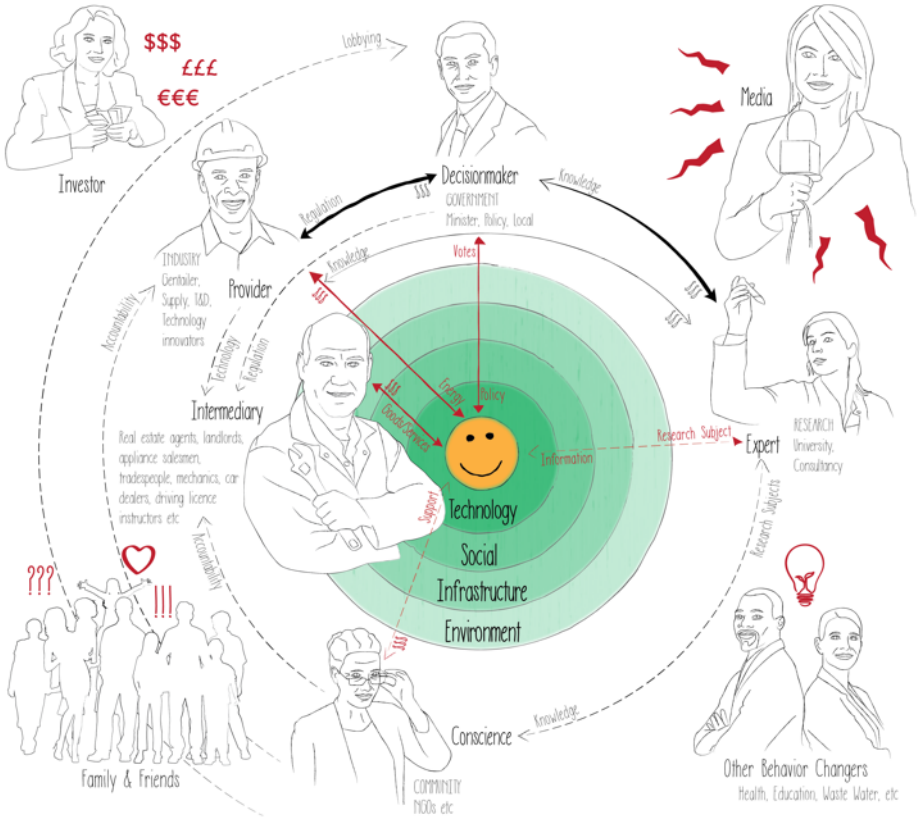
International Energy Agency
Technology Collaboration Platform
Demand Side Management Technologies and Programmes



Subtask 6&7: Case Studies NL

Task 24 – Phase II

Behaviour Change in DSM: Helping the Behaviour Changers

Higher Education and ICT

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Contents

1. Introduction 3
   Introducing Universities, ICT and behaviour change 3
   Task 24 and the case analysis 3
2. Theory 5
   Collective Impact Approach 5
   Behaviour Changer Framework 6
3. Methods 8
4. The case studies 8
   4.1 Utrecht University 8
      The power to save power 10
      The power of miscommunication 10
      Raising awareness 10
      The future of sustainable policies 11
   4.1.1. Does Utrecht meet the Collective Impact Approach? 12
      The power of miscommunication, lack of mutually reinforcing activities and shared measurement systems 12
      Common or separate agendas? 13
      Green Office as backbone organisation? 14
   4.1.2. Did Utrecht meet the Behaviour Change Framework criteria? 14
   4.2 University of Cambridge 15
      Standing on the shoulders of giants 16
      The power of the Environment and Energy Coordinator 16
      Dare or do? 17
      Focus, focus, focus 17
   4.2.1. Does Cambridge meet the Collective Impact Approach? 17
      Backbone organisation or not? 17
      Carbon Management Plan 2010-2020 18
      Shared measurement system 18
      Mutually reinforcing activities 19
   4.2.2. Does Cambridge meet the Behaviour Changer Framework? 19
5. Conclusion 19
      Energy Conservation Projects in ICT 21
6. Limitations and future research 21
7. Recommendations 22
   Knowledge 22
   Intrinsic motivations 22
   Extrinsic motivations 22
   KPIs 23
8. References 23

1. Introduction

Introducing Universities, ICT and behaviour change

Universities across the world are struggling to become more sustainable, but are facing several challenges in doing so. A first challenge is that Universities are often highly bureaucratic and hierarchical systems, which include several administrative layers to deal with large amounts of students. Consequently, change towards more sustainable practices is not always easy (Kühl, 2014). Another challenge is that the increasing use of ICT has resulted in increased energy consumption of Universities over the last few years. This increasing impact of ICT on the energy consumption of Universities is related to the important role ICT plays in both education and research activities. ICT is, for example, used for online learning environments and direct interactions between teachers and students. On the other hand, ICT is also used as a way to save energy by obtaining greater energy efficiency and conservation, for example, by coupling sensors and heating systems.

In terms of sustainability, ICT is a field in which energy can be saved using rather simple methods, for instance, by lowering the screen brightness or putting computers into standby when they are not used. In many Universities, ICT management is the responsibility of both individual faculties and a University-wide faculty. The communication between both is not always straightforward (Orzanna et al., 2014). The combination of lack of communication and the bureaucratic and hierarchical nature of higher education facilities creates yet another challenging situation for the implementation of energy conservation measures focused on ICT. Indeed, we did not find many successful cases on energy conservation related to the use of ICT nationally, or internationally. Two of the most interesting ICT and energy conservation projects (one Dutch case and one English) were used for this case study analysis. The analysis was performed using the *Collective Impact Approach* (CIA) and Task 24s *Behaviour Changer Framework* (BCF, both are discussed in the next sections).

The first case, "ICT Energy Conservation at the University of Utrecht" was initiated by the *Green Office*, a within-University organisation with a high level of student involvement that promotes sustainability at the University. The *Green Office* focused explicitly on ICT as it was acknowledged to have a growing impact on both education and energy demand-side management. The approach that the *Green Office* used is a combination of technical adaptations, behaviour change and awareness raising. An important focus is on investigating (mis)alignments among actors. The intervention explicitly aimed to be a bottom-up initiative.

The second case addresses the "Electricity Incentivisation Scheme" at the University of Cambridge. Rising energy bills, financial pressures, the UK Government's *Carbon Reduction Commitment*, *Energy Efficiency Scheme* and carbon emission targets caused the University of Cambridge to feel it had to act (Bennet, 2012). The University of Cambridge proposed the *Electricity Incentivisation Scheme* which is based on the 'polluter pays' principle. This means that faculties that used more than a predicted baseline had to pay (University of Cambridge, 2016)[7]. The Board of the University of Cambridge is trying to save energy used by ICT through a combination of technical adaptations and behaviour change as well. An important focus is the need of a top-down approach to create success.

Task 24 and the case analysis

This report is part of Task 24 of the International Energy Agency's Demand-Side Management Technology Cooperation Programme[1]. This DSM programme is an international cooperation of 17 countries and sponsors who jointly work on activities and promotion of demand-side management. DSM enables solutions for problems in the areas of load management, energy reduction, energy efficiency, strategic conversations and other related activities. Task 24 aims at bringing together knowledge about behaviour change from several countries, learn from each other's experiences and analyse existing case studies as well as showing how behavioural theory can work in (best) practice. The final aim of Task 24 is to develop useful policy recommendations and an overarching storyline for behaviour change in DSM.

[1] www.ieadsm.org/task/task-24-phase-2/

The first phase[2] of Task 24 was aimed at the translation from theory to practice. Findings from this phase are now being used in practice in the second phase. These findings include the realisation that social systems are complex and difficult to change, and that consequently, collaboration among multiple stakeholders (or 'Behaviour Changers' in this Task) is very important (see Rotmann, 2017 *forthcoming* for a description of the Task and its tools). Shared learning and a shared 'language' that reduces jargon can support successful implementation of behaviour change interventions. Another finding is that a combination of top-down and bottom-up approaches is facilitating change – especially if supported from the middle-out by an independent *Facilitator* like Task 24. And that new ways of communicating are proven to be effective in aligning stakeholders, e.g. the use of cartoons, design characters and storytelling (Rotmann et al 2015).

In the second phase of this Task, explicit attention is given to supporting *Behaviour Changers* (so they can better change behaviours of *End Users*). The target audience for this Task is thus not the energy *End User* (though *End User* representatives are preferably involved from the beginning) but the people in charge of designing, implementing and evaluating behaviour change interventions on these *End Users*. These are called *Behaviour Changers* and fall into five main categories: *Decision-maker*, *Provider, Expert, Conscience* and *Middle Actor* – these often, but not always, coincide with representatives from government, industry, research, the third and the service sectors (Rotmann 2016). Another activity of this second phase is the development of a toolbox of interventions in cooperation with *Behaviour Changers* working for a specific project (Subtask 8). Lessons learnt can be used to show others what the impact can be when Behaviour Changers start to focus on shared learning and creation of a shared language to more effectively cooperate in order to change the behaviour of *End Users*.

Task 24 uses two different, yet complimentary, approaches in the more practice-oriented Phase 2: *The Collective Impact Approach* (Kania and Kramer, 2011) and the *Behaviour Changer Framework* (Rotmann, 2016). The *Collective Impact Approach* (CIA) was first developed by Kania and Kramer in 2011 to aid social entrepreneurs. This approach, aimed at long-term social change, proposes a collective, rather than an individual approach for solving social problems. Walzer et al. (2016) argues that complex situations which would normally be difficult to solve, can be solved using the CIA. Five conditions are listed that are needed to create such a collective impact:

1. **a common agenda,**
2. **mutually reinforcing activities,**
3. **a shared measurement system,**
4. **continuous communication and**
5. **a backbone support organisation**.

