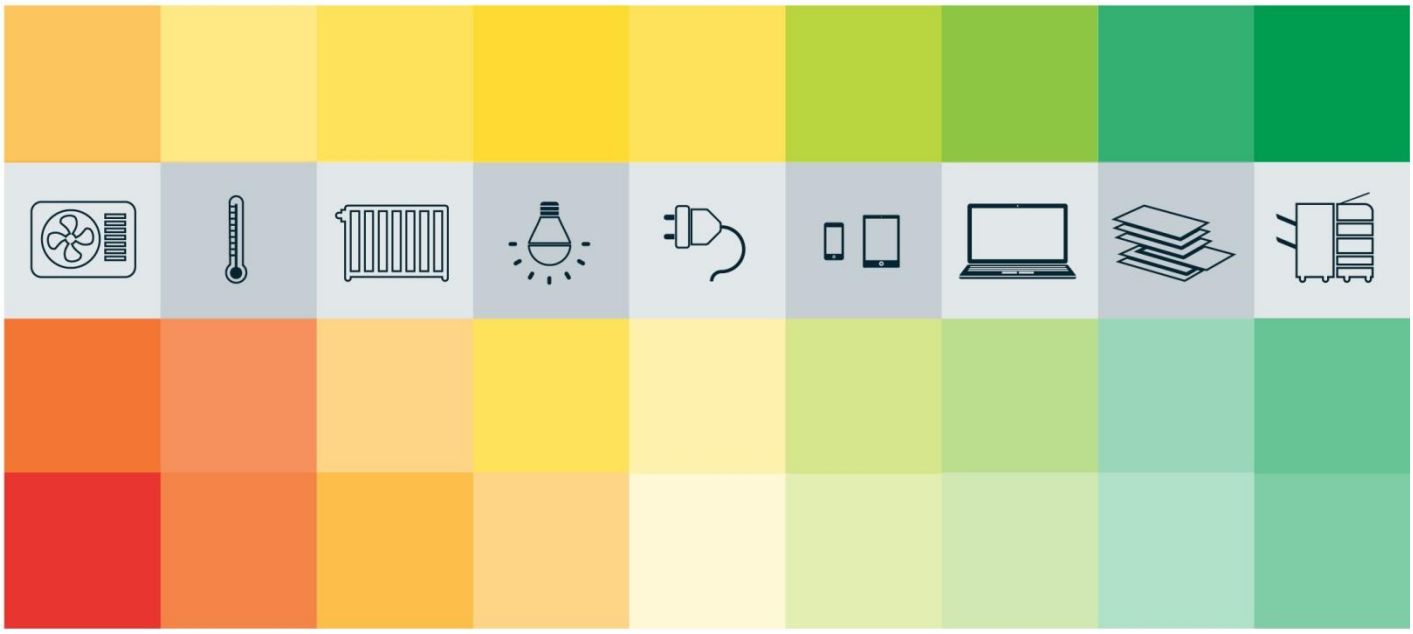

D2.5: Report on the Assessment of the Behaviour of the Target Groups

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Management summary

Energy conservation is an increasingly important topic. In line with the EU's 20-20-20 energy targets, START2ACT aimed to encourage energy savings at the workplace, focusing on young SMEs (small and medium-sized businesses) and startups. Employees of young SMEs and startups received trainings and workshops to make them aware of energy conservation measures. Specifically, startups received one workshop, focussed on facilitating knowledge on energy use, energy monitoring, and specific energy saving measures. SMEs received three trainings. The visits were tailored to each SME, thereby also allowing flexibility with regard to how the content was delivered during a visit. In the visits several topics around energy saving behaviour were discussed (e.g., explanation of energy meters, a staff awareness campaign, energy usage of specific equipment). The impact of the training and mentoring sessions on attitudes and energy efficient behaviour at work were investigated. It was also investigated if there was a positive spill-over effect to the home situation. For SMEs this could be investigated on a continuous basis. Namely, before the mentoring and training activities were started in a SME, and after each training activity – allowing the assessment of attitudinal and behavioural change over time. The mentoring and training activities were positively evaluated by SMEs and startups. The trainings provided them with new and valuable insights on energy savings, and inspired employees to become more energy efficient and take more actions in the future to conserve energy, both at work and at home.

The most important driver for SMEs for energy efficiency was the reduction of energy bills, which became more important over time after the several trainings. Moreover, after each training session employees of SMEs considered it worth paying a little more for an energy efficient product and to help their company to save energy. This might indicate that indeed the company norm has changed into a more energy conscious norm because of the trainings. Also, startups considered it worth paying a little more for energy efficient products, and indicated to find it important to help their company conserve energy. Finally, after each training session employees of young SMEs indicated to feel more informed on how to save energy. The higher the knowledge levels were, the higher the attitudes towards energy saving and the more likely respondents were to conserve energy at home, at work, and in the future. Startups also felt more informed about energy savings after the workshop took place.

Despite the fact that employees of young SMEs already indicated they frequently tried to conserve energy, the trainings were clearly effective in (further) increasing reported energy saving behaviour. This pattern is also reflected in more specific energy saving behaviours at work and at home (e.g., switching off lights, the computer, the monitor, the air conditioner / heater). Positive attitudes towards energy saving (which was targeted by the trainings) were positively related to the reported energy saving at work and at home. After the training sessions employees of young SMEs also reported to be more willing to take additional actions in the future to conserve energy, both at home and at work. This implies that the START2ACT training seem effective and promising in making people more energy conscious and changing their behaviour to become more energy efficient. By addressing people at work there also is a positive spill-over effect to the home situation where people also reported to become more energy efficient.

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1. Introduction

1.1 Background and aims of the START2ACT project

Energy conservation is an increasingly important topic, especially with the EU's 20-20-20 energy targets in mind. These energy targets were set by the EU leaders in 2007 and concern a set of binding legislation to ensure that the EU meets its climate and energy targets for the year 2020. This "climate and energy package" was enacted in 2009.

The package set three key targets: [1]

- 20% cut in greenhouse gas emissions (compared with 1990 levels);
- 20% of EU energy from renewables; and
- 20% improvement in energy efficiency.

In line with the energy targets, START2ACT aimed to encourage energy saving at workplace. More specifically, START2ACT focussed on young SMEs (small and medium-sized businesses) and startups: it is of key importance to already engage small businesses early on, as even though they might currently have relatively low energy consumption, their energy consumption and impact on the environment will increase considerably once these businesses grow and expand.

The young SMEs that were approached in the START2ACT project have a maximum of 50 employees and have been operating for no longer than 5 years. Startups are defined as independent, unlisted, innovative, tech-enabled, scalable enterprises designed by intent from day one to become large companies — by either disrupting an existing market and taking customers from existing companies or by creating a new market — aiming to provide significant returns to their founders and investors using all available outside resources.[2]

An important part of the START2ACT approach was to facilitate behavioural change by understanding the motivations, attitudes and knowledge levels of managers and employees of young SMEs and startups. Employees of young SMEs and startups received trainings and workshops to make them aware of energy conservation measures. The impact of the training programmes on energy saving attitudes and behaviour was investigated.

This is the final report of Work Package 2. The main aim of this report is to provide insights on the impact of training and mentoring sessions on behavioural change towards more energy efficient behaviour at work. In addition, it was investigated if there is a positive spill-over effect of the energy saving measures to the home situation.

Throughout the project, the mentoring and training activities were monitored to investigate the effectiveness of START2ACT actions. Monitoring was done on a continuous basis for SMEs. Namely, before

[1] http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm
[2] Definition from Startups Belgium.

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the start of mentoring and training activities, and after each training activity, which allows to assess behavioural change over time. To assess this, both soft indicators (energy saving behaviour as indicated by the employee) and hard indicator data (actual energy use of the company) were included in the monitoring part. We also provide insights on energy conscious behaviour in the start-up process of an enterprise.

1.2 Energy consumption at work

A substantial proportion of a nation's total energy use is consumed in office buildings and other utility buildings.[3] SMEs are an important part of the world economy, responsible for approximately 60% of all worldwide CO_2 emissions and 70% of all pollution.[4] There is thus a great potential for action at the workplace to achieve significant reductions in energy use. START2ACT aims to achieve an energy saving of 11.48 GWh.

Energy savings can be the result of two approaches: [5]

- Increased energy efficiency through investments in buildings or materials that provide the same benefits but use less energy.
- Decreased energy use by changing behaviour of managers and employees at work, which they could apply to the home environment as well.

START2ACT primarily focussed on reducing energy use by encouraging behavioural change at work. The largest impact in terms of energy saving in the workplace involves a behavioural change in employees' use of daily office equipment: heating, lighting, cooling and IT are the biggest contributors to energy use in offices.[6] Figure 1.1 shows the energy use of business equipment in the typical office.[7] It shows that most energy is consumed by PCs and monitors. By changing certain daily routines of employees at work – for example, powering down the computer when one's work is finished – significant energy reductions can therefore be realised. In fact, it is estimated that 20% of energy that is currently consumed at the workplace can be saved through energy efficiency measures targeting behavioural change.[8] The training and mentoring programs therefore focussed on changing the daily routines of employees by simple interventions.

[3] Staats, H., Leeuwen, E., & Wit, A. (2000). A longitudinal study of informational interventions to save energy in an office building. Journal of Applied Behavior Analysis, 33(1), 101-104.
[4] Parker, C. M., Redmond, J., & Simpson, M. (2009). A review of interventions to encourage SMEs to make environmental improvements. Environment and planning C: Government and policy, 27(2), 279-301.
[5] Tiedemann, K. H., & Hydro, B. C. (2010). Behavioral change strategies that work: a review and analysis of field experiments targeting residential energy use behavior. People-Centered Initiatives for Increasing Energy Savings, 299.
[6] Pérez-Lombard, L., Ortiz, J., & Pout, C. (2008). A review on buildings energy consumption information. Energy and buildings, 40(3), 394-398.
[7] Figure from the Carbon Trust (2006).
[8] EEA, 2013: Achieving energy efficiency through behaviour change: what does it take? EEA Technical report No 5/2013

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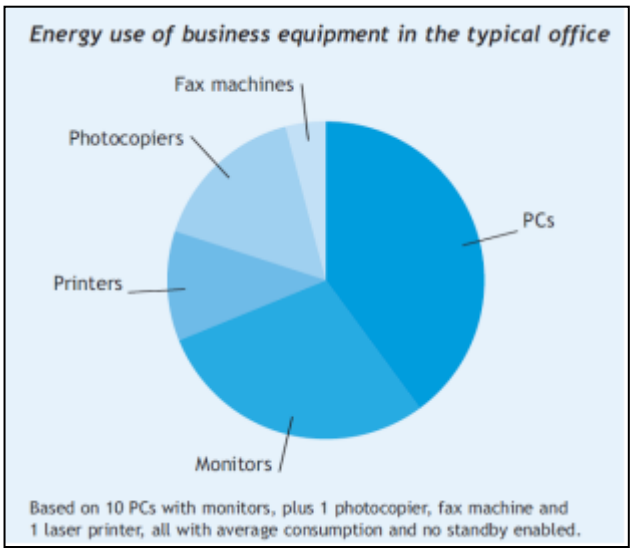
Figure 1.1 Energy use of business equipment



1.3 Structure of the report

This report describes the results of the monitoring surveys for SMEs and the results of the survey which startups received after their training session. In the next chapter, we provide a short literature review on barriers to and facilitators of behavioural change in energy usage, which provided the theoretical foundation for the survey methodology. Chapter 3 provides an overview of the research methodology discussing the themes and concepts that were assessed in the survey for SMEs. Chapter 4 describes the results for SMEs. Chapter 5 provides an overview of the research methodology and sample for startups. Chapter 6 provides the results of the startups survey. In Chapter 7 we provide lessons learned throughout the project and in Chapter 8 we draw conclusions.

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2. Literature review: facilitators and barriers to behavioural change

This chapter focuses on relevant literature on the barriers to and facilitators of behavioural change and the importance of engaging employees and managers of young SMEs and startups. The aim of this chapter is to provide a deeper understanding of the influence of company characteristics and person-related factors, such as knowledge, attitudes and motivations of individual employees, on energy-saving behaviour and behaviour change.

Many tools and solutions for increasing energy efficiency are already available. However, these do not necessarily lead to behavioural change.[9] There are two important reasons for this:

- There is a lack of *understanding*: Individuals are not aware of the things they can do in order to conserve energy.[10]
- There is insufficient *engagement*: Energy conservation is often a very distant goal. Individuals may think that the actions of one person do not matter. However, the cumulative impact of all these actions together does matter.[11]

Therefore, to achieve successful behaviour change, it is important to both inform employees and engage them. This is a central component of the training sessions.

The framework presented in this chapter formed the theoretical basis for the monitoring surveys. To gain insight into the impact of the training and mentoring programmes on energy saving behaviour (change), the mentoring surveys also covered measures of behavioural intentions and actual behaviour, in addition to more psychological factors such as attitudes and motivations. This is important because previous research has documented a discrepancy between environmental attitudes and behaviour (the "attitude-behaviour gap"): People generally report being concerned about the environment, but this concern does not always translate into more sustainable choices and behaviour.[12] Understanding this is important when starting to implement interventions to change behaviour to become more energy efficient. The literature review on effective behavioural interventions is discussed in more detail in report D2.2 on the optimisation of mentoring and training.

2.1 Energy efficient behaviour

Energy efficient behaviour depends on many aspects. Two widely applied theoretical frameworks for explaining behaviour and behaviour change are the Theory of Planned Behaviour (TPB) and the Value-

[9] Hertwich, E. G. (2005). Consumption and the rebound effect: An industrial ecology perspective. Journal of industrial ecology, 9(1-2), 85-98.
[10] Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. Psychological science, 18(5), 429-434.
[11] Abrahamse, W., & Steg, L. (2011). Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. Human Ecology Review, 18(1), 30-40.
[12] Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?. Environmental education research, 8(3), 239-260.

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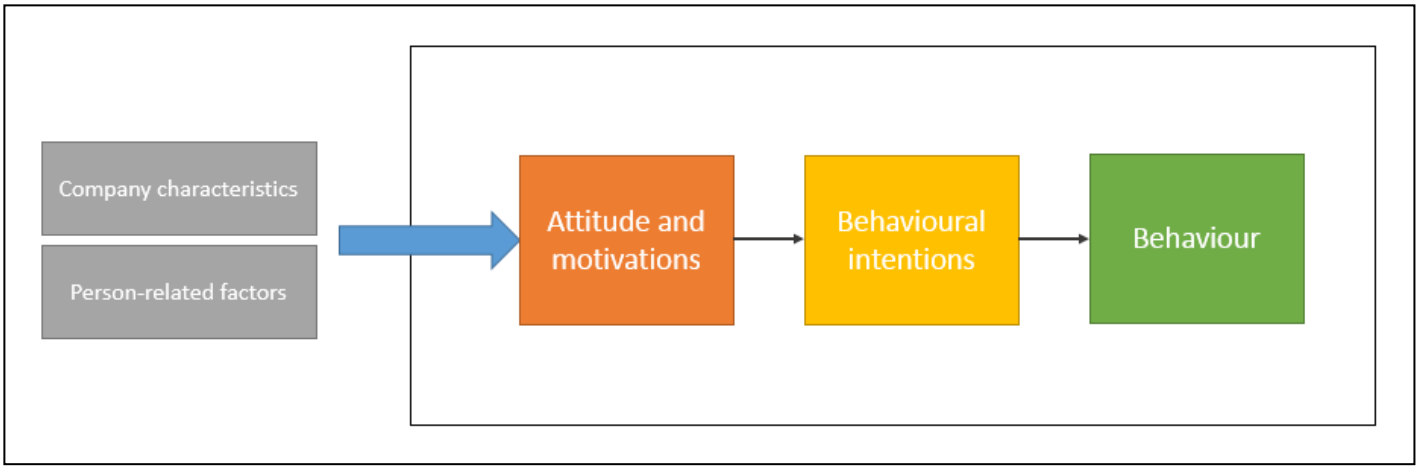
Belief-Norm theory (VBN).[13] The theories have also been applied to energy efficiency.[14,15] The model we describe integrates aspects from both theories and is applied to energy efficiency. The simplified model is displayed in Figure 2.1.

On the right side of the model the 'desired' **behaviour** – conserving energy – is displayed. In START2ACT energy efficient behaviour applied to both behaving energy efficiently in the office during work time, and the potential spill-over of energy efficient behaviour at home.

Figure 2.1 Simplified model to explain energy efficiency behaviour



Behavioural intentions can be seen as the closest predictor of the desired behaviour. Behavioural intentions are an indication of the extent to which people are willing to perform the behaviour (in the future). Behavioural intentions are in turn influenced by **attitudes** and **motivations** to conserve energy. Attitudes refer to the degree to which a person has a favourable or unfavourable evaluation towards energy efficiency. Motivations refer to the degree to which a person is motivated to perform energy efficient behaviour.

Furthermore, attitudes and motivations are influenced by **person-related factors**, such as socio-demographics, knowledge about the (importance of) energy efficiency, and values and beliefs. In the current context of behaviour change among employees of startups and SMEs it is also of key importance to take into account **company characteristics**, such as the size and sector of the company and the company drivers and barriers.

In the remainder of Chapter 2 we discuss these concepts further. The most distal factors (company and person-related) will be discussed first, followed by attitudes and motivations.

[13] Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In Action control (pp. 11-39). Springer Berlin Heidelberg.
[14] Abrahamse, W., & Steg, L. (2011). Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. Human Ecology Review, 18(1), 30-40.
[15] Dixon, G. N., Deline, M. B., McComas, K., Chambliss, L., & Hoffmann, M. (2015). Saving energy at the workplace: The salience of behavioral antecedents and sense of community. Energy Research & Social Science, 6, 121-127.

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2.2 Company characteristics: drivers and barriers to energy efficiency

Some startups or young SMEs are aware of the importance of energy efficiency and also make this part of their policy, whereas others do not. There are different company drivers and barriers regarding energy efficiency that affect the company's decision to behave in an energy efficient manner, for instance having an intrinsic motivation to conserve energy versus valuing monetary gains by conserving energy.

2.2.1 Drivers

Drivers can be understood as factors facilitating the adoption of both energy efficient technologies and practices that contribute to an energy efficient culture within a company. The main drivers for companies to introduce energy efficiency measures can be summarised as: [16,17]

- Legislation: Fines and legal costs underline the importance of compliance with legal norms.[18]
- Stakeholder pressures: Customers, local communities, or environmental interest groups that encourage firms to consider ecological impacts in their decision making.[19]
- Economic opportunities: By optimising production processes companies reduce energy costs and at the same time lower their environmental impact.[20] Other economic opportunities can be that companies prepare for future increases in energy prices or that they want to increase product quality and increase the green marketing potential of their products.[21]
- Ethical motives: Companies respond because it is the right thing to contribute to mitigating climate change. This will also help to improve the company image.[22] It also helps when top management encourages employees to behave in an energy efficient way.

These drivers can be seen as the main reasons that would motivate the company to become more energy efficient. In the surveys the company drivers were measured and it was investigated how these change over time. In the trainings the drivers were also addressed to tailor energy efficiency measures to the company. When company motivations and personal motivations of the employee are brought in line, it might help to internalise energy saving values even more. This might in turn translate into actual energy efficient behaviour of employees within a company.

