both purchase, use and disposal of ICT as well as the use of ICT to curb energy use have high potential/low risk in terms of behaviour change interventions.

- In 1999 and 2002, all Dutch universities and most universities of applied sciences signed *Long Term Agreements* (LTA3) in which they expressed their commitment to reduce energy use in 2020 by 30% compared with 2005 (term Hofte 2011). Each participating organisation needs to have an energy-efficiency plan that needs to be updated every 4 years so that it gives insight into the energy profile and energy-saving options and helps to plan out efficiency measures. The *Environmental Management Act*[4] requires participants to the LTAs to aim for set energy conservation targets. Municipalities are responsible to enforce this law. In 2015, the *Progress Report on the Energy Agreement* pointed out the need to intensify efforts. The progress report states how the government has urged organisations to intensify their efforts in this. In addition, the introduction of lists with measures for energy efficiency and savings (with a 5-year pay-back time) as well as a new *Expertise Centre for Energy Conservation* is expected to support offices, the healthcare and educational sectors.
- A *Green Deal for Sustainable Schools* (Green Deal Verduurzaming Scholen)[5], was established in which the national government, educational sector and municipalities agreed to make the learning and working environment at schools more sustainable for pupils and teachers, and to accelerate this process. The *Green Deal* will help schoolboards and municipalities to realise their ambitions in energy conservation and improving the air quality at schools. While this *Green Deal* targets elementary and secondary schools, no such programme exists as of yet for the higher educational sector in the Netherlands.

We thus decided that the top priority area in the Netherlands should be addressed to universities and higher vocational training institutions. This is a sector with both a large energy efficiency potential, and a strong commitment to innovation and change. Within this sector, we will focus on ICT use. ICT equipment is responsible for almost 20% of electricity use in the sector and this percentage is still rising (Ter Hofte 2011). ICT refers both to the use of ICT to manage the energy use in the higher education buildings and the more energy-efficient use of ICT in higher education buildings.

ST7: Real-life intervention using *Collective Impact Approach*

An important point of departure in this Task is that we pose that "*our energy system begins and ends with the human need for the services derived from energy (warmth, comfort, entertainment, mobility, hygiene, safety etc.) and that behavioural interventions using technology, market and business models and changes to supply and delivery of energy are the all-important means to that end*."

The energy *End User* is placed at the centre in our approach. Usually, behavioural change interventions target the behaviours of end-users and their context, such as organisational culture at a university, social norms among employees, in the boardroom, among students, research and educational staff. One can think of practices as *ways of doing* when it comes to the management of buildings, infrastructure and ICT equipment. Changes in end-user behaviours – e.g. towards using less energy – are strongly influenced by all these contextual characteristics.

Behaviour Changers and the *Collective Impact Approach* in Task 24

We use the term *Behaviour Changers* to denote those that can affect the conditions for energy conservation and efficiency behaviours. They have influence due to their role, mandate, and position in an organisation. Every one of these *Behaviour Changers* holds an important piece of the puzzle and

[4] Wet Milieubeheer
[5] http://www.greendealscholen.nl/

has a power and/or tools needed to affect changes within the organisation, provided they work together in complex contexts with political, financial and social pressures. Hence, complex problems that include technical, organisational, social and behavioural dimensions, ask for a collective addressing of the challenges. Since the Behaviour Changers involved have different perspectives, preferences and interests, the first step is to arrive at a shared understanding of what the main challenges are when attempting to design an intervention aimed at energy conservation and improving efficiency. Such a shared understanding provides the starting point for developing ways to address these challenges – always with due attention to end-user needs.

The *Collective Impact Approach* is a management framework built on principles from conservation psychology and has been used successfully by social entrepreneurs faced with the difficult task of bringing many stakeholders from different sectors together to solve complex, societal problems. The figure below shows the five critical factors for success of the method.

