

# SPEEDIER

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

### D2.1 – REVIEW OF EXISTING ENERGY AUDITING SCHEMES, INCENTIVES, POLICIES AND PROJECTS

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This document is the report associated with Deliverable 2.1 Review of existing energy auditing schemes, incentives, policies and projects. It contains a summary of all the relevant research that was undertaken by the SPEEDIER partners relating to the state-of-the-art in terms of energy auditing in the SPEEDIER pilot countries and a literature review of existing projects, energy auditing tools and policy related to energy efficiency. It provides a short and comprehensive description of the challenges faced and lesson learnt from each of the projects that were reviewed, the benefits and limitations of energy auditing tools and gains and limitations of policies. Additional advice and support can be sought from the coordinator.

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# 1 Executive Summary

Small-to-medium-sized enterprises (SMEs) are [businesses](#) whose personnel numbers fall below certain limits. The abbreviation "SME" is used by international organizations such as the [World Bank](#) as well as the [European Union](#), the [United Nations](#) and the [World Trade Organization](#) (WTO). Globally and economically they are very important for society, employment, trade investment and the environment. Article 8 of the European Energy Efficiency Directive, in recognition of the importance of European SMEs to help combat adverse climatic and the worsening carbon-footprints is a key focal point of SPEEDIER.

In Europe as defined by the European Commission, SMEs are the enterprises that meet the following definition given in **Table 1-1** of staff headcount and either the turnover or balance sheet total:

*Table 1-1 : SME Definition*

Company category	Staff headcount	Turnover	Balance sheet total
Medium-sized	< 250	≤ €50 million	≤ €43 million
Small	< 50	≤ €10 million	≤ €10 million
Micro	< 10	≤ €2 million	≤ €2 million

Despite the associated economic, social and environmental benefits, which exist not only at an organisational level but also at a national and international level, there remains inadequate adoption of energy efficiency measures by SMEs. Energy efficiency measures can help governments achieve environmental objectives such as a reduction in greenhouse gas emissions while simultaneously meeting the increased energy demand and achieving security of energy supply. Improved energy efficiency can provide multiple benefits to energy consumers, and its role is particularly relevant when applied to the services sector (retail, bank, hotel, real estate, education, computer science, media, transport, distribution, food etc., which provides any kind of service), where energy efficiency can improve profitability and productivity.

To develop effective energy efficiency policies to achieve these objectives, it is essential to understand the factors that drive interest in energy efficiency among different types of consumers. For businesses, these factors can include the:

- Characteristics of the business,
- Environment in which the business operates,
- Barriers and the drivers to energy efficiency and
- Attitude and reaction towards energy efficiency policies of these businesses.

Understanding these factors at sector and sub-sector levels is essential for the development of targeted European policies as well as to increase the likelihood of the achievement of the desired outcomes for the SPEEDIER project.

Through Article 8 of the Energy Efficiency Directive (EED), the European Commission has further strengthened the energy efficiency implementation by requiring the European Member States (EU-28) to develop instruments (i.e. Projects, Tools and Policies) that encourage SMEs

to undergo energy audits and to implement their recommendations. The SPEEDIER project is focussed on developing a methodology that will assist Member States to meet this requirement. As a result of the Directive, many Member States have already developed tools, policies and projects that target energy management systems in SMEs.

The aim of this report is to identify and declare the challenges and key learning points resulting from the implementation of key related projects. The report also aims to unravel some of the drivers that encouraged the uptake of energy efficiency implementation programmes by European SMEs. Through the execution of the research conducted by the SPEEDIER consortium we have identified and acknowledge key features and drawbacks on the use of some energy auditing tools as well as policies related to energy efficiency.

The process of implementing literature reviews of tools helped us to identify existing energy auditing tools that could be considered to be incorporated into processing during the SPEEDIER service implementation phase. Led by IERC, consortium partners performed literature reviews. The undertaking focused on projects, tools and policies that related to SME's energy efficiency implementation. As part of the applied methodology, we created a standard review template for projects, tools and policies. This helps to ensure that a standardisation review process was applied by each contributing partner and that a high level of consistency review was realised.