Kania and Kramer (2011) explain that **backbone organisations** are especially important for providing direction, facilitation of the dialogue, mobilising funding and handling all the different layers of linked collaboration. As such, this condition is of particular importance to affect the complex social change that is needed with respect to more sustainable use of ICT at Universities.

To create a more hands-on tool to identify and work on the five conditions of the CIA, Task 24 developed the 'Behaviour Changer Framework' (BCF). This framework was created to have an overview of the social system focusing on all relevant stakeholders, i.e. the *Behaviour Changers* from the different sectors and their relationships with one another, and the *End User*. This framework focuses on a chosen issue (Subtask 6) from the perspective of the *End Users* and their behaviour, and their context in terms of technology, social aspects, infrastructure and environment. It also focuses on each of the *Behaviour Changers* in the system, what their main mandates, stakeholders, restrictions and tools are and how they interact with one another and with the *End User* (Rotmann 2016).

Both the Utrecht and the Cambridge cases are examples of bureaucratic and hierarchical systems that experience change. Both Universities did not explicitly use either the *Behaviour Changer Framework* (BCF) or the *Collective Impact Approach* (CIA). As explained earlier, in these systems change is not always easy due to many administrative layers (Kühl, 2014). CIA offers a way to implement change via a top-down/bottom-up mixed approach. Most research on the *Collective*

[2] http://www.ieadsm.org/task/task-24-phase-1/

Impact Approach focuses on situations in which a collective impact is created by organisations that are independent units. In bureaucratic, hierarchical systems like Universities, many internal separate organisations and faculties are found. The question is which elements of the CIA can be recognised in case of internal change in such organisations and whether they have a positive impact on the implementation of sustainable ICT changes.

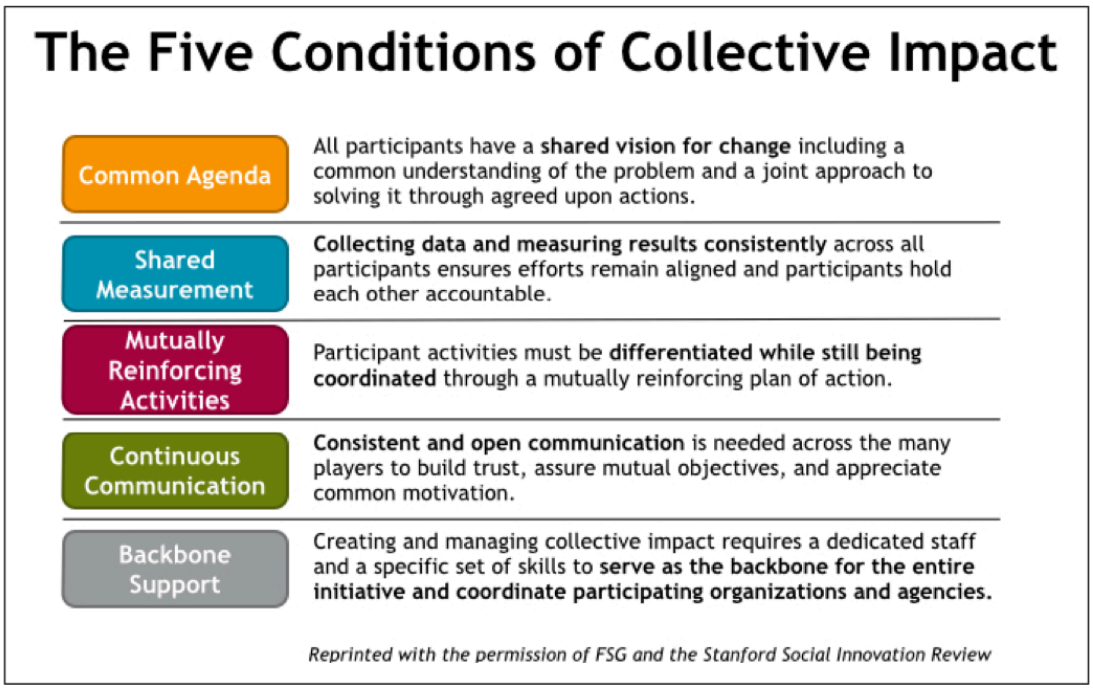
This leads to the following research question: *How can the* Collective Impact Approach *contribute to the success of behaviour change interventions in highly bureaucratic systems?* This research question was formulated to both be able to expand the empirical knowledge base on behavioural change, and to learn about the usefulness of the *Collective Impact Approach* in the specific context of higher education and ICT use.

Before answering the research question, first, a theoretical background is given concerning the *Collective Impact Approach* and the *Behaviour Changer Framework*. Then, the Cambridge and Utrecht case are discussed in more detail, analysing which elements of the CIA are missing and which elements can be found in both approaches. Based on this analysis we conclude with recommendations for future change in bureaucratic and hierarchical systems.

2. Theory

Collective Impact Approach

Social problems are notoriously complex and difficult to solve by individual organisations alone. Kania and Kramer (2011) introduced the *Collective Impact Approach* (CIA) that proposes a collective, rather than an individual approach for solving social problems. This CIA is described by Collaboration for Impact (n.d.) as: ‘’*…an innovative and structured approach to making collaboration work across government, business, philanthropy, non-profit organisations and citizens to achieve significant and lasting social change*.’’ Kania and Kramer (2011) initially described five conditions that have to be fulfilled in order to create collective impact, namely:



A **common agenda** is important to create a common understanding of the problem and the solution in order to make sure all *Behaviour Changers* agree on taking the same road to the common goal. It is also important that the relevant *Behaviour Changers* perform **mutually reinforcing activities**, making sure that they do not impede other *Behaviour Changers* or their stakeholders. Thirdly, it is also important that there is a **shared measurement system** so that outcomes of all *Behaviour Changers* ’ actions are measured and reported in the same way in order to share and learn from each other. In order to create trust and a common vocabulary, it is of high importance that actors **communicate continuously**. Lastly, Kania and Kramer (2011) state that it

is important that a separate **backbone support organisation** is created that facilitates a change of mind set, attracts attentions and mobilises resources (Kania and Kramer, 2011).

The first version of the *Collective Impact Approach* did mention five principles on which successful collective impact should be based. However, nothing was said on steps that should be taken or what type of organisations could function as backbone organisations. In 2012, Kania and Kramer, together with Hanelybrown, wrote a second article in which they remedied both shortcomings. Kania, Kramer and Hanelybrown (2012) state that there are three phases that have to be fulfilled for creating collective impact. In the first stage, **action has to be initiated**. In order to do so, first the landscape of the social problem has to be understood and a champion has to stand up. Only in their second article, did Kania, Kramer and Hanelybrown (2012) discuss the importance of champions who should take care of attracting financial resources and creating a sense of urgency. The champion should show the importance of collaboration. In the second phase it is important to **organise for impact**. This means that common goals, a shared measurement system and backbone organisation have to be arranged. In the third and last phase **action has to be sustained** and impact should arise. **Active learning and coordination** is described to be essential for success (Kania, Kramer and Hanelybrown, 2012).
Kania and Kramer (2011) explained that **backbone organisations** are important for providing direction, facilitation of the dialogue, mobilising funding and handling all the different layers of linked collaboration. They also needed a second article to zoom in more closely on the backbone organisation. Kania, Kramer and Hanelybrown (2012) state that the exact origin of the backbone organisation is situation- and location-specific. The backbone organisation does not always have to be a new organisation, but it can also be intermediaries, governments or non-profit organisations. Despite the background of the backbone organisation, Kania, Kramer and Hanelybrown state that there is a need of both adaptive leadership at the front, but also an ability to manage behind the scenes (Kania, Kramer and Hanelybrown, 2012).

After Kania and Kramer (2011) introduced the CIA and after further build-up of the framework in 2012 together with Hanelybrown, other scholars responded. Two scholars, Christens and Tran Inzeo (2015), for example, state that in addition to the matter that social problems are complex as mentioned by Kania and Kramer, theories like the CIA also gain influence due to: '' *… the increasingly complex, disconnected, and competitive terrain of local organisational ecologies.''* (p. 423). According to these scholars, a major barrier for social change is the current fragmentation of local systems.

