

SPEEDIER

SME Program for Energy Efficiency through Delivery and Implementation of Energy Audits

D7.4 - TECHNICAL REPORT ON SPEEDIER REPLICATION POTENTIAL ACROSS EU

Lead Contractor: IERC

Author(s): Lorena Sánchez Relaño

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Contact persons	Pádraig Lyons padraig.lyons@ierc.ie					
Website	www.speedierproject.eu					

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Deliverable Contributors				
Deliverable leader	Name	Lorena Sánchez Relaño		
	Organisation	IERC		
	Role/Title	Research Assistant		
	Email	lorena.sanchez@ierc.ie		
Contributing	Name	Carla Sebastiani Guía		
Author(s)	Organisation	SIE		
	Role/Title	Business & Marketing Manager		
	Email	carlase bastiani@sustainableinnovations.eu		
Contributing	Name	Diana Romeu Marín		
Author(s)	Organisation	ITEC		
	Role/Title	Engineer		
	Email	dromeu@itec.cat		
Contributing	Name	Nicola de Giusti		
Author(s)	Organisation	Polimi		



	Role/Title	Business Analyst
	Email	nicola.degiusti@polimi.it
Reviewer(s)	Name	Carla Sebastiani Guía
	Organisation	SIE
	Role/Title	Business & Marketing Manager
	Email	carlase bastiani@sustainableinnovations.eu
Reviewer(s)	Name	Diana Romeu Marín
	Organisation	ITEC
	Role/Title	Engineer
	Email	dromeu@itec.cat
Review and quality	Email Name	dromeu@itec.cat Tom Flynn
Review and quality approval	Email Name Organisation	dromeu@itec.cat Tom Flynn TFC Research and Innovation Limited
Review and quality approval	Email Name Organisation Role/Title	dromeu@itec.cat Tom Flynn TFC Research and Innovation Limited Innovation and Business Development Manager
Review and quality approval	Email Name Organisation Role/Title Email	dromeu@itec.cat Tom Flynn TFC Research and Innovation Limited Innovation and Business Development Manager t.flynn@tfcengage.com
Review and quality approval Final review and	Email Name Organisation Role/Title Email Name	dromeu@itec.cat Tom Flynn TFC Research and Innovation Limited Innovation and Business Development Manager t.flynn@tfcengage.com Pádraig Lyons
Review and quality approval Final review and submission	Email Name Organisation Role/Title Email Name Organisation	dromeu@itec.catTom FlynnTFC Research and Innovation LimitedInnovation and Business Development Managert.flynn@tfcengage.comPádraig LyonsInternational Energy Research Centre
Review and quality approval Final review and submission	Email Name Organisation Role/Title Email Name Organisation Role/Title	dromeu@itec.catTom FlynnTFC Research and Innovation LimitedInnovation and Business Development Managert.flynn@tfcengage.comPádraig LyonsInternational Energy Research CentreProject Coordinator

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Abbreviations

- CEP: Clean Energy for all Europeans' Package
- EC: European Commission
- EED: Energy Efficiency Directive
- ECM: Energy Conservation Measure
- MS: Member States
- NEEAP: National Energy Efficiency Action Plans
- NECP: National Energy and Climate Plans
- SME: Small and Medium sized Enterprise
- WP2: Work Package 2
- WP3: Work Package 3





Executive Summary

SPEEDIER is a highly innovative one-stop-shop solution that applies an integrated approach to SMEs energy management, providing information, advice, capacity building, energy auditing, financing, implementation of energy efficiency solutions and monitoring of impacts.

The SPEEDIER Service was developed and tested in SMEs in four pilot countries: Ireland, Italy, Romania and Spain. Beyond the year end of 2021, it will enter its next development stage, further expanding in the pilot countries and developing activities in new EU countries.

Having been developed to ease the energy auditing and management process for EU SMEs and to promote Energy Conservation Measures implementation by companies, SPEEDIER system aims to support the EU in achieving its energy efficiency and energy consumption objectives.

To this effect, and in order to expand on the scope of SPEEDIER and to replicate it in other EU jurisdictions, this report has been targeted at energy experts.

In this manner, the report tackles the best technical tools, approaches and engagement strategies that can be used to enhance the acceptance of energy audits and consequently, the implementation of energy efficiency measures. These learnings notation are drawn from previous Work Packages of SPEEDIER and are focused specifically on SMEs. Nonetheless, they could be also extrapolated to large enterprises in many cases.

As a result, it has been highlighted what are the most relevant factors evaluated in WP2 of SPEEDIER when engaging SMEs with energy experts, together with the detected barriers and their subsequent recommendations to overcome them. Furthermore, the different approaches that are applicable depending on the organisation's size, geographical location, sector, building ownership, and other building or organisational attributes, have been summarised from WP3.

In addition, the insights of the pilot leaders regarding their experience during the implementation process of ECMs with the SMEs, have been collected at the end of the first section of this deliverable. They include not only the challenges energy experts faced, but also some proposals suggested to make the SPEEDIER Service easier as well as a number of best practices that could be helpful.

To demonstrate the importance of user behaviour in achieving energy savings, since real results have not been obtained yet, a survey for SPEEDIER participants was created. This survey tackled the knowledge they had acquired during the trainings and how this impacted their behaviour and awareness concerning energy efficiency. The questions also focused on the willingness of the SMEs to participate in SPEEDIER or a similar programme in the future and it covered their understanding about the "rebound effect" in energy conservation.

To conclude, drawing from the previous sections, some guidelines on enhancing the corporate culture around energy efficiency have been elaborated for business owners and managers to help them with implementing new policies and strategies.





1 Introduction

The SPEEDIER Service delivers a self-financing outsourced energy management service enabling SMEs to implement energy conservation measures and obtain access to the energy services market. The service is available via energy consultants, auditors and experts and facilitates the uptake of energy audits, and the subsequent implementation of energy efficiency measures in SMEs. The service also streamlines for SMEs the process of identifying and implementing energy saving measures by outsourcing all time-consuming energy management activities that require technical expertise to a SPEEDIER Energy Expert.

