

SPEEDIER

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

D7.2

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Abbreviations

CEP	Clean Energy for all Europeans' Package
EC	European Commission
EU	European Union
EED	Energy Efficiency Directive
ECM	Energy Conservation Measure
MS	Member State
NEEAP	National Energy Efficiency Action Plans
NECP	National Energy and Climate Plans
SME	Small and Medium sized Enterprise





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 system is being developed and tested in SMEs in four pilot countries: Ireland, Italy, Romania and Spain. After 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 Service aims to support the EU in achieving its energy efficiency and energy consumption objectives. The system will specifically impact several gaps:

- 2020 EU energy efficiency targets probably not achieved and difficult achievement of 2030 and 2050 target of a 32,5% improvement of energy efficiency and becoming “Climate-Neutral-Bloc” respectively.
- Low institutional involvement of SMEs in energy efficiency auditing and implementation of energy conservation measures.
- A high level of energy consumption in buildings occupied by SMEs.
- Difficult transposition of art. 8 of the EED for SMEs in national laws.
- A lack of quantitative and concrete targets for SMEs.
- Low energy auditing rates for SMEs.
- Low rate of energy conservation measures implementation.
- Lack of national support for energy experts and auditors.
- Lack of energy culture inside SMEs.
- Difficult access to energy efficiency data for SMEs in some countries.
- In some countries, difficulty to achieve national energy efficiency targets.

SPEEDIER will impact EU SMEs’ energy consumption through a variety of tools and pathways, which are reviewed in this document. They include a **Capacity building event** for public administration bodies, to raise awareness organised in 2022; the **Train the trainers kit** allowing organisations to take over the training of energy experts in any Member State; **Best practices guidelines** directed at SMEs in any Member State, building on knowledge and experience acquired in the pilot countries; a **technical report on SPEEDIER replication potential** for organisations overtaking the replication of SPEEDIER Service in any Member State and **E-learning materials**.

To allow for the development and sustainability of the service through the EU, **business model strategies** will be analysed and a plan developed in 2021 and 2022.

SPEEDIER Service features help to reduce the gaps previously identified and have positive impacts on European Union’s targets, especially on the following Energy Union indicators:

- IM1: Electricity interconnection capacity
- EE1: Primary energy consumption



- EE2: Final energy consumption
- EE3: Final energy intensity in industry
- EE6: Final energy intensity in services sector
- DE1: GHG emissions reductions
- DE4: GHG intensity
- RIC1: Public investments on Energy Union related R&I (%GDP)
- EGD Target Area: Transition of industry to a clean or/and circular economy
- EGD Target Area: Building and renovating in an energy and resource efficient way
- EGD Target Area: Financing the green transition
- EGD Target Area: Leaving no one behind in the transition to climate neutrality

The analysis of the opportunities to reduce energy consumption through Europe by aligning on the five dimensions of the Energy Union have led to the development of short and medium-term actions. Stakeholders key to the expansion of the service will be approached with relevant information and adapted communication strategies that are summarised in the table below.

Type of actors	Potential actions
EU and national policy makers	<ul style="list-style-type: none"> • Be informed of SPEEDIER approach when developing energy efficiency policies. • Be aware of potential impacts of ECMs implementation in EU SMEs. • Grants, tenders and other forms of financial support.
Public administrations	<ul style="list-style-type: none"> • Encourage clusters, industries, etc. to use SPEEDIER service, communication on the service. • Be informed of SPEEDIER approach when implementing energy efficiency policies. • Grants, tenders and other forms of financial support.
Sectorial actors	<ul style="list-style-type: none"> • Communication on SPEEDIER service in their networks. • Grants, tenders and other forms of financial support.

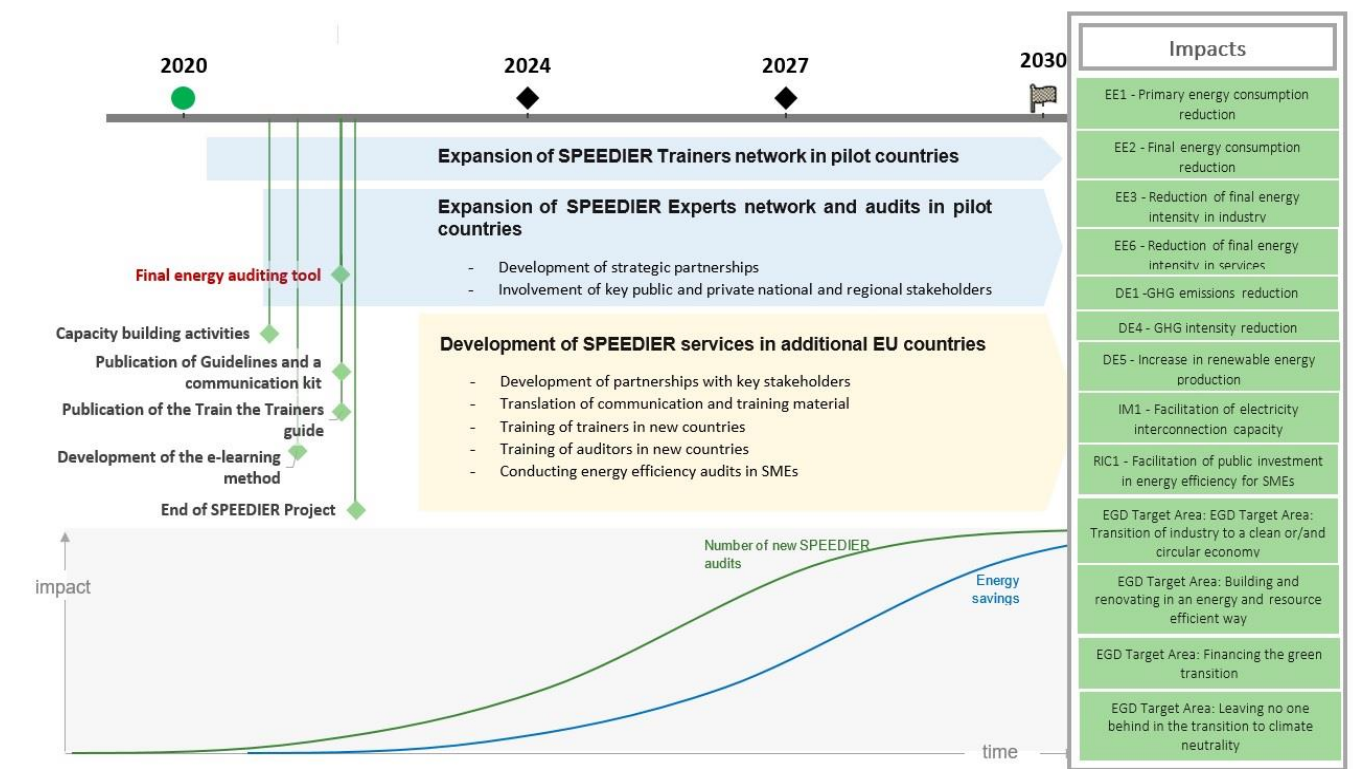


Companies and other organisations

- Direct clients (selection as their EEM audit and/or support partner).
- Communication on SPEEDIER Service in their clients' network.
- Grants, tenders, carbon offsetting schemes and other forms of financial support.

Stakeholder overview.

The roadmap shown below is developed to present how the SPEEDIER tools will be deployed and will impact the number of audits realised and subsequent energy savings to effectively support EU energy efficiency 2030 objectives.



Roadmap for SPEEDIER to contribute to achieving the EU's objectives.



Introduction

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

SPEEDIER delivers a self-financing outsourced energy management service enabling SMEs to implement energy conservation measures and to obtain access to the energy services market. The SPEEDIER 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 Expert.

The SPEEDIER Service aims to create a new dynamic through the EU, increasing energy auditing in SMEs and to improve 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 amended 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 system is being developed and tested in SME environments in four pilot countries: Ireland, Italy, Romania and Spain. After 2021, SPEEDIER will enter its next development 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 permanently reduce their energy consumption by deploying Energy Conservation Measures (ECM) at a larger scale.

After reviewing the targets set by the EU and the national approaches to achieve them, with a focus on the pilot countries, this document (Deliverable D7.2) presents the current status of the industry and identifies the gaps that the SPEEDIER Service could fill in the future. In the final section, the actions, pathways to impact and the timeline are presented, along with a list of stakeholders that could act as catalysers in the deployment of the SPEEDIER Service in new EU regions and sectors.