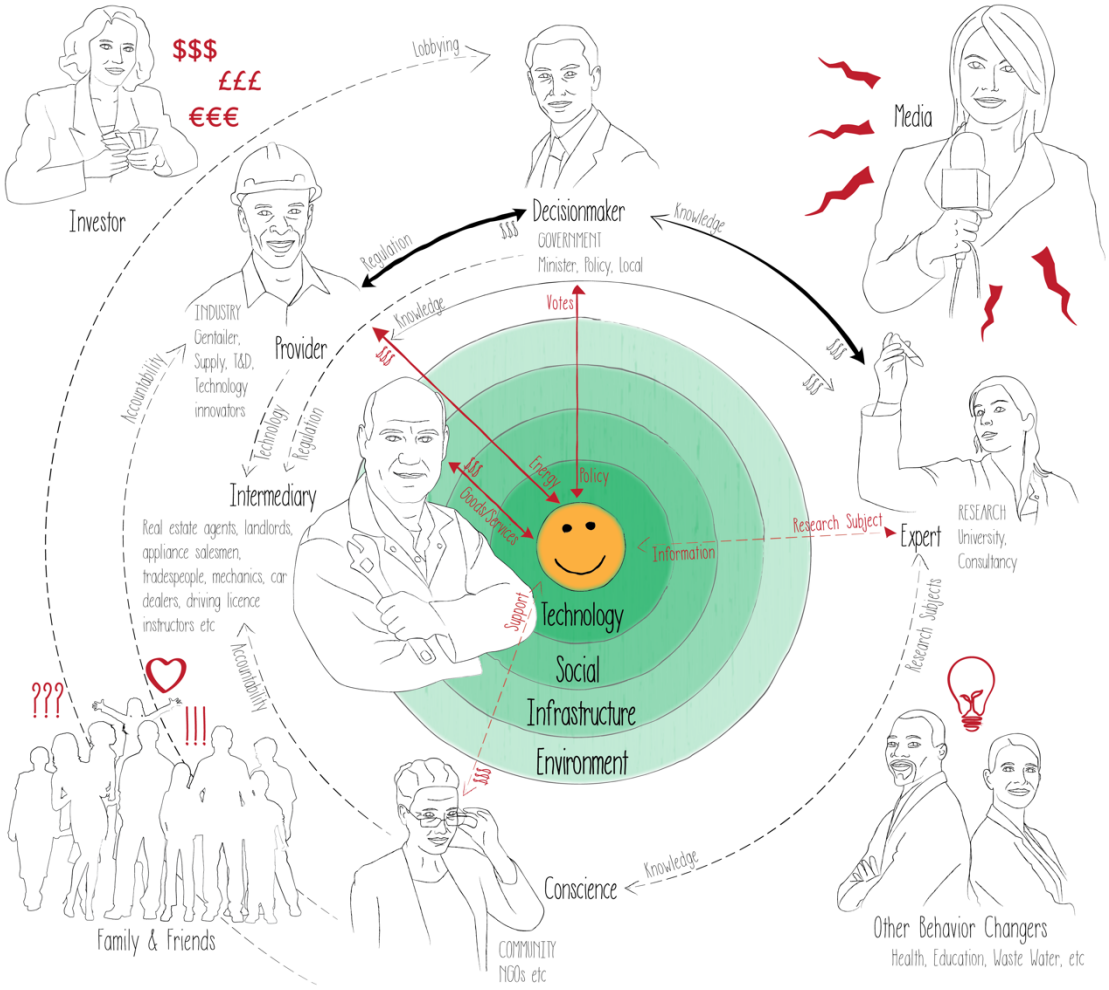
Christens and Tran Inzeo (2015) also state that the CIA is not necessarily a new theory, but a synthesis of practice-based principles for tackling complex social problems. They also mention some important points that the framework misses, e.g., the importance of involving local residents. The *Collective Impact Approach* focuses mostly on organisations, governments and companies, whereas grassroots community groups, for example, focus on local residents. Thus, the framework is focusing largely on a top-down approach, missing partly the bottom-up approach that is essential to engage the *End User* and enable change. Last, Christens and Tran Inzeo (2015) state that it is important to also investigate the intersections of social participation theories in order to use the strong points of all theories.

Not only the popularity and background of the CIA were discussed: It was also discussed by both scholars and internet communities that starting a *Collective Impact Approach* is not always easy. One of the hardest thing about realising a collective impact is money. Quite some investments are needed upfront for realising a **backbone organisation** (Collaboration for Impact, n.d; Christens and Tran Inzeo, 2015; FSG, 2016). FSG (2016) goes one step further and states that, in particular, the social sector is not ready yet for the CIA. They explain that there is a need for a shift in how practitioners design and implement social change, how funders handle grantees and the roles of governments. According to them, it is important that in the early stages of a programme, for example, the governments and funders have clarity as to what is aimed for and that they are willing to invest (FSG, 2016).

Behaviour Changer Framework

As was explained in the previous section, the *Collective Impact Approach* aims at providing collective impact. The first description of the approach did introduce a theory that could change the

world, but did not tell us how, exactly. The second version explained in more detail what is needed to initiate a collective impact. Still, it is quite hard to start with the CIA not only from a monetary, but also from a social perspective. Christens and Tran Inzeo (2015) discussed that the *End User*/local residents are often not directly incorporated in the decision-making of social changes. In Task 24, therefore, a *Behaviour Changer Framework* was developed in order to take note of this end-user perspective. To be able to change the behaviour of *End Users*, an overview of the social playing field including conflicts and barriers is invaluable knowledge for *Behaviour Changers*. This *Behaviour Changer Framework* allows an end-user perspective with a focus on their behaviour and on the technological and social aspects, infrastructure and wider environment (including political pressures) that need to be changed for solving a social problem (Rotmann 2016). Next to this end-user perspective, a strong focus is given to the *Behaviour Changers* and their mandates, tools or instruments, restrictions, and stakeholders they need to perform their role (Rotmann 2017a forthcoming).



The *Behaviour Changers* which commonly have the most 'powerful' impact, the *Decisionmakers*, have different tools like policies, taxes and incentives and legislations to influence behaviour. The second type of *Behaviour Changer* is the *Provider*, often but not always the energy industry, that are focused on providing energy or energy-using technologies with the main mandates of making money for their shareholders and keeping the energy system running. They have different tools, e.g., marketing campaigns or changes to billing systems, with which they can influence *End Users*. The third group, the *Experts*, can both validate and criticise technologies. They have different tools ranging from scientific papers, to big data analysis and evaluation to undertaking interviews, surveys and focus groups. The fourth group is the *Conscience*, often consisting of community groups, NGOs and other organisations accountable for the *End Users* or to reduce the social and environmental impact of the energy system. They use tools like the media, mass marketing and activist campaigns in order to change behaviour. The last group is the *Middle Actor*, often from a service sector in direct contact with the *End User*. They have tools like direct access to consumers, technological information and labels. In addition to various relationships and relationship flows (e.g.

money for energy) between the *End Users* and *Behaviour Changers*, the *Behaviour Changers* also have various relationships of various strengths with one another. Indirect influencers are the *Media, Investors, Family and Friends* and *Other Behaviour Changers* (Rotmann 2016).

The *Collective Impact Approach* is mostly a top-down approach working on the higher levels of social change, whereas the *Behaviour Changer Framework* can be used complementarily as a way to directly focus on changing the behaviour of *End Users* via a bottom-up approach in collaboration with the relevant *Behaviour Changers,* also enabling a middle-out approach. The *Behaviour Changer Framework* thus offers important additional aspects that should be taken into consideration when creating a collective impact, namely the end-user perspective and a clear visualisation of the current energy system, as viewed through the human lens. This includes different conflicts and mandates and different flows of goods and services leading to different strengths in relationships and different tools that each *Behaviour Changer* brings to the table.

The *Behaviour Changer Framework* incorporates those who often do not have a direct say in decision-making processes. The knowledge about the barriers that *End Users* experience can be taken into consideration by the *Behaviour Changers*. By incorporating the knowledge about problems that *End Users* experience, the additional bottom-up and middle-out approach and collaboration among *Behaviour Changers*, a ''collective'' is created which stimulates a feeling of cohesion and empathy. This is a good start for successful communication and recognition that is important for creating a collective impact. Thus the *Behaviour Changer Framework* and *Collective Impact Approach* are able to create a stronger collective impact when combined.

3. Methods

As described in the introduction, the combination of the *Collective Impact Approach* and the Behaviour Changer Framework offers a way to implement change via a top-down/bottom-up mixed approach. In order to investigate whether the CIA is conducive for change in bureaucratic and hierarchical systems like the Higher Education sector, a comparative case study analysis was used to analyse the presence of the essential conditions for a collective impact in the Cambridge and Utrecht projects (Yin, 2014; Kania and Kramer, 2011). Both Universities did not explicitly use the CIA. The approach is based on real-life cases that became successful by using five critical conditions for a collective impact (Kania and Kramer, 2011). We thus investigated what conditions of the CIA could be recognised in the University case studies as no research has been done on the use of the CIA to facilitate ICT energy conservation projects inside bureaucratic and hierarchical organisations.

Observations from both cases are organised and integrated into specific themes for both projects (local integration). The project-specific themes are integrated into an overall conclusion per project (inclusive integration) to be able to generalise the results found in the two projects and contribute to research of the use of the CIA in higher education and ICT (Weiss, 1994). In order to investigate both cases, a wide variety of sources was used, varying from journal articles to webpages of Universities. The main documents in the Cambridge case are a *Responsible Energy Cost* discussion paper written by Bennet in 2012 and several documents provided by the University of Cambridge. The main document that was used in the Utrecht case is the project proposal of *Sustainable Development* students who initiated the idea. Online documents of the University of Utrecht and the *Green Office* were used as well. In addition, interviews were performed with three key stakeholders to enhance the research. An employee from the REBO (law, economics and business studies) faculty, an employee from the ITS (Information Technology Services) and a student from the *Green Office* Utrecht were interviewed. Unfortunately no people of Cambridge University were available to participate in this research directly. Still an employee of the University of Cambridge commented on the Cambridge case and their feedback was integrated in this report.

4. The case studies

4.1 Utrecht University

In 2014, students initiated the so called *ICT Energy Conservation* project at the University of Utrecht. A group of Master Students in *Sustainable Development* came up with the idea during an assignment of one of their courses. Before the project started, these students had found no

specific projects concerning ICT and sustainability at their University. They assumed that this was due to a combination of low awareness and busy agendas of people responsible for implementation of ICT interventions (Orzanna et al., 2014). Although no real projects or pilots were found until that point in time, the Master Students did find that two student consultancy reports about ICT and energy conservation had been written in 2011 and 2013 at the University of Utrecht.

One report focused on changing social-behavioral interventions (e.g. concentrating users in specific parts of a building after a certain time) and the other report focused on organisational interventions (e.g. extra management support to support the sustainability transition; Bernhard et al., 2013; Voorneveld, 2011; Orzanna et al., 2014). It was found via interviews by Orzanna et al. (2014) that these reports, though offering energy conservation options, were perceived by some important stakeholders responsible for ICT change as research projects rather than practical advice for actual implementation. In addition, those in a position to implement the advice and suggested options in these reports, namely the information- and demand-side managers of faculties, never received the reports. Some of the proposed changes of the projects were implemented, but the people implementing these ideas did not read the reports. They thus implemented some proposed changes unconsciously without being inspired or influenced by the student reports. These people thought that they ''invented'' the proposed changes themselves. Thus, despite having two student consultancy projects that aimed for behaviour and organisational change, they were not able to implement directly any of their great ideas (Orzanna et al., 2014; Voorneveld et al., 2011).