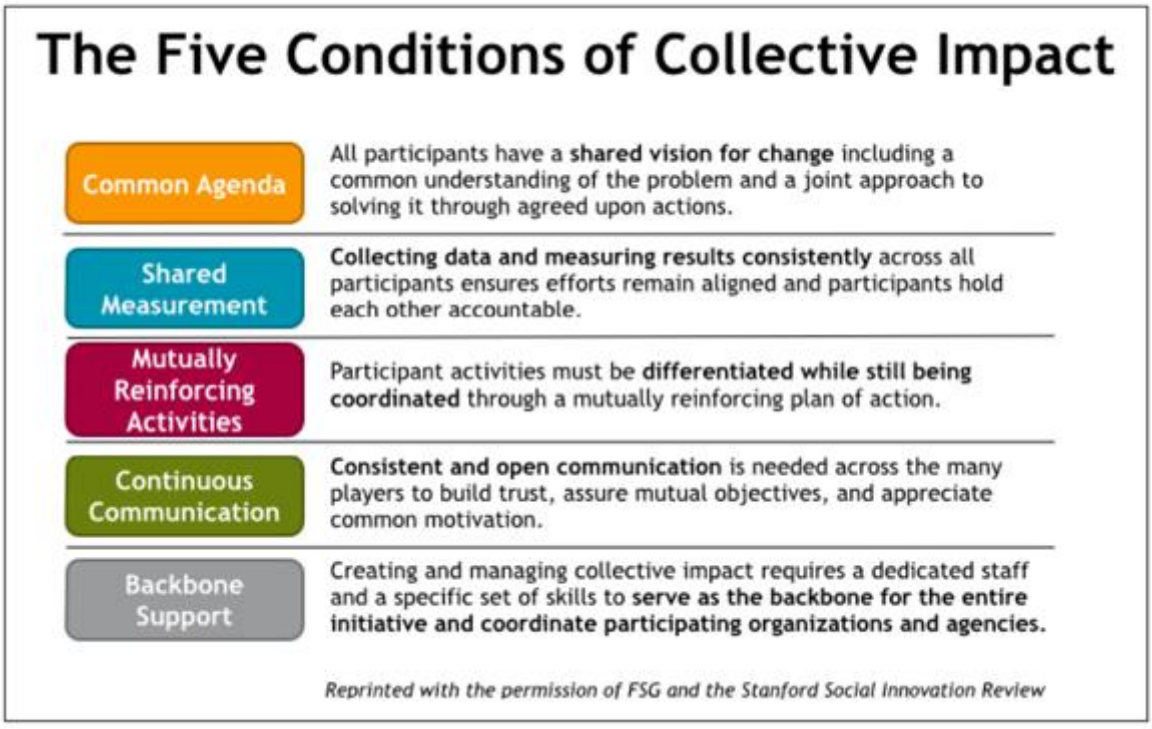


Figure 1: image retrieved from http://www.fsg.org/publications/channeling-change

The 3 phases of the *Collective Impact Approach*:

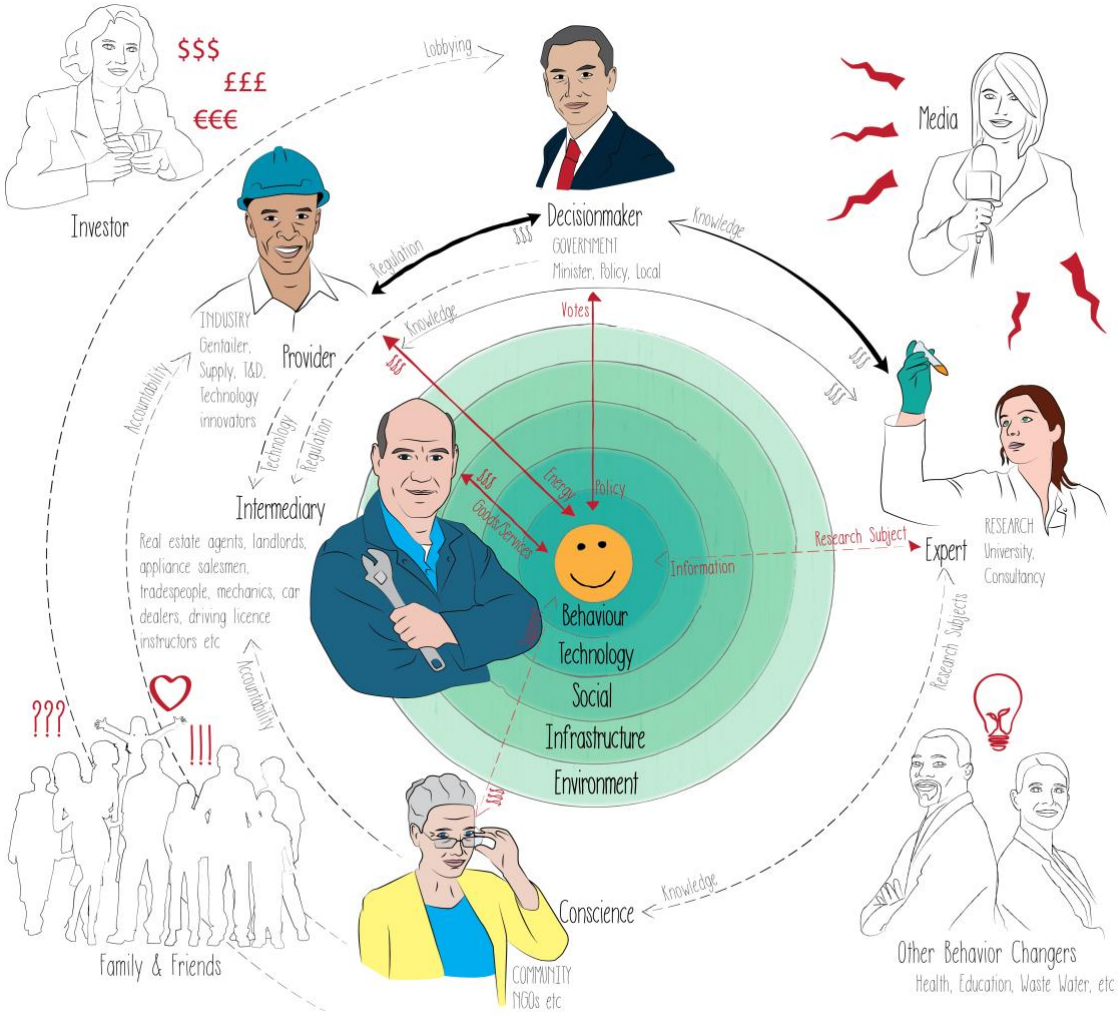
1. *Initiate action*: understand landscape, key players, existing work, baseline data on problem, initial governance, champions