1 EU energy efficiency objectives

1.1 The Energy Efficiency Directive

1.1.1 EU energy efficiency targets

Climate change that has arisen from anthropogenic and industrial activities has presently been identified as one of the greatest challenges facing the world, which will continue to affect businesses, citizens, the planet itself and its' inhabitants over future decades. The implications of climate change for both the human and natural systems are severe. It will have a significant negative impact on resource availability, economic activity and human well-being as things stand today. In response, international, national and local initiatives are being developed and implemented by both public and private sectors to mitigate greenhouse gas (GHG) concentrations in the earth's atmosphere as well as to facilitate adaptation for improved climate change. SPEEDIER is part of that response at micro-level implementation for SMEs and involves Energy Experts. Its adaptation is extremely important as is explain in this document.

Data that map EU GHG emissions at the EU level are available in Figure 1, which shows the contribution of economic sectors responsible for the most emissions in the EU in 2018. It can be noticed that the main responsible of emissions include manufacturing, electricity, gas and construction.

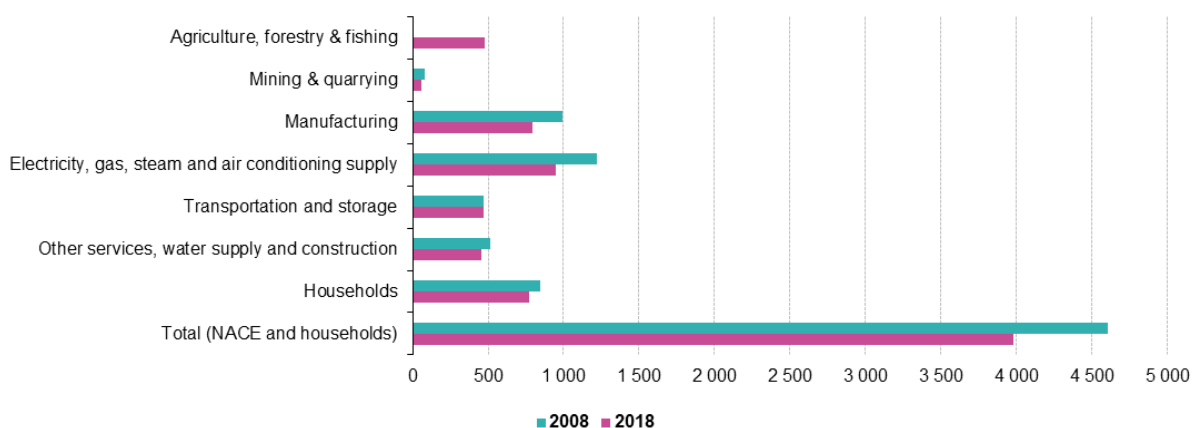


Figure 1 Greenhouse gas emissions by economic activity, EU-27, 2008 and 2018 in million tonnes of CO₂ equivalents. (Eurostat, 2020)

The EU formalized for the very first time its commitment to tackle climate change after the signing in 1997 the Kyoto Protocol, which entered into force in 2005. In 2002, the EU divided the overall European objective into national ones through the Burden Sharing Agreement (Decision 2002/358/EC). The EU ETS (Directive 2003/87/CE and following update) is also a most important mechanism established by the EU Commission to mitigate specified GHG



emissions. It operates in all EU countries as well as additionally in Iceland, Liechtenstein and Norway. It is applied in more than 11.000 heavy energy-using installations (i.e. power stations & industrial plants) as well as aviation activities between these countries, covering around 45% of the EU's GHG emissions. It works on the 'cap and trade' principle, where a cap is set on the total amount of certain direct GHG emissions that can be emitted by all the installations covered by the system. The cap is reduced over time so that total emissions fall. The first phase of the EU ETS ran from 2005 to 2007. It was seen as the pilot phase. The second phase of the EU ETS ran from 2008 to 2012, the same period as the first commitment period under the Kyoto Protocol. Phase-3 (2013- 2020) is intended to become Kyoto's second commitment period. Phase-4 will be on place from 2021 until 2030. It corresponds to the European Union's first commitment under the Paris Agreement. **By 2030, emissions from sectors covered by the EU ETS should be cut by 43% from 2005 levels**, as part of the EU's current 2030 climate and energy framework. Under the **European Green Deal**, the Commission is working for introducing still more ambitious GHG emission reduction target of 2050 climate neutrality, that may have further implication for the EU ETS through the 50 actions planned in the coming five years.

The 2012 Energy Efficiency Directive (EED), 2012/27/EU, established a set of binding measures to help the EU reach a 20% energy efficiency target by 2020. Following a Commission proposal published in 2016, the Clean Energy for all Europeans package (CEP) consisted of an update of EU's energy policy framework. It defined the five dimensions of the Energy Union:

1. Energy security;
2. Internal energy market;
3. Energy efficiency;
4. Decarbonisation of the economy; and,
5. Research, innovation and competitiveness.

The CEP also made a proposal for an amending directive 2012/27/EU on energy efficiency, which was adopted in December 2018 and set a new binding **target of 32,5% energy efficiency by 2030**.

The Paris Agreement, which was adopted on the 12th of December 2015 and is legally binding, envisages the collaboration of all countries at a global level to limit the increase of global temperature to well below 2°C above pre-industrial levels, with efforts to limit it to 1.5°C. The Paris Agreement foresees that **each country submits mitigation pledges** called National Determined Contributions (**NDCs**) that have to be updated and enhanced every five years on the occasion of the Transparency and Global Stocktake process. During the Global Stocktake, countries report progresses in their NDCs implementation in a transparent and accountable way. The Kyoto's targets have been updated with the 2020 package in 2007 and afterwards with the signing of the Paris Agreement. On the 5th October 2016, the EU and its member States ratified the Paris Agreement. The European Union NDC is aimed at reducing GHG emissions by 55% by 2030 compared to the 1990's levels and at implementing legislation to achieve this target at the end of 2018. By the end of this year, 2020, all Parties are required to submit their long-term strategies on GHG emissions reductions. For this reason, **a long-term strategy has been prepared by the EU and submitted to the UNFCCC in March 2020**.

Moreover, at the end of 2019, the first version of the National Energy and Climate Plans (NECP) was published; these plans will guide the 2030 climate and energy policy



implementation coordinating actions at the member States level. The reduction of energy consumption is measured against a “business as usual” baseline. Energy efficiency savings can be achieved through Energy Efficiency Obligation Schemes, alternative measures or a combination of both. To keep track of energy consumption, milestones, also called Union Reference Points, will be set in the years: 2022, 2025 and 2027.

A general review of the EED is required by 2024 and the European Green Deal calls for more ambitious targets:

The European Parliament [...] calls for the Energy Efficiency Directive (EED) and Energy Efficiency of Buildings Directive (EEBD) to be revised in line with the EU's increased climate ambition, and for their implementation to be reinforced, through binding national targets, paying special attention to vulnerable citizens while also taking into account the need for economic predictability for the sectors concerned” (European Parliament, 2020).

In line with the long-term strategy that the EU submitted to the United Nations Framework Convention on Climate Change in early 2020, the **European Green Deal** aims to achieve **climate neutrality by 2050** (“A clean Planet for all, 2050”).

The Communication on the European Green Deal was published by the European Union the 11/12/2019, COM (2019) 640 Final. The Communication constitutes the European Union strategy for achieving carbon neutrality by 2050; this means that no emissions are to be released and decoupling between economic growth and resource use needs to be achieved. The document presents several policy fields in which the EU will have to act in the following months to increase its ambition and decarbonise its economy, among which circular economy and carbon reduction mechanisms are explicitly mentioned. The initial two initiatives that have been published to implement the European Green Deal are the **legally binding European Climate Law** (March, 2020), which transposes the 2050 carbon neutrality objective into EU law, and the **European Climate Pact** (March, 2020), which aims at engaging citizens and society in climate action. Furthermore, the European Commission will tailor the Member States’ emissions reduction pathways with the National Energy and Climate Plans, which constitute an essential tool to cut further greenhouse gases emissions in the Member States. All Member States have to follow emission reduction pathways to achieve the 2030 targets, that are currently set at least at 50-55%. This points out how ambitious the actions to be undertaken during the next decade need to be.