After reading the reports and having realised that the former two student consultancy reports were not implemented as *Behaviour Changers* either did not receive them or they saw the reports as research projects, the Master Students proposed a plan that included clearer guidelines for implementation. The aim of the project was to save energy in ICT in both hard- and software using some simple ICT interventions. The proposed changes for energy conservation included changing the default monitor brightness of working stations from 90% to 50% for all monitors at the University of Utrecht, the automatic turning-on of the standby mode after 20 minutes of inactivity once the user has been logged out; and turning computers off both automatically and manually when not using them. This last proposed change is especially important for staff, as they tended to leave their computers on overnight (Orzanna et al., 2014). Thus, the interventions addressed both software (standby mode, turnoff) and hardware elements (screen brightness). Next to the proposed changes for energy conservation, the project also aimed at increasing awareness among both students and staff about the convenience of solutions to save energy in ICT. The students aimed at raising awareness via flyers, posters, word of mouth, screensavers and intranet pages (Orzanna et al., 2014; *Green Office* student).

The students proposed to focus on PC working stations in this project, because they believed the measures of energy conservation could be implemented without the need of infrastructural or institutional change. The students believed that the proposed interventions could be implemented via the *Information Technology Services* (the central organisation for ICT management) and faculty rather easily as, in theory, only few small adaptations of the configurations were needed to implement the interventions. The students also assumed that the electricity usage and thus costs could be lowered relatively easily and quickly with the proposed measures, which they assumed to be a preferred option by the Board of Executives and the faculty boards (Orzanna et al., 2014).

For the students, the project was only done as part of an assignment for a course. The *Green Office*, however, saw the potential of the idea and decided to launch it formally in 2014 (*Green Office* Student). *Green Offices* (representing *the Conscience and Middle Actor* here) at Universities are an upcoming phenomenon in Europe. They all focus on making Universities more sustainable. The first *Green Office* started in 2010 at the University of Maastricht. *Green Offices* are an initiative of *rootAbility*. They form part of a University and are often supported (including financially) by the Board of Executives. The offices are governed by students and sometimes also have dedicated staff members. The students have an advising role at the Universities, work on raising awareness about sustainability among both staff and students and initiate projects (e.g. aimed at the purchase of sustainable Christmas presents; clothing swaps; more sustainable food in University restaurants; lectures on sustainability etc.). In the Netherlands, Green offices are found at Universities in Groningen, Utrecht, Wageningen, Amsterdam, Rotterdam, Eindhoven and Maastricht (Morgen, 2014).

The power to save power

The moment the *Green Office* adopted the *ICT Energy Conservation* project, the challenges began. The students thought that the proposed changes could be implemented rather easily, without needing changes in policy and the involvement of different actors. In reality however, things were not that easy. At the University of Utrecht, the boards of different faculties have to accept proposed software measures before implementation. After acceptance, *Information and Technology Services* (ITS) is responsible for the implementation of the measures. ITS is a University-wide unit responsible for reliable and trustworthy ICT systems and the implementation of changes related to ICT. In addition, each and every faculty has decision-making power about ICT changes. The provision and organisation of ICT services and related hard-and software is thus organised at two levels, namely at faculty and University-wide level (ITS). More importantly, the responsibilities are decoupled: the ITS is responsible for managing the systems and integrating the wishes of the faculties, whereas decisions are taken at the faculty level.

Every faculty has information- and demand-side managers responsible for ICT. It was discovered that these managers at faculty level have decision-making power (the *Decisionmakers*), and as such are Board of Executives as well, but they have a low interest in ICT-related energy use. This could be due to limited knowledge of the possibilities of energy conservation activities (Orzanna et al., 2014). In addition, as will be explained in more detail below, there is a **split-incentive problem** (decreasing costs due to energy savings are not felt directly at the faculty level resulting in low incentives for investing in energy conservation by faculties, the *End User*). The problem also is that the faculties or *End Users* are not responsible for the technical implementation of energy-saving activities. The responsibility of technical implementation lies with the ITS unit, the *Providers*, which is characterised by a high awareness of energy conservation incentives, but a lack of power. The ITS has only the power to implement changes instructed by faculties and the Board of Executives. They do, however, have responsibility and control over the working stations and are responsible for the development of policy. For too long, user demands were the main focus for the ITS, but the nomination of two sustainability coordinators (*Experts*) at the ITS since the beginning of 2016 caused a shift of focus towards sustainability (Orzanna et al., 2014; *Green Office* Student).

The power of miscommunication

Before the nomination of the two sustainability coordinators at the ITS, both the ITS and the different faculties had to be convinced about the possibilities for energy conservation. The *Green Office*, the *Conscience* in this intervention, tried to contact both the ITS and the information- and demand managers of all the different faculties at the University. The *Green Office* Student stated that it took lots of energy to try to talk and convince all the faculties. In December 2014, however, the REBO (Law, Economics & Governance) faculty agreed to have a pilot project started using some of the suggestions of the ICT Energy conservation project (Orzanna et al., 2014). It is not clear on whose suggestions the pilot project was based exactly. The *Green Office* Student mentioned that at the time of the interview they had no idea what the results of the pilot project at REBO were and whether it was still continued. In April 2016, the REBO employee stated that REBO always follows the general guidelines developed by the Board of Executives and ITS with respect to education and ICT. The faculty incorporates general guidelines like purchasing new monitors with lower brightness, turning all computers off centrally and putting computers in standby mode. These guidelines are implemented on staff computers only. REBO is thus following energy proposals from the University (REBO employee). The measures that the REBO faculty implemented are, however, comparable with the changes proposed by the *Green Office* (GOU). It is unclear whether REBO implemented all these measures after having been informed about these possibilities by the GOU or if they thought of the measures themselves. The question is thus whether some of the intervention proposals of the ICT Energy Conservation project are implemented without the *Green Office* knowing about it. The GOU also continued talking with other faculties to undertake comparable pilot projects, though without having much success (Orzanna et al., 2014; *Green Office* Student). This highlights a **clear lack of shared learning and continuous communication**.

Raising awareness

Next to talking to the ITS and the *End User*, the faculties, the *Green Office* also worked on raising awareness among staff and students, both important final *End Users* of IT as well. Both groups

mainly want a user-friendly system and sustained service level. In general, they have low knowledge levels on energy conservation. Students have a generic usage patterns with respect to using the University working stations. Not only are they not very interested, students also do not have much influence on the technical and infrastructural context. They are not able to change software settings and can only adapt the screen brightness manually. It is still important that students accept changes and do not start to change configurations. Staff members are able to change configurations of the workstations and laptops themselves. Therefore, it makes less sense to change the configurations of the staff computers. They are also rather unpredictable in their energy usage. In the case of staff computers, the focus is on raising awareness on how simple it is to save energy in ICT. The awareness campaign for staff aimed at giving them a better understanding on how to save energy, why, and the reasons behind the choice of certain energy-conservation actions (Orzanna et al., 2014).

Raising awareness among students and staff about the options to save energy was done by a combination of flyers, posters, intranet pages and activities. The promotion material for raising awareness was developed and spread by students of the *Green Office* (*Green Office* Student). One of the flyers, for example, was put on tables in GOU's general rooms and in libraries. This flyer could stand on a table and give information about energy conservation options using images and short text blocks. This way of spreading flyers thus aimed at raising consciousness of sustainable ICT saving options. On one hand it could be discussed that the people seeing the flyer in the GOU's general rooms are already interested in sustainability, but still the *Green Office* Student discussed that not many people now about how energy can be saved in ICT (even if they are interested in sustainability).

In December 2014, as consequence of the *Green Office* campaigns, all new computer screens started to be delivered with a brightness set at 50%. The new computer screens arrangement was done with the supplying division (Universiteit Utrecht, n.d.; *Green Office* Student ; ITS employee). The new computers with screen brightness set at 50% marked an important point in time for the *Green Office*, as they felt that the University was finally listening to them (*Green Office* Student).

The future of sustainable policies

As was explained earlier, a University-wide sustainable ICT policy was still missing. In February 2016, the *Green office* (GOU) and ITS started cooperating on the development of a policy with respect to IT and sustainability. The policy is the result of the nomination of the Sustainability Coordinators at the ITS and the continued pressure from the GOU (REBO employee). This cooperation aimed at developing more sustainable policies about shut-down and software updating policies. The policies aimed at describing in detail how computers are turned off (automatically or manually), when (also during day after inactivity or centrally), and by whom (ITS, faculties, staff or students), etc. The policy was said to be implemented University-wide when it is ready, but it is not sure whether it is implemented yet (Universiteit Utrecht, n.d.; ITS employee; *Green Office* Student).

In February 2016, the GOU started with reducing the screen brightness of student computers. As this task has to be done manually, it took a lot of effort from lots of students as the ITS had not enough manpower to do it. The students consisted of both *Green Office* students and voluntary students with a heart for sustainability (*Green Office* Student). First, only a part of the computers were adapted. After no complaints were received, on April 21, 2016 the screen brightness of all student computer monitors was adapted manually. The ITS and the *Green Office* thus cooperated in order to achieve energy conservation in ICT (Universiteit Utrecht, n.d.; ITS employee). In May 2016, the project was not yet completely rolled out, University-wide. The *Green Office* was still working on raising awareness amongst the *End Users*: staff, students, faculties and the Board of Executives. In cooperation with Information Technology Services, the GOU was trying to reach the Board of Executives and the boards of the faculties. In this way, the *Green Office* tried to find support for implementation for their plans at both the faculties and University-wide. They needed this institutional support to enable their *Middle Actor* role aimed at full implementation of the proposed ICT measures; given that the faculties are responsible for the decision-making, future directions and investments concerning ICT, and the Board of Executives determines the University-wide directions and policies (Orzanna et al., 2014). In the spring of 2017 the *Green Office* decided to put the project on hold.