The SPEEDIER Service aims to create a new dynamic through the EU, increasing energy auditing in SMEs and improving their energy efficiency across all sectors.

In 2012, the EU established a set of binding measures to reach a 20% energy efficiency target by 2020. The 2018 amending directive sets new targets of 32.5% energy efficiency for 2030 with the possibility to revise them upward in 2023.

The energy efficiency support service developed during the SPEEDIER project aims to support the reduction of energy consumption and increase the implementation of energy efficiency measures. The service was developed and tested in SMEs in four pilot countries: Ireland, Italy, Romania and Spain. After the end of the year, 2021, it is envisaged that SPEEDIER will enter its next stage, further expanding in the pilot countries and developing activities in new EU countries. Its application at EU level after the end of the project will help SMEs to reduce their energy consumption by enabling the implementation and embedding of Energy Conservation Measures (ECM) at a large scale.

Hence, the objective of this deliverable is to produce a technical report to support energy experts to replicate, adapt and use the SPEEDIER concept in other EU Member States.

The research has confirmed the importance of the acceptance of energy audits and increase the uptake in both SMEs, and large enterprises across the EU. To this effect, it will be necessary to determine which are the best technical tools, approaches and engagement strategies that can be used to achieve this.

Furthermore, it is vital for the continuity of SPEEDIER to demonstrate the importance and value of changing user behaviour in achieving energy savings considering the "rebound effect" and supporting the creation of an organizational culture that reflexively engages in a continuous cycle of self-evaluation, correction and improvement of energy efficiency actions and processes through heightened employee awareness and commitment in the energy conservation field.

Finally, the research found that SMEs owners to have some guidelines with the aim of enhancing corporate culture around energy efficiency in their business.



2 Improving the uptake of energy efficiency measures across the EU

This section presents a summary of the review of the best technical tools, approaches and engagement strategies that can be used to improve the acceptance of energy audits and increase the uptake of energy efficiency measures in both SMEs and large enterprises across the EU, drawing from the learnings of previous WP of SPEEDIER.

2.1 SMEs engagement with energy experts

2.1.1 Most relevant parameters evaluated in SPEEDIER WP2

In Task 2.3, the results of the SMEs and stakeholder surveys were robustly analysed. In these surveys, a total of 13 parameters were evaluated for SMEs:

- mandatory related to basic information about the company such as the operating sector, the number of employees or the year turnover,
- 9 optional questions regarding the company's energy use and management. On the other hand, for stakeholders there was only one mandatory question, which asked what the main business activity was, in addition
- 11 optional questions focused on different aspects concerning energy audits and the implementation of energy conservation measures (ECMs).

In this deliverable, the focus will be on the parameters that were found to have the largest impact on energy experts engagement with SMEs. However, it should be noted that the relevance of these parameters usually change depending on the pilot site location. The most relevant parameters in terms of engagement analysed in SPEEDIER T2.3 surveys are as follows:

SMEs

- <u>Unit Cost of Energy.</u> If the awareness of the cost of energy is low, it could be difficult to persuade SMEs to engage with the programme. For instance, in Spain, 57% of respondents were unable to answer or preferred not to answer the question on the unit cost of electricity for unclear reasons, making necessary a different approach in Spain in terms of engagement compared to the other pilot sites.
- Implementation of Energy Conservation Measures. The poor implementation of ECMs in SMEs could be addressed by SPEEDIER, as there could be a lot of untapped energy saving potential in these SMEs. However, persuading businesses to engage with energy experts is a big challenge if energy is seen as a low priority. This was the case in Romania, where only 13% of business had implemented any energy conservation measure.

Stakeholders

• <u>Energy audits.</u> The survey results regarding the <u>percentage of annual turnover for</u> <u>energy audits</u> showed that there is already a reasonable level of engagement between





energy experts and SMEs in Ireland, Romania and Spain. Nevertheless, there is potential for improvement and the SPEEDIER Service has been shown to enable experts to broaden their service offering. Conversely, energy experts in Italy appear to have the highest rate of engagement with SMEs, as 60% of respondents stated that SMEs account for more than 60% of their energy auditing work. This may be due to the large ESCO market in Italy and the prevalence of the white certificate scheme. This scheme strongly supports ESCOs to work with smaller organisations and trade the white certificates achieved through certified energy savings. In contrast, Romania has the lowest rate of engagement with SMEs as 60% of energy experts stated that energy audits for SMEs account for less than 10% of their auditing work.

- Ongoing support to ECM implementation in SMEs. Energy experts were asked to estimate the percentage of SMEs that went on to implement the recommended ECMs. Survey results showed that in all countries at least one third of energy experts did not know (or provided no answer) on the number of SMEs that go on to implement and continue engagement with the recommended ECMs. This indicates that their interaction with the SMEs may end after the energy audit without further advice or assistance to implement any ECMs. Furthermore, striking differences were found among the different countries. In Romania, for example, 40% of energy experts estimated that fewer than 1 in 10 SMEs that they worked with went on to implement any ECMs, compared to only 4% in Ireland, 10% in Italy and 17% in Spain. This presents not only a significant opportunity but also simultaneously a challenge for SPEEDIER experts to ensure that recommended ECMs are actually implemented and contribute to long term energy savings and carbon reduction.
- <u>SMEs method of contact.</u> The method of contact with SMEs varies significantly among the pilot countries and has an impact in the engagement of companies. In Ireland, SMEs are more likely to contact energy experts directly to engage their services, while in Italy energy experts initiate the contact with SMEs to introduce themselves and their services. Finally, in Spain and Romania, client referral is the main method of first contact between energy experts and SMEs indicating the importance of word of mouth in the sales process.