To increase climate ambition for 2030, for which the Commission will review and propose to revise, where necessary, the relevant energy legislation by June 2021. When Member States begin updating their national energy and climate plans in 2023, they should reflect the new climate ambition (Figure 2).

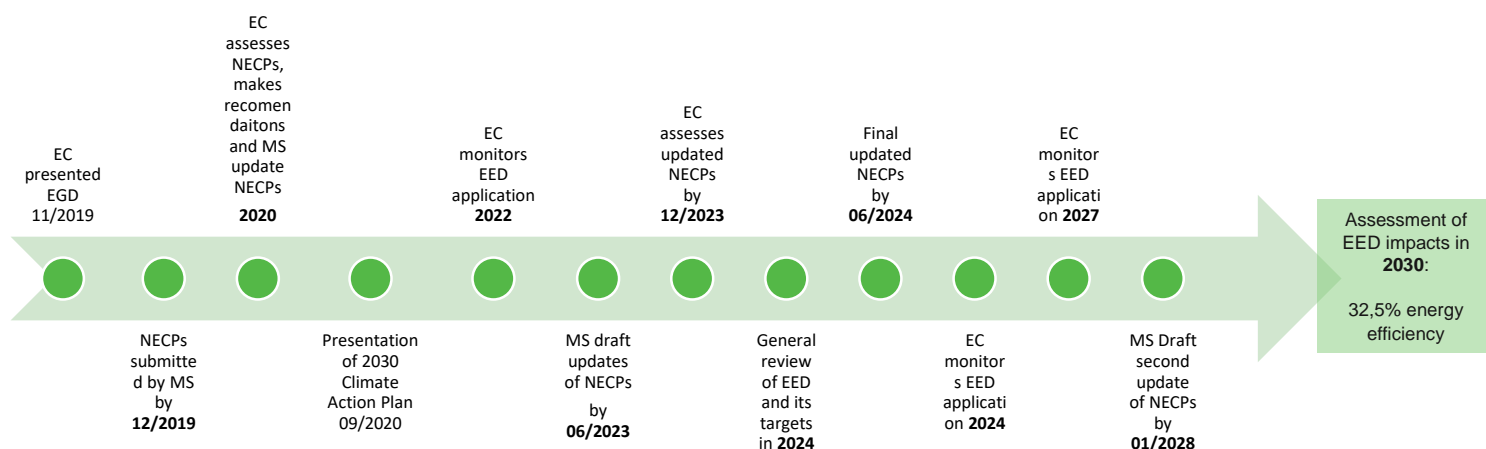


Figure 2 Timeline to implement the EED and achieve its 2030 objectives by the EU

European Green Deal supports the efficient use of energy in industries and buildings and have defined measures and targeted policies area as 'Sustainable Industry' and 'Building and Renovation'.

There was a threefold increase in annual global material extraction in 2017 as compared to 1970. Material extraction and material processing for industrial use across the globe is responsible for about half of total greenhouse gas emission and more than 90% of biodiversity loss and water stress. European industries are responsible for 20% of EU's emission. Recycled material have only 12% share of total European industrial material use. To support and accelerate the industries transition to sustainable model for the inclusive growth, Sustainable Industry area of European Green Deal emphasises decarbonisation and modernisation of energy-intensive heavy industries (steel, cement etc.). Focus is also towards developing low-emission technologies, sustainable products and service. Sustainable industry development will develop circular economy action plans, which prioritises reducing and reusing of material before recycling them with focus on resource intensive sectors such as textiles, construction, electronics and plastics.

Circular economy action plans will also encourage businesses to offer choice of reusable, durable and repairable products to their customers. As reliable, comparable and verifiable information helps on decision making at buyers and commission level, the European Commission will also focus on digitalisation to improve the accessibility of data on the characterisation of products being sold in European regions. Moreover, the commission will explore the adoption of latest digital technologies such as Artificial Intelligence (AI), 5G, cloud and edge computing and Internet of Things (IoT) to maximise the impact of all the policies.

Further to reduce the waste and minimise the environmental impacts of the waste, the EC is also working towards Sustainable product policy to stop over-packaging and waste generation. Additionally, ensuring the continuous supply of sustainable resources such as industrial raw materials are critical achieve the Green Deal targets.

Construction, use and renovation of building is associated with substantial amount of energy. Hence, under the 'Building and Renovations' measures and policy area focus is towards



increasing the rate of building renovation so as to make older buildings more energy efficient. In Europe buildings account for 40% of energy consumed. In order to achieve the EU's energy efficiency targets, the EC suggest to double the rate of building renovation (from current 0.4-1.2%) across the European Member States. Keeping in mind the twin challenge (energy efficiency and energy affordability) EC also recommends its member state to participate in a 'renovation wave' of public and private buildings. Renovation of buildings will lower the energy bills as well as will lower the energy poverty.

The EC is also working towards strictly enforcing the 'Building Energy Performance' legislation in line with the Member States individual national long-term renovation policies. EC will also explore the possibilities of trading building emissions under 'European Emission Trading'. Further to ensure that the building designs increases the digitalisation and climate proofing of buildings and also it meets the requirements of Circular Economy, EC will review 'Construction Products Regulation'.

In addition, the EC will also engage with the renovation stakeholders (building and construction sector, architects, engineers and local authorities) via an online platform to address the barriers to renovation. This scheme will also develop and promote innovative investment ideas for building renovation. Keeping in mind the scale of economies, the EC recommends Member States to pay attention towards the renovation of larger blocks of buildings. The EC will also promote the energy efficiency renovation and investment of rented and multi-owner buildings with priority given to renovation of social housing, schools and hospitals.

The Coalition for Energy Saving estimates that this target will lead to the creation of 800,000 additional jobs (Santini, 2018).

1.1.2 EU energy auditing objectives

Energy audits are one of the tools identified in the EED to encourage energy consumption reduction by the private sector. No qualified objectives are defined by the EED (2012/27/EU), but article 8 aims to increase the number of energy audits in industry and the commercial sector. Measures to achieve this aim are obligatory for large enterprises, for which energy audits are required. For SMEs Member States are encouraged to establish appropriate instruments to support energy audits. In the EED (2012/27/EU):

"To tap the energy savings potential in certain market segments where energy audits are generally not offered commercially (such as small and medium-sized enterprises (SMEs)), Member States should develop programmes to encourage SMEs to undergo energy audits."

And,

"Energy audits should take into account relevant European or International Standards, such as EN ISO 50001 (Energy Management Systems), or EN 16247-1 (Energy Audits), or, if including an energy audit, EN ISO 14000 (Environmental Management Systems) and thus be also in line with the provisions of Annex VI to this Directive." (EED, 2012/27/EU)

SPEEDIER has been designed to follow the guidelines for energy audits within Annex VI of the EED (2012/27/EU), Article 8:



- a) “be based on up-to-date, measured, traceable operational data on energy consumption and (for electricity) load profiles;
- b) comprise a detailed review of the energy consumption profile of buildings or groups of buildings, industrial operations or installations, including transportation;
- c) build, whenever possible, on life-cycle cost analysis (LCCA) instead of Simple Payback Periods (SPP) in order to take account of long-term savings, residual values of long-term investments and discount rates;
- d) be proportionate, and sufficiently representative to permit the drawing of a reliable picture of overall energy performance and the reliable identification of the most significant opportunities for improvement.

Energy audits shall allow detailed and validated calculations for the proposed measures so as to provide clear information on potential savings. The data used in energy audits shall be storable for historical analysis and tracking performance”.

1.1.3 EU objectives for SMEs energy consumption

SME-specific energy efficiency policies are not obligatory. The EED specifies nevertheless that “Most Union businesses are SMEs. They represent an enormous energy saving potential for the Union. To help them adopt energy efficiency measures, Member States should establish a favourable framework aimed at providing SMEs with technical assistance and targeted information.”

At the national level, EU countries adopted different types of measures to encourage energy consumption reduction for SMEs, as we will see in Chapter 1.3.

1.2 Other EU energy efficiency policies

The Energy Performance of Buildings Directive (EU2018/844) amends provisions from the Directive 2010/31 /EU. Its main elements relevant to SPEEDIER are:

- Low and zero emissions building stock in the EU by 2050;
- Use of smart technologies;
- Long term building renovation strategies;
- Mobilise public and private financing and investment.

Member States must establish strategies and roadmaps for 2050.