Though the project never was able to get completely rolled out, some successes can be reported. Increased awareness for ICT at the ITS, also caused by the *Green Office* campaigns, resulted in a Master thesis on zero measurements and future measurements aimed at giving an overview of the current ICT energy usage and being able to calculate the energy usage in the future. The combination of these two measurements will be used to prove the results of conservation done in the future after implementation of ICT energy conservation measures. The student of the Master thesis is also changing a model of *SurfSara* for energy measuring to make the model more detailed and applicable at the University of Utrecht. *SurfSara* is a provider organisation that, among other things, offers ICT services to research institutions and higher education. ITS hopes that in the future, this adapted model can also be used at other Universities. A group of students is working on exact measurements of energy use per building. It also seems that a part of the proposed IT changes of the *Green Office* project (computers on stand-by and turning off after not using them, centrally turning them off at night) are now being incorporated across the whole University on staff computers. The screen brightness of all student computers was adapted for example (ITS employee). Still, not all ideas for change are implemented. The screen brightness of the staff computers for example are not yet adapted. Also changes for the student working stations the proposed measures proposed by the *Green Office* are still not implemented. It is not clear whether the new policy will also incorporate the student computers in the University-wide guidelines.

4.1.1. Does Utrecht meet the Collective Impact Approach?

In this section we will reflect on the University of Utrecht case from the perspective of the five conditions of the *Collective Impact Approach* (CIA) described by Kania and Kramer (2011) to identify causes for the lack of implementation of the proposed ICT-related conservation measures and the lack of collective impact on a University-wide scale.

The power of miscommunication, lack of mutually reinforcing activities and shared measurement systems

Different *Behaviour Changers*, like the *Green Office* (*Middle Actors* and *Conscience*) and Board of Executives (*Decisionmakers*), both have a stake in the *ICT Energy Conservation* project, but communication and collaboration with respect to energy conservation measures was far from optimal. It was unclear who was responsible for interventions like changing the settings of computers at workstations. This resulted in the fact that several *Behaviour Changers* were all working on certain issues independently from each other. Another example of this lack of communication focused on shared learning is that the *Green Office* thought the REBO faculty had a pilot project as part of the GOU project, whilst the faculty was just implementing the University-wide proposals for ICT that they had received earlier by the Board of Executives and ITS. These University-wide proposals, however, remarkably resembled the proposals of the *Green Office*, but were not combined or clearly linked - yet another failure in **mutually reinforcing activities**, resulting in frustration on the side of the *Green Office*.

The ITS (the *Provider*) and faculties have different levels of power and responsibilities. The ITS has the knowledge and feels the sense of urgency but the faculty has the decision-making power. The faculties have, however, no incentive to reduce energy costs due to the shared energy bills and lack of knowledge. The communication between the ITS and faculties about sustainability is often missing, so no knowledge transfer takes place (Orzanna et al., 2014). Also, according to the *Green Office*, the Board of Executives focuses too much on economic incentives, a measurement system that does not sufficiently reflect the indicators the faculty should value. The result is frustrations on all sides. These frustrations, in themselves, create a barrier for successful implementation of energy conservation measures because they at least impede the development of **trust and a common language** and greater focus on **mutually reinforcing activities** and creating a **shared measurement system**. Thus, the condition to have proper **continual communication**, an essential condition for collective impact is not fulfilled in the Utrecht case.

Another element that is missing, is a **shared vision and agenda**. All actors had different expectations, visions and plans which were not communicated to other parties. For quite some time all actors worked in isolation of each other, thus failing to create **mutually reinforcing**

activities. Only at a later stage when the communication between ITS and the *Green Office* started to take off, did collaboration improve and in a relatively short time some collective incentives for change were arranged (e.g. two *Sustainability Coordinators*). In order to create a collective impact, it is important that the Board of Executives and boards of faculties (*Decisionmakers*), demand and information managers (*Providers*), *End Users*, etc. take part in the discussion and communication process, which they did not in the Utrecht case study. The use of the *Behaviour Changer Framework* (BCF) to bring together the relevant *Behaviour Changers* and visualise the restrictions and conflicts in the current system, would thus have improved the situation – granted, only if all the relevant parties were willing to engage.

At the moment, no **shared measurement system** is possible yet. The Board of Executives, but also faculty boards are mostly thinking in terms of return on investments. This monetary-based measurement system is not the same as what the *Green Office* had in mind. The GOU on the one hand aimed at saving money, but on the other hand also aimed at behaviour change of the employees and students. The aims of the Board of Executives and the GOU are not mutually exclusive. Still, at the moment the lack of communication cause that it is not possible to combine both opinions into one shared measurement system. Therefore, the condition to have a shared measurement system is not fulfilled yet. People have to get on the same page, before a shared measurement system can be started and shared learning is possible. The *Green Office* worked very hard in several ways to get their energy conservation ideas implemented. They tried to contact several faculties and people, held guerrilla actions, initiated a pilot project and organised awareness campaigns. Though they spent large amounts of time and effort to get their ideas implemented, the University was not responding to their call for action. As was explained earlier, only after a while when ITS and the *Green Office* started to work together, activities started to mutually reinforce each other. Still, it is believed that at the moment only the *Green Office* and ITS did mutually reinforcing each other in terms of activities. Faculties like REBO are following University-wide guidelines, but were not reinforcing the activities of the *Green Office*. Therefore, the condition for **mutually reinforcing activities** is not fulfilled. The cooperation between the *Green Office* and ITS was a start in terms of mutually reinforcing activities, but in order to create a collective impact, all actors have to be involved.

Common or separate agendas?

According to Geels and Raven (2006), expectations and visions of stakeholders give direction to search and development activities. Geels and Raven (2006) state: ‘*’When learning processes produce outcomes that do not meet the expectations, this leads to a backlash in expectations that turn from positive to negative*.’’ (p. 389). When expectations are not met, a collective impact will be difficult to realise as stakeholders are not on the same page. Difference in expectations results in a lack of a **common agenda**. In the Utrecht case, all stakeholders have different expectations and visions regarding sustainability. The Board of Executives is stimulating sustainability in general. Sustainability is one of their strategic themes. Pressure from among others the national government and global research institutions caused an increasing need to be more sustainable (Orzanna et al., 2014). The University board aimed at integration of sustainability in the institutional management of the University since 2012. The integration of sustainability resulted in the development of a strategic outline until 2020 including a stronger focus on top research, connecting different fields of top research, sustainability as strategic theme and open innovation. This theme could be used to convince the *Decisionmakers* of the need for simple, day-to-day behaviour change steps to support this bigger goal.

In addition, the *Green Office* arose to reinforce the strategic outline in practice by advising the University and work on the implementation of projects (Universiteit Utrecht, n.d.). Though sustainability is part of the strategic plan, in reality the focus is on efficiency and effectiveness according to the *Green Office* and the Master Students of *Sustainable Development* (Orzanna et al., 2014; Green Office Student).

The Board of Executives is thus assumed to work on sustainability due to external and internal pressures. The *Green Office’s* main aim is to promote sustainability by the implementation of projects and creating awareness among students and staff. As this was not proceeding as well as they’d have liked, they tried to put pressure on the Board of Executives and faculties by guerrilla actions like manually adapting screen brightness of all student working computers (ITS employee;

Green Office Student). Sustainability in their view, is thus about raising awareness and implementation of energy-conservation measures. ITS believes that ICT can be more sustainable rather easily by implementing simple technological tips and tricks (Orzanna et al., 2014). The faculties are not directly focusing on energy-conservation measures in ICT as they will not benefit themselves directly (Orzanna et al., 2014), but are mainly following the University-wide guidelines (REBO employee).

The different expectations and visions created different directions of development and thus different agendas. The *Green Office* aimed at full implementation of all their proposed energy-conservation measures and raising awareness, where the ITS is aiming mostly at technical changes. The Board of Executives only formulates that they want to be sustainable, but it is not really clear on how they want to reach this, specifically. The combination of different expectations and lack of cooperation and communication caused every group aiming at different development paths. The groups are not up-to-date about the progress of other *Behaviour Changers*, resulting in duplication of efforts. The condition of a **common agenda** is missing in the Utrecht case.

Green Office as backbone organisation?

Kania and Kramer (2011) state that it is important that a separate **backbone support organisation** is created that facilitates a change of mind-set, attracts attentions and mobilises resources. The *Green Office* unconsciously tried to take the role of backbone organisation and to change the mind-set of *Behaviour Changers*, but they were not given all the necessary power and resources to do so. Faculties and *End Users* are not responding on calls for action and the GOU did not have the power to enforce behavioural interventions. This is related to the fact that the Board of Executives did not clearly define the role of the *Green Office*. The lack of predefined vision meant that the Board of Executives and the GOU were not on the same page. It seemed that the *Green Office* was established to enforce the policies developed by the Board of Executives, but in reality the Board of Executives is implementing sustainable policies themselves. Even though the *Green Office* could function as a backbone organisation, it did not have the financial resources, power and clear role to act independently.

In addition, having an internal organisation within the University system, is a new type of **backbone organisation**. Kania and Kramer (2011) only mention independent, external organisations that function as backbone organisations. Therefore, it is not yet known what types of conditions have to be exactly fulfilled in order to create success in case of an internal backbone organisation.