2.1.2 Findings from focus groups

In order to complement the survey's results for SMEs and stakeholders, a focus group was organised in each pilot country as part of task T2.4. The aim of these focus groups was to understand in more detail the views of SMEs & experts about barriers and drivers to energy efficiency uptake, that they maybe not have been able to provide via online survey. The focus groups enabled identification of the most significant barriers as well as recommendations to improve the engagement between SMEs and energy experts and have been summarised below.

Barriers and recommendations to engage SMEs with Energy Experts

I. <u>Lack of finance to conduct energy audits and to implement the subsequent energy</u> <u>saving recommendations.</u>





The research confirms that not only do some ECMs require an unjustifiably large initial capital investment, but also that SMEs struggle to justify the cost of having an energy audit in the first place. Furthermore, the insecurity concerning the recovery of the initial investment makes SMEs consider the audits not worth the risk.

 In response to this, the energy experts state that in most cases they can readily identify savings that will recover the cost of the audit immediately through switching to better tariffs or behavioural change actions that cost nothing. The self-financing mechanism therefore, is one of the ways to lower the perception of risk: a free energy assessment, or showing how the SPEEDIER Energy Expert can be paid from the savings identified can further reduce the risk from the point of view of the SMEs and thus support SMEs to carry out energy audits.

II. Lack of regulation that mandates SMEs to undertake an energy audit.

SMEs usually have other business priorities that consume their time and attention making it unlikely that they invest in energy management, since they are not mandated to carry it out.

 Therefore, the SPEEDIER Energy Expert will need to find other ways to persuade SMEs of the benefits of energy audits and more actively engaging with their energy behaviour. This can be supported by emphasising the wider benefits of energy efficiency in meeting their business targets rather than a more narrow focus on financial benefits or return on investment. Furthermore, a discussion about reducing waste, improving comfort or moving ahead of their competitors could be a more successful way of engaging with SMEs.

III. Lack of in-house expertise on energy management.

As an example of this, in Ireland, this typically falls under the remit of the Environment, Health and Safety (EHS) role. These individuals tend to be experts on health and safety but lack knowledge of energy or environmental management. This again reinforces the low priority energy management takes within organisations and leads to individuals being unable to take action on reducing energy consumption due to lack of knowledge of what to do.

• SPEEDIER energy experts agreed that engagement of staff at all levels of the organisation is critical for identifying and achieving energy savings.

IV. Lack of time.

Lack of time, was cited by SMEs as a barrier to energy auditing both in terms of gathering the data required by an auditor and coordinating the demands of a role that often include health and safety management. Gaining senior management buy-in is key but getting it from SME business owners can be difficult because they are busy running their business.

• SPEEDIER Energy Experts need to ensure that they facilitate SMEs and demonstrate that a relatively small amount of time can be used to greatly improve the management of energy that does not significantly impact on business operation. They also need to





show how the SPEEDIER Service offers value to the business to make it attractive to business owners.

V. Lack of a more direct contact by energy experts.

Some of the SMEs stated that they are not being contacted by energy experts offering energy auditing or energy management services. As a result, they are unaware of the benefits and are unable to communicate their importance to senior management to make a case for investment. The lack of ongoing sales conversations leads to decision makers lacking clear, accessible knowledge and information they need to make key decisions around energy management.

 A more straightforward way of contacting SMEs was suggested by energy experts. Furthermore, the energy experts indicated that it was critical that SMEs are engaged with in a bespoke manner so that it aligns with the main focus of their business. Since energy is often a low priority for SMEs, it is difficult to sell them an energy management project. However, focussing on a topic that is of high importance to them, such as reducing wastage or improving production efficiency, can increase the chance of successful engagement and result in energy savings.

VI. The term "energy auditing".

A further barrier identified by the group was that the word 'audit' has negative connotations and could put off some SMEs from engaging with the Service.

• For this reason, it was suggested that the term 'energy assessment' is used in place of the term 'energy audit'.

Additional recommendations to enhance engagement:

- In order to maintain trust, the SPEEDIER Energy Expert must remain neutral and not recommend particular products or companies.
- The SPEEDIER Energy Expert will need to engage with senior management at an early stage, identify their key priorities and present SPEEDIER as a tool that can help to meet those key priorities.
- The SPEEDIER team should consider how to ensure that staff download the interactive mobile application and continue to use it in the longer term. Some options could include augmenting the app to record energy saving ideas from staff, using gamification techniques to encourage people to engage with the app, reward employees by giving public recognition of their achievements, using quizzes, surveys and notifications as tools to inform staff and check knowledge and understanding.





2.2 Characterization of SMEs by energy experts

2.2.1 Work done in WP3, T3.1

Description of the task

This task characterised the particular parameters associated with each business that will assist in the process of identifying appropriate ECMs. The characterisation takes into account the following parameters; climatic conditions, number of employees and their comfort, business sector, building age, building form, dimensions, isolation, orientation, glazing, building ownership, proximity to other businesses, local regulations/policies. All the data from each country partner was collated by ITEC into a needs analysis report and this information has been transferred to the main on-line database developed in Task 4.2.

Methodology

Easily obtained general information about the SME is required in order to begin the SPEEDIER project calculations. Further information, can then be used to increase accuracy of the assessment and suitability of the proposed ECMs, and will be used to a greater or lesser extent later in the energy saving calculations depending on how much other information is available.

The general information required is broadly described in Task 3.1 of the Grant Agreement. This was review and refined by the project team into a simple set of survey questions that should be completed by the SPEEDIER Energy Expert in as much detail as possible at the start of the process of the energy audit/assessment. The final survey questions are given in Table 2 1. Most of the information requested can be easily gathered by the SPEEDIER Energy Expert during initial discussions with each SME.