ECMs applied to buildings play an important role in energy efficiency recommendations of SPEEDIER Service. Hence, SPEEDIER is expected to support EU2018/844 requirements on e.g.:

- self-regulating devices (Art 8(1));
- Inspection on heating and air-conditioning systems (Articles 14 and 15).

Through the application of ECMs by SMEs, SPEEDIER will support the achievement of these long-term targets.



1.3 National declarations, focus on the pilot countries

Article. 8 of the EED requires the development of SME-specific programs to undergo energy audits and support the implementation of their recommendations. Member States offered different answers to this requirement, consisting mainly of encouraging mechanisms. Under a third of Member States developed such policies, with around 50 policy instruments in Europe answering this requirement (Kaar & al., 2017).

EU countries take three main types of approaches towards improving energy efficiency in SMEs (adapted from Hirzel et al., 2016):

The Informative approach:

- Ireland: The Sustainable Energy Authority of Ireland (SEAI) provide information and hold trainings for SMEs. Financial support is provided to all types of companies having an energy bill over €250 000 per year, leaving most SMEs outside of the scheme.

The Voluntary approach

- Finland: encourage and fund energy audits
- UK: Department of Energy and Climate Change (DECC) published a guide to support SMEs with energy efficiency. The Energy Saving Trust provides SMEs with advice and support around energy audits and implementation.
- the Netherlands: access to contract templates, communication of a list of ESCOs and financing structures. Voluntary agreement schemes encouraging SMEs to draw and implement every four years energy efficiency plans.

Financial incentives (subsidies, tax reduction)

- Germany: The SME Energy Consulting Programme offers financial support for energy audits in SMEs by qualified and independent consultants. The Eco Tax Cap for the manufacturing industry links tax reductions/ exemptions to energy efficiency improvements or, in the case of SMEs, to energy audit. It enables the redemption of up to 90% of electricity and/or energy taxes paid.
- Austria: regions fund energy audits
- Denmark: development of an energy management system adapted to SMEs
- Sweden: Hackefors Model, which is a commercial network approach to EMS implementation. All participating companies appoint an environmental manager; together these form the EMS group. From this group a steering committee is selected and a central co-ordinator appointed. The co-ordinator is responsible for the network and the common parts of the system, including common documentation. The co-ordinator acts as a hired and shared environmental manager of the group.)

Table 1 lists energy efficiency audit mentions or measures for SMEs in the final version of the National Energy Efficiency Action Plans (NECPs) of each SPEEDIER pilot country. We can see that some countries encourage voluntary approaches, without providing further details on their implementation. The EU reviewed the primary energy consumption reduction targets of each EU country and assessed its ambition level from sufficient to very low, based on the country's potential for reduction, its total primary energy consumption and previous targets.



Table 1 Approach of energy audits for SMEs in pilot countries NECPs

Country	National contribution for 2030 energy efficiency	Mentions of audits for SMEs
Ireland	Primary energy consumption in 2030: 15,9 Mtoe, which represents a 14,6% increase compared to 2020 target. EU assessment: Very low.	“SME Programmes (Small to Medium Enterprises): To support and assist small & medium-sized enterprises to achieve greater energy efficiency with lighting & energy costs”; And, New initiatives to scale up efforts: “Using the Article 8 Audit obligation to encourage more efficiency improvement. Tapping into more of the energy efficiency potential in the SME sector.”
Italy	Primary energy consumption in 2030: 125 Mtoe. (2020: 158). EU assessment: Sufficient. The largest impacts on energy efficiency are attributed to the tax deduction mechanism for building renovation (18 Mtoe) and to the Energy Efficiency Obligation Scheme (15 Mtoe).	“Activities to promote energy efficiency in SMEs will also be carried out, renewing the co-financing initiatives for energy audits and energy management systems, for example creating links with support instruments present at a national and local level, supporting energy efficiency training programmes in conjunction with the relevant traders’ associations, and laying the groundwork for promotion of voluntary agreements between companies which have as their target the promotion of energy efficiency.” SME audits can be included in the national auditing database under certain conditions (SMEs that participate in regional tenders).
Romania	Primary energy consumption is estimated to reach 36.7 Mtoe in 2030, compared to a primary energy consumption of 30.3 Mtoe in 2020. This represents a 37.5% decrease in 2030. EU assessment: very low.	New provisions for energy audits are not mentioned.
Spain	Primary energy consumption is expected to reach 98.5Mtoe by 2030, representing a 39.5% decrease. EU assessment: sufficient.	“Programmes of public aid and support for financing [...] will also promote energy audits in small and medium-sized enterprises that are not affected by the obligatory nature of the Directive.”



		SME audits are not mentioned and are not included in the national auditing database
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The measures and actions specified in the EGD does not focus towards SMEs, currently the main focus is on upcoming climate law, new circular economy action plan, farm to fork strategy, and industrial strategy. The EGD could be helpful for SMEs by setting up a framework that allows SMEs to take major role in recognising their potential and that allows them to implement sustainable business practices.

2 Gap analysis: potential for impact.

The SPEEDIER Service (See SPEEDIER Deliverable D3.3) is adapted to SMEs and facilitates their uptake of ECMs, including behavioural approaches and building upgrades. It will help to reduce limitations and resistance that prevented SMEs from implementing energy saving measures.

Through various features of the system, which will be reviewed in Chapter 3, SPEEDIER will impact at EU level the energy consumption of buildings, SMEs and the overall total primary energy consumption.

2.1 Primary energy consumption

Primary energy consumption is the final indicator that will be impacted by the deployment of SPEEDIER through the EU. Primary energy consumption in the EU decreased by 9,2 %, from 2005 (1,720 Mtoe) to 2017 (1,561 Mtoe), 5,3 % above the 2020 target of 1,483 Mtoe (see **Error! Reference source not found.**).

Figure 3: Distance to 2020 and 2030 targets for primary energy consumption in the EU-28 (Eurostats, 2020)



The Services sector, representing more than half of EU SMEs, recorded the highest increase in energy consumption from 2005 to 2017 (+4 %), which has been attributed to an increase in their activity, with an estimated 45% of the services sector's energy consumption used for space heating (Eurostat, 2020).

According to the 2030-2050 Eurostat PRIMES model, to achieve climate neutrality by 2050, energy demand in industry is reduced by 25 -28% and in services by 15% in 2030.¹

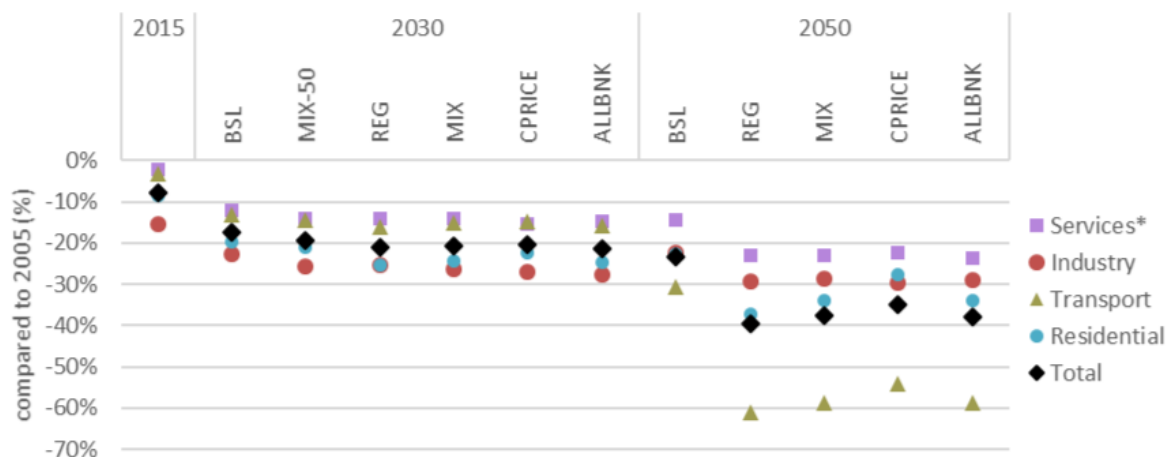


Figure 4: Evolution of final energy consumption (compared to 2005)

Gaps identified

2020 target probably not achieved, need to decrease overall primary energy consumption in the EU.

The previously low involvement of SMEs leads to a need to involve SMEs to achieve 2030 primary energy consumption objectives.

Need to reduce energy consumption of buildings occupied by SMEs.