The literature review was performed by the partners representing each country in the consortium. **Table 1-2** lists the contributing partners:

**Table 1-2 : SPEEDIER Consortium**

No.	Consortium Partner Organisation Name	Short Name	Country
1	International Energy Research Centre- University College Cork	IERC	Ireland
2	Sustainable Innovation Europe SL	SIE	Spain
3	Limerick Institute of Technology	LIT	Ireland
4	Fundacion Corporacion Tecnologica De Andalucia	CTA	Spain
5	Parque Cientifico Y Tecnologico Cartuja Sa	PCT	Spain
6	Vertech Group	Vertech	France
7	Politecnico Di Milano	POLIMI	Italy
8	Institut De Tecnologia De La Construccio De Catalunya	ITEC	Spain
9	TFC Research and Innovation Limited	TFC	Ireland
10	Asociatia Agentia Pentru Eficienta Energetica Si Protecția Mediului	AEEPM	Romania

The geographical location of the projects was not limited to pilot countries but they are chosen from across the World to represent best practice in energy auditing and implementation of energy efficiency measures in SMEs.

**In total, 23 projects, 13 tools and 3 policies were reviewed as part of this literature review.**

To ensure consistency in the approach to the review, a template was developed for reviewing projects, tools and policies to ensure that each partner focussed on the same key features



and that the key learning points across each of the items reviewed were comparable. The templates are described briefly below:

- **Projects:** A brief, general description of the project and its aims followed by a review in terms of the key achievements of the project, the challenges that were faced during the project deployment, the key learning points that came out of the project and the relevance of the project and key learning points to SPEEDIER. See template used in Annex 1.
- **Tools:** A brief general description of each identified tool, followed by a review of its commercial availability, the key features, drawbacks and limitations, and the relevance of the tool to SPEEDIER. See template used in Annex 2.
- **Policies:** Similarly Policies were described in brief and then reviewed in terms of their impact, cost & gains, limitations and relevance to SPEEDIER. See template used in Annex 3.

Furthermore, a literature review was carried out for each of the pilot countries to identify State-of-the-art' schemes and policies relating to energy auditing in SMEs and uptake of energy efficiency measures among SMEs. **One of the findings** that we observed was that despite of having many government supported schemes for energy efficiency uptake, there is low participation by SMEs because of the perceived barriers in all four pilot regions. **Secondly**, there is also a large untapped potential for cost effective energy savings in the industrial sector due to barriers for the uptake of energy efficiency. **Another finding** was the fact that lack of information seems to be a very relevant barrier that impacts of the amount of interest and take up opportunities by SMEs.


We know, and Article 8 reaffirms, that energy audits and energy management systems are important concepts to overcome these barriers and to further help companies to achieve cost-effective energy savings. Instruments to promote both of these concepts have been established in many countries, including Ireland, Spain, Italy and Romania.

As the result of the literature review undertaking, we found that the major challenges faced were due to:

- Lack of finance
- Lack of public interest
- Low priority for investment in Energy Efficiency Improvement

Further relevant findings and key learnings from this review include the following:

- Modern buildings present a challenges energy efficiency projects as in some cases the existing technologies were working correctly and efficiently meaning that there were few additional recommendations that could be made to further reduce energy consumption.
- The complexity of EPCs (Energy Performance Contract), hassle factor of installing efficiency measures, lack of trust of external consultant and lack of knowledge of the



available financing instruments are all additional challenges faced by several projects during their implementation phase.

- It is essential to have frequent and easy communication with the SMEs and a simple and easy to understand service offering. Companies are interested in having long term support services, throughout and beyond the energy audit and implementation phase as long as a relationship has been developed with a trusted consultant.
- The availability of high quality data is very important before, during and after the implementation phase as this affects the level of analysis that can be performed and the level of savings that can be clearly demonstrated to the SME.
- Information and economic drivers appear to be the most important drivers for SMEs to implement the energy efficiency measures identified, showing the need for enterprises to be supported not only by government and public institutions but also by external stakeholders involved in the supply of energy-efficient technologies and practices (such as industrial associations and service and technology suppliers). However these are not the only benefits and SPEEDIER should also consider the non-energy benefits that energy audits and energy efficiency can bring to an SME as key features of the programme.
- Among the tools that we reviewed, many are location restricted, some must be purchased and some are free to use. The SPEEDIER team will further analyse the features, limitations and availability of the tools with a view to building on what is already available rather than repeating something that has already been done.
- Policies are of somewhat moderate relevance to SPEEDIER, as it gives the overall EU directions for energy efficiency, rather than any specific goals for improving energy efficiency in SMEs. Article 8 of the EU Energy Efficiency Directive is the most relevant policy across Europe as it puts a requirement on Member States to develop programmes that encourage take up of energy audits and implementation of energy efficiency measures among SMEs however implementation of this policy within Member States is varied.
- There are some projects related to improving SME energy efficiency that have only recently begun. The SPEEDIER team will keep a close watch on their development for identifying any challenges they face and key learning points that could be useful to enhance the outcome of SPEEDIER.
- The information gathered in this report will be used as a foundation for the rest of the project and will inform the definition of the SPEEDIER Service and the way in which it is implemented in each other pilot regions.