2.2.2 Barriers

Barriers can be understood as factors that impede energy efficiency within companies. The main barriers for companies can be summarised as: [23,24,25,26]

[16] Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. Academy of management journal, 43(4), 717-736.
[17] Eurochambres - CHANGE (2010). Promoting intelligent energy to SMEs. See www.eurochambres.eu/change
[18] Cordano, M. (1993). Making the natural connection: Justifying investment in environmental innovation.
[19] Berry, M. A., & Rondinelli, D. A. (1998). Proactive corporate environmental management: A new industrial revolution. The Academy of Management Executive, 12(2), 38-50.
[20] Eurochambres - CHANGE (2010). Promoting intelligent energy to SMEs. See www.eurochambres.eu/change
[21] Parry, S. (2012). Going green: the evolution of micro-business environmental practices. Business Ethics: A European Review, 21(2), 220-237.
[22] Spence, L. J., & Rutherfoord, R. (2001). Social responsibility, profit maximisation and the small firm owner-manager. Journal of Small Business and Enterprise Development, 8(2), 126-139.
[23] Trianni, A., & Cagno, E. (2012). Dealing with barriers to energy efficiency and SMEs: some empirical evidences. Energy, 37(1), 494-504.

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- Financial barriers: The available funds within the company are reserved for more important or promising investments, there is a lack of profitability of investing in energy efficiency, or there is a lack of funding for energy efficient investments.
- Lack of time or other priorities: The cost of obtaining information on energy consumption and/or future to-be purchased energy efficient equipment is too high.
- Lack of information / skills: Management and personnel are not aware of energy efficiency, the company internally lacks the skills to incorporate energy efficiency policies, and/or there is a lack of information on cost-efficient energy efficiency interventions.
- Uncertainty: For instance, pay-back period of investments is long or the incentives are split with others, e.g., energy service companies.
- Technology-related barriers: There is a lack of sub-metering that provides insights on the energy consumption of the company.

Some barriers, such as financial barriers, are difficult to remove. In the training and mentoring sessions, START2ACT focussed on those aspects that can be changed with behavioural interventions. For instance, the lack of information barrier was addressed by providing companies with relevant advice and information on energy efficiency.

2.2.3 Company aspects

It is important to distinguish between different types of SMEs and startups as they have diverse business models and environmental improvement aspirations.[27] No single intervention would be effective for all SMEs or startups. For instance, companies that act in very competitive industries will only make environmental improvements when this is a regulatory requirement (when all competitors also have to improve on this). For profit-driven firms financial incentives are effective. However, such interventions usually only have a short-term effect in behavioural change as firms revert back to their previous practices when the incentives are removed.[28] The information in the trainings was tailored to the specific situation of the startups and SMEs.

2.3 Person-related factors regarding energy efficiency

Person-related factors directly feed into attitudes, motivations, and behaviour.

[24] Cagno, E., & Trianni, A. (2013). Exploring drivers for energy efficiency within small-and medium-sized enterprises: first evidences from Italian manufacturing enterprises. Applied Energy, 104, 276-285.
[25] Fleiter, T., Schleich, J., & Ravivanpong, P. (2012). Adoption of energy-efficiency measures in SMEs—an empirical analysis based on energy audit data from Germany. Energy Policy, 51, 863-875.
[26] Okereke, C. (2007). An exploration of motivations, drivers and barriers to carbon management:: The uk ftse 100. European Management Journal, 25(6), 475-486.
[27] Blumer, Y., Wemyss, D. (2015). Indicators of innovation: Empirical insights into activities, challenges, and strategies of Swiss energy sector start-ups. Workpackage 1: Energy, Innovation, Management SCCER CREST.
[28] Parker, C. M., Redmond, J., & Simpson, M. (2009). A review of interventions to encourage SMEs to make environmental improvements. Environment and planning C: Government and policy, 27(2), 279-301.

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2.3.1 Knowledge

One of the most important reasons why people are not taking action regarding energy efficiency is because they do not know what to do, or how to do it.[29] A lack of knowledge, understanding, or awareness regarding energy efficiency may be caused by: [30]

- people not understanding the (sometimes complex) information;
- people not being able to find the information they are looking for;
- people lacking awareness regarding the benefits of energy efficiency; and
- people perceiving calculations as too complex to compute payback of energy efficient investments (e.g., how many years it takes before the investment in energy efficient equipment pays back).

Clearly, people must have a basic knowledge about environmental issues and effective environmental behaviours in order for them to act pro-environmentally. Knowledge in the form of concrete examples of what they can do in order to perform more energy efficient behaviour might be particularly effective to achieve behaviour change.[31] The training and mentoring sessions therefore provided participants with relevant knowledge, including concrete examples of energy-saving behaviours. Further, in the surveys it was investigated how well employees are informed on saving energy techniques, and in the SME monitoring surveys we also investigated if (subjective) knowledge levels grow over time.

2.3.2 Socio-demographics

Many studies have demonstrated effects of gender on environmental concern.[32,33] A typical finding is that women have higher environmental concern and are more willing to change, even though they are often less informed about environmental problems.[34] It also seems that most environmentally relevant behaviour takes place at home, and is often performed by women.[35] Besides gender, educational level also influences energy efficient behaviour, as people with higher education levels also have more knowledge about environmental issues.[36] Higher knowledge levels do not necessarily lead to more energy efficient behaviour, however. Important socio-demographics that may explain differences in energy saving behaviour (e.g., gender) were taken into account in the statistical analyses.

[29] Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. Psychological science, 18(5), 429-434.
[30] Painuly, J. P. (2001). Barriers to renewable energy penetration: A framework for analysis. Renewable Energy, 24, 73-89.
[31] Ek, K., & Söderholm, P. (2010). The devil is in the details: Household electricity saving behavior and the role of information. Energy Policy, 38(3), 1578-1587.
[32] Schahn, J., & Holzer, E. (1990). Studies of individual environmental concern the role of knowledge, gender, and background variables. Environment and behavior, 22(6), 767-786.
[33] Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. Environment and behavior, 25(5), 322-348.
[34] Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?. Environmental education research, 8(3), 239-260.
[35] Cecelski, E. (2000). The role of women in sustainable energy development.
[36] Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?. Environmental education research, 8(3), 239-260.

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2.4 Attitudes and motivations on energy efficiency

Attitudes refer to the degree to which a person has a favourable or unfavourable evaluation of energy efficiency. Attitudes inform behaviour. Employees with strong pro-environmental attitudes are more likely to engage in pro-environmental behaviour.[37]

Motivations refer to the degree to which a person is motivated to perform energy efficient behaviour. However, it is important to keep in mind that positive attitudes and motivations towards energy saving do not necessarily translate into carrying out energy saving behaviour.[38,39] This is because intrinsic motivations to conserve energy can be overridden by non-environmental motivations that are more intense or important. Examples of strong non-environmental motivations could be:

- individuals are typically motivated by self-interest (in terms of perceived costs, such as time, or social approval) – for example: "I will drive to work because I'd rather be comfortable than environmentally friendly";
- individuals may have the intent to carry out energy efficient behaviour, but are socially pressurised to not do so (for instance due to company norms);
- individuals may lack the opportunity to carry out energy efficient behaviour;
- individuals might be motivated and willing to become more energy efficient, but might not be urged by the company;
- it can also be the case that companies are willing to increase energy efficiency but experience all kinds of barriers (see 2.2.2), which might also demotivate the employees; and
- at home people might be economically constrained.

The training and mentoring sessions focussed on promoting pro-environmental attitudes/motivations and took into account non-environmental motivations to increase the likelihood that the training and mentoring sessions will result in actual energy saving behaviour. In addition, attitudes and motivations were measured in the SME and start-up surveys.

2.5 Training and mentoring programmes

In the training and mentoring programmes several behavioural strategies outlined above are implemented by START2ACT partners (see report D2.2 for a more elaborate review on effective behavioural interventions). The monitoring surveys were intended to measure behaviour and behaviour change, so that the impact of the training and mentoring programmes could be evaluated. Below, an overview is provided of the content of the training and mentoring sessions for SMEs and start-ups (see WP4 and WP5 for more details on the trainings / training materials).

[37] Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?. Environmental education research, 8(3), 239-260.
[38] Kaiser, F. G., Ranney, M., Hartig, T., & Bowler, P. A. (1999). Ecological behavior, environmental attitude, and feelings of responsibility for the environment. European psychologist, 4(2), 59.
[39] Owens, S., & Driffill, L. (2008). How to change attitudes and behaviours in the context of energy. Energy policy, 36(12), 4412-4418.

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2.5.1 SMEs

Three visits were planned for each SME. In each visit, pre-specified content and materials were presented and discussed (see below) with an energy manager or other staff member(s). However, to ensure that in principle all SMEs – including those with little time available – could participate, some flexibility was allowed with regard to how the content was delivered during a visit (e.g., the manner of presentation, fewer visits but more information per visit, etc.).

Visit 1 started with (1) an orientation, in which energy-related information was obtained, such as the type of building, level of staff awareness, energy management, and energy efficiency. This was followed by (2) a discussion of the (importance of) completing an Energy Statement and Buy Smart Strategy, and (3) a visit and explanation of the energy meters. Next, (4) guidance was provided on designing their own staff awareness campaign using a Training Kit. This kit was tailored to the country in which it was implemented and to the specific SME. Finally, (5) it was discussed what actions the SME needed to have completed by the next visit.

In **Visit 2**, (1) the progress of the energy statement and Buy Smart Strategy was monitored, (2), the progress on the energy metering was reviewed, (3) the staff awareness campaign was evaluated and new actions for the campaign were discussed, (4) plug-in timers were introduced, and (5) the action plan was reviewed, in which actions were defined that needed to be completed by the next visit.

Visit 3 started with (1) a review of the progress of the actions formulated in Visit 2. Next, (2) the heating and cooling systems were checked to see if they are under appropriate time and temperature control. It was also checked how (3) energy use for lighting (e.g., improving switch off regimes or upgrading luminaires), and (4) energy use for IT equipment and small power items can be reduced. Finally, (5) actions for the next visit are reviewed.

In addition to these on-site trainings, SMEs were provided with other START2ACT tools and resources using the Interactive Online Platform.

2.5.1 Startups

Given that startup companies are generally short in time, 1.5h meetings were organized that were attended by multiple startups. The meetings started with an introduction, after which a training was provided that focussed on facilitating knowledge on energy use, energy monitoring, and specific energy saving measures. Follow-up services were also made available (e.g., eTools). After the meeting, participants completed a survey.

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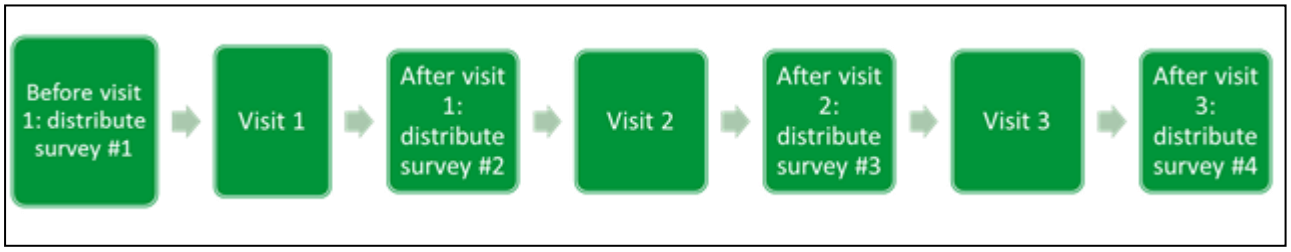
3. SMEs: Methodology

For SMEs the monitoring surveys were administered on a periodic basis among employees who followed the START2ACT trainings. For SMEs there were three training sessions and four short surveys. The first survey took place prior to the first training and provided a baseline to which the follow-up surveys can be compared (from now on: Wave 1). The first monitoring survey took place after the first training (from now on: Wave 2), the second monitoring survey after the second training (from now on: Wave 3), and the third monitoring survey after the third training (from now on: Wave 4) (see Figure 3.1). A large part of the content of the surveys overlapped so that longitudinal comparisons could be made to investigate whether the attitudes and behaviour of respondents change over time. The surveys were made as short and engaging as possible to limit the time it takes for respondents to fill in the survey.[40]

Figure 3.1: Survey flow SMEs



3.1 Main concepts and themes survey

The survey consisted of questions regarding company and personal motivations, attitudes, current behaviour and future behavioural intentions at home and at work. Furthermore, some company characteristics and socio-demographics were measured. Hard indicators (such as actual energy usage as provided on energy bills) were also measured, where possible. Finally, in the surveys that took place after each training session, the training was evaluated. Table 3.1 provides an overview of survey topics per survey, which we will shortly explain below.

Introduction

The questionnaire started with a general introduction of the START2ACT project, explaining the aim of START2ACT. Also, respondents were explicitly asked for their consent.

Company motivations regarding energy efficiency (SME only)

We asked questions about the reasons that would motivate the company to save energy, the drivers to conserve energy (cost reductions, contributing to the fight against climate change, etc.).

[40] Therefore at some points trade-offs had to be made in the number of items that could be used for certain constructs.

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Table 3.1: Survey topics

Survey	Topics
Survey for startups	Personal motivations, attitudes, subjective knowledge, current behaviour and behavioural intentions at home and at work, company characteristics and socio-demographics + workshop evaluation
SME Baseline survey target group	Company motivations, personal motivations, attitudes, subjective knowledge, current behaviour and behavioural intentions at home and at work, hard indicators, company characteristics and socio-demographics
SME First monitoring survey	Baseline (without hard indicators) + training evaluation (effectiveness)
SME Second monitoring survey	Baseline (without hard indicators) + training evaluation (effectiveness)
SME Third monitoring survey	Baseline + training evaluation (effectiveness)

Note. Company motivations and hard indicators are not measured in the survey for startups but are added in the SME baseline survey. The hard indicator questions were only asked in the baseline survey and the third monitoring survey.

Personal motivations, attitudes and knowledge regarding energy efficiency

This part of the questionnaire asked about the personal motivations and knowledge toward energy conservation. For instance, whether respondents considered it important to help the company conserve energy and how well informed they were on saving energy.

Current behaviour and future behavioural intentions at home and at work

We measured e current energy saving behaviour at home and at work by asking questions related to energy saving actions, such as switching off a computer when being finished for the day or switching off lights when leaving a room. We also measured the likelihood that the respondent will take more actions to conserve energy at work and at home in the next few months.

Hard indicators (SME only)

(Energy) managers of SMEs were asked to provide information on their energy consumption (i.e. electricity (kWh), gas (kWh), oil (litres), others (e.g., biomass, coal)). They could either provide the actual data and/or costs or estimations hereof.

Company characteristics

We asked background questions regarding the company in terms of size, operation time, and office type.

Socio-demographics

Age, gender, and education level were measured.

Training evaluation

Respondents evaluated the training by indicating whether the training provided them with useful and new insights and whether they would change their behaviour because of what they have learned in the training(s).

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All items were measured on 5-point scales. Appendix A provides an overview of the survey questions. For a full overview of the survey methodology, we refer to our previous reports “D2.1. Baseline Assessment Report” and “D2.3. Monitoring methodologies”.

3.2 Translation process

The questionnaire was programmed by CentERdata using the programming language Blaise. Blaise is developed and maintained by Statistics Netherlands. The main structure of the questionnaire was formalised in this programming step. This version of the questionnaire contained English questions and was called the “Source” version.

When the source questionnaire was programmed, it included both the English questions and the routing rules to determine the order of questions in the survey. For the different survey languages the questions needed to be translated, but the routing remained the same. To enable the translation, the questions were cut into smaller building blocks and entered into a database. A presentation of these translatable items allowed translation of only the questions, without the need for any knowledge of Blaise programming or routing. The Translation Management Tool (TMT) is the interface that was used to manipulate this database. The TMT is a web-based tool specially designed to allow translators to translate questionnaires without the burden of understanding complex routing and programming code for large multi-lingual questionnaires. It eliminates the need for copy-pasting text from Word documents or struggling through lengthy pages of computer code. When the text was translated, a second person evaluated the translations and explicitly approved these.

When the translation was complete, a localised version of the questionnaire was generated. The source version of the questionnaire was walked through, and the translations were pasted over the elements that were defined in the source version. The local version was compiled and integrated with the sample management system in an installer. Once installed this translated version was then tested.

The translating process was iterative, meaning that this process was repeated several times. If during testing a problem concerning a question was found, the generic version in the database was updated, requiring new translations. Each cycle improved the questionnaire and/or translation ultimately leading to a final version that could be used in the field.

3.3 Sample description

A sample of employees and managers of young SMEs was drawn from the networks of the local partners (GEO, CT, ENVIROS, EHIP, SOFENA, SIEA, ENERO, KAPE). Companies were contacted in a traditional way in their local language: an announcement e-mail was sent via the local partner to the target company (e.g., manager of a young SME / startup) in combination with a brochure explaining the nature of the study. No SME-data was collected by Startups.be in Belgium, as they were only involved in the mentoring of startups.

Data were collected between May 2017 and May 2019. Figure 3.2 provides the survey response for SMEs over time. It shows that after the project extension (granted in October 2018), many additional survey responses were collected. In total, 730 respondents were collected.

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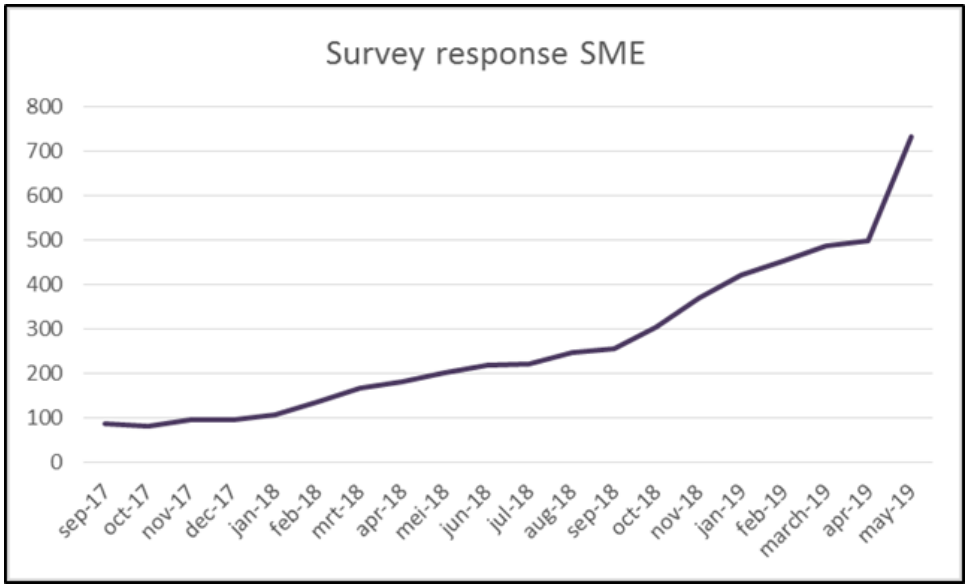
Figure 3.2 response rate over time



After extensive data checks and cleaning – in which for instance cases that seemed to appear double in the dataset were removed – 686 cases were selected for data analyses. Table 3.2 provides an overview of the response rates per country before and after data cleaning. Responses in Wave 4 are slightly higher than Wave 2 and 3. This is due to some companies receiving multiple trainings in one session and therefore completing the first and last survey only.