2.1.1 Tools and policies

In a 2016 review of Art.8 of the EED realised by Fraunhofer for the European Council for an Energy Efficient Economy, (Eichhammer & Rhode, 2016), the authors recommended that Member States develop specific instruments to encourage energy audits by SMEs. They identified that SMEs that have a high energy consumption are not targeted by any of the obligations of large companies and that few of them will have a dedicated energy management system and team. This report makes the following recommendations to Member States and the EU as a whole:

¹ <https://ec.europa.eu/transparency/regdoc/rep/10102/2020/EN/SWD-2020-176-F1-EN-MAIN-PART-2.PDF>



- Have one-stop shops in each country to ease access to information on energy audits (best practices, energy auditors list, etc.) for SMEs.
- Providing lightweight energy management systems for SMEs, that could be a first step to broader systems.
- Integrating energy demand and not only the size (workforce and revenue) to make the distinction between companies impacted by Art. 8 requirements.
- Regular monitoring of the impact of encouragement mechanisms.
- Use energy service providers in order to generate scale effects for SMEs.

Gaps identified

Difficult transposition of art. 8 for SMEs in national laws.

Lack of quantitative and concrete targets for SMEs.

2.1.2 Results of SPEEDIER survey on improvements needed

A survey was conducted in WP2 (Deliverable D2.3) to further understand the barriers that would prevent the application of energy efficiency measures by SMEs in the EU, and more specifically in the pilot countries.

To the survey question “Has your organisation had an energy audit in the last five years?”, more than 80% of respondents answered “No” or “I don’t know” (see **Error! Reference source not found.**), pinpointing the lack of energy audits, but also of energy culture in SMEs.

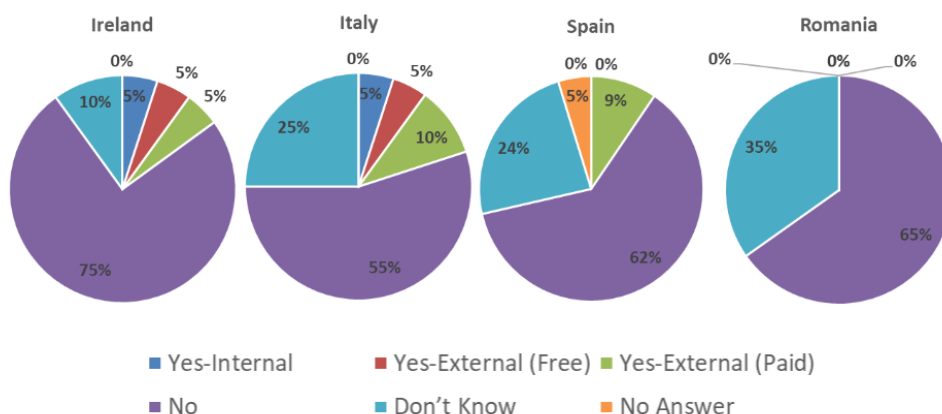


Figure 5: Answers to SPEEDIER survey question “Has your organisation had an energy audit in the last five years?”

The main reasons to the low energy auditing rate are the lack of finance and the lack of knowledge (See Figure 6).

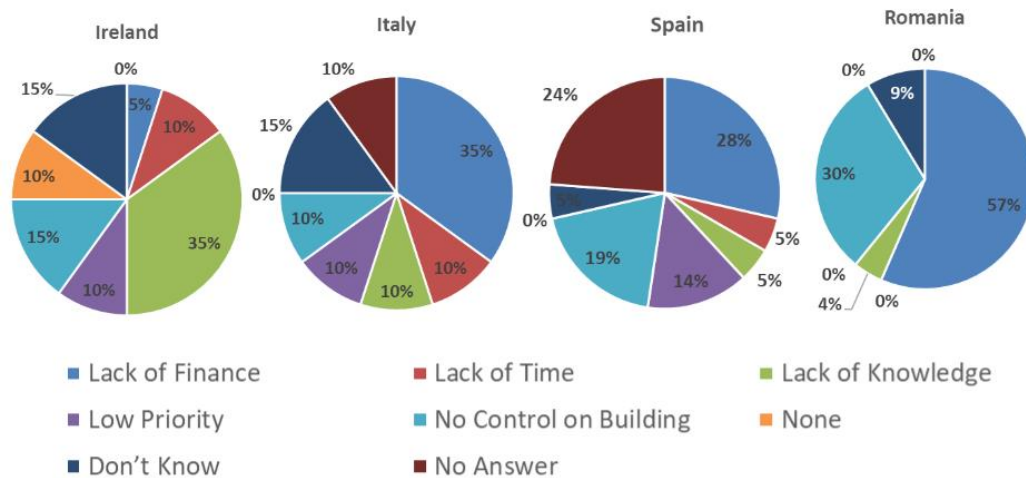
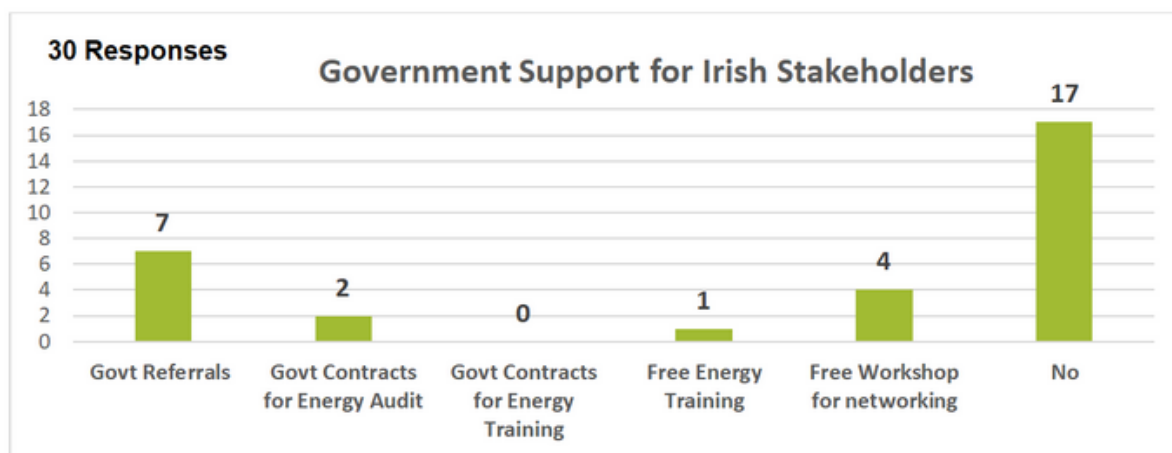


Figure 6 Answers to SPEEDIER survey question “Of the barriers you identified above, please select the ONE that you consider to be the MAIN barrier to implementing energy conservation measures”.

In addition, most energy experts do not receive any kind of local or national government support to deliver energy audits or other energy efficiency support services (See Figure 7Figure 6).



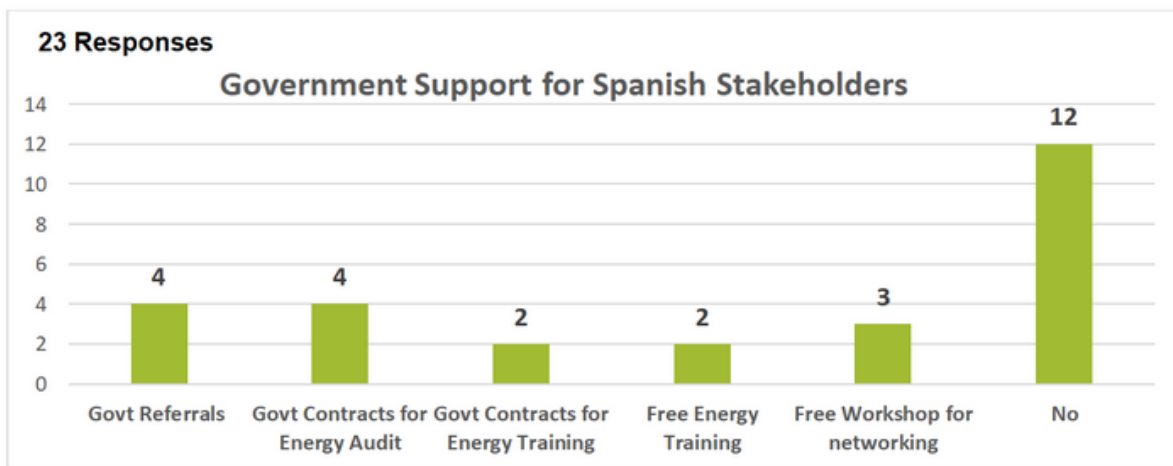


Figure 7 Answers to SPEEDIER survey question “Do you receive any form of local or national government support to deliver energy auditing or other energy efficiency support services to SMEs?”