## 2 Introduction

SPEEDIER is a highly innovative *one-stop-shop solution* that applies an integrated approach to energy management, providing information, advice, capacity building, energy auditing, financing, as well as implementation of energy efficiency solutions and monitoring of impacts. This integrated approach is advocated by the International Energy Agency in their 2015 report 'Accelerating Energy Efficiency in Small and Medium-Sized Enterprises'.

The primary aim of SPEEDIER is to provide a self-financing outsourced energy management service to SMEs, by outsourcing the role of the Energy Manager to SPEEDIER Experts allowing them to access the expertise needed at the required time, leading to greater uptake of energy audits and implementation of energy efficiency measures.

SPEEDIER delivers a self-financing outsourced energy management service with much benefit to SMEs, enabling them to implement energy conservation measures and also access the energy services market. The service will be available via energy consultants, auditors and experts and will facilitate 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. This is achieved through the process of outsourcing to a SPEEDIER Expert the time-consuming energy management activities that require technical expertise. It includes the activities of performing an energy audit, training staff in good energy practices, obtaining quotes from suppliers for implementation of energy saving measures, project managing the installation as well as measuring and also verifying the savings). As such SPEEDIER makes significant inroads to help remove barriers, especially the lack of in-house expertise, lack of time, lack of resources and conflicting priorities that would prevent SMEs from undertaking energy audits and acting on the recommendations.

A key innovation upon which the SPEEDIER Service is founded, is the self-financing mechanism. This novel funding mechanism works by implementing simple no-cost actions first (e.g. raising energy awareness of staff or switching to a cheaper energy supplier), ring fencing the savings from these actions and using them to pay for low, medium or high cost energy efficiency measures and the continued services of the SPEEDIER Expert. The iterative cycle of implementing energy conservation measures, determining the savings against an agreed baseline, ring fencing those savings and reinvesting them into additional measures is the core innovative principle of the SPEEDIER Service that can be applied to both SMEs and large enterprises. Thus, a revolving energy efficiency fund is created for each participating business, removing any barriers relating to lack of capital or lack of access to finance and allowing deep energy efficiency upgrades to be funded.

The project is to be self-financing to remove any financial barriers to energy audit uptake and implementation of ECMs. The mechanism for making this work in practice follows an Energy Performance Contract model where the consultant delivering the support retains a share of the savings as payment for the duration of the contract. This ensures that the Service is also suitable for large enterprises.

## 2.1 Objective of the study

The consortium undertaking the SPEEDIER project consists of 6 RTDs, 3 SMEs and 1 NGO from 5 European member states as already described in Table 1-2. SPEEDIER will target groups of SMEs in 4 EU pilot regions:

- 1) In **Spain** we will test a location based approach, engage with SMEs based at a single business park to demonstrate that advantages of clustering SMEs give them better access to the economies of large scale projects;
- 2) In **Ireland** and **Romania** SMEs in the manufacturing and hospitality sectors respectively will be approached to test a sector based approach to service delivery;
- 3) In **Italy**, a more general approach of accessing SMEs from any sector via ESCOs will be tested.

These pilots will be used to test the developed SPEEDIER Service through a number of iterative steps in the quest to create a fully functioning and self-sustaining service that can be rolled out across the EU. Naturally, we aim to commence this process in the pilot countries mentioned above.

The objective of this study is to review energy auditing programmes that are already in existence and to identify any best practice examples that can be used to assist the development of the SPEEDIER Service. There are several projects of great relevance to SPEEDIER. Some are completed and others are ongoing, at national or international level. They have investigated methods for the removal of barriers leading to the uptake of energy efficiency measures. The SPEEDIER project will build on the outputs and learning outcomes of these projects, using them as a foundation and an additional entity to the body of knowledge on the subject.