Table 3.2 response rate per country and wave, before and after data cleaning

Company	Country	Response Wave 1		Response Wave 2		Response Wave 3		Response Wave 4		Total	
		Before	After	Before	After	Before	After	Before	After	Before	After
SOFENA	Bulgaria	61	59	51	51	33	33	49	48	194	191
ENVIROS	Czech	23	21	14	13	12	11	14	13	63	58
EIHP	Croatia	36	32	15	14	8	8	13	11	72	65
GEO	Hungary	37	36	27	27	2	2	0	0	66	65
KAPE	Poland	37	35	25	23	30	29	15	15	107	102
ENERO	Romania	58	55	51	44	29	23	44	38	182	106
SIEA	Slovakia	1	1	0	0	0	0	0	0	1	1
CT	UK	37	36	4	4	3	3	1	1	45	44
	Total	290	275	187	176	117	109	136	126	730	686

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Table 3.2 does not provide insights into how many respondents participated in all (or some) waves. Therefore, Table 3.3 shows per country the number of respondents that participated in one or multiple waves and which of the waves. Table 3.3 for instance shows that there were 78 respondents across all countries that took part in all surveys, 31 of which were collected by SOFENA (BG), and 22 by ENERO (RO). For some START2ACT partners it turned out to be particularly difficult to encourage young SMEs to participate in multiple training sessions. In these cases all information was provided in one single visit. Other partners slightly changed the set-up of the training sessions. For instance, the first SME visit was used for a "light" version of an energy audit, and the second visit was centralized around the economic assessment of implementing energy saving measures (for instance cost calculation of replacement boiler). Some SMEs participated in the trainings but did not take part in the surveys. Further, some companies did not survive throughout the study period.

Table 3.3 Number of respondents that participated in one or multiple waves per country[41]

Company	Bulgaria	Czech	Croatia	Hungary	Poland	Romania	Slovakia	UK	Total
Only Wave 1	10	7	19	13	13	14	1	33	110
Only Wave 2	2	-	1	4	1	3	-	2	13
Only Wave 3	-	1	-	-	5	-	-	1	7
Only Wave 4	1	1	-	-	-	1	-	-	3
Wave 1 & 2	-	2	3	22	7	3	-	2	39
Wave 1& 3	-	-	-	1	2	-	-	1	4
Wave 1 & 4	-	1	1	-	-	-	-	-	2
Wave 2 & 3	-	-	-	1	4	-	-	-	5
Wave 2 & 4	-	-	-	-	-	-	-	-	-
Wave 3 & 4	-	-	-	-	5	-	-	1	6
Wave 1, 2 & 3	2	-	-	-	3	1	-	-	6
Wave 1, 2 & 4	16	1	2	-	-	15	-	-	34
Waven1, 3, & 4	-	-	-	-	2	-	-	-	2
Wave 2, 3 & 4	-	-	1	-	-	-	-	-	1
All waves	31	10	7	-	8	22	-	-	78
Total	**62**	**23**	**34**	**41**	**53**	**59**	**1**	**40**	**310**

[41] Table 3.2 and 3.3 relate in the following way: In total there are: 110 + 39 + 4 + 2 + 6 + 34 + 2 + 78 = 275 responses for Wave 1 (all grey cells are added). This is the 275 that is provided in the row with Totals for Wave in Table 3.2.

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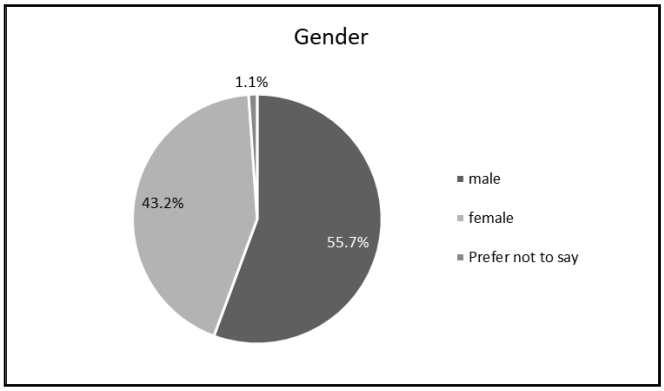
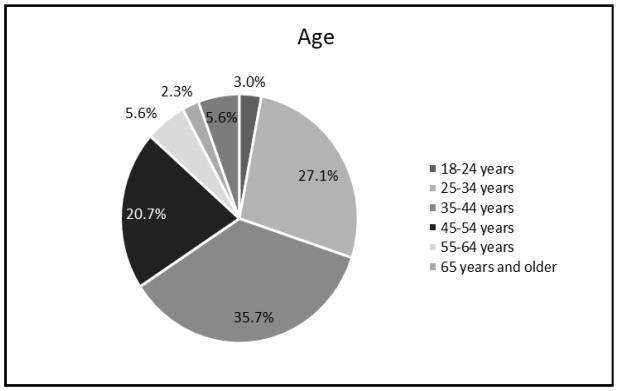
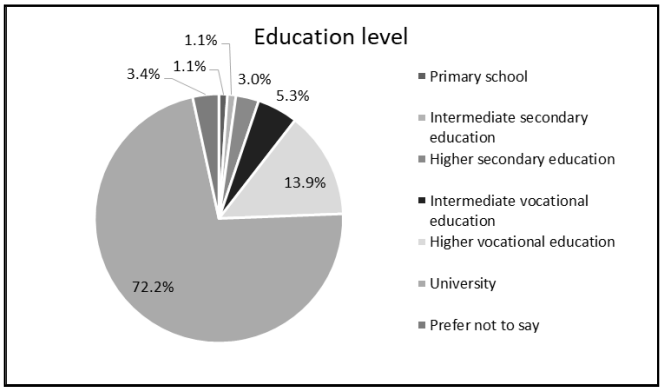
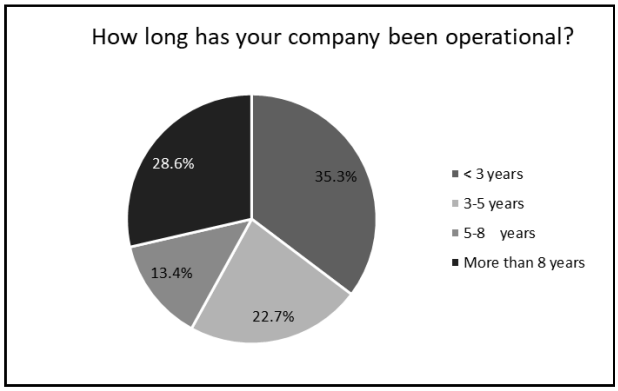
Socio-demographic information was only measured in wave 1. 55.7% of the respondents were male and 43.2% were female (see Figure 3.3). The education level was high, with 72.2% of respondents having a university degree. More than 55% is 35 or older. About one-third (35.3%) of the SMEs was operational for less than 3 years (when they were approached to take part in the study). Most SMEs rent (44.6%) or own a permanent office (39.0%) and the typical size of SMEs is 0-10 persons (73.5%) (see Figure 3.3, for more details see Appendix B.1). Some of the SMEs that took part in the trainings had more than 50 employees or were operational for longer than 5 years. As these SMEs were very interested in the START2ACT program they were allowed to participate.

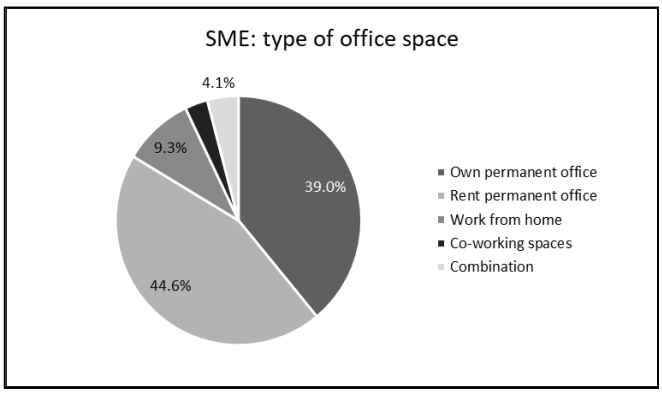
Figure 3.3 socio-demographic information and company background SMEs

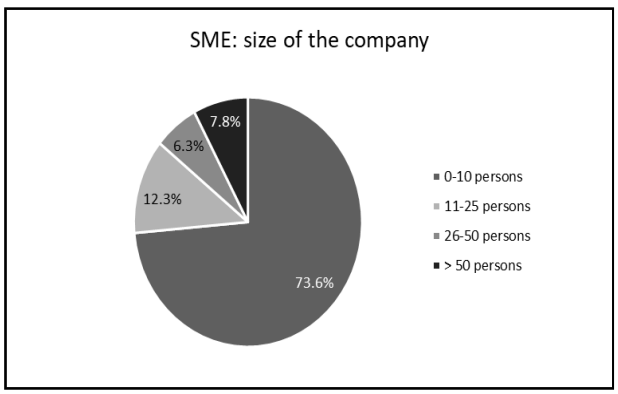












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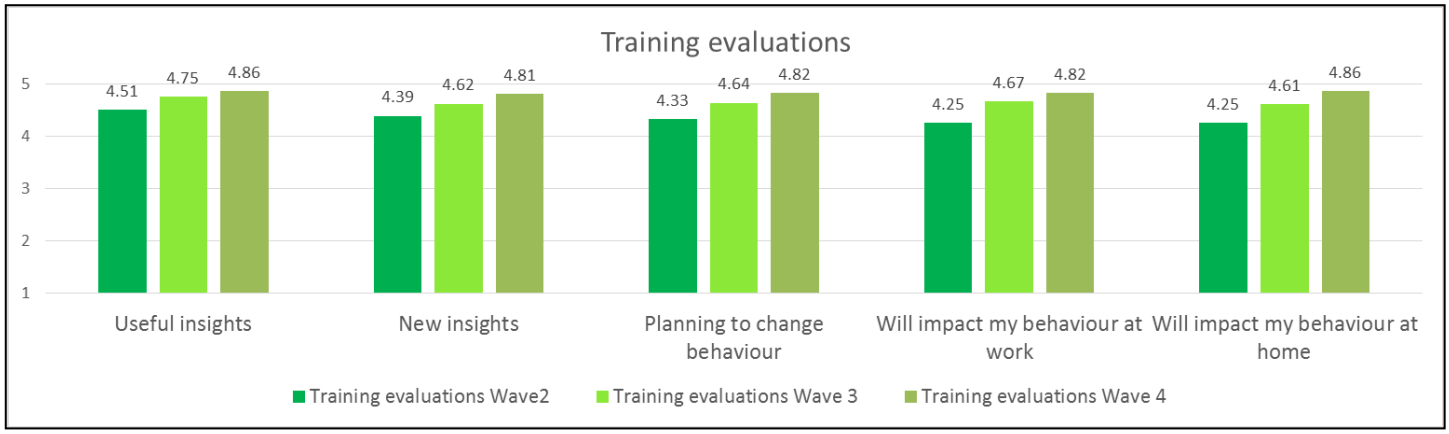
4. SMEs: Results

4.1 Training evaluations

After each training respondents evaluated the training (Wave 2, 3, 4). The trainings were evaluated positively from the start (see Figure 4.1):[42] employees from young SMEs indicated that the trainings provided them with useful and new insights. More important, they indicated that they were planning to change their behaviour based on what they have learned in the START2ACT trainings and also expected that the trainings will impact their energy efficiency behaviour at work and at home. Over time, training evaluations further increased, and employees of SMEs became significantly more willing to change their behaviour, both at work and at home.[43] It thus seems that **the trainings inspired employees from young SMEs to become more energy efficient.**

Figure 4.1 Training evaluations[44]



Note. All scales are 5-point scales with 1 = certinaly not or strongly disagree, and 5 = certinaly so or strongly agree.

4.2 Company motivations and attitudes

There are several motivations for a company to become more energy efficient. Respondents were asked which company motivations regarding energy efficiency are the most important to them, selecting the top 3 reasons from the following list:

[42] The data is structured in long format, which means that for each respondent, for each wave, a separate row of data appears in the dataset. When a respondent participated in all waves, there are four rows in the dataset, whereas when a respondent only participated in one wave, there is only one row in the dataset. In the current dataset some respondents have more waves of data, and/or data from not all, but different waves (see Table 3.3). Time is thus nested within persons. In such cases multilevel models are preferred over ANOVA models / repeated measure models as multilevel models make use of all available data without the need to delete cases listwise when cases are incomplete (e.g., when only wave 1 & 2 data is available for a certain respondent this case does not have to be removed). It also takes into account that respondents were not measured at the same intervals.

[43] It was tested whether there were significant changes over time. A *p*-value indicates whether the differences over time are statistically significant, which means that they are very unlikely to have occurred by chance. A small *p*-value (<.05) indicates that there are significant differences over time. The increases over time in Figure 4.1 are statistically significant. The changes between wave 3 & 4 for useful insights and whether the trainings will have an impact on energy efficiency behaviour at work are marginally significant (a p-value <.10). Useful insights: F (2, 239) = 23.02, p < .001; wave 2 & 3: p <.001; wave 3 & 4: p = .059. New insights: F (2, 233) = 29.61, p < .001, wave 2 & 3: p <.001; wave 3 & 4: p =.002. Planning to change behaviour: F (2, 246) = 41.79, p < .001, wave 2 & 3: p <.001; wave 3 & 4: p =.005. Impact on behaviour at home: F (2, 234) = 33.02, p < .001, wave 2 & 3: p <.001; wave 3 & 4: p =.060. Impact on behaviour at work: F (2, 226) = 37.57, p < .001, wave 2 & 3: p <.001; wave 3 & 4: p =.002.

[44] N wave 2 = 175, N wave 3 = 108, N wave 4 = 124.

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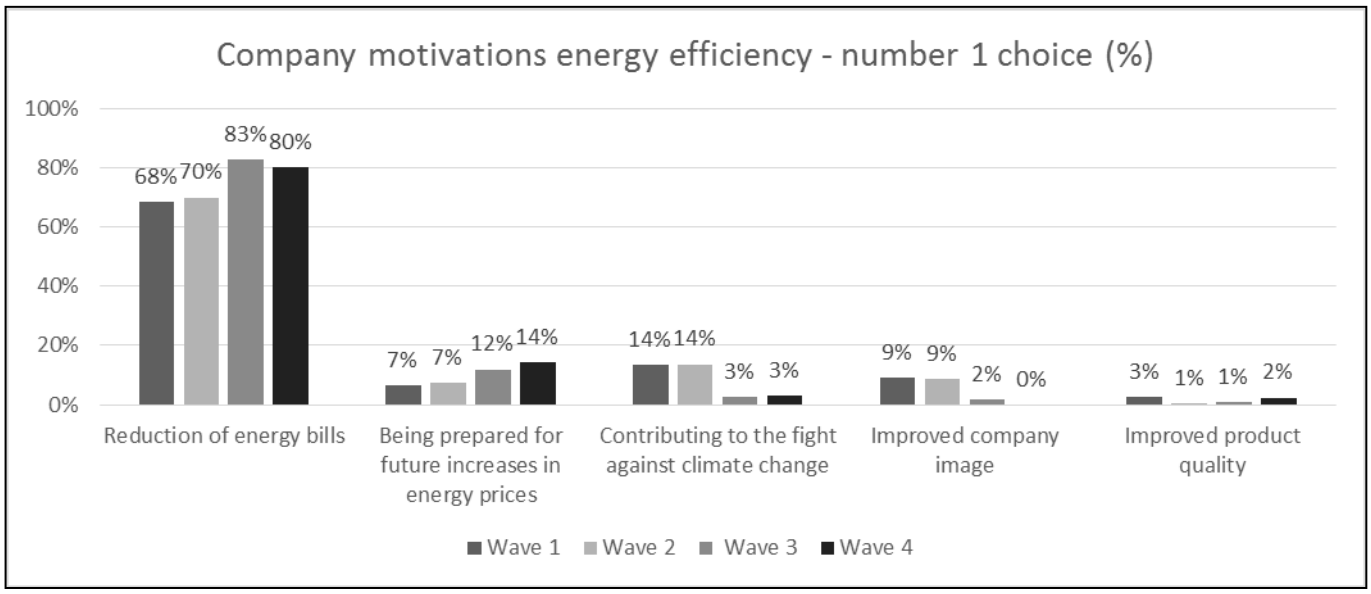
1) reduction of energy bills;
2) being prepared for future increases in energy prices;
3) contributing to the fight against climate change;
4) improved company image;
5) improved product quality.

Across all waves, **reduction of energy bills appeared to be the most important reason** for young SMEs to become more energy efficient. More specifically, 68% of respondents in Wave 1 (before the trainings stared) indicated that reduction of energy bills is the company's number one motivation (see Figure 4.2).[45] Moreover, after the second and third training importance of reducing energy bills even increased further (70% in Wave 2, 83% in Wave 3, and 80% in Wave 4). Contributing to the fight against climate change was slightly more important before the trainings took place (14% in Wave 1) and after the first training (14% in wave 2), whereas this was 3% in Wave 3 and 4. After the second and third training, being prepared for future increases in energy prices was slightly more important (7% in Wave 1 and 2, 12% in Wave 3, 14% in Wave 4). So, after the second and third training the focus was more on the monetary gains for the company in relation to energy efficiency. This may not be surprising as many of the partners calculated for the SMEs how much money could be saved by implementing energy efficient measures during the trainings. This could have led to a higher importance attributed to cost savings due to the attention paid to costs.

Figure 4.2: Company drivers to energy efficiency[46]



Respondents were also asked about attitudes towards energy efficiency in their company (measured on five-point scales). Figure 4.3 (averages) and Table 4.1 (frequencies) provide the results. Before the training more employees believed that it was **not** a priority in their company to save energy (Wave 1: 17.9%, M_{wave1}

[45] The percentage is computed as the frequency that the statement was selected as number one choice divided by the total frequency of the number one choice.
[46] *N* wave 1 = 275, *N* wave 2 = 176, *N* wave 3 = 109, *N* wave 4 = 126.