Gaps identified

Low auditing rate for SMEs.

Lower rate of energy conservation measures implementation.

Lack of national support for energy experts and auditors.

Lack of energy culture in SMEs.



2.2 SMEs and non-residential buildings' energy efficiency: a great potential for improvement

A study conducted within Horizon 2020 project, ODYSEE (ODYSSEE, 2020), identified that EU final energy consumption was 50 Mtoe higher in 2019 than in 2014 but that energy savings were responsible for offsetting more than half of the effect of the increase in activity (see Figure 8).

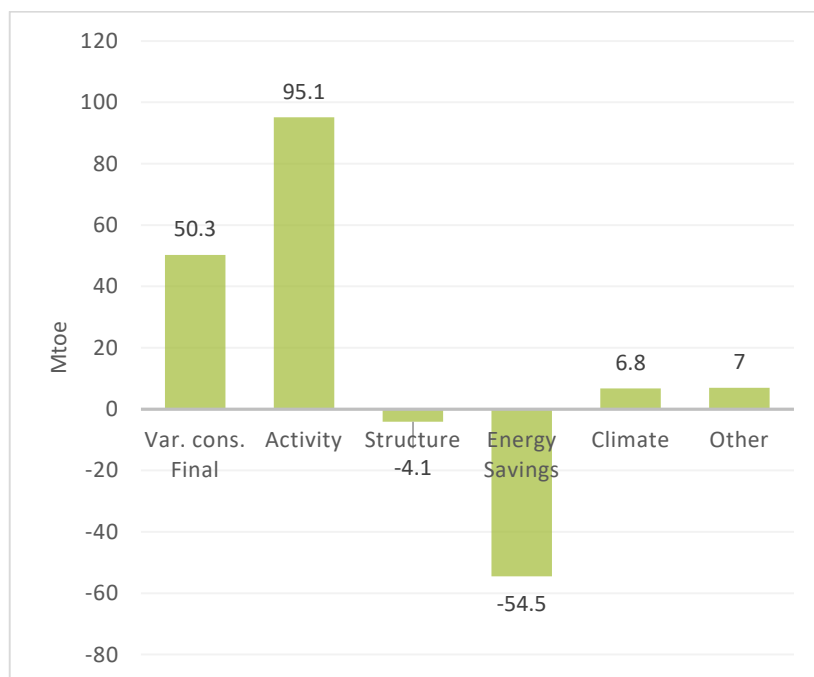


Figure 8 Drivers of final energy consumption variation at EU level, including air transport (2014-2019)

By focusing on activity-related ECMs, behavioural ones and building renovation, SPEEDIER can maximise energy savings for SMEs.

SMEs make up a large share of the workforce in the EU (see Figure 9 below) and it is estimated that SMEs are responsible for over 60% of the energy consumption of companies in the EU (Eichhammer & Rhodes, 2016).





Figure 9 Share of employees in large companies and SMEs per sector (Eurostat, 2020)

However, SMEs have faced numerous barriers to exploit energy savings and are considered an almost untapped source of energy efficiency in the EU.

ECMs recommended by SPEEDIER auditors apply to non-residential buildings, especially offices used by service companies and other industrial SMEs. Buildings accounted for about 40 % of total final energy consumption and around 60 % of electricity consumption in the EU-28 in 2015. They are also responsible for 32 % of CO₂ emissions in the EU. This makes buildings the largest energy end-use sector, followed by transport (33 %), industry (25 %) and agriculture (2 %). In some countries, such as Estonia, Croatia and Hungary, buildings represent even more than 45 % of final energy consumption in countries (Eurostat, 2017). For the EU-28, around two thirds of the energy consumption of buildings is for residential buildings (Odyssee-MURE, 2015). Therefore, reduction of energy consumption and the increased use of energy from renewable sources in the buildings sector constitute important measures needed to reduce the Union's energy dependency and greenhouse gas emissions.

Non-residential buildings are on average 40 % more energy intensive than residential buildings (250 kWh/m² compared to 180 kWh/m²) with Italy, Malta and Estonia using by far the largest amount of energy per m² (more than 1.5 time higher than the EU average). For the other countries, energy consumption per m² is much more homogeneous: most countries use between 200 and 300 kWh per m².

Energy consumption of non-residential buildings in SPEEDIER pilot countries is presented in Table 2.

Table 2 Energy consumption of non-residential buildings in SPEEDIER pilot (EU buildings database, European Commission, 2020)

Country	Energy consumption in non-residential buildings* (kWh/m ²)
Ireland	184,32
Italy	647,12
Romania	332,13
Spain	320,12

* Latest reporting year, 2013

The wide gap between Italy figures and other EU countries might be a consequence of difficult access to energy consumption data and could be overestimated.

Gaps identified

Difficult access to energy efficiency data for SMEs in some countries.

In some countries, difficulty to achieve energy efficiency targets.



3 SPEEDIER contribution to energy efficiency in the EU and roadmap

3.1 Energy Union Indicators impacted by SPEEDIER

To identify the impacts of SPEEDIER Service on EU energy efficiency objectives, we establish which elements of the Energy Union it will affect. Consortium partners reviewed all indicators attached to the five dimensions of the Energy Union and selected the most relevant ones, shown in Table 3.

Table 3 Energy Union indicators impacted by SPEEDIER Service

Dimension	Indicators impacted by SPEEDIER Service	SPEEDIER effect
1st dimension: Energy security, solidarity and trust	S1: Net import dependency	Reduction of energy consumption by end users (SMEs) that were not in the scope of previous government measures. Renewable energy production by SMEs when relevant.
2nd dimension: A fully integrated internal energy market	IM1: Electricity interconnection capacity	Facilitated monitoring of SMEs' energy consumption at EU level.
3rd dimension: Energy efficiency and moderation of demand	EE1: Primary energy consumption	Reduction of energy consumption by end users (SMEs).
	EE2: Final energy consumption	Reduction of energy consumption by end users (SMEs).
	EE3: Final energy intensity in industry	Reduction of energy consumption by SMEs in industry sector (15% of EU SMEs, Eurostat, 2020).
	EE6: Final energy intensity in services sector	Reduction of energy consumption by SMEs in services sector (49,8% of EU SMEs, Eurostat, 2020).
4th dimension: Decarbonisation of the economy	DE1: GHG emissions reductions (base year=1990)	Reduction of energy consumption by end users (SMEs) that were not in the scope of previous government measures. Renewable energy production by SMEs when relevant.
	DE4: GHG intensity	Renewable energy production by SMEs when relevant.
	DE5: Renewable energy share	Renewable energy production by SMEs when relevant.
5th dimension: Research, innovation and competitiveness	RIC1: Public investments on Energy Union related R&I (%GDP)	Innovation to develop an audit end energy management system applicable to SMEs at EU level.



Similarly, impacts of SPEEDIER Service on the European Green Deal target areas, have been presented in below table: -

Table 4: EGD target areas impacted by SPEEDIER Service

Target Area	SPEEDIER effect
Transition of industry to a clean or/and circular economy	Irish pilot of SPEEDIER service is focused towards reducing energy consumption of small industries with the help of ring fencing the savings to implement higher cost of energy conservation measures. This energy consumption reduction will lead to considerable greenhouse gas emission reduction, together resulting in cleaner industries.
Building and renovating in an energy and resource efficient way	SPEEDIER Experts will assist SMEs to implement the recommended energy conservation measures in most energy and resource efficient way.
Financing the green transition	SPEEDIER proposes innovative 'Ring-fencing-saving' financing idea for implementing energy saving measures in phased manners, which eradicates the needs of capital investment for energy efficiency upgrades. Also SPEEDIER Expert will assist SMEs to avail the most suitable financing grants offered by local/national government.
Leaving no one behind in the transition to climate neutrality	SPEEDIER Service offers free training for SPEEDIER Experts and SPEEDIER Trainers. SPEEDIER Experts training is focused on training the energy experts to deliver the SPEEDIER Service and SPEEDIER Trainers training is 'Train-the-Trainer' approach, where SPEEDIER Trainers will train the SPEEDIER Experts. SPEEDIER Service also offers energy efficiency awareness capacity building training for SMEs general employees, who generally doesn't pay attention to energy management and energy efficiency of their organisation. The aim of the training is to encourage all employees to participate in improving energy efficiency of their organisation.