1	Enterprise data
1.1	Which is the country and city of the SME?
1.2	How many workers has the SME?
1.3	Which is the annual turnover rate?
1.4	What sector does the SME work in?
1.5	How many buildings has the SME?
1.6	Do you share your building with another enterprise?
2	Building data (for each SME building)
2.1	What is the year of construction?
2.2	How many floors has the building?
2.3	What type of window do you have?
2.4	Where is the building?
2.5	What kind of surroundings does the building have?
3	Building facilities data
3.1	Do you feel cold in winter?

Table 1: Proposed initial survey





3.2	Do you feel hot in summer?
3.3	Is there enough ventilation in the building?
3.4	Do you know what kind of energy facilities has the building?
3.5	How many hours do people work in that building?
3.6	How much does the monthly and annually electricity bill cost approximately?
3.7	How much does the monthly and annually gas bill cost approximately?

2.2.2 WP3 SMEs characterization

Once the initial profile of each SME participating in SPEEDIER has been determined from the answers provided for the initial questions described in Table 1 the SPEEDIER Expert will be able to provide initial advice on ECMs that may be suitable for the SME. This will allow them to anticipate which further data and/or parameters they will need to gather in order to calculate and quantify the potential energy and cost savings associated with these possible ECMs.

In this section, the characterizations of SMEs and the involvement of each of the variables necessary for the proper calculation of energy and cost savings from the proposed ECMs and their relationship to the data entered by the user, will be explained in more detail.

Parameters not related to the building configuration

I. Location

The location of the building will enable the weather conditions of the general environment to be determined, which allows some general hypotheses regarding temperature and comfort to be made, prior to gathering full details about the building fabric specification. In order to achieve these first hypotheses, it is necessary to establish a direct relationship between the location input from the SPEEDIER platform user and the associated climatic conditions. For the characterization of the SMEs, there were three options to define the location for data entry in the tool:

(a) Input location from database: The user chooses an approximate location based on a list of cities and countries in Europe. Each city is already associated with predetermined climatic condition. In an exceptional case, the SPEEDIER Expert will be able to override the weather conditions if they do not agree with the default general weather conditions for the specified location.

(b) Input location from map: The user can specify the physical address of the project building on a map, so the interface becomes more graphical and fluid. This option can be particularly useful in projects that are within the limits of climatic areas, and does not require the user to know all the details of each climatic zone.

(c) Download a specialized climate file: Currently, there are specialised public file libraries available for each climatic condition, from which guidance measures can be directly extrapolated, prior to knowing all details of the building. These files enable the option to display the climatic information with more specific parameters and hourly detail





throughout the year. Also, there is the possibility to display the information on the weather conditions with a more graphical and fluid workflow. This may be the most complete option for obtaining information, but it is extremely complex to program, so ITeC cannot guarantee its viability for the SPEEDIER platform.

Option (a) was chosen because it was the simplest and does not require a command of the SPEEDIER Expert's climatic zones, after the pilot tests it has also been seen that it was the most effective solution.

II. Use and comfort conditions of the building

This information is necessary to define the difference between the external weather conditions, and the comfort conditions required inside the building. The weather conditions will usually change through the year, so it is necessary to know the degree of adaptation of the inhabitants of the building during regular use. These parameters may be found in the international regulations <u>EN ISO 7730:2005</u> - Ergonomics of the thermal environment — Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria.

The four most used comfort models according the ANSI/ASHRAE Comfort Standards are:

(a) For the purpose of sizing residential heating and cooling systems the indoor dry Bulb Design Conditions should be between 20°C to 23.9°C. 80% Relative Humidity and 18.9°C Wet Bulb is used for the upper limit and 2.8°C Dew Point is used for the lower limit.

(b) Thermal comfort is based on dry bulb temperature, clothing level (clo), metabolic activity (met), air velocity, humidity, and mean radiant temperature. Indoors, it is assumed that mean radiant temperature is close to the dry bulb temperature. The zone in which most people are comfortable is calculated using the PMV (Predicted Mean Vote) model. In residential settings people adapt their clothing to match the season and feel comfortable in higher air velocities and so have a wider comfort range than in buildings with centralized HVAC systems.

(c) For people dressed in normal winter clothes, effective temperatures of 20°C to 23.3°C (measured at 50% relative humidity), which means the temperatures decrease slightly as humidity rises. The upper humidity limit is 17.8°C wet bulb and a lower dew point 2.2°C. If people are dressed in light weight summer clothes, then this comfort zone shifts to 2.8°C warmer.

(d) In naturally ventilated spaces where occupants can open and close windows, their thermal response will depend in part on the outdoor climate, and may have a wider comfort range than in buildings with centralized HVAC systems. This model assumes occupants adapt their clothing to thermal conditions, and are sedentary (1.0 to 1.3 met). There must be no mechanical cooling system, but this method does not apply if a mechanical heating system is in operation.

Models prepared from ASHRAE Comfort Standards:

These comfort profiles can also be extrapolated from the building activity previously specified by each SME and since it is a very difficult variable to calculate, what has been determined is





that through the selection of the SME Activity, part of these data can be obtained. In this way, SPEEDIER Expert can save time by reducing the number of complex measurements and calculations required.

This characterization directly affects the user and must be taken into account when proposing ECMs. They will not be direct savings but improvements in comfort.

III. Annual schedule profile

By default, the typical hours of use of the building can be anticipated based on the economic activity. ITeC has already configured profiles of yearly activity for the SPEEDIER Energy Expert to choose the most appropriate option.

IV. Number of employees

The number of regular employees in the building impacts directly on the calculation of usage parameters such as the need for domestic hot water, or the quantity of necessary work equipment and the building energy consumption.

V. Building ownership

The ownership of the building will determine the type of ECMs that can be implemented. In general, only SMEs that own the building they occupy will be able to apply ECMs related to the building fabric and construction system.

Parameters related with the building configuration

I. Dimension

The shape and size of the building will affect the energy demand if the aforementioned comfort conditions are to be achieved

II. <u>Construction system</u>

The SPEEDIER software tool allows the introduction of hypothetical construction systems based on general models, so other parameters can be anticipated, such as air tightness or thermal resistance.