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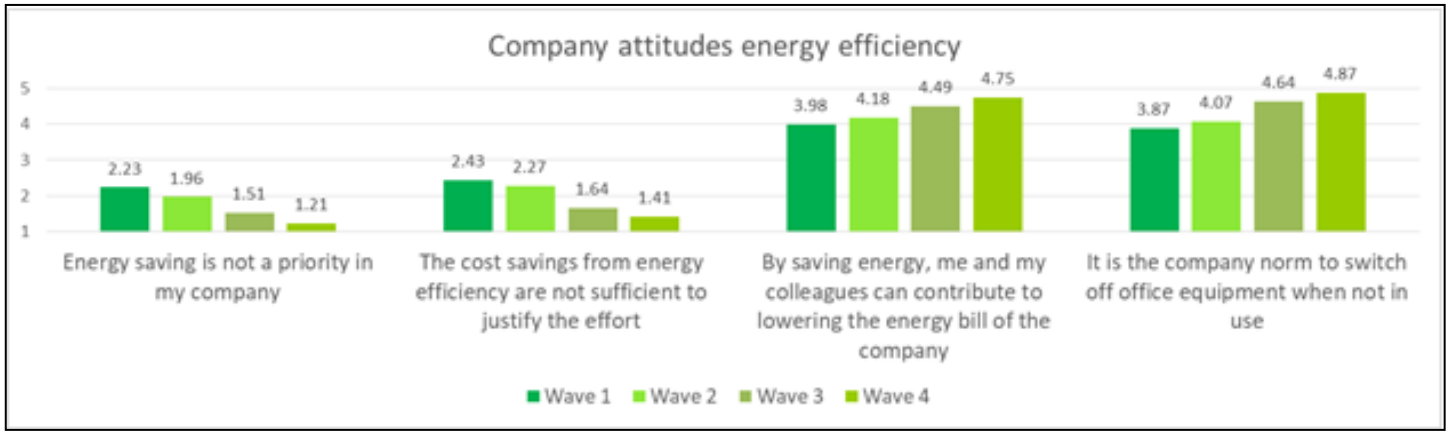
= 2.23) than after the trainings (Wave 2: 7.3%, M_{wave2} = 1.96; Wave 3: 6.4%, M_{wave3} = 1.51; Wave 4: 3.2%, M_{wave4} = 1.21).[47] Similarly, before the trainings employees more often thought that the cost savings from energy efficiency were **not** sufficient to justify the effort (Wave 1: 17.8%, M_{wave1} = 2.23) than after the trainings (Wave 2: 10.8%, M_{wave2} = 2.27; Wave 3: 5.5%, M_{wave3} = 1.64; Wave 4: 2.4%, M_{wave4} = 1.41).[48] Before the training sessions employees already indicated that they think employees are able to lower the energy bill of the company by saving energy (M_{wave1} = 3.98), and this belief further increased after the trainings (M_{wave2} = 4.18; M_{wave3} = 4.49; M_{wave4} = 4.75).[49] **A key driver to conserve energy is thus the lower costs associated with it, and this driver became more important over time**. Finally, after each training session the perceived company norm to save energy positively changed (M_{wave1} = 3.87; M_{wave2} = 4.07; M_{wave3} = 4.64; M_{wave4} = 4.87).[50]

Figure 4.3: Company attitudes energy efficiency



Note. All scales are 5-point scales with 1 = *strongly disagree*, and 5 = *strongly agree*.

Table 4.1: Company attitudes energy efficiency

Company attitudes energy efficiency (1 = strongly disagree; 5 = strongly agree)	(strongly) disagree				(strongly) agree			
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
Energy saving is **not** a priority in my company.	60.2%	68.2%	86.2%	96.0%	17.9%	7.3%	6.4%	3.2%
The cost savings from energy efficiency are **not** sufficient to justify the effort.	50.7%	54.5%	83.5%	91.3%	17.8%	10.8%	5.5%	2.4%
By saving energy, me and my colleagues can contribute to lowering the energy bill of the company.	10.2%	5.7%	7.3%	2.4%	70.8%	80.1%	86.3%	93.7%
It is the company norm to switch off office equipment (e.g., PCs, lights) when not in use.	15.0%	5.7%	1,8%	0%	57.6%	74,5%	91,7%	97,6%

Note. *N* wave 1 = 275, *N* wave 2 = 176, *N* wave 3 = 109, *N* wave 4 = 126.

[47] F (3, 424) = 39.74, p < .001, wave 1 & 2: p =.003; wave 2 & 3: p <.001; wave 3 & 4: p = .012.
[48] F (3, 439) = 53.98, p < .001, wave 1 & 2: p =.049; wave 2 & 3: p <.001; wave 3 & 4: p = .026.
[49] F (3, 449) = 24.33, p < .001, wave 1 & 2: p =.024; wave 2 & 3: p <.001; wave 3 & 4: p = .023.
[50] F (3, 463) = 83.13, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p = .018.

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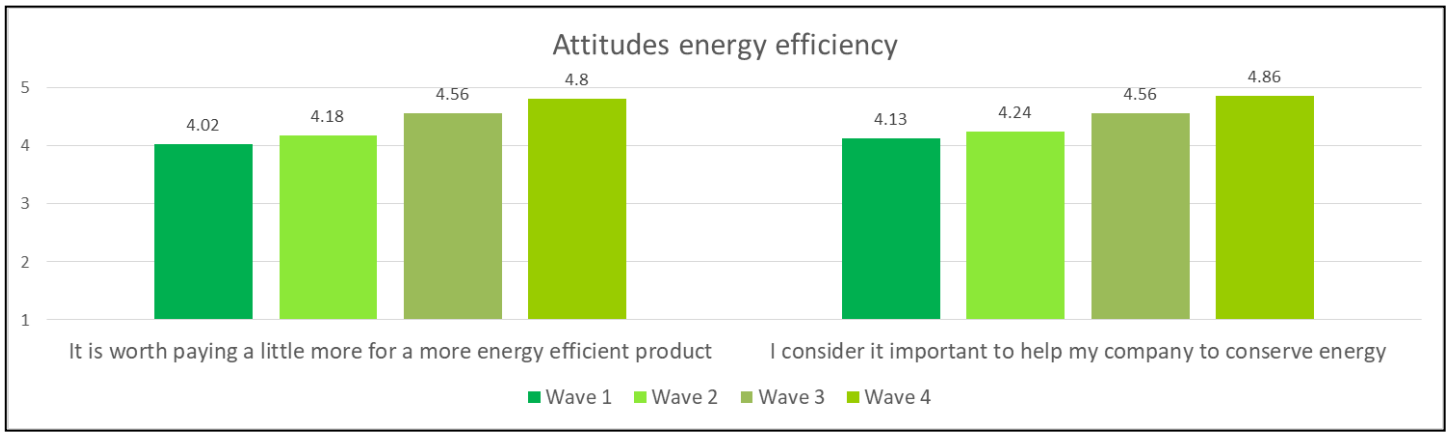
4.3 Personal motivations and knowledge

Respondents were also asked about their own attitudes towards energy efficiency (measured on five-point scales). Figure 4.4 (averages) and Table 4.2 (frequencies) provide the results. The results show that **after each training session more employees considered it worth paying a little more for an energy efficient product** (M_{wave1} = 4.02; M_{wave2} = 4.18; M_{wave3} = 4.56; M_{wave4} = 4.80). After the second and third company visit it became especially important to employees of SMEs to help their company to save energy (M_{wave1} = 4.13; M_{wave2} = 4.24; M_{wave3} = 4.56; M_{wave4} = 4.86).

Figure 4.4: Attitudes energy efficiency



Note. All scales are 5-point scales with 1 = *strongly disagree*, and 5 = *strongly agree*.

Table 4.2: Attitudes energy efficiency

Attitudes energy efficiency (1 = strongly disagree; 5 = strongly agree)	(strongly) disagree				(strongly) agree			
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
It is worth paying a little more for a more energy efficient product.	4.4%	1.7%	1,8%	0%	70.1%	85.2%	95,4%	96,9%
I consider it important to help my company to conserve energy.	2.6%	1.1%	1,8%	0%	74.1%	79,5%	92,6%	97,7%

Note. *N* wave 1 = 275, *N* wave 2 = 176, *N* wave 3 = 109, *N* wave 4 = 126.

Finally, it appeared that **after each training session** employees of young SMEs indicated they **felt more informed** on how to save energy (see Figure 4.5).[51]

[51] F (3, 456) = 124.62, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p <.001; *N* wave 1 = 275 , *N* wave 2 = 176, *N* wave 3 = 109, *N* wave 4 = 126.

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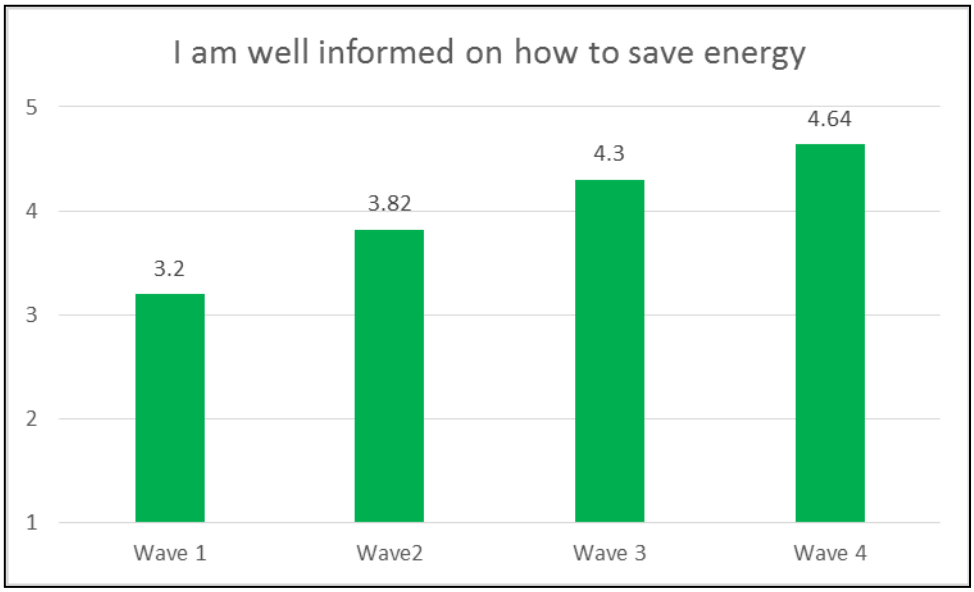
Figure 4.5: Knowledge about energy saving

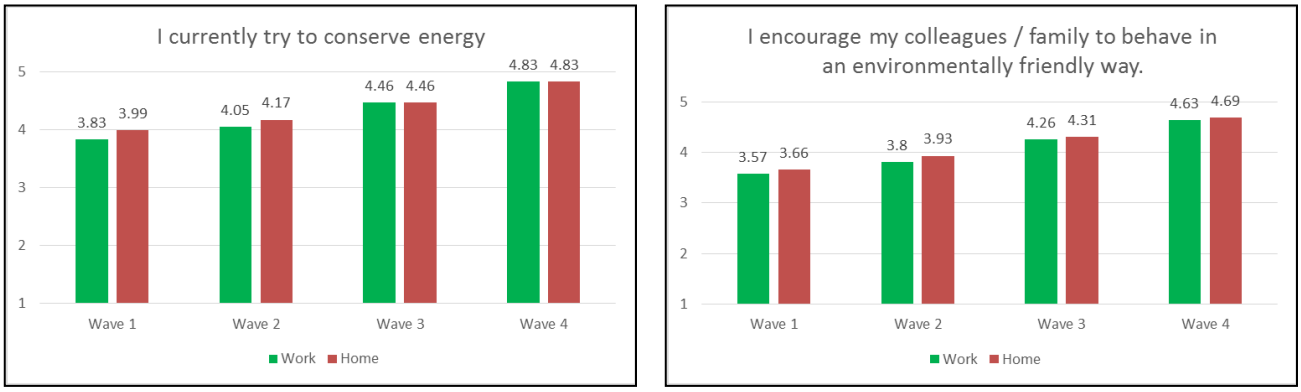


Note. 5-point scales with 1 = *strongly disagree*, and 5 = *strongly agree*.

4.4 Current and future behaviour, and comparisons of actions at work and at home

We measured current energy saving behaviour of respondents in several ways (using five-point scales) and investigated changes over time. First, we asked in a more general way whether respondents tried to conserve energy at work. Before the trainings it seemed that, on average, employees already frequently tried to conserve energy at work (M_{wave1} = 3.83). After each training energy conservation behaviour further increased (M_{wave2} = 4.05; M_{wave3} = 4.46; M_{wave4} = 4.83), see Figure 4.6 and Table 4.3.

Figure 4.6: Energy saving behaviour



Note. All scales are 5-point scales with 1 = *not likely at all*, and 5 = *very likely*.

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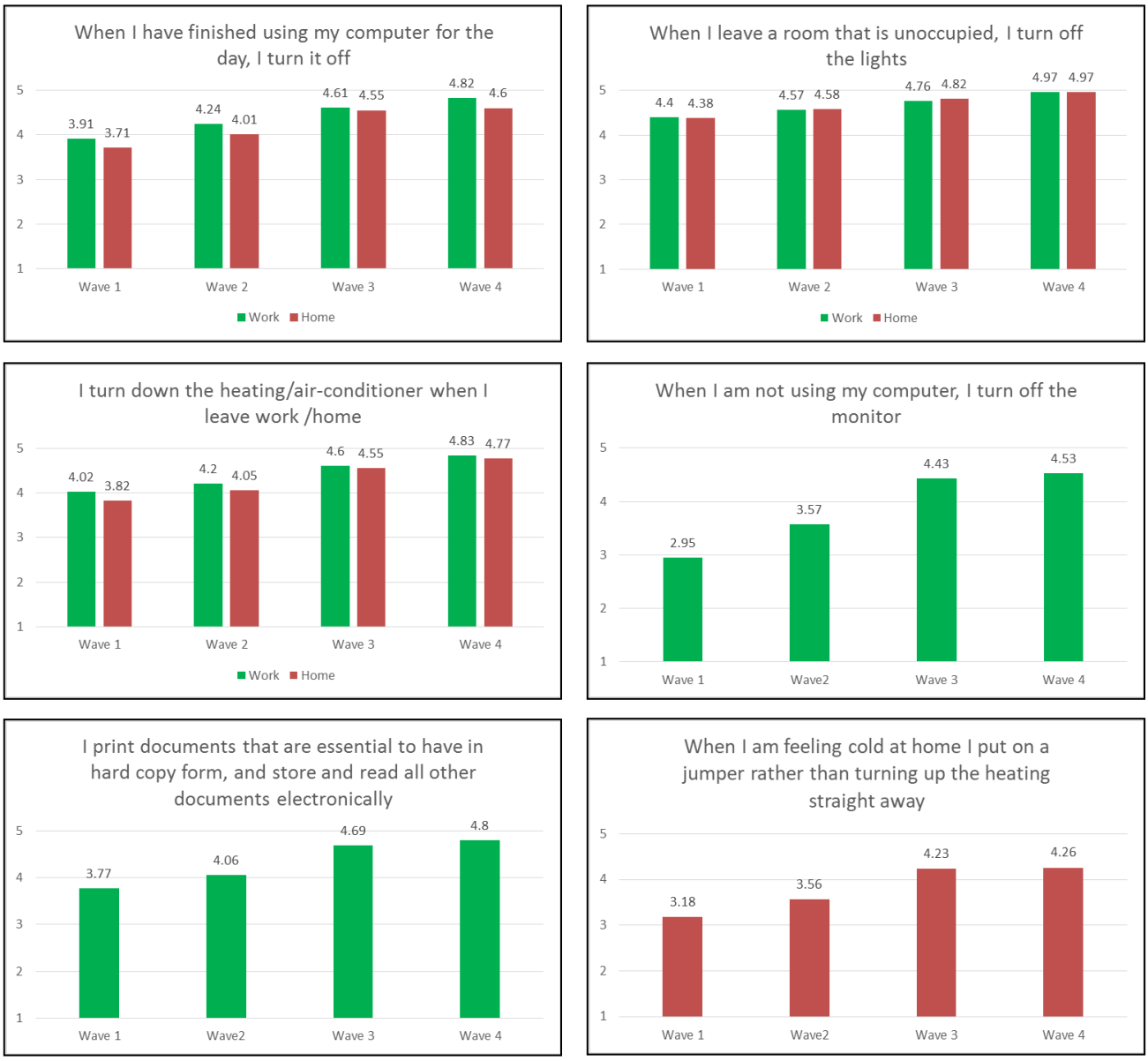
We then asked whether respondents encouraged colleagues to behave in an environmentally friendly way. Results showed that after each training respondents started encouraging their colleagues more to behave environmentally friendly (M_{wave1} = 3.57; M_{wave2} = 3.80; M_{wave3} = 4.26; M_{wave4} = 4.63, see Figure 4.6 and Table 4.3).

Third, we investigated specific energy saving behaviours. The graphs in Figure 4.7 show specific energy saving behaviours at work (green bars) and at home (red bars).

Figure 4.7: Specific energy saving behaviours



Note. All scales are 5-point scales with 1 = *never*, 5 = *always*.

Before the trainings started respondents already turned off their computers and the lights, and turned down the heating/ air-conditioner regularly. Still respondents showed an increase over time doing so (after the trainings, see Table 4.3 and Figure 4.7). Respondents did not so much turn off their monitors regularly

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or read essential documents electronically, yet after each training, these behaviours also increased (see Table 4.3 and Figure 4.7).

Spill-over effects

With regards to energy saving behaviour at *home*, a similar picture emerged: When asking whether respondents save energy at home in a more general sense, before the trainings, on average many respondents seem to do this. Almost all respondents indicated doing this after the training sessions (M_{wave1} = 4.0; M_{wave2} = 4.2; M_{wave3} = 4.5; M_{wave4} = 4.8, see Figure 4.6 and Table 4.3). Before the trainings many respondents also indicated they already encouraged family and friends at home; after all trainings they started encouraging their family and friends even more (M_{wave1} = 3.7, M_{wave2} = 3.9; M_{wave3} = 4.3; M_{wave4} = 4.7). Looking at more concrete behaviours at home we also see that before the trainings started respondents already turned off their computers and the lights, and turned down the heating/ air-conditioner regularly. Still respondents showed an increase over time doing so (after the trainings, see Table 4.3 and Figure 4.7). Respondents did not so much turn down their heating at home regularly and put a jumper on instead, yet after each training, this behaviour also increased (see Figure 4.7 and Table 4.3).

It is possible that respondents consider it more important to conserve energy at home compared to the work situation, as energy saving at home translates more directly into monetary savings (e.g., lower energy bills). We therefore tested whether there were significant differences between behaviour at work and at home for each of the waves, which was not the case.[52] When the different waves were not taken into account, it turned out that family and friends are more encouraged to save energy (M = 4.32) than colleagues (M = 4.24), and that the computer and heating / air conditioner are switched off more at work (M = 4.46 and 4.47) than at home (M = 4.27 and 4.35).

Taken together, it thus seems that the trainings inspired employees from young SMEs to behave more energy efficient, both at work and at home.

[52] The *p*-values shown in Table 4.3 show for each of the waves whether the differences between behaviour at work and at home are statistically significant, which means that they are very unlikely to have occurred by chance. A small *p*-value (<.05) indicates that there are significant differences in behaviour at home and at work. However, since there were no significant interaction effects between Wave and the home vs. work situation these are not interpreted.