2. *Organise for impact*: Work together towards common goals and shared measures, backbone structure, aligning the rest

3. *Sustain action and impact:* Pursue areas for action in coordinated way, learn, adjust, track progress

One of the tools derived from the *Collective Impact Approach* which was designed to be complementary to it and which was used in all Task 24 Phase 2 workshops is the '*Behaviour Changer Framework*'. This tool is used as a 'heuristic' method to clarify roles, mandates and relationships of the Behaviour Changers and their interaction with the *End Users*, putting the *End User* centre stage and designing an intervention both bottom-up, from the perspective of the *End User,* top–down such as is

the main focus of the *Collective Impact Approach*[6], and middle-out, with Task 24 as the important, neutral, trusted *Facilitator*. In addition, we add an element of *storytelling* to the workshops, enabling each of the *Behaviour Changers* working on a specific behavioural intervention in a specific domain, context and country to work towards and align with a common agenda from their specific perspective. The figure below shows the mechanisms in this framework[7] (see also Rotmann, 2016).



The real-life intervention in Groningen University

The University of Groningen (RUG) was selected as action research case study: it was the most promising place to explore and investigate how the role of the *Behaviour Changers* can affect energy efficiency improvements, and if a *Collective Impact Approach* might be useful to identify and tackle complex behaviour change issues.

The action research case at Groningen University was intended to set up a local platform of *Behaviour Changers* on-site. The aim was to build upon the spirit that won this University the title "Most Sustainable University of the Netherlands" in 2015, and to use a *Collective Impact Approach*, the *Behaviour Changer Framework* and *storytelling* with this group in a series of workshops.

Before the first workshop we already (by means of interviews with all relevant *Behaviour Changers*) identified the top three issues to focus on for the University:

[6] See Annex E for a more critical discussion of the Collective Impact Approach and its usefulness and shortcomings for the type of live interventions this Task focuses on.
[7] See Annex C – Theoretical Framework

These three questions were proposed as central issues around which the discussions would be structured using the *Behaviour Changer Framework* as a dialogue tool.

1. How can ICT be used to arrive at a better match of demand and supply? And which forms of collaboration are needed? (types of behaviour: organisational, logistic)

2. How to arrive at behavioural propositions for groups that so far have not been activated? And how can we reach behavioural change in this group? (types of behaviour: routine behaviour; social norms; mind-set oriented)

3. How can energy efficiency and conservation become more structurally embedded in the RUG policy? How to arrive at a business case (including non-energy benefits) for the Board of Executives (type of behaviour: organisational-political)

During and after the workshop, these three top issues were broken down into the following, more concrete actions:

1. Coupling ICT and schedules
2. Addressing the heating in the buildings on weekends
3. Develop communication strategy for staff and students
4. Develop ambassador's role and make it happen in practice
5. Organise a talk with the Board of Executives to discuss questions 1, 2 and 3
6. Address the issues pointed out at the Sustainability Tables at the RUG
7. Something entirely different, namely…….

And we asked the participants to explain for each chosen action:

- What will your role be?
- With whom will you collaborate?
- What instruments do you have at your disposal?
- What will be in it for whom?
- When will you take this on?
- How will you make this intervention as visible as possible?

The first workshop was held in February 2016. In May 2016, at the Dutch conference for *ICT and Sustainability in Higher Education*, the first results were presented and discussed with participants from other Higher Education organisations. A second workshop on the University of Groningen case took place September 2016 prior to the *Behave* conference. In addition, another workshop is planned for March 30th 2017 where we will invite other universities (including from the applied sciences) and student networks to discuss the findings so far and to see if there is potential to co-develop an intervention across universities in the Netherlands.