4.1.2. Did Utrecht meet the Behaviour Change Framework criteria?

In terms of the Behaviour Changer Framework (BCF), in the Utrecht case, the different *Behaviour Changers* did not communicate with the purpose of **shared learning**. The *Green Office*, that takes the role of *Middle Actor and Conscience* via a bottom-up approach, was not able to discuss the ICT topic with other *Behaviour Changers* like the *Decisionmakers* (Board of Executives) or *Providers* (ITS facilities). The *Middle Actor* in this story, the *Green Office*, does have the advantage that they have direct contact with a large part of the *End Users* (students), whereas the *Decisionmakers* have the advantage of access to policies to influence behaviour of both staff and students. The ITS also takes the role of the *Middle Actor* from a different perspective: they have access to both staff and students. The moment both *Middle Actors* (ITS and GOU) started to cooperate and communicate, in a relatively short time, progress was made.
The Utrecht Case thus shows that in order to create a collective impact, it is important to consider the mandates and roles of other *Behaviour Changers* in order to be able to create an impact together. As described earlier, the Board of Executives did not take into consideration the knowledge that, for example, the *Green Office* had about the *End User*. No feeling of cohesion and empathy among *Behaviour Changers* was created and therefore no successful communication and recognition as needed for a collective impact was found.

What could help circuit-break these problems is to investigate the co-benefits of all *Behaviour Changers* in the system and to create storylines that follow each of these benefits. For example, for *Decisionmakers*, a good ROI is important which a lot of simple energy-conservation measures, as proposed here, can achieve. However, the University also prided itself in its sustainability award, so a loss of credibility or opportunity to win further accolades, could also be a powerful motivator for

these *Behaviour Changers.* The *Conscience* feels dis-empowered, their main driver is to implement sustainability across the University. They may have to find the right storyline to convince *End Users* (students and staff) why sustainability and simple energy-conservation measures are important. It may help to undertake a survey to find out if it is indeed lack of knowledge that causes the problems (which could then be solved by awareness campaigns and flyers etc.) or if it is the split-incentive issue of not seeing the energy bills and thus not paying attention to energy conservation as they may do at home. Competitions and other gamification strategies may be a better way of raising awareness, e.g. by pitting faculties against each other, thus also including the *Decision-makers* and *Providers.* Telling inspiring stories of other Universities where these interventions led to great success and PR (e.g. in Cambridge) could also support the GOU in convincing other *Behaviour Changers* of their mission.

4.2 University of Cambridge

At the University of Cambridge, energy bills kept rising despite several attempts at energy savings. Financial pressures, the *Carbon Reduction Commitment Energy Efficiency Scheme* and sectoral carbon emission targets meant that the University of Cambridge had to change its practices (Bennet, 2012). At a certain moment in time, the University of Cambridge realized that the old way of handling energy could not continue. Therefore, the University proposed the *Electricity Incentivisation Scheme* (EIS; University of Cambridge)[7]. This is a shared savings scheme which defines a baseline of energy usage at the start of each year. This scheme is aimed at rewarding faculties that are able to save energy and punishing faculties that are not, compared to a predefined baseline. The EIS was part of a much bigger picture, namely the *Carbon Management Plan 2010-2020* of the University of Cambridge. The EIS had a double mandate: reduce carbon emissions and energy costs. The University of Cambridge aims at a carbon reduction from energy usage of 34% in 2020 compared to 2005 (University of Cambridge, 2016)[7].

On August 1, 2008 the EIS was officially adopted at the University of Cambridge (Bennet, 2012). The first baseline was based on the electricity consumption in 2006/2007. Each faculty was either fined or rewarded for every kWh that they were below or above the first predefined baseline. In the following years, the baseline was adapted every year to the electricity consumption of a year before. This resulted in lower energy consumption over time as the yearly adaptation of the baseline stimulated continuous improvements (Bennet, 2012). The faculties had insights into their electricity use via online systems based on *SystemsLink*. The project was a large success: in the first year of implementation over €800,000 were saved (Bennet, 2012). The University's carbon emissions were reduced by 3,606 tonnes in the first year (University of Cambridge, 2016)[2]. The success of the project kick-started several initiatives. One of the initiatives was the *Energy and Carbon Reduction Project* (ECRP), which was founded in 2011. The aim of this Programme is to support faculties to make energy efficiency improvements and reduce carbon emissions by providing funding (Bienias, 2008). The funding enables faculties to implement energy-saving measures that would normally be too expensive.

The University of Cambridge started with the implementation of sustainable policies quite early (before 2008).The *Environmental Strategy Committee* was responsible for the implementation of all ideas regarding sustainability. It was founded in 1995 as the *Committee for Environmental Management*. In 2010, the committee was changed into the Environmental Strategy Committee. The committee was chaired by a Pro-Vice-Chancellor for Institutional Affairs and reported directly to Planning and Resources committee. It also had an indirect link to the Buildings Committee. The Environmental Strategy Committee had the responsibility to oversee the management of operational environmental issues. In 2010, the Environmental Strategy Committee received strengthened membership of the University board, which meant that they received more power (University of Cambridge, 2016)[2]. In October 2015, the *Environmental Strategy Committee*, the *Energy and Carbon Reduction Project Board* and the *Living Lab Advisory Group* were combined into the *Environmental Sustainability Strategy Committee*. The aim of this new committee was to deliver the *Environmental Sustainability Vision, Policy and Strategy*. The Environmental Sustainability Strategy Committee provides strategic oversight, recommend strategies, policies, procedures, review and comments on plans, etc. The main characteristics of the Environmental Strategy Committee as explained above are also found in the new committee (University of Cambridge, 2017).

Several examples of successful projects (some were enabled by the ECRP) can be found over the past years (University of Cambridge, 2016)[6]. The University of Cambridge worked on a wide variety of activities like renewables, e.g. the Faculty of Engineering refurbished their existing data centre, leading to savings of €36,000 a year. The Faculty of Engineering also placed solar panels on their roof. In the area of behaviour change activities are also undertaken, e.g. the chemistry faculties started campaigns to save energy by closing the fume cupboards. Building infrastructure (central cooling system combined with building analysis), equipment (replacing energy consuming fluorescent light bulbs for growing plants with LED) and support for capital project levels (refurbishment *Green Which House* from Royal Greenwich observatory to house of administrative staff) were other energy-saving projects. The *Cancer Research UK Gordon Institute* introduced a web-based dashboard to allow for real time information, behavioural change campaigns and competition between labs (University of Cambridge, 2016)[6]. All activities aimed at saving energy or increasing energy efficiency.

In total, the University of Cambridge used the EIS for creating financial Incentives at faculties, the ECRP for funding projects for energy saving and efficiency increase, developing communities (for example of staff and students) to change behaviour, and created a network of *Environment & Energy Coordinators* as **champions** and technical solutions to have an overview of the energy usage and to save energy/increase energy efficiency (University of Cambridge, 2016)[5]. The combination of the EIS and various initiatives that were started around it caused that the amount of energy savings to increase at a high rate. However, the speed of the improvements resulted in the fact that low-hanging fruit were gone quite quickly. In the nearby future, lowering energy consumption became increasingly difficult (Bennet, 2012). Unfortunately the University of Cambridge decided to stop the project only recently. They are considering another scheme for the recharging of electricity costs.

Standing on the shoulders of giants

The Electricity Incentivisation Scheme (EIS) was part of a much bigger picture, namely *The Carbon Management Plan 2010-2020* of the University of Cambridge. This plan was developed as a response to the national *Carbon Reduction Target and Strategy for Higher Education* in England that obliges Universities to reduce their carbon dioxide emissions. The *Carbon Management Plan* (CMP) proposes a combination of policies, strategies, new technology developments, data gathering and reporting and targets to decrease carbon dioxide emissions. The strength of the CMP is that it means that not only a policy is developed, but that it also defines how this policy is translated into practice. This is witnessed, for example, by the fact that the University of Cambridge aims at conducting pilot projects at different faculties that can be rolled out University-wide in case of success (University of Cambridge, 2016)[2].

One of the largest success factors is the ECRP. In total, this programme had 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 had to fulfil several criteria (University of Cambridge, 2016)[6]. Other important aspects in which the practical focus can be seen are the improvement of monitoring systems, greater coordination across the University and cooperation with other institutions (University of Cambridge, 2016)[2]. The University of Cambridge was thus, on the one hand, obligating faculties to change, but also offered them the tools for change. So, the two giants (*Carbon Management Plan 2010-2020* and the *Carbon Reduction and Strategy for Higher Education*) created an environment in which both strategy and direction is provided in order to save energy.

The power of the Environment and Energy Coordinator

The University of Cambridge stimulates a network of staff volunteers that work on being a local focus for environmental and energy issues. These people are called *Environment and Energy Coordinators* and are aiming at being a **champion** in their organisation. They try to stimulate their colleagues to make their lives a little bit more sustainable every day. Every inspired person will contribute to some energy saving. The Environment and Energy Coordinators function as a communication channel between their department, *Environment and Energy Section*, students and the Board of Executives. One of the major aims of the Environment and Energy Coordinators is to

raise awareness at their departments on how to save energy and be an inspiration. The University of Cambridge believes that a one-size-fits-all principle does not work in such large organisations like a University. Therefore, every faculty has its own Environment and Energy Coordinators. They know the culture of their faculty, the people and know best how people from a specific faculty can be motivated. The Environment and Energy coordinators thus provide a two-way flow of information that results in feedback from inside the faculty being communicated to the governing board. The power of the Environment and Energy Coordinators is thus that they function as a champion and *Middle Actor* inside their department. This local focus is assumed to create a feeling of understanding at the side of employees and students (University of Cambridge, 2017).

Dare or do?