We use the five dimensions (above) of the EED, these indicators and EGD target areas as guidelines to setup the action plan supporting the achievement of EU energy efficiency objectives in the following sections.

3.2 Impacts pathways

Using the gaps identified in Chapter 2 as a starting point and keeping the Energy Union indicators as focal points, the project partners identified SPEEDIER features and pathways to impact. They are presented in Table 6 Speedier Impact pathways at national level Table 5, Table 6 and Table 7 and will serve in future work of SPEEDIER project to define an actionable roadmap.

Three levels of action and impact were identified: EU level, national level and company level. At each level, working groups identified the answers that SPEEDIER solution can provide to

gaps and needs and how it will impact the achievement of EU's objective. The tables below show these pathways: -

Table 5 Speedier Impact pathways at EU level

Gaps at EU level	Corresponding needs that can be covered by SPEEDIER	SPEEDIER solution	SPEEDIER Potential impacts	Energy union indicators and EGD areas impacted
2020 target probably not achieved.	Need to reduce energy consumption of companies.	<ul style="list-style-type: none"> - ECMs adoption by SMEs through: <ul style="list-style-type: none"> o a systematic suggestion of solutions. o the research of cost-effective solutions. o a ring-fencing approach. o a multi-sectorial system adapted to SMEs. 	<ul style="list-style-type: none"> - Reduction of energy consumption of buildings. - Reduction of services companies' energy consumption. - Reduction of SMEs' energy consumption. - Innovation to provide a new energy auditing and management solution, available at EU level. - improved energy culture in SMEs resulting in more responsible energy consumption. 	IM1: Electricity interconnection capacity EE1: Primary energy consumption EE2: Final energy consumption EE3: Final energy intensity in industry EE6: Final energy intensity in services sector DE1: GHG emissions reductions DE4: GHG intensity EGD Target Area: Transition of industry to a clean or/and circular economy EGD Target Area: Building and renovating in an energy and resource efficient way EGD Target Area: Financing the green transition
	Need to increase efforts to reach 2030 targets.	<ul style="list-style-type: none"> - System replicability across the EU. - A communication strategy extending through Europe. 	<ul style="list-style-type: none"> - Increased awareness of energy efficiency opportunities for EU SMEs. 	

Lack of quantitative and concrete targets for SMEs.	Need to systematise support for EU SMEs' energy audit.	- A cost-effective approach.	- Provide a transparent, structured and replicable approach of energy auditing that can be included in national energy efficiency support schemes.	EE1: Primary energy consumption EE2: Final energy consumption EE3: Final energy intensity in industry DE1: GHG emissions reduction
	Need to measure SMEs impacts and ECMs.	- Proactive communication towards SMEs in Europe. - The setup of a training system for auditors ensuring a uniform approach in all EU countries and ensuring continuity quality of audits.	- Uptake of energy audits by SMEs. - Standardisation of audit results. - Transferrable results at EU level? In aggregated form?	EGD Target Area: Leaving no one behind in the transition to climate neutrality

Table 6 Speedier Impact pathways at national level

Gap and needs at National level	Corresponding Needs that can be covered by SPEEDIER)	SPEEDIER solution	SPEEDIER Potential impacts	Energy union indicators impacted
Difficult transposition of art. 8 for SMEs in national laws.	Need to support SME auditing at national level.	- A structured communication and development strategy. - Clear and accessible energy audit developed for SMEs.	- Uptake of energy audits by SMEs. - Involvement of experts and SMEs in the audit process.	EE1: Primary energy consumption EE2: Final energy consumption EE3: Final energy intensity in industry DE1: GHG emissions reduction
	Need to communicate and implement	- A structured communication and development strategy.	- Integration of national support for energy audits.	

	energy auditing support activities for SMEs (national co-financing initiatives, public aids, etc.).		<ul style="list-style-type: none"> - ECMs easy to integrate in SPEEDIER tool and system. - Larger communication on national support activities. 	
	Need to understand SMEs needs and barriers to the adoption of EEMs.	<ul style="list-style-type: none"> - Ongoing communication with public actors. - Affordable, transparent service adapted to the national context. 	<ul style="list-style-type: none"> - Share aggregated field experience. - Provide a solution applicable at the national level. - Provide an affordable solution to SMEs, overcoming financial barriers through the ring-fencing mechanism. 	EE2: Final energy consumption EE3: Final energy intensity in industry EE6: Final energy intensity in services sector DE1: GHG emissions reduction RIC1: Public investments on Energy Union related R&I (%GDP)
In some countries, difficulty to achieve energy efficiency targets.	Need to increase efforts and impact at national level.	Use of savings produced by measures to reinvest in energy improvements.	<ul style="list-style-type: none"> - ECMs adoption by SMEs. - Implementation of savings measures in phases. - System adaptable to each national context. 	
In some countries, difficult access to energy	Need to develop data sharing tools and processes between the local/company	Standardised and reliable datasets on results of energy efficiency actions to be undertaken by SMEs and their subsequent implementation.	Facilitate data sharing between companies and municipalities or national public bodies in charge of energy efficiency monitoring.	

efficiency data	and national bodies.			
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Table 7 Speedier Impact pathways at company level

Gap and needs at company level	Corresponding Needs that can be covered by SPEEDIER	SPEEDIER solution	SPEEDIER impacts	Potential Energy union indicators impacted
Low auditing rate for SMEs (80% were not audited in the last five years or didn't know).	Clear and systematic support needed for SMEs.	A transparent and systematised approach.	<ul style="list-style-type: none"> - Increased awareness by SMEs. - High trust in the audit result and recommendations. 	EE2: Final energy consumption EE3: Final energy intensity in industry EE6: Final energy intensity in services sector
	Affordable support needed for SMEs. Making SMEs aware about energy and non-energy benefits of energy efficient buildings. Need to build trust on external energy auditors by demonstrating case studies of saving achieved.	<ul style="list-style-type: none"> - Ring-fencing approach - Training for SMEs Decision makers and Senior Staff on benefits of energy efficient buildings. - SPEEDIER Mobile app will help SMEs to develop enhanced energy culture within their organisation. - Offering audit scheme, where SMEs need to pay audit fee upfront and cost of audit is covered by savings achieved by proposed ECMs. 	<ul style="list-style-type: none"> - Affordable program. - Increased awareness and informed decision making for SMEs senior staff. - Increased trust on external energy auditor leading to a greater number of energy audits within SMEs. 	EE6: Final energy intensity in services sector DE1: GHG emissions reduction RIC1: Public investments on Energy Union related R&I (%GDP)

		<ul style="list-style-type: none"> - Program adapted to the national context and integrating a large array of ECMs and public support measures. 		
Lower rate of energy conservation measures implementation.	<p>Assist SMEs to avail a suitable financing supports and grants to invest in energy conservation measures implementation.</p> <p>Help SMEs with energy management to help them to implement ECMs using SPEEDIER's novel ring-fencing mechanism.</p>	<ul style="list-style-type: none"> - SPEEDIER Expert will advise SMEs for most suitable and affordable financing support available with assistance on requisite paper works. - SPEEDIER Expert will propose SMEs with the most suitable ECMs and help them with procurement and implementation. 	<ul style="list-style-type: none"> - Easy and affordable financing and paperwork for SMEs. - External outsourced energy management service for SMEs with no need of having in-house energy management expertise. 	
Lack of national support for energy experts and auditors.	<p>Need for training on advising SMEs with most suitable ECMs and financing options available.</p> <p>Need for an integrated energy auditing system.</p> <p>Need for a standardised energy auditing process</p>	<ul style="list-style-type: none"> - Methodological support of auditors. - SPEEDIER Energy Auditing tool will help energy auditors with the standard energy auditing process and will suggest most suitable ECMs for individual SMEs. - SPEEDIER Training for Energy experts to train them on using SPEEDIER 	<ul style="list-style-type: none"> - Improve energy auditors' training level and the subsequent audit quality. - Increased number of energy experts with a standard energy auditing process. 	