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Table 4.3: Current behaviour at work and at home[53]

Current behaviour at work and at home (1= not likely at all / never; 5 = very likely / always)	Wave 1 (*N* = 274)			Wave 2 (*N* = 176)			Wave 3 (*N* = 109)			Wave 4 (*N* = 126)			Across waves
	At work	At home	*P*	At work	At home	*P*	At work	At home	*P*	At work	At home	*P*	*P*
I currently try to conserve energy [at work / a home].[54]													
% (strongly) agree	62.7%	73.5%		78.4%	80.4%		92.7%	93.3%		98.4%	99.2%		
% (strongly) disagree	6.9%	10.9%		8.0%	6.5%		1.8%	1.9%		1.6%	0.8%		
Average	3.8	4.0	.008	4.1	4.2	.067	4.5	4.5	1.00	4.8	4.8	.925	**<.001**
I encourage [my colleagues (work) / friends (home)] to behave in an environmentally friendly way.[55]													
% (strongly) agree	56.5%	67.6%		60.3%	70.2%		92.7%	87.7%		97.6%	99.2%		
% (strongly) disagree	18.2%	17.5%		10.8%	10.7%		3.7%	3.8%		2.4%	0.8%		
Average	3.6	3.7	.136	3.8	3.9	.100	4.3	4.3	.570	4.6	4.7	.538	**<.001**
When I have finished using my computer [for the day / at home], I turn it off.[56]													
% Often/ always	67.6%	62.6%		78.4%	70.3%		90.8%	88.6%		95.2%	88.5%		
% Never / rarely	19.0%	23.7%		7.4%	13.1%		1.8%	2.9%		0.0%	0.8%		
Average	3.9	3.7	.001	4.2	4.1	.002	4.6	4.6	.569	4.8	4.6	.012	**<.001**
When I leave a room [in a work area / at home] that is unoccupied, I turn off the lights.[57]													
% Often/ always	82.5%	86.4%		93.2%	94.1%		98.2%	98.1%		100%	100%		
% Never / rarely	5.5%	4.7%		0.6%	0.6%		0.9%	1.0%		0%	0%		
Average	4.4	4.4	.938	4.6	4.6	.839	4.8	4.8	.594	5.0	5.0	1.00	**<.001**

[53] To assess this, data was restructured so that answers to the statements I currently try to conserve energy at home / at work etc. were merged into one variable and could statistically be compared using multilevel models. A model was estimated with Wave and Work/Home as independent variables and the interaction between these variables. The p-value "across waves" reports if there are sig. effects across waves. When these are in bold, it indicates that there are significant differences over time. The figures throughout the text graphically represent these results. Which specific waves significantly differ is explained in the footnotes. The p-values per wave show if there are sig. differences across work and home for each time point. However, since there were no significant interaction effects between Wave and the home vs. work situation these are not interpreted.

[54] I currently try to conserve energy at work/home: there is a sig. effect of wave F (3, 1191) = 153.61, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p <.001; there is a marginal sig. effect of work vs. home F (1, 1053) = 3.60, p = .058, M_{workk} = 4.43 vs. M_{home} = 4.51, and no sig. interaction effect F (3, 1053) = 1.51, p =.327.

[55] I encourage colleagues / family & friends to behave in an environmentally friendly way: there is a sig. effect of wave F (3, 1166) = 172.82, p < .001, wave 1 & 2: p <.001; wave 2 &3 : p <.001; wave 3 & 4: p <.001; there is a sig. effect of work vs. home F (1, 1042) = 3.96, p = .047, M_{work} = 4.24 vs. M_{home} = 4.32, and no sig. interaction effect F (3, 1042) = 0.16, p =.921.

[56] When I have finished using my computer I turn it off: there is a sig. effect of wave F (3, 1120) = 118.35, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p <.001; there is a sig. effect of work vs. home F (1, 1022) = 19.41, p <.001, M_{work} = 4.46 vs. M_{home} = 4.27, and no sig. interaction effect F (3, 1019) = 0.84, p =.469.

[57] When I leave a room that is unoccupied I turn off the lights: there is a sig. effect of wave F (3, 1179) = 87.81, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p =.001; there is no sig. effect of work vs. home F (1, 1022) = 0.33, p = .565, and no sig. interaction effect F (3, 1022) = 0.14, p =.934.

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Current behaviour at work and at home (1= not likely at all / never; 5 = very likely / always)	Wave 1 (*N* = 274)			Wave 2 (*N* = 176)			Wave 3 (*N* = 109)			Wave 4 (*N* = 126)			Across waves
	At work	At home	*P*	At work	At home	*P*	At work	At home	*P*	At work	At home	*P*	*P*
I turn down the heating/air-conditioner when I leave the room/building at last.[58]													
% Often/ always	63.8%	55.7%		68.8%	68.5%		89.0%	88.5%		100%	96.7%		
% Never / rarely	15.0%	18.3%		8.5%	12.5%		1.8%	1.0%		0%	0%		
Average	4.0	3.8	.001	4.2	4.1	.107	4.6	4.6	.627	4.8	4.8	.559	**<.001**
When I am not using my computer [at work], I turn off the monitor.[59]													
% Often/ always	34.3%			49.5%			79.8%			79.3%			
% Never / rarely	39.1%			21.0%			2.8%			1.6%			
Average	3.0			3.6			4.4			4.5			**<.001**
I print documents that are essential to have in hard copy form, and store and read all other documents electronically. [at work][60]													
% Often/ always	63.8%			67.0%			97.6%						
% Never / rarely	17.2%			9.7%			0.8%						
Average	3.8			4.1			4.7			4.8			**<.001**
When I am feeling cold **at home** I put on a jumper rather than turning up the heating straight away.[61]													
% Often/ always		41.6%			52.3%			88.5%			74.6%		
% Never / rarely		30.7%			21.4%			1.0%			3.3%		
Average		3.2			3.6			4.2			4.3		**<.001**

Note. Table 4.3 shows the averages and percentages for all respondents that had actual behavioural control. For instance, in case a respondent did not have the option to switch off lights they could indicate that this situation was non-applicable.

Next, we investigated future behavioural intentions. Respondents were willing to take more actions to conserve energy at home and at work in the future, and this intention increased after each of the training sessions (see Figure 4.8 and Table 4.4).

[58] I turn down the heating / air conditioner when I leave the building: there is a sig. effect of wave F (3, 1112) = 130.97, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4, marginally significant: p =.057; there is a sig. effect of work vs. home F (1, 985) = 6.76, p = .009, M_{work} = 4.47 vs. M_{home} = 4.35, and no sig. interaction effect F (3, 981) = 1.00, p =.392.

[59] When I am not using my computer I turn off the monitor: F (3, 399) = 99.66, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p =.397

[60] I print documents that are essential to have in hard copy: F (3, 450) = 68.07, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p =.286

[61] When I am feeling cold at home I put on a jumper: F (3, 421) = 62.97, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p =.769.

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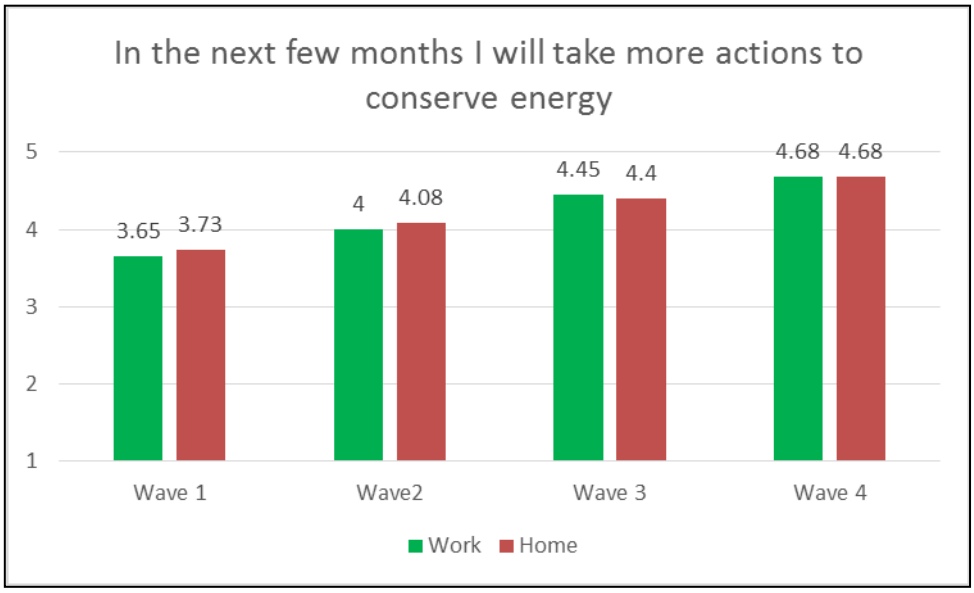
Table 4.4: Future behavioural intentions

Future behavioural intentions at work and at home (1= strongly disagree; 5 = strongly agree)	Wave 1 (*N* = 274)			Wave 2 (*N* = 176)			Wave 3 (*N* = 109)			Wave 4 (*N* = 126)			Across waves
	At work	At home	*P*	At work	At home	*P*	At work	At home	*P*	At work	At home	*P*	*p*
In the next few months I will take more actions to conserve energy [at work / at home] than I currently do.[62]													
% (strongly) agree	62.7%	73.5%		78.4%	80.4%		92.7%	93.3%		98.4%	99.2%		
% (strongly) disagree	6.9%	10.9%		8.0%	6.5%		1.8%	1.9%		1.6%	0.8%		
Average	3.7	3.7	.148	4.0	4.1	.249	4.5	4.4	.602	4.7	4.7	1.00	**<.001**

Figure 4.8: Future energy saving behaviour



Note. All scales are 5-point scales with 1 = *not likely at all*, and 5 = *very likely*.

4.5 Hard indicator data

Both before the trainings started and after the final training SMEs were asked to provide hard indicator data: The amount of energy used and costs. SMEs could either provide information on the actual energy amount and/or costs or could provide estimations if they did not had this information available when filling in the survey. In total, 64 SMEs provided hard indicator data in wave 1 (before the trainings), of which 16 also provided hard indicator data in wave 4 (the final survey). Some SMEs could not provide this

[62] In the next few months I will take more actions to conserve energy: there is a sig. effect of wave F (3, 1180) = 176.99, p < .001, wave 1 & 2: p <.001; wave 2 & 3: p <.001; wave 3 & 4: p <.001; there is no sig. effect of work vs. home F (1, 1024) = .58, p = .444, and no sig. interaction effect F (3, 1024) = 0.67, p =.566.

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information as they, for instance, paid a fixed price. Further, some SMEs did not provide numbers, but instead provided feedback, suggesting their energy use decreased (e.g., "Since I have started to implement Start 2 Act set of tips (measurements), my energy bills have decreased. I find the platform very useful! Thank you!"). Table 4.5 shows the hard indicator data for the 16 SMEs that provided data in both waves. Appendix C provides an overview of all hard indicator data provided by the SMEs. For the SMEs that provided hard indicator data in both waves, there were 14 SMEs with an (estimated) decrease in energy amount / costs, and there were 2 SMEs with an (estimated) increase in energy amount / costs (BG, company 4 and RO company 1). However, with this limited number of SMEs that provided hard indicator data or estimated data for both waves it is not possible to draw further conclusions as there are too many external factors that can explain the changes between wave 1 and 4. For instance, the weather in a specific year might influence the numbers (e.g., a milder winter requires less heating which might be reflected in the lower numbers). Or, if an SME is scaling up in a specific year (e.g., in terms of employees or production) this might be reflected in an increase in the numbers.

Table 4.5: Hard indicator data of the 14 SMEs that provided this data for both time points

Country	Company	Energy source	Energy amount		Energy costs (local currency)		Actual		Estimate	
			Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4
BG	1	Electricity (kWh)	5974	5670	1075	1020	☒	☐	☐	☒
BG	2	Electricity (kWh)	864	804			☐	☐	☒	☒
BG	3	Electricity (kWh)	940		11280	10152	☐	☐	☒	☐
BG	4	Electricity (kWh)	720	840	86		☐	☐	☒	☒
BG	5	Electricity (kWh)	69510	67000	13902	12000	☒	☐	☐	☒
BG	6	Electricity (kWh)	18612	13550	4524	4500	☒	☐	☐	☒
BG	7	Electricity (kWh)	5139	5100	1118	1110	☒	☐	☐	☒
BG	8	Electricity (kWh)	7800	6960			☐	☐	☒	☒
CZ	1	Electricity (kWh)	1680	1534	7560	6903	☒	☐	☐	☒
		Gas (kWh)	12128	12053	20057	19903	☒	☐	☐	☒
HR	1	Electricity (kWh)			4000	1000	☐	☐	☒	☒
RO	1	Electricity (kWh)	2500	2904			☒	☒	☐	☐
RO	2	Electricity (kWh)			1200	1050	☐	☒	☒	☐
RO	3	Electricity (kWh)			4440	4320	☐	☐	☒	☒
RO	4	Electricity (kWh)			4680	4440	☐	☐	☒	☒

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Country	Company	Energy source	Energy amount		Energy costs (local currency)		Actual		Estimate	
			Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4
RO	5	Electricity (kWh)			2820	2700	☐	☐	☒	☒
		Oil (litres)	1320			1440	☐	☐	☒	☒
RO	6	Electricity (kWh)			10200	10020	☐	☐	☒	☐
		Gas (kWh)			3000	3000	☐	☐	☒	☐

4.6 Gender, person-related, company-related, and country differences

It was also investigated whether gender, person-related factors, company-related factors, and country explain differences in attitudes towards energy saving, energy saving behaviour at work and at home, and future behavioural intentions to save energy. In order to test this, we computed averages for attitude,[63] behaviour at work,[64] behaviour at home[65] and future behavioural intentions[66]. First, gender differences were examined. Analysis indicated that there were no differences between males and females across waves in terms of attitudes towards energy saving, energy saving behaviour at work and at home, and future behavioural intentions to save energy.[67]

Next, we investigated whether certain person-related and company-related characteristics could explain differences in attitudes, energy saving behaviour at work and at home, and future behavioural intentions to save energy. Specifically, knowledge, age, gender, education level, company size[68] and type of office[69] were taken into account in the model. None of these factors could explain differences in attitudes, energy saving behaviour at work, energy saving behaviour at home and future behavioural intentions, except for knowledge: The lower the respondent's knowledge levels, the lower the attitudes towards energy saving. Respondents with lower knowledge levels were also less likely to conserve energy at home, at work and in the future.[70]

Further, we investigated differences across countries. As the number of responses across countries varied considerably, we tested whether there were differences across countries for which data across all four waves was available (see Table 3.3), i.e. Bulgaria (N = 31), Czech (N = 7), Poland (N = 8), and Romania (N =

[63] Attitude: "It is worth paying a little more for a more energy efficient product" and "I consider it important to help my company to conserve energy" into one attitude construct" formed a reliable construct, α = .764.
[64] Behaviour at work: "I currently try to conserve energy at work" and "I encourage my colleagues to behave in an environmentally friendly way" formed a reliable construct, α = .878.
[65] Behaviour at home: "I currently try to conserve energy at home" and "I encourage my family and friends to behave in an environmentally friendly way" formed a reliable construct, α = .881.
[66] "In the next few months I will take more actions to conserve energy at work than I currently do" "In the next few months I will take more actions to conserve energy at home than I currently do" into the construct Future behavioural intentions formed a reliable construct, α =.881.
[67] Attitude: there is a sig. effect of wave F (3, 447) = 46.26, p < .001; there is no sig. effect of gender F (1, 246) = .00, p =.984; and no sig. interaction effect F (3, 448) = 0.44, p =.722. Behaviour at home: there is a sig. effect of wave F (3, 426) = 87.41, p < .001; there is no sig. effect of gender F (1, 284) = .09, p =.764; and no sig. interaction effect F (3, 427) = 1.57, p =.197. Behaviour at work: there is a sig. effect of wave F (3, 425) = 70.91, p < .001; there is no sig. effect of gender F (1, 278) = .20, p =.652; and no sig. interaction effect F (3, 425) = 0.24, p =.869. Future behavioural intentions: there is a sig. effect of wave F (3, 417) = 84.92, p < .001; there is no sig. effect of gender F (1, 236) = 1.40, p =.238; and no sig. interaction effect F (3, 418) = 0.63, p =.595.
[68] Company size: 0-10 persons, 11-25 persons, 26-50 persons, > 50 persons.
[69] Type of office: owns permanent office, rents permanent office, works from home, co-working space, combination.
[70] Attitude: p <.001. Behaviour at home: p <.001. Behaviour at work: p <.001. Future behavioural intentions: p <.001.

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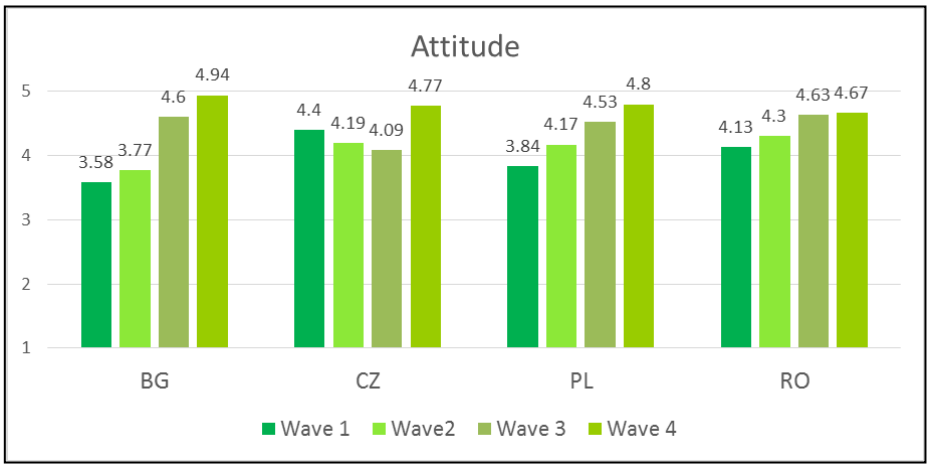
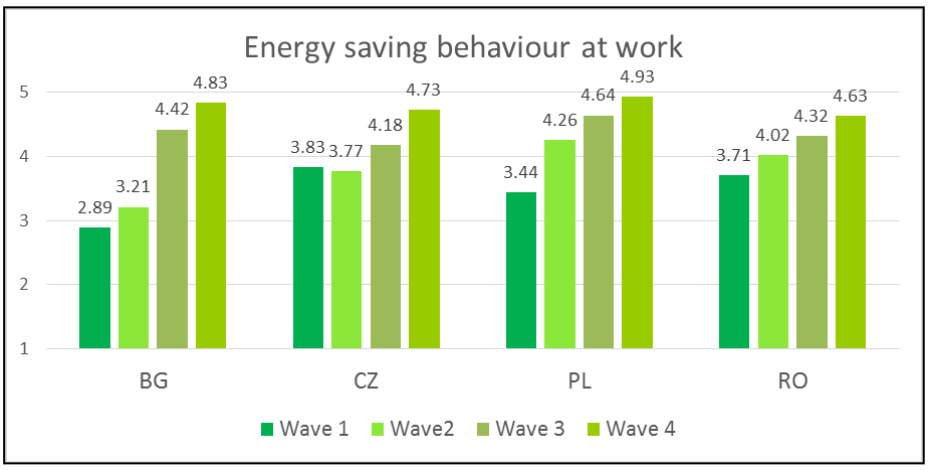
22). There were significant differences across countries across waves, see Figure 4.9.[71] Specifically, before the trainings started, employees from SMEs in the Czech Republic were already somewhat more energy conscious and already did more in terms of energy savings at work and at home than employees from SMEs from the other countries. Before the trainings Czech employees also had a higher intention to become more energy-conscious in the future compared to the other countries.[72] For Czech Republic there were no significant differences after the first and second training in energy saving attitudes, energy saving behaviour at work and at home. Only after the third training, attitudes became significantly more positive, and energy saving behaviour at work and in the future increased. Whereas, for the other countries (Bulgaria, Poland, and Romania) there was a gradual increase (many of these being significant) in all measures after each training visit.[73]

Figure 4.9: Country-differences in energy saving attitudes and behaviour





[71] Attitude: sig. interaction effect F (3, 369) = 7.79, p <.001. Behaviour at home: sig. interaction effect F (3, 349) = 10.42, p <.001. Behaviour at work: sig. interaction effect F (3, 347) = 6.67, p <.001. Future behavioural intentions: sig. interaction effect F (3, 350) = 9.36, p <.001.
[72] For CZ, attitude: no sig. differences between wave 1 & 2, 2 & 3; energy saving behavior at work: no sig. differences between wave 1 & 2, 2 & 3. Energy saving behavior at work: no sig. differences between wave 1 & 2, 2 & 3, 3 & 4; future energy saving behaviour: no sig. differences between wave 1 & 2, 2 & 3.
[73] The differences that were not sig. are: Attitude: PL & RO wave 3 & 4; energy saving behaviour at work: BG & RO wave 3 & 4, PL Wave 2 & 3; energy saving behaviour at home: BG & RO wave 3 & 4, PL Wave 2 & 3; future energy saving behaviour: BG & RO & PL wave 3 & 4, PL Wave 2 & 3.