III. Glazing

Likewise, gaps can be introduced in each of the orientations and parameters associated with the main glass facades.

IV. Orientation

To define the orientation, the SPEEDIER Energy Expert can directly enter each of the facade surfaces, define its orientation, and associate them with the construction systems mentioned above.





V. Energy consumption elements

In order to obtain energy consumption, another important characterization is the energy consumption elements, such as: HVAC, Domestic Hot Water, lighting and all those elements that consume energy.

2.2.3 Conclusions

The findings of WP3 are focused on the main parameters that characterize the SMEs, they are based on the organisation's size, geographical location, sector, building ownership, and other building or organisational attributes. The objective of this study is to gain a more fundamental understanding of the market before energy auditing of SMEs begins, that will allow the characterisation of SMEs based on general parameters such as location, size, sector and building occupancy. Thanks to an introductory guestionnaire and using data about the SME, the building itself and its parameters, the SPEEDIER Experts will have the necessary tools to start creating an energy auditing plan. Furthermore, the classification of ECMs according to their cost will help to tailor a specialised plan according the needs of every SME and to determine the best strategy in each case.

With these elements it is possible to define properly the SMEs and propose ECMs that suit their characteristics in a more effective way, making it more attractive for them and easier to start an energy audit process.

This approach could be an engagement strategy itself that can be used to improve uptake of energy audits and increase the uptake of energy efficiency measures in both SMEs and large enterprises across the EU.

2.3 Pilot sites experiences – The SPEEDIER Energy Expert point of view

In this section, the energy experts from each pilot site of SPEEDIER were asked to provide their feedback based on the implementation of the ECMs in business and working with the SMEs. Therefore, all the learnings provided by the pilot leaders in this regard, together with some proposals and best practices identified, have been detailed below.

2.3.1 Ireland

The feedback provided by the experts in Ireland can be summarized as challenging to implement SPEEDIER, but also rewarding. The main challenges reported were the following:

- Difficulty to gather data.
- Difficulty to engage senior management to build momentum within the companies (buy in/response time).
- Starting the ring-fencing mechanism is challenging (installing, monitoring, making slight changes) because SMEs want to see physical changes in equipment or renewable energy installed, and that is not the case at the beginning.
- Difficulty to access clients through the SPEEDIER protocols.





- The tool had an important limitation on wall type options.
- Since clients do not have "skin in the game" from the beginning, they can take advantage of the framework to get the free advice and then they finish the service.

For all the mentioned reasons, some proposals were suggested in order to make SPEEDIER Service easier:

- A grant for installing energy monitoring equipment or a non-invasive, easy to use and accurate mobile monitoring kit that can be used for a couple of months and is then removed.
- In the case of Ireland, it does not work to start at no-cost ECMs. They stated that it was a better idea to start with mid-cost ECM to get buy-in from the SME, then look at alternative no-cost and low-cost measures to compliment the larger ECM.
- Update the audit tool database to be more user friendly and in local languages.

Last but not least, a number of best practices were also reported:

- The comments from experts showed that good communication with SMEs was set in place only after physically introducing themselves and having multiple site visits. The effort of being on site is appreciated by the management.
- Weekly brief Zoom meetings.
- Keeping in mind that each company is different.

2.3.2 Spain

In the case of the Spanish SMEs that participated in pilot implementation (located in the Technoincubator Marie Curie), they did not have access to their consumption rates. They currently have an agreement where they only pay for the consumption if it exceeds the maximum kWh established per contract. Furthermore, these companies have a very low costs associated with energy usage, as their direct energy consumption is primarily computers and lights, meaning that the potential savings are also reduced. However, they have been grateful to receive information on their energy consumption and have asked to receive it periodically in order to follow-up. Critically, they are looking for this information for environmental awareness reasons than to reduce costs.

The SMEs were really pleased to know their consumption and potential measures to save energy, in addition to receive training in this matter. Around 10% of the companies had already implemented some recommendations before receiving SPEEDIER SME capacity building training and have reported positively on their implementation and regarding the SPEEDIER Energy Expert.

The Expert explained that they would not consider Spain as a jurisdiction where SPEEDIER does not work. However, the learning from this pilot was that the generic SPEEDIER framework needed to be modified completely given the typology of the SMEs in the pilot. Many SMEs are located in a multi-tenant buildings where energy saving and carbon reduction investments are the responsibility of the building owner and not typically the SMEs themselves.





Thus, the main challenge identified in Spain is that the aforementioned small savings margin due to low energy consumption leads to very small savings from the no-cost measures too. Therefore, it is hard to implement the following measures without extra financing.

Taking this factor into consideration, these would be the best practices identified:

- Monitor first approach: Since none of the SMEs that joined had any energy monitoring mechanism, baselines have been established during the pilots and it has facilitated this monitoring process.
- Free audits: Providing free audits has been key to the developments of the project.
- One-stop-shop approach: The pilot implementation of the SPEEDIER concept provided companies with information, advice, energy tools, capacity building, training and monitoring of impacts. It was developed following the one-stop-shop SPEEDIER Service solution approach. This approach manages to mitigate the problems faced by companies.

In the case of SMEs are tenants in buildings, building owners are involved in order to decarbonize the SME.

In terms of energy savings, the building achieved close to 25% of energy saving, and this was possible because of the property's self-financed saving measures. When looking into SME savings, they are much lower given the reasons explained above.

For the future, this expert considers important that the companies involved in this type of pilots either own their workplaces or have contracted their own energy services. Also, it would be good to consider the activity and sector of the companies, because the savings margin can depend on this. For instance, companies based on knowledge generation of services with B2B business models (e.g. Saas) mostly use computers, so they will have a smaller savings margin, where production sectors (factories, heavy machinery, etc.) would have a greater margin available since more equipment is used.