		<p>energy auditing tool so as to advise SMEs with various ECMs.</p> <ul style="list-style-type: none"> - SPEEDIER Training will also be provided to experts in order to advise SMEs for available EU wide local and national financial supports. - Accessible and affordable training 		
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3.3 Roadmap to support EU objectives for energy efficiency

Based on the selected Energy Union indicators and the pathways to impact described in Chapter 3.2, two main indicators are selected to monitor the overall impact of SPEEDIER Service in the EU:

- **Energy savings** is used as a primary indicator of SPEEDIER impact. It impacts the main target of the EED of 32,5% energy efficiency in 2030. In each MS, energy consumption reduction achieved by SMEs will add to the national figures, that have the obligation to report (2012/27/EU) “the cumulative amount of energy savings achieved [...] in years X-3 and X-2”.
- **Number of audits realised**: “number of energy audits carried out in in year X-3 and X-2” (2018/1999/EU).

To support the steady increase of those indicators, a number of tools are being developed during the SPEEDIER project and will be used for communication and training after the end of the project, both in pilot countries and in additional countries. These tools for replication are:

- **Capacity building event** for public administration bodies, to raise awareness (M25-30).
- **Train the trainers kit** (M30): for organisations taking over the training of energy experts in any Member State.
- **Best practices guidelines**(M30). For SMEs in any Member State, building on knowledge and experience acquired in the pilot countries.
- **Technical report on replication potential** (M30): for organisations overtaking the replication of SPEEDIER service in any Member State.
- Development of **E-learning materials** (M28)
- Definition of **business model strategies** (M26).

The main stakeholders, institutional structures and organisations, that the SPEEDIER Service will involve to facilitate upscaling and replication through the EU and in a variety of sectors are presented in Table 8.

Table 8 Stakeholders overview

Type of actors	Potential actions
EU and national policy makers	<ul style="list-style-type: none">• Be informed of SPEEDIER approach when developing energy efficiency policies.• Be aware of potential impacts of ECMs implementation in EU SMEs.• Grants, tenders and other forms of financial support.
Public administrations	<ul style="list-style-type: none">• Encourage clusters, industries, etc. to use SPEEDIER service, communication on the service.• Be informed of SPEEDIER approach when implementing energy efficiency policies.• Grants, tenders and other forms of financial support.



Sectorial actors	<ul style="list-style-type: none">• Communication on SPEEDIER service in their networks.• Grants, tenders and other forms of financial support.
Companies and other organisations	<ul style="list-style-type: none">• Direct clients (selection as their EEM audit and/or support partner).• Communication on SPEEDIER Service in their clients' network.• Grants, tenders, carbon offsetting schemes and other forms of financial support.

As we have learned from our experienced in pilot countries, the effective upscaling of the SPEEDIER Service can be facilitated by these actors. When entering a new market, a first step would be to conduct an effective identification of the most relevant institutions and organisations, an understanding of their priorities and decision-making process and to have a proactive approach towards specific actions.

The timed approach for SPEEDIER to contribute to achieving the EU's objectives of energy efficiency are presented in Figure 10.

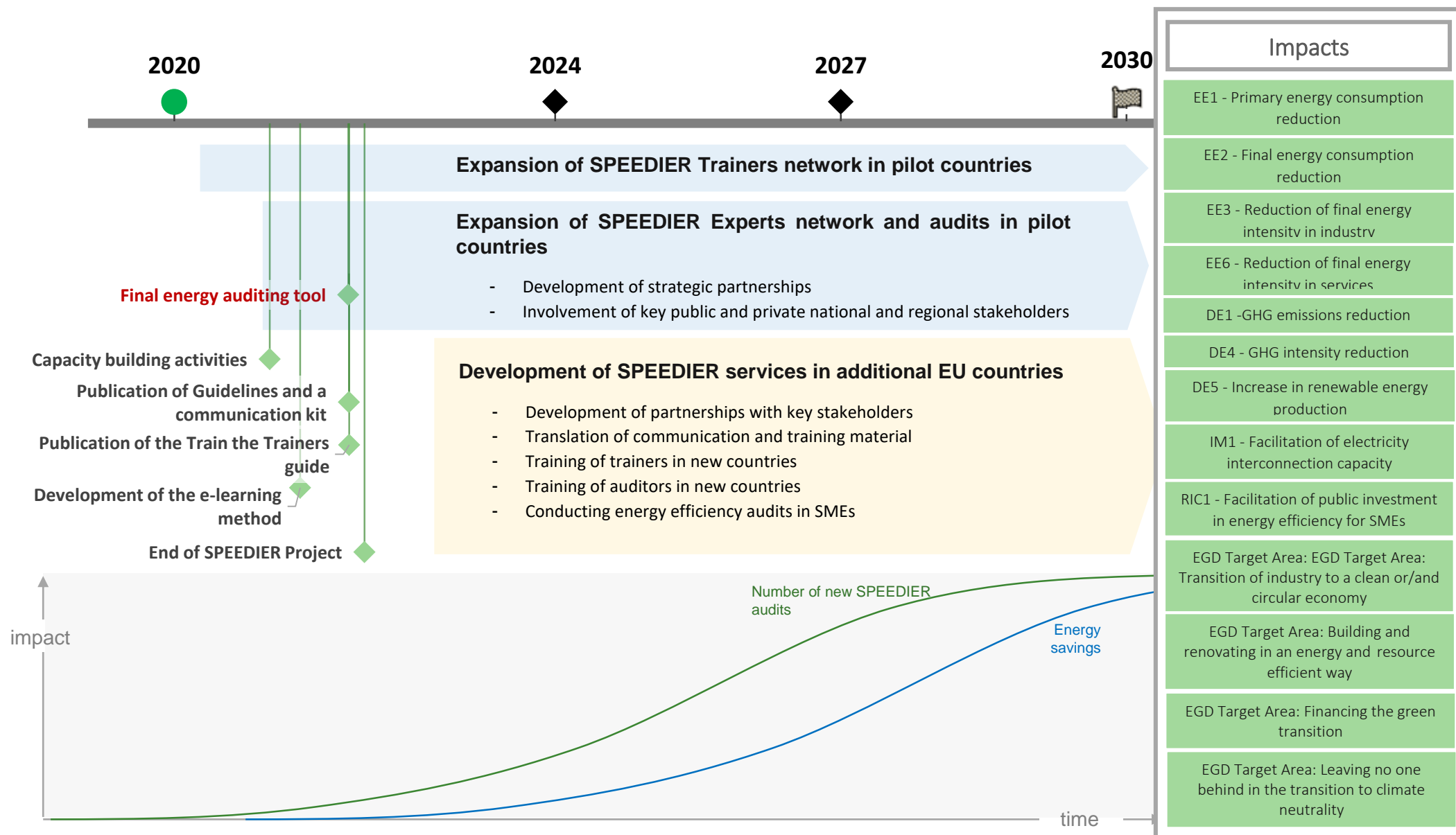


Figure 10 Roadmap for SPEEDIER to contribute to achieving the EU's objectives



Conclusion

SPEEDIER Service has been developed to ease the energy auditing and management process for EU SMEs and to promote Energy Conservation Measures implementation by companies. By doing so, it aims to support the EU in achieving its energy efficiency and energy consumption objectives by specifically impacting several gaps:

- 2020 EU energy efficiency targets probably not achieved and difficult achievement of 2030 target of a 32,5% improvement of energy efficiency.
- Low institutional involvement of SMEs in energy efficiency auditing and implementation of energy conservation measures.
- A high level of energy consumption in buildings occupied by SMEs.
- Difficult transposition of art. 8 of the EED for SMEs in national laws.
- A lack of quantitative and concrete targets for SMEs.
- Low energy auditing rates for SMEs.
- Low rate of energy conservation measures implementation.
- Lack of national support for energy experts and auditors.
- Lack of energy culture inside SMEs.
- Difficult access to energy efficiency data for SMEs in some countries.
- In some countries, difficulty to achieve national energy efficiency targets.

We have seen in this roadmap through which tools and pathways SPEEDIER will impact EU SMEs' energy consumption and the timing of their implementation. The impact endpoints analysed correspond to selected Energy Union indicators belonging to the Energy Union's five dimensions.

The roadmap presents how SPEEDIER tools will be deployed and will impact the number of audits realised and subsequent energy savings to effectively support EU energy efficiency 2030 objectives.

The main actions towards the SPEEDIER Service upscaling and its exploitation after the project end will be further described in deliverable D7.3 (M30) and the supporting business models in deliverable D8.10 (M26).



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