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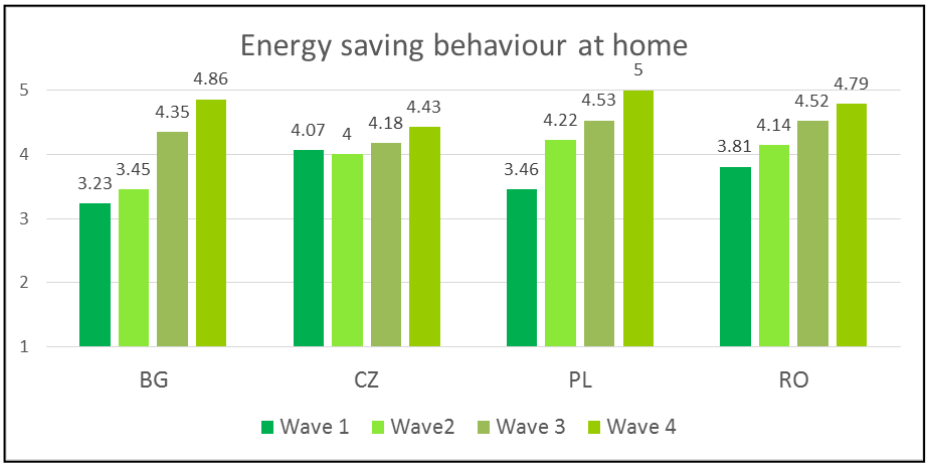

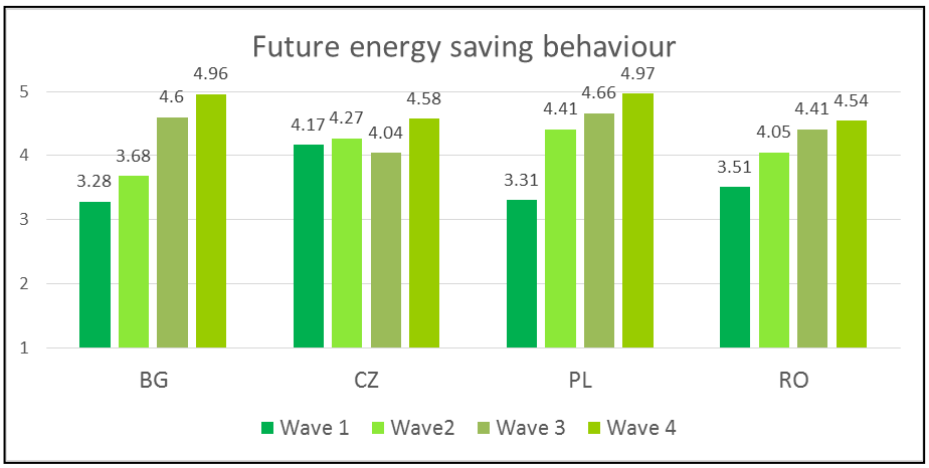

Finally, we investigated whether attitudes towards energy saving predict energy saving behaviour at work and at home and future behavioural intentions over time. The results show that when respondents had positive attitudes towards energy saving they were more likely to conserve energy at work.[74] This effect was the same after each training.[75] Also, when respondents had positive energy saving attitudes they were more likely to conserve energy at home.[76] This effect was stronger after they received the first training, and decreased after the second and third training.[77] Attitudes also positively influenced future behavioural intentions to save energy.[78] This effect was the same after each training.[79]

4.7 Conclusions

The mentoring sessions were evaluated positively by employees of young SMEs: They thought the trainings were valuable and brought them new insights. After the trainings, they were also more willing to change their behaviour and become more energy efficient based on what they had learned in the trainings. One of

[74] p <.001.
[75] B_{wave1} = .72, B_{wave2} = .85, B_{wave3} = .72, B_{wave4} = .55, p =.164
[76] p <.001.
[77] B_{wave1} = .60, B_{wave2} = .75, B_{wave3} = .46, B_{wave4} = .32, p <.001
[78] p <.001.
[79] B_{wave1} = .44, B_{wave2} = .55, B_{wave3} = .40, B_{wave4} = .56, p =.068

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the reported core drivers to become more energy efficient was cost reductions, which could be a result of monetary savings associated with energy efficiency being extensively discussed during the trainings. After each training session employees of young SMEs were more willing to help their company save energy and also felt that they were more informed on energy efficiency.

At baseline, employees of young SMEs indicated to already frequently try to conserve energy at work and at home, and after each training session energy saving behaviour further increased. This pattern was also reflected in more specific energy saving behaviour at home and at work, such as switching off the lights, the computer, the monitor, the air conditioner, and the heater. Especially for switching off the monitor a large change in behaviour occurred after the trainings. Moreover, after each training session employees of young SMEs seemed willing to take more actions in the future to conserve energy, both at home and at work. It should be noted that it regards self-reported behaviour and that the factual hard indicator data is too few to draw conclusions on.

There was only one person-related factor that explained differences in (changes in) attitudes towards energy saving, energy saving behaviour at work and at home, and future behavioural intentions to save energy: A respondent's knowledge on energy saving. The lower the knowledge levels, the lower the attitudes towards energy saving, and the less likely respondents were to conserve energy at home, at work and in the future. Further, employees from SMEs in Czech Republic (compared to Bulgaria, Poland and Romania) were already more energy conscious before the mentoring sessions started and already did more in terms of energy savings at work and at home than employees from SMEs from the other countries.

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5. Startups: Methodology

Startups were invited to a 1.5h mentoring workshop. At the end of the workshop, they participated in the survey.

5.1 Survey topics and translation process

The survey topics for startups were similar to the SME survey topics (see paragraph 3.1), except that company motivations and hard indicators were not measured. Also, the translation process was similar to the translation process of the SME survey (see paragraph 3.2).

5.2 Sample description

The sample of employees of startups was drawn from the networks of the local partners (GEO, SB, CT, ENVIROS, EHIP, SOFENA, SIEA, ENERO, KAPE). Startups were contacted in a traditional way in their local language: An announcement email was sent via the local partner to the target company in combination with a brochure explaining the nature of the study.

Data were collected between May 2017 and May 2019. In total, 320 respondents participated in the study. Table 5.1 provides an overview of the response rates per country.

Table 5.1 response rate per country

Company	Country	Response
Startups.be	**Belgium**	62
SOFENA	**Bulgaria**	68
ENVIROS	**Czech**	19
EIHP	**Croatia**	19
GEO	**Hungary**	28
KAPE	**Poland**	25
ENERO	**Romania**	32
SIEA	**Slovakia**	25
CT	**UK**	42
	Total	**320**

59.3% of respondents were male and 36.8% of participants who completed the questionnaire were female (see also Figure 5.1). The education level was high, with 78.7% of respondents having a university degree.

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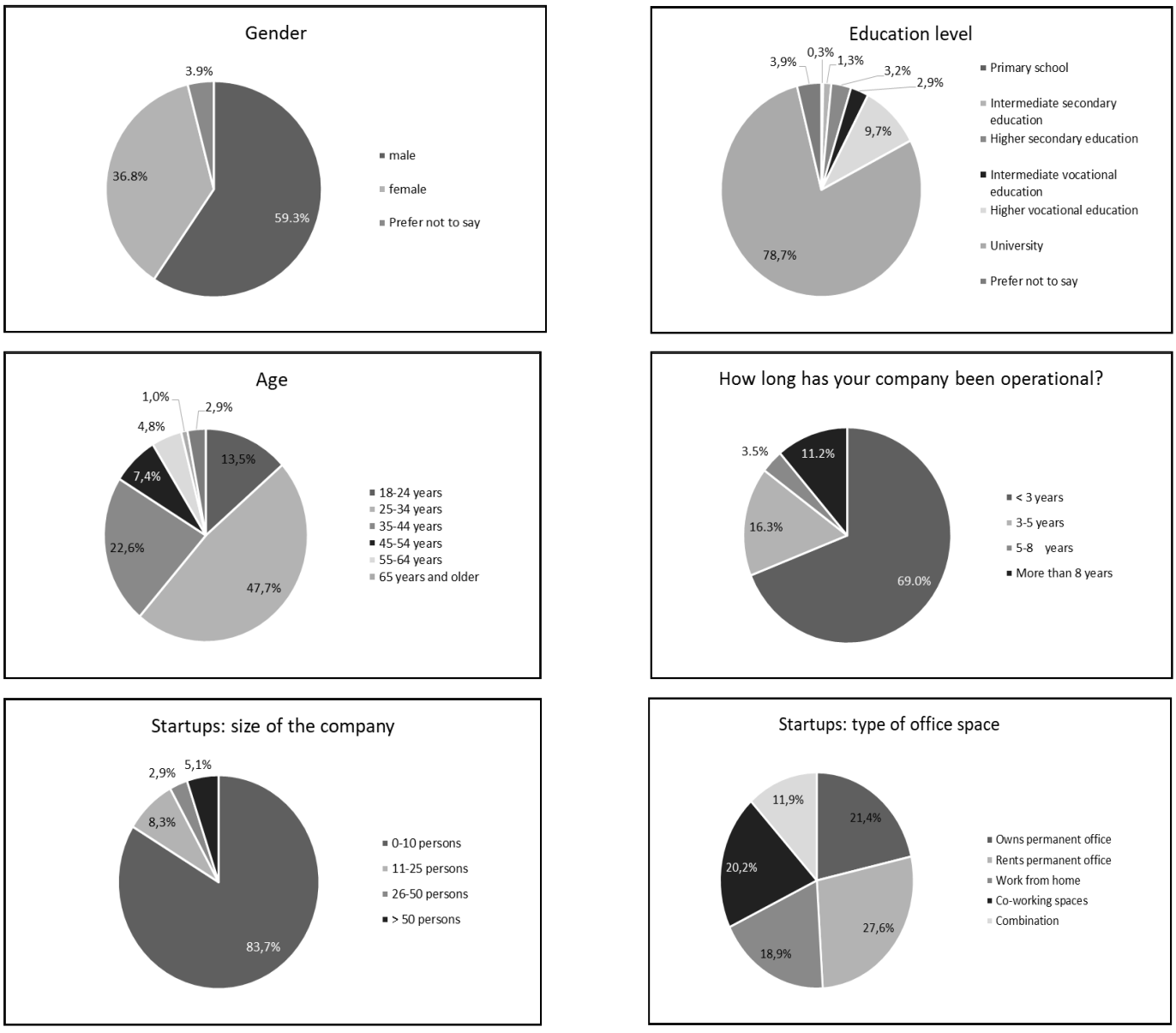
Six out of ten (61.2%) respondents were younger than 35 years old and almost 70% of the startups had been operational for less than 3 years. Most startups rent (43.4%) or own a permanent office (49%) and typically have 0-10 employees (63.7%) (See Figure 5.1, for more details see Appendix B.2).

Figure 5.1 Socio-demographic information and company background startups



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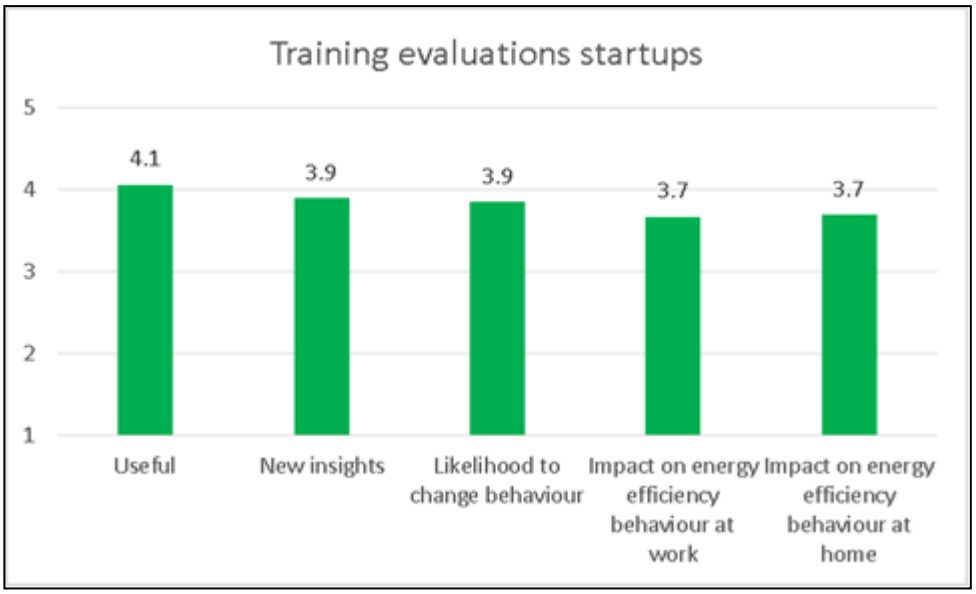
6. Startups: Results

Chapter 6 provides the survey results for startups.

6.1 Training evaluations

An important part of the survey was the evaluation of the workshop that employees of startups received. Results indicated that the responses to the trainings have been very positive. Looking at the averages, the training provided them with useful (*M* = 4.1) and new (*M* = 3.9) insights. Moreover, respondents indicated they were likely to change their behaviour because of what they had learned in the trainings (*M* = 3.9). Respondents also indicated that the training would impact their energy efficiency behaviour both at work (*M* = 3.7) and at home (*M* = 3.7), see also Figure 6.1.

Figure 6.1: Evaluations of trainings



Note. All scales are 5-point scales with 1 = certinaly not or strongly disagree, and 5 = certinaly so or strongly agree.

6.2 Company attitudes, personal motivations and knowledge

Respondents were asked about their own attitudes and the company norm towards energy efficiency (see Table 6.1). A majority of respondents (83.7%) considered it worth paying a little more for energy efficient products. Furthermore, respondents considered it important to help their company conserve energy (83.1%), and indicated it is their company norm to switch off office equipment (73.8%).

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Table 6.1: Attitudes energy efficiency

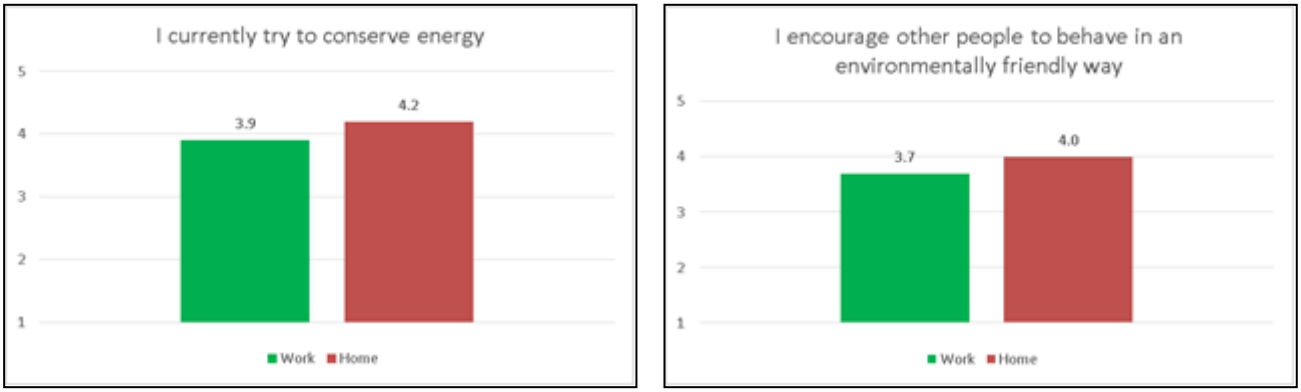
Attitudes energy efficiency (1= strongly disagree; 5 = strongly agree)	Startups		
	Overall mean (*N* = 89)	(Strongly) disagree	(Strongly) agree
It is worth paying a little more for a more energy efficient product.	4.28	4.0%	83.7%
I consider it important to help my company to conserve energy.	4.20	5.0%	83.1%
It is the company norm to switch off office equipment (e.g., PCs, lights) when not in use.	3.91	11.6%	73.8%

Furthermore, looking at the averages, there is room for improvement regarding how well-informed respondents were on how to save energy (*M* = 3.46).[80]

6.3 Current and future behaviour, and comparisons of actions at work and at home

We measured current energy saving behaviour of respondents in several ways. First, we asked in a more general way whether respondents tried to conserve energy at work. This seemed to be the case: 63.9% of respondents indicated to try to conserve energy at work (*M* =3.9, see Table 6.2 and Figure 6.2, the graphs show energy saving behaviours at work (green bars) and at home (red bars)). We then asked whether respondents encouraged colleagues to behave in an environmentally friendly way. The percentage is slighter lower now, namely 58.3% of respondents encouraged colleagues (*M* = 3.7, see Table 6.2 and Figure 6.2).

Figure 6.2: Current behaviour at work and at home



Note. All scales are 5-point scales with 1 = *not likely at all*, and 5 = *very likely*.

[80] 59.1% of the respondents agreed that they are well informed on how to save energy, and 11.0% disagreed. Note that startups answered this question after receiving a workshop.