Methods used to perform the analysis of the Groningen situation and to help create an intervention included desk-study research, interviews, workshops, co-creation dialogues and storytelling. To collect and organise the data in a systematic manner, we developed templates for the interviews, workshop-templates (e.g. for participants to fill in their role and mandate; or to write up a story); and for the case studies. The rather broad and general case-study framework used in Subtasks 1 and 2 was adapted in an iterative process of discussion, comparison and contrasting these cases with findings in Groningen, since these addressed very specific interventions. As for the Groningen case study, we have built up empirical reporting (in Dutch), and shared *ex durante* analyses with the participating stakeholders, always collecting their feedback. The case study was thus developed in iterative, double-loop learning cycles[8].

Conclusions and Upcoming Activities

Despite the meticulous preparations, motivated staff and inspiring workshops, and the enthusiasm from partners such as the *Green Office* (the 'Middle Actor' *Behaviour Changer*, the student network of

[8] See Annex D – Research Case University Groningen

the University), the intervention in Groningen was hindered by the position of the 'Decisionmakers': the Chairman of the Executive Board, who refused to go beyond 'low hanging fruit' - or even to make any investments in substantial energy and CO_2 reduction efforts. This was a disappointing, but valuable experience highlighting that we did not take sufficient time to reach a thorough common understanding of the underlying conflicts and issues, before moving on to direct action.

The outcome led initially to an impasse. Fortunately, we were able to present the University case during an international Task 24 workshop as part of the *BEHAVE* conference, where we could workshop it with about 20 international experts from the field of energy and behaviour in September 2016. The solution that came up was: The *Green Office* Groningen should take ownership instead of waiting until the boardroom issue was solved, because:

- The Green Office is ultimately the legitimate owner
- The Green Office is the appropriate party to mobilise students and staff and represent them on the Executive Board
- The Executive Board is benevolent but also maintains a certain frame / discourse and the challenge is to change that without it feeling like it is taking huge (financial) risks
- That means that some options should be better developed with expertise from the University, which explicitly include attention to identifying and qualifying non-financial benefits

These ideas of the *Experts* were discussed with the *Green Office* Groningen and a representative environmental and health officer at the University, another *Middle Actor*. Both groups were interested in the recommendation to take ownership and both saw some concrete ideas how to do this.

Commitment to take up the above path was expressed and 2017 will be about further drafting the necessary roadmap. As such, it can be concluded that the first phase of the *Collective Impact Approach*, which is focused on "Initiating action: understanding the landscape, key players, existing work, baseline data on problem, initial governance, and champions", was successfully conducted and the first steps towards the second phase of the *Collective Impact Approach* has started: "Organising for impact: working together towards common goals and shared measures, creating a backbone structure, aligning the rest of the stakeholders".

Another aspect of Task 24, our widespread use of *storytelling* as a shared 'language' (e.g. Rotmann et al 2015 and Rotmann 2017), could also come in handy when convincing the *Decisionmakers* of the validity of a pilot – this is particularly the case once multiple benefit analysis for all Behaviour Changers have been undertaken. Once it is clear which co-benefits accrue to each *Behaviour Changer* and how to measure them (e.g. for *Decisionmakers* it could be identifying energy efficiency intervention with a decent ROI, low risk profile but high potential for additional awards or great PR for the University), the right story can then be shaped to be told to that specific *Behaviour Changer,* and their stakeholders (e.g. University board of shareholders). This forms the final plank of the *Collective Impact Approach*, as part of the dissemination strategy.

Our schedule for 2017 was as follows:

• We (the *Middle Actors* at RUG and the Dutch *Facilitator* team for Task 24) would have looked for opportunities with a small starting amount (10K) (to be financed by the *Decisionmakers,* the Executive Board) to get started in the form of a revolving fund to get incrementally started working on sustainable computing and behaviour change.
• Part of the budget would have been used to buy expertise of the *Expert Behaviour Changers*: the researchers at the University to do research into the practices around ICT and behaviour at the University amongst the *End Users*. There's already work done by a student who has looked at the potential of various ICT sustainability options for saving, so the data is there to be analysed (not done).
• A research programme could have been also be set up in which researchers (the *Experts*) explicitly

to investigate the multiple benefits of ICT sustainability and translate this into more quantitative indicators and stories so that the Executive Board (the *Decisionmakers*) could have worked with them in its rating practices.
• The plan was to partially start all this in a workshop end of March 2017 and a subsequent hackathon. This work was not completed.

The *Green Office* intended to take the lead on this in spring of 2017 and the representative from the environmental / occupational health service have expressed commitment to tackle this task from their angle.