Bennet (2012) states that many IT managers did not want to add new areas of responsibility to their existing work. They experience new areas of responsibility as a burden, probably due to too high workloads. Estate faculties also did not dare to force the IT managers into the field of energy savings. The Estate managers themselves did not enter the field as they found it too complex (Bennet, 2012). It can be seen that a lack of knowledge and high work load were barriers for implementation of energy saving measures at the University of Cambridge prior to the *Electricity Incentivisation Scheme* (EIS). Not only were employees not engaging in new responsibilities, but on a faculty level people did also not engage. At many Universities, including Cambridge, options are investigated for a central cloud system. Centrally-organised data centres could reduce energy consumption. However, the decision-making to change from a decentral to a central cloud system depends on a number of factors like control, security, risk, environmental impact, costs, legal compliance and costs. Past experiences, capacity, concern about price fluctuations, fairness and loss of control mean that most faculties are not willing to change from decentralised to centralised cloud systems (Bennet, 2012). So, despite the Board of Executives having energy-saving plans, employees and faculties often do not accept the changes due to differing mandates. Whereas employees are afraid of higher workloads or increased complexity, the faculties are afraid of losing autonomy. It could be questioned whether the University of Cambridge considered these human-based issue enough.

Focus, focus, focus…

The University of Cambridge took several measures at the same time, like adding renewables (solar panels on the roof of Engineering faculty), focusing on behavioural change (attention on closing fume cupboards via *Shut the Sash* campaign), changes at building level (central cooling system in combination with building analysis) and support for capital projects (*Energy and Carbon Reduction Programme*). This focus on several aspects at one time meant that policy and implementation went hand in hand, but the question was whether the quality was maintained due to this buckshot approach. In the case of behaviour change, league tables were used to create competition among faculties. In the league table faculties could see how others are performing. As no one wants to be the loser, faculties were assumed to be more intrinsically motivated to be the best (Bennet, 2012).

4.2.1. Does Cambridge meet the Collective Impact Approach?

The combination of sustainable policies and instruments resulted in the successful implementation of the *Electricity Incentivisation Scheme* (EIS). The *Energy and Carbon Reduction Programme* (ECRP) provided the funding needed to purchase for example solar panels, whereas the *Carbon Management Plan* (CMP) obligated faculties to change their behaviour. The University of Cambridge was able to create a collective impact. In this part, we investigate how Cambridge used the five conditions of Kania and Kramer (2011) to do so.

Backbone organisation or not?

As explained already earlier, Kania and Kramer (2011) state that it is important that a separate **backbone support organisation** is created that facilitates a change of mind-set, attracts attention and mobilises resources. Kania and Kramer (2011) also state that it can take several years before a collective impact is created. The Environmental Sustainability Strategy Committee (*Conscience*) takes the role of developing sustainable policies that can be implemented by them once the Board of Executives (*Decisionmaker*) agrees on the policies and plans. According to Kania

and Kramer (2011) a backbone organisation is responsible for the development of a **common agenda**. At the University of Cambridge, the common agenda itself is developed by the University and the operational aspects of the agenda are implemented by the Environmental Sustainable Strategy Committee. They do have the power and resources to facilitate a change of mind set, attract attention and mobilise resources, but they did not develop a common agenda themselves.

This example shows that, in case of bureaucratic and hierarchical organisations, internal backbone organisations are not usually able to set agendas themselves. However, they can give input for the agenda and they can implement it. Nowadays, the Environmental Sustainable Strategy committee also has the responsibility of developing agendas with respect to sustainability, but always need confirmation from the *Decisionmakers* before implementation is allowed.

The combination of power and resources makes the Environmental Sustainable Strategy Committee able to function as backbone organisation. In addition, the Board of Executives gave the Environmental Sustainable Strategy Committee a clear role and task that was in line with their own vision. Therefore, the *Behaviour Changers* were not working against each other, but were reinforcing each other's activities. The Environmental Sustainable Strategy Committee as a backbone organisation agrees for a large part with the definition of Kania and Kramer (2011), despite being internal and not independent from the senior management. As also discussed in the Utrecht case, in certain cases such as highly bureaucratic and hierarchical sectors like higher education, the definitions have to be redefined in order to still be able to use the Collective Impact Approach.

Carbon Management Plan 2010-2020

Kania and Kramer (2011) explained the importance of a **common agenda** in creating a collective impact. It was discussed how the University board developed a *Carbon Management Plan* which was a response to the UK's national *Carbon Reduction Target and Strategy for Higher Education*. The University board developed a combination of policies and instruments as part of one common agenda: reduce energy usage and carbon dioxide emissions (University of Cambridge, 2016)[2]. This agenda can be seen in all kinds of initiatives that were started like the EIS. Due to the practical implementation that also included competitive elements and fines/rewards, all faculties were forced to participate. At hierarchical and bureaucratic organisations like the University of Cambridge agendas are designed top-down. In order to create a common agenda, it is important that all stakeholders of the organisation (faculties, facility organisations, students, employees, etc.) support the agenda. Thus, in order to let an agenda designed by the *Decisionmaker* of an organisation be a common agenda, it has to be carried by all *Behaviour Changers* in order to be able to create a collective impact. The *Carbon Management Plan 2010-2020* also functioned as a communication channel for the total University of Cambridge. It was clear what was expected from everyone by, for example, the EIS. Kania and Kramer (2011) explain that **continuous communication** is important for creating learning effects. The two-way flow of information provided by the Energy and Environment Coordinators resulted in continuous communication among *Behaviour Changers*.

Shared measurement system

The University of Cambridge does use a **shared measurement system**: the *Electricity Incentivisation Scheme* which was described earlier. Bennet (2012) described that the EIS is a centrally-managed measurement system. The energy usage is measured every year and is compared with a predefined baseline. As all faculties take part in this system, the EIS can be seen as a shared measurement system as all faculties are compared based on the same kind of measurement system. The EIS is a system in which all actors are stimulated to continuously learn. Faculties are constantly searching for improvements to save more energy as they will be rewarded for their savings. Also the publication of a ranking of faculties as was explained earlier is an extra stimulation for further energy savings. The EIS is thus able to create a collective impact as all *Behaviour Changers* together aim at saving energy and are continuously learning. Not only the *Decisionmakers*, but the ''collective'' is working towards energy saving.

Mutually reinforcing activities

The University of Cambridge is focusing on several roadmaps at the same time. The combination of policy and instruments are conducive to the **mutual reinforcement of activities** and large amounts of energy and costs are saved. The following example of the *Energy and Carbon Reduction Programme* and EIS combination illustrates the mutual reinforcement of activities. The EIS is stimulating faculties to change and the ECRP provides the money they need for technological solutions that can save energy. The combination creates a boost in energy savings. Thus, this specific combination of activities are mutually reinforcing as they complement each other.

4.2.2. Does Cambridge meet the Behaviour Changer Framework?

In terms of the *Behaviour Changer Framework*, in the Cambridge case most *Behaviour Changers* did communicate well. It is important to mention that, in the Utrecht case, *End Users* are explicitly mentioned to be students and staff, in the Cambridge case a more top-down approach is used. Therefore, the faculties are *End Users* in the Cambridge case. The Environmental Sustainable Strategy Committee takes the role of *Middle Actor* between the University board and faculties. The *Middle Actor* has the advantage that they have the power, support and resources they need in order to change the behaviour of the faculties. The *Decisionmakers* (University Board) have the policy and instruments to change the behaviour of *End Users* and support the *Middle Actors*. All *Behaviour Changers* are communicating, but they also have the same goal in mind (which could be argued as having been set by the *Conscience*, in this case the UK Government, that put the *Carbon Reduction Target and Strategy for Higher Education* in place).

Having the same goal and clear roadmaps, as well as the same 'language' in the use of cohesive policies creates a feeling of cohesion and empathy. This in turn is assumed to result in better communication and collaboration. It is assumed that the successful incorporation of all *Behaviour Changers* enabled Cambridge to create a collective impact, whereas in the Utrecht case a lack of collaboration contributed to a failure in creating a collective impact. The use of the *Behaviour Changer Framework* is thus complementary to the *Collective Impact Approach* in achieving a successful collective impact.

5. Conclusion

This report researched how the *Collective Impact Approach* and the *Behaviour Changer Framework* can both contribute to the success of cases in which bureaucratic and hierarchical systems are experiencing the need for change. Two case studies investigated to what extent the underlying conditions of the CIA and BCF were used (implicitly) and how they did or could indeed increase the successful implementation of ICT-related energy conservation measures.

In the Utrecht case we described that the institutional climate was not optimal. The *Green Office* (both *Conscience* and *Middle Actor*) aimed at facilitating and coordinating energy conservation measures related to ICT, but they lacked the power, resources and clear vision to do so. Therefore, no clear **backbone organisation** was found in the Utrecht case. The **continuous communication** between actors like the REBO faculty and GOU was not always going very smooth. This resulted in a situation where *Behaviour Changers* did not know what others were doing, resulting in duplication of efforts and frustrations. The cause of this was both, a lack of continuous communication and a lack of a **common agenda**. In addition, the activities being deployed were not aligned and as a result they did not **mutually reinforce** one another. The moment the *Green Office* and ITS (the *Provider*) started cooperating, in a relatively short time both stakeholders started to reinforce each other and changes were occurring. The lack of cooperation, communication and a common agenda caused that it was not possible to have a **shared measurement system**. Thus, in the Utrecht case, towards the end of 2016 only one condition of success for a collective impact was fulfilled: **mutually reinforcing activities**. The sustainable ICT project is consequently, still not fully implemented aside from some small successes such as the implementation of the proposed changes at all staff computers. The project was stopped in in the spring of 2017.

In the Cambridge case, the institutional climate was more optimal than in the Utrecht case. Pressure from the British Government resulted in the development of the *Carbon Management Plan* which set a **common agenda**. Alongside the governmental pressure, internal stakeholders were aware that the old way of working could not continue. The *Environmental Sustainable Strategy Committee* (the *Conscience*) took the role of internal **backbone organisation**, whereas the Board of Executives (the *Decisionmaker)* developed a **common agenda.** Energy and Environment Coordinators (the *Middle Actors*) were appointed to function as a communication channel from the Board of Executives to the *End Users*. The Energy and Environment Coordinators provided a two-way flow of information, resulting in **continuous communication** among *Behaviour Changers*. Also, a **shared measurement system** was developed, the *Electricity Incentivisation Scheme*, which led to all faculties (the *Providers*) being judged by the same standards. A combination of projects (*Energy and Carbon Reduction Programme, Electricity Incentivisation Scheme , Carbon Management Plan*) and collaboration among *Behaviour Changers* resulted in **mutually reinforcing activities**. Despite its success, the EIS project stopped in 2017.