2.3.3 Italy

The experience of the SPEEDIER Energy Expert from Italy was described as offering support to SMEs in the process of going through energy audits, exploiting the concepts, the knowledge and the tools provided by SPEEDIER in parallel to their usual activities of energy auditing. The explanation of ring-fencing mechanism is something appreciated by the SMEs, because they perceive this as an opportunity for pursuing a more sustainable model.

The main challenge for this region was to identify the ECMs which best fit each SME with their given characteristics and issues. Nonetheless, they found the methodology and the steps to follow very clear because it is very similar to their everyday activities and this methodology has already been implemented in Italy.

They had very consistent communication with the companies, providing them support from beginning to end. There are plans to continue this collaboration to reach the expected savings and implement the ECMs as soon as possible. From these regions' perception, the Italian SMEs do pay attention to any possibilities for energy saving, both from the economic and environmental point of view.

As a result, the "best practices" process would be as follows:





- Start with a detailed analysis of the energy consumption sources of each company, taking into consideration their characteristics and needs.
- Then, list all the convenient ECMs that can be applied.
- After this, a decision must be made within the company, considering their budget for investment, time needed for each solution and the expected savings. This is a decision that must come from the company, but the expert must offer their support during this part as well.

Regarding the outcomes, the companies are reaching the expected results. In some cases, the savings were a little less than expected due to overestimation of the benefits or side effects that were not considered. In the future, they hope to continue the service and reach the calculated expected savings.

2.3.4 Romania

For the Romanian pilot, the SPEEDIER framework and approach was slightly different from the typical energy audit methodology that they have in the country. In the expert's opinion, the SPEEDIER ECM 5-year-plan table is more attractive to the SMEs than the current procedures where they have to invest money upfront, and they also believe this approach is the new face of selling and determining how to implement audit findings.

The SPEEDIER framework was reported as an easy-to-follow methodology from the expert's perspective, and as a good way of dealing with the energy efficiency challenge from the SMEs'. Communication with the companies was easy, as they agreed to the proposed approach for monitoring and reinvesting the savings. Most SMEs were able to save more than expected, and they are also motivated to act to achieve the carbon neutral by 2050 target, but results are still being monitored. The focus of the pilot in Romania was in the hospitality sector.

As a result, the main challenges identified were the following:

- COVID-19 restrictions and limitations due to the lockdown, since the work had to be done remotely.
- More difficulties to implement when you do not have any no-cost and low-cost measures, i.e.: for industries other than hospitality or if the SME does not own the building its more difficult to carry out the corresponding implementations.

To conclude, without COVID-19 in the picture, the expert estimates an extension of the implementation of the SPEEDIER methodology is something that would be attractive to SMEs and energy experts in the jurisdiction.



3 Importance of user behaviour improving energy efficiency

As real results have not been obtained yet to demonstrate the importance of user behaviour in achieving energy savings, a survey for SMEs participating in SPEEDIER was created. This survey was mainly focused on what they had learned concerning energy saving measures during the trainings and how this new acquired knowledge had influenced in their behaviour and awareness about energy efficiency. All the survey questions can be found at the end of this document (Annex 1), together with the template of the results analysis (Annex 2), which is divided in the following five sections.

3.1 SPEEDIER impact in terms of energy efficiency knowledge

All the SMEs from the four pilot countries declared that SPEEDIER training has increased their knowledge and skills related to energy efficiency and energy conservation. In particular, 80% of Irish and Italian SMEs agreed with that statement, and 20% of them strongly agreed, underlining the importance of SPEEDIER training and the increase of their knowledge and skills related to the theme. Furthermore, in Romania, 45% of SMEs strongly agreed and 55% agreed in having expanded their knowledge in energy efficiency thanks to SPEEDIER, adding that the training had been really helpful for the staff, who is now more prepared to deal with the subject. For what concerns Spanish SMEs, 60% of them agreed that SPEEDIER training had a relevant impact and the 40% has a neutral opinion. It is important to highlight that nobody disagreed.



Fig. 1: Answers to the question "Has the SPEEDIER training increased your knowledge and skills related to energy efficiency and energy conservation?"

As a consequence, in the majority of cases (about 81% of SMEs from the four countries), also the SMEs awareness regarding energy savings has been improved as a result of their experience with SPEEDIER, especially for the collaboration and the effective presentations of topics. The other 19% of them is neutral on this affirmation, but nobody disagreed.





Fig. 2: Answers to the question: "Do you consider that your awareness regarding energy savings has improved as a result of your experience with SPEEDIER?

3.2 SPEEDIER impact in terms of behaviour concerning energy efficiency

81% of SMEs agreed or strongly agreed that SPEEDIER training has impacted on their behaviour towards a higher commitment of energy efficiency, whereas19% (mainly Spanish SMEs and 20% of business from Ireland and Italy) have a neutral opinion. Therefore, also in this case, no SMEs disagreed with that statement and Romania can be considered the pilot with the most successful impact in this regard



Fig. 3: Answers to the question "Do you think the SPEEDIER training has had an impact on your behaviour?"

SMEs from the all the pilot countries underline that a deeper knowledge on energy efficiency measures helps a lot in changing the behaviour towards a stronger commitment. In particular, having detailed information on all the important steps of the process revealed to be fundamental, also to extend the awareness, the knowledge and the skills to other company members which can now support them in this transition.

The main challenges emerged from SMEs point of view mainly regard the payback time of the energy saving measures, which sometimes is too high to be make the implementation appealing.



3.3 SPEEDIER impact in terms of commitment with energy efficiency

85% of the interviewed SMEs stated that they were committed or strongly committed to carry out a behaviour transition towards the concept of energy efficiency also in their daily life. This is a very important result because it allows to extend a hope for the future represented by the changing behaviour of people not only inside the company boundaries but also in their daily activities.