In addition, we had 2 other plans (not completed):
In March 30th 2017, we planned to organise a workshop for all Green Offices in the Netherlands in cooperation with *Green Office Coordination NL*, *BE* and students' *Network of Tomorrow* and the Provider of the ICT at Universities SURF SARA. It would have been a workshop on lessons learned on ICT and how ICT can be more sustainable and/or how ICT can be used to reduce power consumption of a University. Also, the role of Green Offices in facilitating projects around ICT and sustainability would have be discussed. Other initiatives for 2017 would have included:

- Policy workshop with the Behaviour Insight Team (a team from policy makers in several departments of the Dutch government, who aim to address behaviour factors in the execution of policies
- Presentations to meetings of Green Deal and TLA networks
- Connections to other European/global efforts.

Subtasks 6&7: The other Case Studies

Directly after the selection of the top priority issues and sector, we carried out a quick scan in search of examples of universities trying to achieve energy efficiency with smart ICT solutions. The purpose was both, to support the live intervention and to strengthen the empirical knowledge base of the Task 24 network. Different sectors/domains may face different challenges but within sectors, similar practices, norms, organisational structures and physical characteristics may apply.

We identified cases in Europe and South-East Asia, some with results up to **30 to 60% energy savings per year**, using ICT solutions. Based on the results and available data, we performed an in-depth analysis of the examples of the Universities Cambridge and Utrecht, analysed on what elements of the *Collective Impact Approach* were used and what elements are missing. The results of both cases (see Annex E) are used to give recommendations for future systemic changes in bureaucratic and hierarchical systems.

Utrecht University case study

The *Green Office*, an internal student-driven university organisation that promotes sustainability at the University of Utrecht, focused explicitly on ICT. The *Green Office* is trying to save energy in ICT at the University of Utrecht (UU) by a combination of technical adaptations and behaviour change.

In the Utrecht case it was clear that the institutional climate was not optimal for change. The *Green Office* aimed at facilitating and coordinating energy conservation measures related to ICT (become the **backbone**), but they lacked the power and resources to do so. Communication was not always clear and sufficient. There was a lack of reinforcing activities at the start. The moment that the internal cooperation improved, stakeholders (*Behaviour Changers*) started to reinforce each other and changes were made. No shared measurement system was possible in Utrecht as stakeholders were not working in the same direction.

Thus, it can be seen that in the Utrecht case that, towards the end of 2016, only one condition of success for a collective impact was fulfilled: **Mutually reinforcing activities**. The other conditions for a collective impact were missing. The *Green Office* can function as a backbone organisation, if they are supported by other stakeholders like the Board of Executives. The combination of missing factors – especially insufficient and unclear **communication** - meant that the project is still not fully implemented. Some successes are found, like the implementation of the proposed changes at all staff computers, but the project remains underway.

Cambridge University case study

One of the initiatives at Cambridge University (CU) was the *Energy and Carbon Reduction Project* (ECRP), founded in 2011. The aim of ECRP is to support departments to make energy efficiency improvements and reduce carbon emissions by providing funding (Bienias, 2008). The funding enables departments to implement energy-saving measures that would normally be too expensive. In total, the ECRP has a budget of 2 million pounds for four types of interventions: efficiency improvements of existing buildings, modification/upgrades of energy-intensive equipment, behaviour change initiatives and major renovations of existing and new buildings. In order to get funding, a project has to fulfil several criteria (**shared measurements**). This clearly sets a **common agenda.**

In the Cambridge case, the institutional climate was more optimal than in Utrecht. Pressure from the British government resulted in the development of the *Carbon Management Plan*. Alongside government pressure, internal stakeholders also realised that the old way of working could not continue. The *Environmental Strategy Committee* took the role of **internal backbone organisation**, whereas the Board of Executives developed a common agenda (The *Carbon Management Plan*). Champions were appointed to function as a communication channel from the Board of Executives to the *End Users*. It is not certain whether **communication** was continuous among stakeholders. In addition, a shared measurement system was developed, the EIS, which specified that all departments were judged on the same standards. A combination of projects (ECRP, EIS, Carbon Management Plan) and cooperation among stakeholders resulted in **mutually reinforcing activities**.

Thus, it can be seen that in the Cambridge case at least four out of five conditions for a *Collective Impact Approach* are found. It is not clear whether the fifth condition (**continuous communication**) is fulfilled as well. Although the **backbone organisation** in the Cambridge case does not completely fulfil the definition defined by Kania and Kramer (2011), still, it is believed that committees like the *Environmental Strategy Committee* can fulfil that role well. However, not everything that the University of Cambridge is doing reinforces sustainability. On June 20, 2016 the Guardian publicised an article stating that the University of Cambridge is not willing to divest from fossil fuels. The University still owns a €7.3 billion endowment in fossil fuels. Even after (internal) protests, the University is not willing to divest (Vaughan, 2016). So, despite the implementation of several projects being highly promising, the University of Cambridge has a much bigger opportunity to show its commitment to sustainability by divesting.