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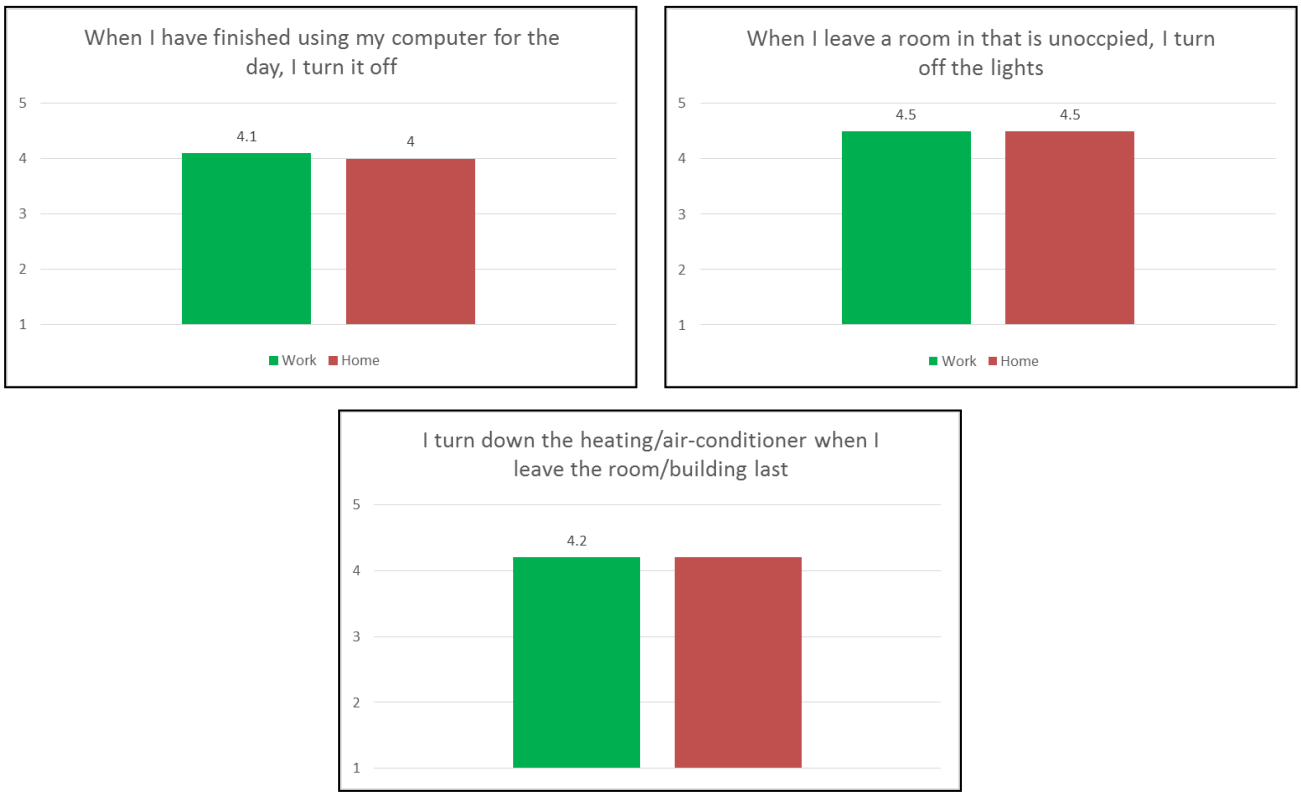
Third, we investigated specific energy saving behaviours. It seemed that many respondents (almost) always turn off their computer at the end of their workday (73.4%), most respondents almost always turn of the lights when they leave a room (84%), and many turn off the heating/air-conditioner before leaving (66.5%). However, less respondents regularly turn off their monitor when not using the computer (56.8%, see Figure 6.3 and Table 6.2).

Figure 6.3: Specific energy saving behaviour at work and at home



Note. All scales are 5-point scales with 1 = *never*, 5 = *always*.

Spill-over effects

We see a similar picture emerge for energy saving behaviour at home. Most respondents indicated that they save energy at *home* (82.4%). Slightly less respondents encouraged family and friends to do this (70.6%) (see Figure 6.2 and Table 6.2). The more concrete behaviours (turning off the computer after use, turning off the lights, turning of the heater, putting on a jumper when cold), were performed by 67.3% to 89.3% of the respondents (see Table 6.2).

It could be the case that respondents consider it more important to conserve energy at home compared to the work situation, as energy saving at home translates more directly into monetary savings (e.g., lower energy bills). We therefore tested whether there were significant differences between behaviour at work and at home. The *p*-value shown in Table 6.2 indicates whether the differences between behaviour at work and at home is statistically significant, which means that they are very unlikely to have occurred by chance.

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A small *p*-value (< .05) indicates that there are significant differences in behaviour at home and at work. For employees working for startups we see that they tried to conserve energy significantly more at home (*M* = 4.7) than at work (*M* = 3.9), and that they encouraged their family and friends significantly more (*M* = 4.0) than their colleagues (*M* = 3.7) to behave environmentally friendly (see Figure 6.2). This seems contradictory, but it could be due to the fact that a large group of startups work from home.

Table 6.2: Current behaviour at work and at home[81]

Current behaviour at work and at home (1= not likely at all / never; 5 = very likely / always)	Startups		
	At work	At home	*P*
I currently try to conserve energy [at work / a home]. ($N_{startups}$ = 319; $N_{startups\_at\ home}$= 272)			
% (strongly) agree	63.9%	82.4%	
% (strongly) disagree	8.5%	4.8%	
Average	3.9	4.2	**<.001**
I encourage [my colleagues (work) / friends (home)] to behave in an environmentally friendly way. ($N_{startups\_at\ work}$ = 319; $N_{startups\_at\ home}$= 272)			
% (strongly) agree	58.3%	70.6%	
% (strongly) disagree	14.8%	7.4%	
Average	3.7	4.0	**<.001**
When I have finished using my computer [for the day / at home], I turn it off. ($N_{startups\_at\ work}$= 319; $N_{startups\_at\ home}$= 272)			
% Often/ always	73.4%	71.4%	
% Never / rarely	11.3%	14.7%	
Average	4.1	4.0	.052
When I leave a room [in a work area / at home] that is unoccupied, I turn off the lights. ($N_{startups\_at\ work}$= 319; $N_{startups\_at\ home}$= 272)			
% Often/ always	84.0%	89.3%	
% Never / rarely	2.5%	1.5%	
Average	4.5	4.5	.712
I turn down the heating/air-conditioner when I leave the room/building at last. ($N_{startups\_at\ work}$= 319; $N_{startups\_at\ home}$= 272)			
% Often/ always	66.5%	75.8%	
% Never / rarely	5.3%	8.1%	
Average	4.2	4.2	.723
When I am not using my computer [at work], I turn off the monitor. ($N_{startups}$ = 319)			
% Often/ always	56.8%		
% Never / rarely	19.7%		
Average	3.7		
I print documents that are essential to have in hard copy form, and store and read all other documents electronically. [at work] ($N_{startups}$ = 319)			
% Often/ always	74.7%		
% Never / rarely	7.2%		
Average	4.2		
When I am feeling cold **at home** I put on a jumper rather than turning up the heating straight away. ($N_{startups}$ = 272)			
% Often/ always		67.3%	
% Never / rarely		10.0%	
Average		3.9	

[81] The number of respondents varies across items because respondents could indicate if a situation was non-applicable to them. Thus, only the number of respondents for whom the situation was applicable were included.

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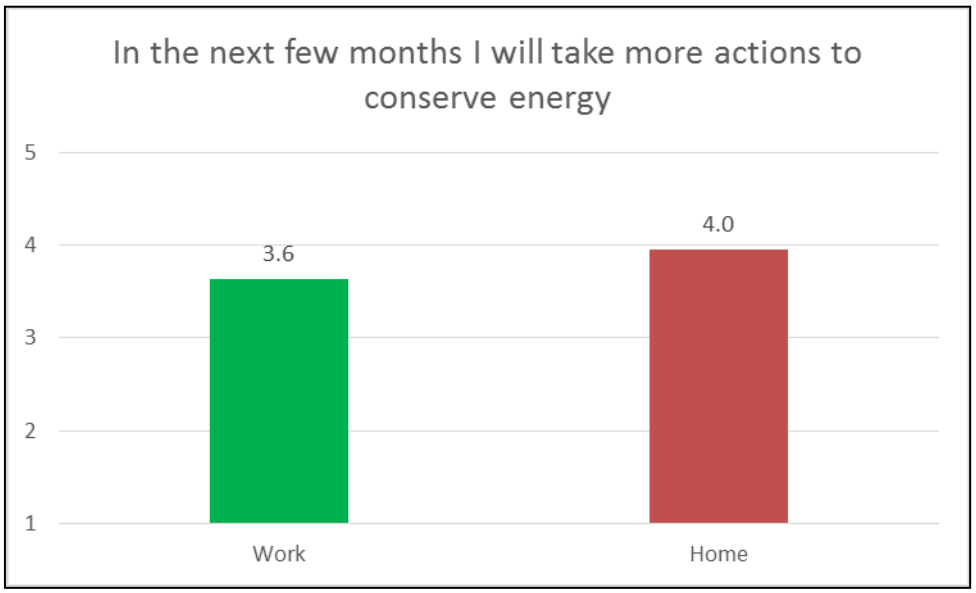
Note. Table 3.3 shows the averages and percentages for all respondents that had actual behavioural control. For instance, in case a respondent did not have the option to switch off lights they could indicate that this situation was non-applicable.

We also investigated future behavioural intentions (see Table 6.3 and Figure 6.4). Respondents from startups indicated that they would take more actions to conserve energy at home (69.9%) than at work (53.6%) in the future.

Table 6.3: Future behavioural intentions

Future behavioural intentions at work and at home (1= strongly disagree; 5 = strongly agree)	Startups (*N* = 319)		
	At work	At home	*P*
In the next few months I will take more actions to conserve energy [at work / at home] than I currently do.			
% (strongly) agree	53.6%	69.9%	
% (strongly) disagree	12.2%	10.3%	
Average	3.6	4.0	<.001

Figure 6.4: Future energy saving behaviour



Note. All scales are 5-point scales with 1 = *not likely at all*, and 5 = *very likely*.

6.4 Gender differences

We investigated whether there were any gender differences in attitudes, motivations, knowledge and behaviour. 37% of the startups sample was female and 59% male (4% preferred not to indicate their gender). There were significant differences in training evaluations between male and female employees.[82] Women considered the training more useful (*M* = 4.28) than men (*M* = 3.96), and indicated that the training

[82] Useful insights: *p* = .030, new insights: *p* = .152; behavioural change: *p* = .085; not impact energy efficiency behaviour at work: *p* = .008, and at home: *p* = .014

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would have a greater impact on their energy efficiency behaviour at work (M_{female} = 2.84, M_{male} = 2.57), and at home (M_{female} = 2.86, M_{male} = 2.60). In addition, women were more willing to take actions to conserve energy at home in the next few months than they currently do (M = 4.18) than men (M = 3.88). [83] There were no significant differences between male and female employees of startups in terms of attitudes, motivations and knowledge.[84] Also, there were no significant gender differences for startups with regards to current energy saving behaviour at work and at home.[85]

6.5 Conclusions

The startup mentoring session was positively evaluated. Employees working for startups seem willing to take more actions in the future to conserve energy, both at home and at work after they had the training session. It should be noted that the survey took place immediately after the mentoring session. During the mentoring session participants received extensive information on energy efficiency measures and energy saving. This already activates an energy conscious mindset, which might be reflected in the positive survey responses to conserving energy at work and at home, now and in the future.

[83] Future energy saving behaviour, at work: p = .396; at home: p = .042.
[84] Attitudes (as in Table 6.2), item 1: p = .247, item 2: p = .113, item 3: p = .557; Knowledge: p = .153
[85] Current behavior at work (as in Table 6.2), item 1: p = .622, item 2: p = .978, item 3: p = .466, item 4: p = .204, item 5: p = .445, item 6: p = .123, item 7: p = .965; Current behavior at home (as in Table 6.2), item 1: p = .720, item 2: p = .863, item 3: p = .923, item 4: p = .724, item 5: p = .404, item 8: p = .121. Future energy saving behaviour (as in Table 6.3), at work: p = .396; at home: p = .042. Note that explanation in text is based on reverse coded item means.

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7. Lessons learned

This chapter describes the main lessons learned throughout the START2ACT project. The lessons were threefold:

- Reaching out to a difficult to reach target group can best be done using direct communication;
- Creating short and engaging surveys, checking hard indicator data directly with the company, and limiting the number of trainings and surveys to increase willingness to participate and reduce attrition;
- Using one central survey in English (for each wave) in which the partners can register the survey responses themselves, to optimize efficiency.

7.1 Reaching out to a difficult to reach target group

Employees from startups and young SMEs turned out to be a difficult to reach target group. This was due to energy efficiency not being a short-term priority for many startups and SMEs. In addition, the (monetary) benefits of most energy saving measures will only be noticed in the long run (e.g., purchase of energy efficient equipment). Also, many startups and SMEs rent office space in large office buildings (or in the case of startups from incubators or accelerators) and may pay a fixed amount for their energy consumption; as a result, some energy saving measures cannot be implemented or do not lead to immediate financial gains for the startup or SME. This can limit the perceived gains for the startup or young SME of engaging in energy saving measures. Of note, despite this, it is still important to reach out to these young SMEs and startups to create awareness of the importance of energy efficiency: when they learn about this in an early phase they already possess this information when scaling up.

At the start of this project different ways of reaching out to the target group were implemented and changes in response rates were monitored. It turned out to be most effective to send direct emails or to have calls with respondents, as this increased involvement and thus responses. Using social media (such as Facebook and LinkedIn) to invite people to take part was less effective as people are less committed and are scrolling through many other messages and posts. It was also important to send reminders, usually the effect of a request faded out after 1 or 2 days as we could see from monitoring the survey responses. Further, it turned out to be effective to get in touch with umbrella organisations and stakeholders (e.g., directors of hubs, owners of business incubators, or facility managers). Throughout the project, partners have adjusted their targeting strategies accordingly and started to send direct emails which increased response rates and they got in touch with umbrella organisations.

7.2 Structure of the trainings and surveys

When SMEs agreed to take part in the mentoring sessions it was challenging to make them fill in the surveys and to make sure that all training sessions took place. Many SMEs were positive about the trainings and were willing to fill in the survey in return for the free training sessions; however, sometimes the time

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investment needed was too large for them. START2ACT partners were therefore free to adjust the set-up of the mentoring sessions for SMEs to some degree. For instance, for some of the SMEs it turned out to be more useful to combine multiple sessions in one. It could thus be that some SMEs did not receive all information.

One of the lessons learned from the very first START2ACT survey (not part of the mentoring surveys described in this report) was that the survey should not be too long. At that time many SMEs complained about the large number of questions on similar topics. For the START2ACT partners it was at that time challenging to make sure that SMEs completed the survey. Therefore, compared to the first START2ACT survey the number of questions was significantly reduced and the questions were made more engaging. Furthermore, based on this first survey it was decided that startups did not have to provide hard indicator data (as this is data that is difficult to provide for many startups because they work from home or have shared office space), and SMEs only had to do this twice (before the trainings started and after the final training session) instead of in each monitoring survey (as it would be too time consuming to provide these data each time). Still it turned out to be difficult for SMEs to provide the hard indicator data. This is something that best can be checked together with the trainer while the trainer is present at the company site. We would recommend for future similar projects to use short and engaging surveys (selecting only the most important aspects to be studied) and to limit the number of mentoring sessions and surveys.

7.3 Optimisation of the data collection process

The surveys were developed in the languages of the local country. Much time, effort, and resources have gone into translating and programming these surveys, as for the mentoring surveys for SMEs 32 surveys had to be translated and programmed (8 countries times 4 questionnaires) and for startups 9 surveys. In practice, however, many partners printed the surveys and then entered the responses themselves into the central survey software. Others administered the survey questions face-to-face or via phone. Thus, future similar research projects should consider creating one central survey in English (one for each wave) in which the partners can register the survey responses themselves.

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8. Conclusions

START2ACT aimed to facilitate behavioural change by changing the motivations, attitudes and knowledge levels of managers and employees of young SMEs and startups. Trainings and workshops were developed to make them aware of energy conservation measures and the importance hereof. This report provided insights in the impact of the training and mentoring sessions on more energy efficient behaviour at work, and if there were positive spill-over effect to the home situation.

START2ACT focussed on startups and SMEs, as there is a great potential for action at the workplace to achieve significant reductions in energy use. Given that startups and SMEs differ regarding their operating phase (e.g., startups are mainly focussed on survival while SMEs are focussed on growth, startups usually work from home whereas SMEs rent or own a permanent office, etc.), different trainings were developed for SMEs and startups. Specifically, startups received one workshop, usually lasting around 1.5h, focussed on facilitating knowledge on energy use, energy monitoring, and specific energy saving measures. SMEs received three trainings. The visits were tailored to each SME, thereby also allowing flexibility with regard to how the content was delivered during a visit. In the visits several topics around energy saving behaviour were discussed, such as: a Buy Smart Strategy, explanation of energy meters, a staff awareness campaign, energy usage of specific equipment (such as the heating and cooling systems, lighting, and IT equipment).

The effectiveness of the trainings on energy saving attitudes and behaviour was investigated. For SMEs this could be done on a continuous basis. Namely, before the mentoring and training activities were started in an SME, and after each training activity – allowing the assessment of attitudinal and behavioural change over time. The surveys were carried out between May 2017 and May 2019. All local partners contacted startups and SMEs within their networks and encouraged them to participate in the survey. In total data from 686 respondents that participated in the SME survey and 320 respondents that participated in the startups survey were analysed. The majority of the survey participants were highly educated.

Training evaluations

The mentoring and training activities were positively evaluated. Employees from SMEs indicated that the trainings provided them with new and valuable insights on energy savings. After having followed the training(s), both employees working for startups and SMEs reported that the trainings inspired them to take more actions in the future to conserve energy, at home and at work, and that they became more willing to change their behaviour and become more energy efficient based on what they have learned in the trainings.

(Changes in) attitudes, motivations and knowledge

The most important driver for SMEs for energy efficiency was the reduction of energy bills, which became more important over time after the several trainings.

The trainings had a positive effect on attitudes of employees about the company norm to save energy. Before the trainings it was not so much of a priority for SMEs to save energy, however after the trainings this became more important and it also became in their opinion more and more the company norm to save

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energy. This might indicate that indeed the company norm has changed into a more energy conscious norm because of the trainings. After the second and third company visit it became especially important to employees of SMEs to help their company to save energy. Startups also indicated after the workshop that it is their company norm to switch off office equipment.

After each training session employees of SMEs considered it worth paying a little more for an energy efficient product. Further, after the second and third company visit, it became especially important to employees of SMEs to help their company to save energy. Also, startups considered it worth paying a little more for energy efficient products, and indicated to find it important to help their company conserve energy.

Finally, after each training session employees of young SMEs indicated to feel more informed on how to save energy. The higher the knowledge levels were, the higher the attitudes towards energy saving and the more likely respondents were to conserve energy at home, at work and in the future. Startups also felt more informed about energy savings after the workshop took place.

Effects of the trainings on current and future energy saving behaviour

As for SMEs there was data on energy saving behaviour from before and after the trainings, we could investigate changes in their behaviour.[86] These changes in behaviour reflect self-reported behaviour. Despite the fact that employees of young SMEs already indicated they frequently tried to conserve energy, the trainings were clearly effective in (further) increasing reported energy saving behaviour. This pattern is also reflected in more specific energy saving behaviour at work and at home, such as switching off the lights, the computer, the monitor, the air conditioner, and the heater. Further, it was found that positive attitudes towards energy saving (which was targeted by the trainings) was positively related to the reported energy saving at work and at home. After the training sessions employees of young SMEs also reported to be more willing to take additional actions in the future to conserve energy, both at home and at work.