The results from all the pilot countries are very similar among each other, especially for Ireland and Spain, as it can be appreciated in Fig. 4. Only 20% of SMEs were neutral in their response in Ireland, Spain and Italy, whereas in Romania this was the option for 9% of businesses.



Fig. 4: Answers to the question "Do you consider yourself to be committed with the energy saving measures you have adopted, not only in your company, but also in your daily life?"

In terms of motivation to carry out this behaviour transition, the survey results have been represented in Fig. 5. In line with the previous question, the vast majority of SMEs from all the countries have agreed on being motivated or strongly motivated and only a less significant percentage has stated to be neutral about this in Ireland (20%) and Spain (40%). Specifically, in the case of Romania, SMEs admitted that the most stimulating reasons to be motivated in this behaviour transition were the rumours about the strong increasing of energy prices in the coming period.





3.4 Evaluation of SMEs understanding about the rebound effect

About 40% of SMEs from all the pilot countries declared that they did not have a clear understanding about the rebound effect in energy conservation. In particular, 80% of Irish SMEs did not have an understanding on this particular effect, where 20% of SMEs stated not having any idea about what this was. Something similar happens in Spain and Romania, although in a lesser extent: 40% and 36% of SMEs, respectively, admitted to not really understand what the rebound effect is. Meanwhile, Italian SMEs seem to be more educated in this sense and most of them assured to understand the rebound effect or at least they considered their knowledge neutral. What is more, 20% of Italian SMEs and 9% of Romanian businesses assured having a detailed understanding of the topic, as it has been shown in Fig. 6:



• Have a detailed understanding • Understand • Neutral • Don't really understand • No idea

Fig. 6: Answers to the question "What is your understanding about the rebound effect in energy conservation?"

The rebound effect is defined as the reduction in expected gains from new technologies that increase the efficiency of resource use, because of behavioural or other systemic responses. Therefore, a clear understanding of the rebound effect is important because it helps SMEs to have a realistic estimation of the potential savings in terms of energy use. SPEEDIER will help in making SMEs aware of this negative effect explaining this concept and highlighting the impacts of energy conservation measures experienced in all the pilot countries.

3.5 Future perspectives for SPEEDIER

About 63% of SMEs from all the pilot countries feel that they could still learn more about energy efficiency and energy saving measures in their companies because the scope is really broad. Particularly, in Italy all the SMEs agreed with this statement, whereas in Ireland and Romania, about 60% of SMEs agreed or strongly agreed with it, adding they needed more support on the technology side, remaining neutral in this regard the rest of SMEs asked, as it can be appreciated in Fig.7. On the other hand, Spain was the only country where a minor percentage of SMEs disagree, specifically 20%.





Fig. 7: Answers to the question "Do you feel you could still learn more about energy efficiency and energy saving measures in your company?"

As a consequence, there is a general willing (about 74% of SMEs – especially Irish, Spanish and Romanian companies) to continue collaborating in the SPEEDIER programme in the future (or other similar projects) to augment their energy efficiency training (Fig. 8). Specifically, all the SMEs from Romania claimed they definitely (36%) or probably (64%) would be willing to extend this collaboration. In the case of Italy, their lower willing is owing to their current contact with ESCOs, which make them feel that the content and training offered by SPEEDIER could be overlapping with ESCOs usual activities. For instance, some SMEs said that in Italy they already had a lot of auditing processes with ESCOs, so they would not need SPEEDIER for that.

In this way, it has been found that 20% of SMEs of each country (except for Romania) probably would not continue collaborating with SPEEDIER or other similar programmes (Fig.8). The reasons for Ireland have not been found. However, some of the Spanish SMEs claimed that they did not have enough time to participate in this type of programmes.



Definetely would • Probably would • Neutral • Probably not • Definitely not

Fig. 8: Answers to the question "Would you be willing to continue collaborating in the SPEEDIER programme in the future (or other similar programme) to augment your energy efficiency training?"

What emerges is that SPEEDIER project represents a solid support for SMEs both in terms of spread of awareness and knowledge, helping people and companies to pursue their commitment towards energy efficiency.



4 Guidelines on enhancing the corporate culture around energy efficiency

With the purpose of helping business owners and managers to implement policies and strategies that will guide and motivate all employees to take responsibility for making all SMEs and large enterprises in the EU more energy efficient, the following guidelines have been identified, based on the learnings and the conclusions of the previous sections of the present deliverable:

1. Presence of an energy expert

When planning to implement measures with the aim of making a business more energy efficient, it is advisable to have an energy expert who guides throughout the whole process. This means having someone not only to undergo the energy audit, but also to support the implementation of the recommended measures, and critically, in the medium and long-term as well as part of the initial implementation. This will enable the creation of a business culture engaged in a continuous cycle of self-evaluation, correction and improvement of energy efficiency actions which is crucial to achieving and embedding long-term energy and carbon savings.

2. Involvement of the rest of employees

In order to achieve this corporate culture around energy efficiency, it is important that all the employees taking part of the business are aware about the ongoing actions and plans concerning this field and that they receive the same training (if exists), even if they work in a totally different area and they don't have any initial knowledge.

3. Starting with simple measures

When starting to think about implementing energy efficiency measures in a business for the first time, it is critical, apart from the aforementioned follow-up of an energy expert, to be well informed about the choices offered by the local or regional government for SMEs to this effect, such as a first free energy auditing or other type of grants.

Generally, the best approach is to look for low no-cost ECMs, although this also depends on the budget for investment, time needed for each solution and expected savings for the company.

4. Ease of use of technology

A good start in decarbonising an SME is to monitor the energy consumption of various loads within the SME. This has the potential for employees to begin to engage with energy saving in the SME. This can be done in non-invasive, easy to use and accurate mobile monitoring kit that can be used for a couple of months and is then removed. The ease of use of tools or application selected is critical and it is important that they are always user-friendly in order to keep the motivation of employees in the path of energy efficiency and not get them frustrated.