The Cambridge case shows that a **backbone organisation** does not necessarily have to be an external organisation. Especially in the case of bureaucratic organisations that are already rather complex and slow, it can help to appoint an internal organisation to this role. This organisation will be comfortable already in the existing structure, is able to more quickly understand the relationships between actors and is more trusted compared to external organisations. Still, as seen in the Cambridge case, these internal backbone organisations are often not allowed to develop their own agenda, as this is mostly done by the Board of Executives. Therefore, more research is needed into the characteristics of backbone organisations, as it is seen that bureaucratic organisations might need a different approach in order to create a collective impact. The overall conclusion is that a strong implementation of the *Collective Impact Approach* indeed increases the chance of success of projects in bureaucratic

organisations. Still, the *Collective Impact Approach* as designed for social entrepreneurs, will need some adaptions before it can be fully implemented. Especially the nature of the backbone organisation needs more research (internal and external nature of backbone organisation)[9].

Recommendations based on the case studies

The analysis of the cases has shown that the implementation of the five conditions of the **Collective Impact Approach** is an essential factor in the success of a project. Based on both case studies (Utrecht and Cambridge) the following recommendations can improve future (bureaucratic) projects.

1. Shared knowledge base

It is important that all stakeholders have a certain knowledge base concerning energy conservation measures and keep on learning and sharing their knowledge during a project's lifetime. According to Geels and Raven (2006), circulation of knowledge is important as it stimulates local knowledge generation and formulation of generic patterns. Knowledge circulation inside faculties creates the possibility to experiment on a local scale. Lessons learned can be implemented University-wide and are thus more generic. In the end it is believed that the circulation of knowledge will stimulate knowledge diffusion and also the development of generic lessons that can be implemented in comparable projects. As every single unit has their own knowledge and lessons, it is of high importance that all actors are involved. This will help when setting a **shared agenda**.

2. Participation of all actors

It is recommended to develop **mutually reinforcing activities** in order to create a collective impact. Participation of all actors will create a differentiated field of actors in which every actor can do what they are best at and what fulfils they stakeholder needs and mandates. Cooperation can help redevelop standard systems in such a way that they work for specific situations, but the lessons learned can work for comparable projects as well. A lack of expectations and vision in policy can create tensions between stakeholders. Expectations and values need to be **communicated clearly and continuously** with all stakeholders. In order to be able to communicate expectations and values, clear and concrete policy targets and **shared measurements** with respect to sustainability in ICT need to be set. When these targets are communicated to all stakeholders, everyone knows what to expect and what others expect from them.

3. Systematic communication

It is recommended to have **continuous communication** aimed at building trust, assuring mutual objectives and developing common motivation (Kania and Kramer, 2011). Not only in communication of expectations but also for communication in general, it is important that expectations and visions are clear. Collaboration and an open dialogue will create knowledge among actors what the expectations are other stakeholders might have. Also spreading the word via videos, posters and flyers is assumed to create more knowledge about expectations (Orzanna et al., 2014). This is where *storytelling* can be highly useful, especially if it is undertaken with the view to disseminate outcomes tailored to each *Behaviour Changer's* expected co-benefits.

4. Participation Ongoing Development of the Common Agenda

The **common agenda** is crucial as a guideline to all stakeholders. It can prevent tensions between actors and overlap between actions. Therefore, it is recommended to develop a common agenda in projects in order to get everyone pointed in the same direction and to create a common understanding of the problem and solution in order to make sure all actors agree on taking the same road to the final destination (Kania and Kramer, 2011).

5. Participation in Shared Measurement Systems

Next to a **common agenda** and **mutually reinforcing activities**, **shared measurement systems** are also an essential factor for a successful collective impact. It is important that everyone feels partly responsible and engaged before making the decision to invest money, people and resources in sustainability. It is known that if people are, for example, punished for not being sustainable and rewarded for being (more) sustainable, the incentive for sustainability increases: people start to feel more responsible as being sustainable becomes ''their problem''. For example, the *Electricity Incentivisation Scheme* at the University of Cambridge created an external pressure for the stimulation

[9] Cobben, D. (2017) The collective Impact Approach in relation to ICT and Sustainability in Higher Education. Case studies Utrecht and Cambridge. Duneworks.

of responsibility. This polluter-pays principle system resulted in a situation where all faculties were judged equally on their energy usage. Equality is created as everyone is judged on the same baseline. Actors can hold each other accountable and track each other's progress and compare their results (Kania and Kramer, 2011). Based on the combination of knowledge from theory and practice it is thus recommended to develop a shared measurement system in order to make sure that all actors are judged on the same criteria, creating aligned efforts (Kania and Kramer, 2011).