This implies that the START2ACT training seems effective and promising in making people more energy conscious and changing their behaviour to become more energy efficient. By addressing people at work there also is a positive spill-over effect to the home situation where people also reported to become more energy efficient. It turned out to be challenging to get SMEs and startups involved in the trainings and surveys. Especially for SMEs the current set-up with three trainings and four surveys seemed too time-consuming. Therefore, the current set-up is a good basis. By limiting the number of trainings and surveys however, this energy saving program can become more cost-effective and less time-consuming. As this energy saving program proved to be effective it can then also be implemented among a broader audience taking into account the suggested adjustments.

[86] For startups there was no data available before the trainings, so the effect of the training on changes in behavior cannot be tested.

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Appendix A: Questionnaire

NOTE: startups received the questionnaire below without question 1, 2, and 7. Evaluation questions were added (Q10). Also, the italic parts in the introduction were removed.

SMEs received the same questionnaire after each training session. Compared to the baseline questionnaire, in the monitoring surveys the background questions about the company and person-specific characteristics were not asked again. Q10 was added to the questionnaire. Also, the introduction was slightly adjusted. The hard indicator question was asked prior to the start of the training and after the last training session.

A.1 General questionnaire

[Introduction screen]

Welcome.

Thank you for participating in this START2ACTquestionnaire [mouse roll-over 1].

The purpose of this questionnaire is to monitor the effectiveness of the START2ACT activities in which you are participating. *We will send follow-up questionnaires after each training activity to track your energy efficiency progress throughout your participation in the programme.*

If you are the manager of your company, we ask you to have information on your energy costs ready. START2ACT hopes to track the actual energy savings achieved by participants over the course of the programme. This will also help your organisation to define the success of the trainings you received in terms of energy monetary savings. If you do not have access to this information you can skip this step.

Your data will be kept confidential and will not be provided to third parties.

Thank you in advance for your help!

On behalf of the START2ACT team,

CentERdata and [local partner]

Once you have read the text and agree to participate in START2ACT, please click the box below and press the 'next' button to start the first questionnaire. If you do not agree to participate, please indicate so.

- ☐ I agree to participate
- ☐ I do not agree to participate

[Mouse roll-over 1: START2ACT is a three-year project supported by the European Union's Horizon 2020 programme for research and innovation under Grant Agreement No. 696069.]

[If respondents do not agree to participate, the following screen appears]

You indicated that you do not want to participate in this questionnaire. By clicking the 'Next' button you will leave the questionnaire, and you will not be able to fill it out at a later time.

If you want to return to the questionnaire please click 'Previous' and change your answer.

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[q1] To what extent do you think the following options would motivate your company to implement energy efficiency measures? Please indicate your top 3 (1st, 2nd, and 3rd).

	1	2	3
Reduction of energy bills	☐	☐	☐
Being prepared for future increases in energy prices	☐	☐	☐
Contributing to the fight against climate change	☐	☐	☐
Improved company image	☐	☐	☐
Improved product quality	☐	☐	☐
Other, namely…	☐	☐	☐

[q1a if, other, namely: text box appears]

You indicated that other options would motivate your company to implement energy efficiency measures. Which other options(s) do you consider? [open textbox]

[q2]

To what extent do you agree with the following statements?

	Strongly disagree		Neutral		Strongly Agree
Energy saving is **not** a priority in my company.	1	2	3	4	5
The cost savings from energy efficiency are **not** sufficient to justify the effort.	1	2	3	4	5
By saving energy, me and my colleagues can contribute to lowering the energy bill of the company.	1	2	3	4	5

[q3]

To what extent do you agree with the following statements?

	Strongly disagree		Neutral		Strongly Agree
It is worth paying a little more for a more energy efficient product.	1	2	3	4	5
I consider it important to help my company to conserve energy.	1	2	3	4	5
I am well informed on how to save energy.	1	2	3	4	5
It is the company norm to switch off office equipment (e.g., PCs, lights) when not in use.	1	2	3	4	5

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[q4] Please indicate how likely it is that you will do the following:

	Not likely at all				Very likely
I currently try to conserve energy at work.	1	2	3	4	5
I encourage my colleagues to behave in an environmentally friendly way.	1	2	3	4	5
In the next few months I will take more actions to conserve energy at work than I currently do.	1	2	3	4	5
I currently try to conserve energy at home.	1	2	3	4	5
I encourage my family and friends to behave in an environmentally friendly way.	1	2	3	4	5
In the next few months I will take more actions to conserve energy at home than I currently do.	1	2	3	4	5

[q5] Please indicate whether you do, or do not do the following:

	never	rarely	sometimes	often	always	N/A*
When I have finished using my computer for the day, I turn it off.	○	○	○	○	○	○
When I leave a room in a work area that is unoccupied, I turn off the lights.	○	○	○	○	○	○
When I am not using my computer, I turn off the monitor.	○	○	○	○	○	○
I print documents that are essential to have in hard copy form, and store and read all other documents electronically.	○	○	○	○	○	○
I turn down the heating/air-conditioner when I leave the room/building at last.	○	○	○	○	○	○

* e.g., when this turns off automatically or is centrally controlled.

[q6] Please indicate whether you do, or not do the following actions at home:

	never	rarely	sometimes	often	always	N/A
When I have finished using my computer **at home**, I turn it off.	○	○	○	○	○	○
When I leave a room **at home** that is unoccupied, I turn off the lights.	○	○	○	○	○	○
When I am feeling cold **at home** I put on a jumper rather than turning up the heating straight away.	○	○	○	○	○	○
When I leave home, I turn down the heating/ air-conditioner	○	○	○	○	○	○

[q7] The following question addresses managers/directors, namely those who oversee the company's day-to-day business operations and are in charge of decision making.

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Are you the energy manager / START2ACT contact person?

- ☐ Yes
- ☐ No

If yes continue with hard indicator question q7a. If no, continue to general questions.

[q7a] What was the energy cost during the past year?

In order to easily answer this question you will need to have this information ready (i.e. in the form of energy bills). **Note that if you close the browser of this questionnaire before you finished the questionnaire, all data will be lost and you would have to start again if you want to finish the questionnaire. Moreover, the questionnaire will time out in one hour, so if you need to look up the information needed for this question, make sure you do so within one hour. Otherwise you would have to start again as well.**

If you do not have access to this information you can skip this step.

Instructions

You can type in the information in numbers. If you do not know the exact amount of energy used, please provide a rough estimation of the energy cost. You only need to enter the amount **OR** the cost. Please also indicate whether these are actual or estimated costs/amounts by ticking the corresponding box.

	Energy amount	Energy costs (in Euros)	Actual	Estimate	N/A
Electricity (kWh)	Open textbox	Open textbox	☐	☐	☐
Gas (kWh)	Open textbox	Open textbox	☐	☐	☐
Oil (litres)	Open textbox	Open textbox	☐	☐	☐
Other (e.g., biomass, coal)	Open textbox	Open textbox	☐	☐	☐

In case it is difficult to provide the information in the format above you can provide the information that you do have here: [open textbox]

[general questions]

[q8a] Finally, we have some general questions for you. Please note that your data will be kept confidential and will not be provided to third parties.

What is the name of your company?

[open textbox]

[q8b] What is the size of the company in terms of personnel? Please provide a numerical value.

- ☐ 0-10 persons
- ☐ 11-25 persons
- ☐ 26-50 persons
- ☐ > 50 persons

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[q8c] Does your company have a permanent office/site?

- Our company owns a permanent office/site.
- Our company rents a permanent office/site.
- Our company works from home.
- Our company makes use of co-working spaces.

[q8d]
How long has your company been operational?

- <3 years
- 3-5 years
- 5-8 years
- > 8 years

[screen 2 general questions]

[q9a] What is your age?

- 18 - 24 years
- 25 - 34 years
- 35 - 44 years
- 45 - 54 years
- 55 - 64 years
- 65 years and older

[q9b] What is your level of education?

- primary school
- intermediate secondary education (e.g., junior high school)
- higher secondary education/preparatory university education (e.g., senior high school)
- intermediate vocational education (e.g., junior college)
- higher vocational education (e.g., college)
- university
- prefer not to say

[q9c] What is your e-mail address? Please fill in the same e-mail address to which the invitation for the workshop / training was sent.

[open textbox]

[q9d]Do you have any questions/comments about the questionnaire?

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- Yes
- No

If yes -> open textbox appears. If no, go to outro.

[outro]

Thank you for participating in the START2ACT questionnaire.

If you do not want to participate in the next questionnaire please contact [local partner].

Please click the 'Next' button to submit your questionnaire.

A.2 Evaluation of the training

Q10 will be part of the startup questionnaire. For SMEs Q10 will be part of the questionnaire in survey 2, 3, 4.

[q10a]

	Certainly not				Certainly so
The training provided me with useful insights on energy efficiency.	1	2	3	4	5
The training provided me with new insights on energy efficiency.	1	2	3	4	5
I am planning to change my behaviour based on what I learned in the training.	1	2	3	4	5

[q10b]

	Strongly disagree		neutral		Strongly agree
The training will not have an impact on my energy efficiency behaviour at work.	1	2	3	4	5
The training will not have an impact on my energy efficiency behaviour at home.	1	2	3	4	5

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Appendix B: Socio-demographics and company background

Table B.1 SMEs: socio-demographic information and company background

Variable	Categories	Percentage	N = 266 / 269[87]
Gender	male	55.7%	148
	female	43.2%	115
	Prefer not to say	1.1%	3
Education level	Primary school	1.1%	3
	Intermediate secondary education	1.1%	3
	Higher secondary education	3.0%	8
	Intermediate vocational education	5.3%	14
	Higher vocational education	13.9%	37
	University	72.2%	192
	Prefer not to say	3.4%	9
Age	18-24 years	3.0%	8
	25-34 years	27.1%	72
	35-44 years	35.7%	95
	45-54 years	20.7%	55
	55-64 years	5.6%	15
	65 years and older	2.3%	6
	Prefer not to say	5.6%	15
Company operational	< 3 years	35.3%	95
	3-5 years	22.7%	61
	5-8 years	13.4%	36
	More than 8 years	28.6%	77
Type of office space	Own permanent office	39.0%	105

[87] Sample size is *266* for socio-demographic information and 269 for company background information.

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	Rent permanent office	44.6%	120
	Work from home	9,3%	25
	Co-working spaces	3,0%	8
	Combination	4,1%	11
Company size	**0-10 persons**	73.6%	198
	11-25 persons	12.3%	33
	26-50 persons	6.3%	17
	> 50 persons	7.8%	21

Table B.2 Startups: socio-demographic information and company background

Variable	Categories	Percentage	N = 310 / 312[88]
Gender	**male**	59.4%	184
	female	36.8%	114
	Prefer not to say	3.9%	12
Education level	**Primary school**	0.3%	1
	Intermediate secondary education	1.3%	4
	Higher secondary education	3.2%	10
	Intermediate vocational education	2.9%	9
	Higher vocational education	9.7%	30
	University	78.7%	244
	Prefer not to say	3.9%	12
Age	**18-24 years**	13.5%	42
	25-34 years	47.7%	148
	35-44 years	22.6%	70
	45-54 years	7.4%	23
	55-64 years	4.8%	15
	65 years and older	1.0%	3

[88] Sample size is 310 for socio-demographic information and 312 for company background information.

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	Prefer not to say	2.9%	9
Company operational	**< 3 years**	68.9%	215
	3-5 years	16.3%	51
	5-8 years	3.5%	11
	More than 8 years	11.2%	35
Type of office space	**Own permanent office**	21.5%	67
	Rent permanent office	27.6%	86
	Work from home	18.9%	59
	Co-working spaces	20.2%	63
	Combination	11.9%	37
Company size	**0-10 persons**	83.7%	262
	11-25 persons	8.3%	26
	26-50 persons	2.9%	9
	> 50 persons	5.1%	16

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Appendix C: Hard indicator data SMEs

Table C.1 SMEs hard indicator data

Country	Company	Energy source	Energy amount		Energy costs (local currency)		Actual		Estimate	
			Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4
BG	1	Electricity (kWh)	5974	5670	1075	1020	☒	☐	☐	☒
BG	2	Electricity (kWh)	1032	936			☐	☐	☒	☒
BG	3	Electricity (kWh)	194000		26000		☐	☐	☒	☐
BG	4	Electricity (kWh)	5500		600		☐	☐	☒	☐
BG	5	Electricity (kWh)	864	804			☐	☐	☒	☒
BG	6	Electricity (kWh)	940		11280	10152	☐	☐	☒	☐
BG	7	Electricity (kWh)	720	840	86		☐	☐	☒	☒
BG	8	Electricity (kWh)	69510	67000	13902	12000	☒	☐	☐	☒
BG	9	Electricity (kWh)	1008	936			☐	☐	☒	☒
BG	10	Electricity (kWh)	6600	5880			☐	☐	☒	☒
BG	11	Electricity (kWh)	18612	13550	4524	4500	☒	☐	☐	☒
BG	12	Electricity (kWh)	5139	5100	1118	1110	☒	☐	☐	☒
BG	13	Electricity (kWh)	7800	6960			☐	☐	☒	☒
CZ	1	Electricity (kWh)	93059		386483		☒	☐	☐	☐
CZ	2	Electricity (kWh)	10594		51517		☒	☐	☐	☐
		Gas (kWh)	59742		63958		☒	☐	☐	☐
CZ	3	Electricity (kWh)	1680	1534	7560	6903	☒	☐	☐	☒
		Gas (kWh)	12128	12053	20057	19903	☒	☐	☐	☒
CZ	4	Electricity (kWh)	54240		220038		☒	☐	☐	☐
HR	5	Electricity (kWh)			1000		☐	☐	☒	☐
		Gas (kWh)			700		☐	☐	☒	☐
HR	6	Electricity (kWh)			5000		☒	☐	☐	☐
HR	7	Electricity (kWh)			4000	1000	☐	☐	☒	☒

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Country	Company	Energy source	Energy amount		Energy costs (local currency)		Actual		Estimate	
			Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4
HR	8	Electricity (kWh)	282570		230167		☒	☐	☐	☐
HR	9	Electricity (kWh)	146325		68156		☒	☐	☐	☐
HR	10	Electricity (kWh)	800		1300		☒	☐	☐	☐
HU	1	Electricity (kWh)	13993784		276521382		☒	☐	☐	☐
		Gas (kWh)	141211		17849316		☐	☐	☐	☐
HU	2	Electricity (kWh)	284225				☒	☐	☐	☐
		Gas (kWh)	424934				☒	☐	☐	☐
		Oil (litres)	155				☐	☐	☒	☐
Hu	3	Electricity (kWh)	1500				☒	☐	☐	☐
HU	4	Electricity (kWh)	7527				☒	☐	☐	☐
		Gas (kWh)	135948				☒	☐	☐	☐
		Oil (litres)	3000000				☐	☐	☒	☐
HU	5	Electricity (kWh)	1733		1700		☐	☐	☒	☐
HU	6	Electricity (kWh)	1400				☐	☐	☒	☐
HU	7	Electricity (kWh)			120000		☐	☐	☒	☐
		Gas (kWh)			150000		☐	☐	☒	☐
HU	8	Electricity (kWh)	8316		250000		☒	☐	☐	☐
		Gas (kWh)	118944		882000		☒	☐	☐	☐
		Oil (litres)	5100		1297000		☒	☐	☐	☐
HU	9	Electricity (kWh)	2400				☐	☐	☒	☐
		Gas (kWh)			20000		☐	☐	☒	☐
		Oil (litres)	150000				☐	☐	☒	☐
HU	10	Electricity (kWh)	333				☒	☐	☐	☐
		Gas (kWh)	77				☒	☐	☐	☐
HU	11	Electricity (kWh)	850				☒	☐	☐	☐
		Gas (kWh)	120				☒	☐	☐	☐
PL	1	Electricity (kWh)			3100		☐	☐	☒	☐
		Gas (kWh)			400		☐	☐	☒	☐
RO	1	Electricity (kWh)			1680	3600	☐	☐	☒	☒
RO	2	Electricity (kWh)	2500	2904			☒	☒	☐	☐

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Country	Company	Energy source	Energy amount		Energy costs (local currency)		Actual		Estimate	
			Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4
RO	3	Electricity (kWh)	9089		4998		☒	☐	☐	☐
		Gas (kWh)	60154		7218		☒	☐	☐	☐
		Oil (litres)			44644		☒	☐	☐	☐
RO	4	Electricity (kWh)			1640		☐	☐	☒	☐
RO	5	Electricity (kWh)			1200	1050	☐	☒	☒	☐
RO	6	Electricity (kWh)			4440	4320	☐	☐	☒	☒
RO	7	Electricity (kWh)	50		29		☐	☐	☒	☐
RO	8	Electricity (kWh)			1800		☐	☐	☒	☐
RO	9	Electricity (kWh)			1360		☒	☐	☐	☐
		Gas (kWh)			2530		☒	☐	☐	☐
RO	10	Electricity (kWh)			4680	4440	☐	☐	☒	☒
RO	11	Electricity (kWh)			1300		☐	☐	☒	☐
RO	12	Electricity (kWh)			4000		☒	☐	☐	☐
		Gas (kWh)			3000		☒	☐	☐	☐
RO	13	Electricity (kWh)			1920		☐	☐	☒	☐
RO	14	Electricity (kWh)			58559		☒	☐	☐	☐
RO	15	Electricity (kWh)			600		☐	☐	☒	☐
		Gas (kWh)			780		☐	☐	☒	☐
RO	16	Electricity (kWh)			2820	2700	☐	☐	☒	☒
		Oil (litres)	1320			1440	☐	☐	☒	☒
RO	17	Electricity (kWh)			10200	10020	☐	☐	☒	☐
		Gas (kWh)			3000	3000	☐	☐	☒	☐
UK	1	Electricity (kWh)			2000		☒	☐	☐	☐
UK	2	Electricity (kWh)			1000		☐	☐	☒	☐
UK	3	Electricity (kWh)	24705		4200		☐	☐	☒	☐
		Other (e.g., biomass, coal)			10200		☐	☐	☒	☐
UK	4	Electricity (kWh)	22180				☐	☐	☒	☐

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Country	Company	Energy source	Energy amount		Energy costs (local currency)		Actual		Estimate	
			Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4	Wave 1	Wave 4
		Gas (kWh)	800				☐	☐	☒	☐
UK	5	Electricity (kWh)			4500		☒	☐	☐	☐
		Gas (kWh)			5000		☒	☐	☐	☐
UK	6	Electricity (kWh)	1200		2000		☐	☐	☒	☐
UK	6	Electricity (kWh)	45000		5600		☐	☐	☒	☐
UK	7	Electricity (kWh)			1000		☐	☐	☒	☐
UK	8	Electricity (kWh)			556000		☐	☐	☒	☐
UK	9	Electricity (kWh)	12583		1760		☒	☐	☐	☐
UK	10	Electricity (kWh)	22000		2400		☐	☐	☒	☐
		Oil (litres)	2000		800		☐	☐	☒	☐
UK	11	Electricity (kWh)			16000		☒	☐	☐	☐
		Gas (kWh)			7500		☒	☐	☐	☐
UK	12	Electricity (kWh)	11537		2520		☒	☐	☐	☐
		Gas (kWh)	2005.164		1148.91		☒	☐	☐	☐

Note. Company 6 UK is the same company. Companies were asked to provide their annual energy consumption or annual energy costs. It cannot be derived whether all companies did this.

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