Thus, in the Cambridge case, five out of five conditions for a collective impact are found. The *Environmental Sustainable Strategy Committee* shows that a **backbone organisation** does not necessarily have to be an external organisation, as defined by Kania and Kramer (2011). Especially in the case of bureaucratic organisations that are already rather complex and slow, it can help to appoint an internal organisation as backbone organisation. This organisation will already be comfortable in the existing structure, is able to more quickly understand the relationships *between Behaviour Changers* 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 that is mostly done by the Board of Executives. The question is whether the internal backbone should have the power to set their own agenda, or whether it simply should be accepted that the definition of a backbone organisation is different in a hierarchical and bureaucratic organisation. The Cambridge case is the perfect example that more research is needed into internal backbone organisations as the case shows that this new type of backbone organisations can support the creation of a collective impact. Interestingly, and somewhat ironically seeing they were both Universities full of experts, both case studies had a clear dearth of *Experts*. Including experts (internal or external) who have detailed knowledge on the energy consumption and DSM potential and who could have helped develop a co-benefit analysis showing the many multiple benefits of energy efficiency and conservation measures to all different *Behaviour Changers*, could have improved both case studies.

The Cambridge case also shows that in case of internal change in hierarchical and bureaucratic organisations, the definition of a **common agenda** has to be redefined. The acceptance of the agenda set by the Board of Executives can be illustrated by the difference between the Cambridge and Utrecht case. It was seen that in the Utrecht case, the Board of Executives did set a common agenda, but this agenda was not carried by some *Behaviour Changers* like the *Green Office*. In the Cambridge case the Board of Executives did also set a agenda, but they integrated all important *Behaviour Changers* in the changing process. In both cases of hierarchical and bureaucratic organisations, it is clear that a common agenda is not set in consultation directly with all *Behaviour Changers* or the *End Users*. Thus the definition of a common agenda as defined by Kania and Kramer (2011) has to be redefined.

The case analyses show that the other three conditions of the *Collective Impact Approach* can be used in the way they were defined by Kania and Kramer (2011). For example, it is always important to have open, **continuous communication** on expectations, tasks, visions and mandates. The Utrecht case shows that a lack of communication causes a lag in the progress of ICT energy conservation projects. Also, the condition of having **mutually reinforcing activities** is essential as was seen in the Cambridge case. This can be seen in the example of on one hand having a **shared measurement system** and on the other hand a **fund** that enables faculties to purchase energy saving technological solutions. Linking up to this, the importance of a shared measurement system is shown. When everyone is judged on the same criteria, a competition element can come in at Universities. This is an additional incentive for faculties to save even more energy. Thus, based on the Cambridge and Utrecht case the definitions of the conditions of mutual reinforcement, shared measurement systems and continuous communication as described by Kania and Kramer (2011) can be used for change in bureaucratic and hierarchical organisations.

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 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 was unwilling to divest (Vaughan, 2016). This behaviour is not in line with their call for sustainability. A **common agenda** needs consistency and thus should always be a guideline for all activities of an organisation. The fact that the Cambridge University is not willing to divest from fossil fuels could mean that certain *Behaviour Changers* (e.g. faculties) will be less willing to share an agenda as they know that the *Decisionmakers* themselves are not following it. It could thus become more difficult to create a collective impact as *Behaviour Changers* are not on the same page anymore. It will be interesting to observe what the consequences on the collective impact at Cambridge will be of the unwillingness to divest from fossils.

Energy Conservation Projects in ICT

Energy conservation projects in ICT can be approached both from a bottom-up and top-down perspective. One approach is not necessarily better than the other, but they impose different ways of handling behaviour change and a different type of *End Users*. In the bottom-up approach the *End Users* have a relatively active role as for example the *Green Office* invited the *End Users* (students) to take part in their activities and the change that the *Green Office* would like to reach directly aims at changing the behaviour of *End Users*. In the top-down approach, *End Users* also have an active role, but the *End Users* are often not students or employees, but faculties. The behaviour of faculties as *End User* is completely different from the behaviour of students and employees as *End User* as they have responsibilities and obligations towards both their students and staff and the Board of Executives. The flexibility of using the *Behaviour Changer Framework* allows different actors playing different roles, as framed by the wider system.

This research has focused specifically on **ICT energy conservation projects**. ICT in Higher Education is a special field as it was seen that the *Behaviour Changers* being responsible for decision-making and the ones implementing changes are often not the same. This was clear in the Utrecht case, where the ITS *Providers* had the knowledge about how energy could be conserved, but were not allowed to do so. The *Decisionmakers* were allowed to start energy conservation projects, but had not much knowledge about the possibilities. The Cambridge case shows that it is possible that the *Decisionmakers* and implementers can reinforce each other, as long as they are on the same page and have trusted *Middle Actors* (e.g. the energy champions or the *Green Office*) in place to carry out the work with the *End Users*. In Cambridge, the Board of Executives assigned the implementation process to the Environmental Sustainable Strategy Committee (the *Conscience*). This Committee identified Energy and Environment Coordinators as *Middle Actors* to take the joint responsibility for implementation. The difference in Utrecht was that the *Green Office* was meant to take both roles, which may have placed too much pressure and expectations on a small group of people.

6. Limitations and future research

It is important to consider the differences of depth of the case studies. In the Utrecht case, three interviews were done along a wide variety of literature sources. These interviews provided insights that were not able to be retrieved from general documentation as it revealed specific information about the relationships between *Behaviour Changers*. In the Cambridge case no interviews were done due to lack of time by the responsible actors. Therefore, the Cambridge case is based entirely on available online documentation (e.g. websites, articles). The final draft was checked by a *Behaviour Changer* of the University of Cambridge, pinpointing some aspects that had to be changed. As a result, the Utrecht case is far more detailed and goes more into depth compared to the Cambridge case. Still, the feedback of the University of Cambridge increased the validity of the case study.

It also has to be taken into consideration that this report is based on case studies from only two countries (the United Kingdom and the Netherlands). Every country has different laws and regulations concerning climate change and energy-saving goals. These differences can lead to diverse ways (bureaucratic organisations) of handling energy-conservation measures. It is recommended for future research to investigate more (comparable) projects in different countries.

Lastly, it is important to do more research into different types of **backbone organisations** and the development of **common agendas**. It can be argued that internal organisations can fulfil the function of backbone organisation if they did not develop a common agenda themselves. More research is needed to investigate whether using internal organisations as a backbone organisation could work and who should ultimately be responsible for the design of a common agenda.

7. Recommendations

This report has shown that the use 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) a number of additional recommendations can be given for future projects in bureaucratic and hierarchical sectors like higher education.

Knowledge

It is important that all *Behaviour Changers* 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), the circulation of knowledge is important as it stimulates local knowledge generation and formulation of generic patterns. Knowledge circulation inside faculties creates an opportunity to experiment on a local scale. As every single unit has their own knowledge and lessons, it is of high importance that all *Behaviour Changers* are involved in sharing their stories. The use of the *Behaviour Changer Framework* can help with this.

Intrinsic motivations

Shared responsibility among staff and students could be stimulated by the use of a dedicated *Conscience*. This person/institution can help to make sure Universities are (intrinsically) motivated to reduce energy and GHGs – i.e. by social or environmental, rather than economic or status concerns. They could help to appoint dedicated *Middle Actors* that supervise ICT energy consumption, implement energy conservation programmes and function as contact person regarding ICT energy use. These champions can stimulate and help other *Behaviour Changers* 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* better, together. The integration of a trusted *Conscience* with no mandate other to ensure sustainable outcomes, can simulate staff and students to become more intrinsically motivated and engaged in energy saving projects.

Extrinsic motivations

The successful *Electricity Incentivisation Scheme* in Cambridge is based on the polluter-pays principle. 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 by, e.g. organising a tea party for staff (University of Cambridge, 2016)[1]. The EIS is a good example of using extrinsic motivations (save money and win status) to lower energy usage in ICT. Competitions were happening not only on faculty level, but also inside faculties competitive games were started. For example, in some faculties competition was going on between labs to have the highest energy savings (University of Cambridge, 2016)[4]. Not every faculty has the resources available for investments in energy saving. The University of Cambridge started the *Energy and Carbon Reduction Programme* which is a funding pot for energy saving projects. The ECRP did not only provide money, but also did things like developing communities for employees to take action within their working environment. The invested money was 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].

Bénabou and Tirole (2003) and Chatterton (2011) discuss the difference between intrinsic and extrinsic motivators and how some studies argued that they should not be used in combination as the use of extrinsic motivators like rewards and punishment can undermine intrinsic motivations like

doing what's right for the environment. It is dependent on circumstances which one is most useful, but pilots based on randomised control trials would be most preferable to identify the best interventions.

KPIs

The last recommendation aims at the job descriptions, or key performance indicators (KPIs) of employees. It was seen in the Utrecht case that people tend to 'ignore' energy conservation measures as they feel that it adds extra burden to their already-high workloads. When *Sustainability Coordinators* with clear KPIs were appointed at the University of Utrecht, suddenly energy conservation policy became an important agenda point. It is important that sustainability becomes integrated in the job description of all relevant *Behaviour Changers*.

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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
Finland	Sweden
India	Switzerland
Ireland	Canada
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, RVO, 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, United Kingdom

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

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

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

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

Task 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, United Kingdom

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 Behaviour Change in DSM: Phase 1 - From theory to practice
Phase 2 – Helping the Behaviour Changers
Dr Sea Rotmann, SEA, New Zealand

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

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