6. Install a Backbone Organisation

The last recommendation based on the *Collective impact Approach* is the importance of having a trusted, independent **backbone organisation** facilitating projects. When bureaucratic organisations start projects, it can be quite difficult to appoint a suitable independent organisation that could fulfil this role. The University of Cambridge is the perfect example that the backbone principle can work at hierarchical organisations, but the definition of backbone has to be refined. At the University of Cambridge, the backbone organisation did have the power and resources to execute the project, but they did not develop a **common agenda** themselves: this was done by the Board of Executives. Still, it fulfilled the role of connecting various faculties and other important actors. It also facilitates and coordinates the execution of the Carbon Management plan. It is thus recommended to have an actor that fulfils at least some important characteristics of the backbone organisation to be able to connect the different actors. The *Green Offices*, found at many universities, could be enabled to fulfil this role.

In sum it can thus be said that it is important to fulfil the five criteria of the *Collective Impact Approach* of Kania and Kramer (2011) in order to create a successful collaborations: **shared measurement system, mutually reinforcing activities, a backbone organisation, continuous communication** and a **common agenda**.

In addition to recommendations based on the Collective Impact Approach, some general recommendations can also be given that can be used to solve barriers for existing and future cases:

Divide Responsibilities

Responsibility among staff and students could be stimulated by the use of a dedicated *Behaviour Changer Champion*. This person can help to make sure universities are (intrinsically) motivated. It could help to appoint dedicated persons that *supervise ICT energy consumption, implement energy conservation programmes and function as contact person regarding ICT energy use. These persons, which are described in* the Collective Impact Approach *as* champions*, can stimulate and help other persons to understand why it is important to save energy and how it can be done. Thus it is recommended to use the* Behaviour Changer Framework *in order to analyse how all* Behaviour Changers *ranging from the* Experts *to the* Decisionmakers *can change the behaviour of* End Users*, together.* The integration of Behaviour Changers creates more trust among employees, stimulating them to become intrinsically motivated and engaged in energy-saving projects.

Sticks, Carrots and Competition

The *Electricity Incentivisation Scheme* at Cambridge is based on the polluter-pays principle. As explained, faculties going over the predefined baseline of energy usage have to pay penalties, whereas faculties staying below the baseline receive money. The money can be spent on further energy-saving projects, but is sometimes also used to create a community feeling, for example, by organizing a tea party for the staff (University of Cambridge, 2016)[1]. The *Electricity Incentivisation Scheme* case is thus a perfect example of implementation of the polluter-pays principle, to decrease energy usage in ICT. This principle creates incentives for people or faculties to invest in energy conservation measures on one hand, but also creates both internal cohesion (inside faculties) and competition (between faculties).

The competition element is also an effective tool to stimulate desired behaviour. As all faculties have insights into the performance of others, the natural response is that everyone wants to be the best. Not only on faculty level, but also inside faculties, competition games have started that create and maintain attention. For example, in some faculties, competition is going on between labs to have the highest energy savings (University of Cambridge, 2016)[4]. Therefore, it is recommended to introduce a competition element in energy savings in order to stimulate complete faculties to save energy.

Provide Resources

Not every faculty has the resources available for investments in energy saving. The University of Cambridge started the *Energy and Carbon Reduction Programme* faculty which is a funding site for energy saving projects. The ECRP not only provides money, but also does several other things like developing communities for employees to take action within their working environment. The money is often invested in sensors for tracking energy usage, renewable and low carbon technologies, renovation of existing buildings or integration of new technologies into new buildings (University of Cambridge, 2016)[1]. Large amounts of energy are currently saved at the University of Cambridge, thus, it is recommended for comparable projects to set up similar funds that can help faculties with investments in energy-saving solutions.

Adapt Job Descriptions

The last recommendation aims at the job descriptions of employees. It was seen in the Utrecht case that people tend to ''ignore'' energy conservation measures as they feel that it adds extra workload to their jobs that are already full in terms of tasks to do. When sustainability coordinators were appointed at the University of Utrecht, suddenly, energy conservation policy became an important agenda point for the two coordinators. Therefore, it is important that sustainability becomes integrated in the job description of employees in order to take away the feeling that sustainability is an extra thing to do.