5. Patience is always essential

In some cases, the savings are a little less than expected due to overestimation of the benefits or other external factors that may not have been originally considered. In these occasions, it is important not to quit or being disappointed with the outcomes. The measures implemented can



always be readjusted (this is another reason why the presence of an energy expert is so important) and in the future the calculated expected savings are finally reached.



5 Conclusion

The survey results and the learnings drawn from earlier work packages implemented in the project, indicate that the success of the implementation of SPEEDIER in other EU jurisdictions depends a lot on different factors such as the energy culture in the country, i.e., people awareness regarding energy efficiency and energy transition. This factor is most relevant in terms of SMEs involvement in a program like SPEEDIER, when feeling responsible and also being part of these improvements.

The work conditions for SMEs in each country have also been found to be important. It has been shown that in countries with poorer work conditions, SMEs feel more pressured by time and money, implementing ECMs are a low priority for them or even something that is not their problem at all (e.g. Spain). Therefore, the greater the pressure they feel on their business, the less they are likely to worry about energy savings and other energy conservation measures.

It is also important the way in which energy audits and ECM implementation are regulated in a country. For example, in the case of Italy, ESCOs are the ones carrying these tasks out, so it works in a different way that in other pilots.

Nevertheless, the pilots have demonstrated that a flexible approach and adapting them to each country and situational circumstances, most SMEs could consider engaging with the SPEEDIER concept and continuing to engage with it in the long-term.

For this reason, the approach should be different depending on the aforementioned factors. In this manner, in situations with worse working conditions for SMEs and a lower awareness of energy efficiency, the spotlight should be put on the fact that being involved in SPEEDIER is not time-consuming and it helps their business to save money.

Moreover, additional mechanisms such as a first free energy assessment or other financial schemes would help to engage SMEs, and put them on the first steps of a journey towards making long term cost and carbon savings within their business. Furthermore, offering the trainings out of the business working hours and in flexible time slots has been shown to be beneficial also.

Conversely, in countries with better work conditions for SMEs and a higher awareness concerning energy efficiency and ECMs, SPEEDIER could be addressed from a different perspective: highlighting not only the advantages that it could entail for their businesses, but also the knowledge they could gain in this field and how they could participate in a more active way in the challenge of energy transition and move ahead of their competitors.

Finally, it should be noted that the energy footprint of an SME is not only the energy they might pay directly pay for. Therefore, engagement with other stakeholders such as building owners in multi-tenant buildings or transport providers should be considered to more holistically view energy conservation in SMEs.





Annex 1: Survey Questions

1) Has the SPEEDIER training increased your knowledge and skills related to energy efficiency and energy conservation? Please, explain your answer.

Strongly disagree Disagree Neutral Agree Strongly agree

2) Do you consider that your awareness regarding energy savings has improved as a result of your experience with SPEEDIER?

□Strongly disagree □Disagree □Neutral □Agree □Strongly agree

3) Do you think the SPEEDIER training has had an impact on your behaviour?

Strongly disagree Disagree Neutral Agree Strongly agree

Please, explain how the SPEEDIER training has impacted on your behaviour, and if it hasn't, explain how the training could be enhanced to improve the impact.

4) Are you motivated to carry out this behaviour transition? Please, explain your answer.

Strongly disagree Disagree Neutral Agree Strongly agree

5) Do you consider yourself to be committed with the energy saving measures you have adopted, not only in your company, but also in your daily life?

Strongly disagree Disagree Neutral Agree Strongly agree

If you disagree, explain what are the challenges to continue with the energy saving measures. If you agree, explain what aspects of the energy saving measures have made them relatively easy to be adopted in the long-term.

6) Do you feel you could still learn more about energy efficiency and energy saving measures in your company?

□Strongly disagree □Disagree □Neutral □Agree □Strongly agree

If you agree, explain what you would like to learn more about. If you disagree, was there any duplication of the SPEEDIER training and other training/sources of information?

7) What is your understanding about the rebound effect in energy conservation?

□No idea □Don't really understand □Neutral □Understand □Have a detailed understanding

8) Would you be willing to continue collaborating in the SPEEDIER programme in the future (or other similar programme) to augment your energy efficiency training? If not, do you think is there anything that could make you change your opinion? What could it be?

Definitely not Probably not Neutral Probably would Definitely would



Annex 2: Survey Responses Template

SMEs			countries	-
Description: SPEEDIE	R impact in terms of er	nergy efficiency k	nowledge	

Indicate the level in which SPEEDIER training has increased SMEs knowledge and skills related to energy efficiency and energy conservation and how.

Indicate the extent in which the SMEs awareness regarding energy savings has improved as a result of their experience with SPEEDIER

Was there any duplication of the SPEEDIER training and other training/sources of information?

SPEEDIER impact in terms of behaviour concerning energy efficiency

Indicate the extent in which SPEEDIER training has impacted on SMEs behaviour and explain how.

In case it hasn't impacted, how the training could be enhanced to improve the impact for SMEs?

Explain what are the challenges for SMEs to continue with the energy saving measures and what aspects of the energy saving measures have made them relatively easy to be adopted in the long-term.

SPEEDIER impact in terms of commitment with energy efficiency

Indicate if SMEs are motivated to carry out this behaviour transition and explain how. Do SMEs consider themselves to be committed with the energy saving measures they have adopted, not only in their company, but also in their daily life?

Evaluation of SMEs understanding about the rebound effect

Indicate which is the SMEs level of understanding about the rebound effect in energy conservation. Explain why it is so important and how SPEEDIER could help with this.

Future perspectives for SPEEDIER

Indicate if SMEs feel they could still learn more about energy efficiency and energy saving measures in their companies and what they would like to learn. Explain if SMEs would be willing to continue collaborating in the SPEEDIER programme in the future (or another similar) to augment their energy efficiency training. If not, what

in the future (or another similar) to augment their energy efficiency training. If not, wr could make them change their opinion in this regard?