IEA Demand Side Management Energy Technology Initiative

The Demand-Side Management (DSM) Energy Technology Initiative is one of more than 40 Co-operative Energy Technology Initiatives within the framework of the International Energy Agency (IEA).The Demand-Side Management (DSM) Energy Technology Initiative, which was initiated in 1993, deals with a variety of strategies to reduce energy demand. The following member countries and sponsors have been working to identify and promote opportunities for DSM:

Austria	Norway
Belgium	Spain
Canada	
Finland	Sweden
India	Switzerland
Ireland	
Italy	United Kingdom
Republic of Korea	United States
Netherlands	ECI (sponsor)
New Zealand	RAP (sponsor)

Programme Vision: Demand side activities should be active elements and the first choice in all energy policy decisions designed to create more reliable and more sustainable energy systems
Programme Mission: Deliver to its stakeholders, materials that are readily applicable for them in crafting and implementing policies and measures. The Programme should also deliver technology and applications that either facilitate operations of energy systems or facilitate necessary market transformations

The DSM Energy Technology Initiative's work is organized into two clusters:
The load shape cluster, and The load level cluster. The 'load shape" cluster will include Tasks that seek to impact the shape of the load curve over very short (minutes-hours-day) to longer (days-week-season) time periods. Work within this cluster primarily increases the reliability of systems. The "load level" will include Tasks that seek to shift the load curve to lower demand levels or shift between loads from one energy system to another. Work within this cluster primarily targets the reduction of emissions.

A total of 24 projects or "Tasks" have been initiated since the beginning of the DSM Programme. The overall program is monitored by an Executive Committee consisting of representatives from each contracting party to the DSM Energy Technology Initiative. The leadership and management of the individual Tasks are the responsibility of Operating Agents. These Tasks and their respective

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

Task 2 Communications Technologies for Demand-Side Management – *Completed*
Richard Formby, EA Technology, United Kingdom

Task 3 Cooperative Procurement of Innovative Technologies for Demand-Side Management – *Completed*
Hans Westling, Promandat AB, Sweden

Task 4 Development of Improved Methods for Integrating Demand-Side Management into Resource Planning – *Completed* Grayson Heffner, EPRI, United States

Task 5 Techniques for Implementation of Demand-Side Management Technology in the Marketplace – *Completed*
Juan Comas, FECSA, Spain

Task 6 DSM and Energy Efficiency in Changing Electricity Business Environments – *Completed*
David Crossley, Energy Futures, Australia Pty. Ltd., Australia

Task 7 International Collaboration on Market Transformation – *Completed* Verney Ryan, BRE, UK

Task 8 Demand-Side Bidding in a Competitive Electricity Market – *Completed*
Linda Hull, EA Technology Ltd, United Kingdom

Task 9 The Role of Municipalities in a Liberalised System – *Completed* Martin Cahn, Energie Cites, France

Task 10 Performance Contracting – *Completed* Hans Westling, Promandat AB, Sweden

Task 11 Time of Use Pricing and Energy Use for Demand Management Delivery- *Completed*
Richard Formby, EA Technology Ltd, United Kingdom

Task 12 Energy Standards - To be determined

Task 13 Demand Response Resources - *Completed* Ross Malme, RETX, United States

Task 14 White Certificates – *Completed* Antonio Capozza, CESI, Italy

Task 15 Network-Driven DSM - *Completed* David Crossley, Energy Futures Australia Pty. Ltd, Australia

Task 16 Competitive Energy Services Jan W. Bleyl, Graz Energy Agency, Austria / Seppo Silvonen/Pertti Koski, Motiva, Finland

Task 17 Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storages Seppo Kärkkäinen, Elektraflex Oy, Finland

Task 18 Demand Side Management and Climate Change - *Completed*
David Crossley, Energy Futures Australia Pty. Ltd, Australia

Task 19 Micro Demand Response and Energy Saving - *Completed* Linda Hull, EA Technology Ltd, UK

Task 20 Branding of Energy Efficiency - *Completed*
Balawant Joshi, ABPS Infrastructure Private Limited, India

Task 21 Standardisation of Energy Savings Calculations – *Completed* Harry Vreuls, SenterNovem, Netherlands

Task 22 Energy Efficiency Portfolio Standards – *Completed* Balawant Joshi, ABPS Infrastructure Private Limited, India

Task 23 The Role of Customers in Delivering Effective Smart Grids - *Completed*
Linda Hull, EA Technology Ltd, United Kingdom

Task 24 Phase 1: Closing the Loop: Behaviour Change in DSM – From theory to practice
Dr Sea Rotmann, SEA – Sustainable Energy Advice Ltd, New Zealand and Dr Ruth Mourik, Duneworks, Netherlands – *Completed*

Task 24 Phase 2: Behaviour Change in DSM - Helping the Behaviour Changers
Dr Sea Rotmann, SEA – Sustainable Energy Advice Ltd, New Zealand

Task 25 Business Models for a more Effective Market Uptake of DSM Energy Services
Ruth Mourik, DuneWorks, The Netherlands

For additional Information contact the DSM Executive Secretary, Anne Bengtson, Liljeholmstorget 18,11761 Stockholm, Sweden. Phone: +46707818501. E-mail: anne.bengtson@telia.com
Also, visit the IEA DSM website: http://www.ieadsm.org