The review of existing or ongoing projects, will give insights into their achievements, the challenges faced during their implementation, key learning points from each project and finally its relevance to the SPEEDIER. The review of energy auditing tools will also give insights into the commercial availability of auditing tools, their features and benefits, drawbacks and limitations, and their relevance to the SPEEDIER. Similarly the review of existing policies related to energy efficiency improvement will tell us about impacts of the policy, cost of implementation of policy, gains or achievements by implementation of policy and relevance to the SPEEDIER.

## 3 State of the art in each pilot region

### 3.1 Ireland

The Sustainable Energy Authority of Ireland (SEAI; Government agency under the aegis of Department of Communications, Climate Actions and Environment) is helping Irish companies and organisations to reduce their energy costs significantly while improving their energy efficiency. SEAI offer a range of supports to help SMEs on their energy efficiency journey including financial supports (i.e. grants, funding & incentives), information and advisory services, online tools and energy training supports. There are many schemes under the administration of SEAI to help SMEs to reduce their energy consumption. Below is a brief description of some of these schemes.

#### Accelerated Capital Allowance (ACA) Scheme

- 3.1. The Accelerated Capital Allowance (ACA) schemes offers a tax incentive to encourage companies to invest in energy efficient equipment. It allows companies to deduct the full cost of such equipment from their taxable profits in the same year of purchase. Only equipment that is listed on the 'Triple E' register can qualify for these capital allowances. Products on this register all meet a minimum set of stringent energy efficiency criteria and typically will be of a best-in-class efficiency standard. By encouraging companies to purchase energy efficient equipment, the ACA aims to improve the overall energy efficiency of Irish companies. This assists Ireland in meeting its EU targets for energy savings and the reduction of carbon emissions. The SEAI administers the ACA scheme on behalf of DCCA.

#### 3.1.2 Energy Efficiency Guide for SMEs

SEAI published an Energy Efficiency guide for SMEs to help them to implement best practices in terms of energy efficiency in their organisation. The guide includes advice on several energy conservation measures that can be implemented with little or no capital cost that could result in energy savings of up to 10%, and also includes case studies showing examples of businesses that have already implemented these measures. SEAI offers free Energy Management Training for SMEs employees. SEAI established a dedicated SME programme in 2018 for 200,000 Small and Medium Businesses in Ireland. SEAI will launch an online learning platform for SMEs in Q4 of 2019, which will be available free of charge. It will include short online learning modules and will allow multiple registered users per business. Topics that will be covered in the online modules include:

- 3.1.3
- How to carry out an in-house Energy Audit.
  - The basics of Energy management.
  - Advancements in energy technology.

#### Dairy Farm Grant

SEAI ran a grant scheme for Dairy Farmers wishing to reduce energy costs and hence increase their profitability by increasing their resilience to fluctuating milk prices until early 2019. The grant scheme provided financial support to dairy farmers to upgrade their existing vacuum and milk pump systems with more efficient technology, covering up to 40% of the total cost of the new system. The grant was supported by the Irish Agriculture and Food Development Authority (Teagasc) and supported the installation of variable speed drives to improve the efficiency of the milking process.

In addition, further support was provided to dairy farmers through:

- 'The Dairy Energy Decision Support Tool', a collaborative initiative between SEAI, Teagasc and the Cork Institute of Technology that helps farmers to make decisions regarding farm energy consumption by calculating the likely payback periods and cost savings attributed to different technologies.
- 'The Dairy Farm Infrastructure Handbook', developed by Teagasc, to help farmers to make decisions when considering upgrading their existing farm infrastructure.

The Dairy Farm Grant had 69 successful applications during 2018, and over €1 million was awarded over the life of the project. On average each applicant reduced their energy costs by €1,440 per year, and the scheme as a whole resulted in energy savings of approximately 1.6 GWh.

### **SME Lighting Support Scheme**

3.1.4 In 2017, the SEAI launched the SME Lighting Support Scheme which provided grant support to SMEs wishing to upgrade their lights to LED technology until May 2019. Through upgrading their lights and lighting controls, SMEs can save up to 60% of their lighting electricity costs. The SME Lighting Support Scheme offered a grant of up to 30% of the eligible approved costs to assist SMEs to upgrading their lighting systems. Eligible costs included product and installation costs. Over its duration, the scheme supported 200 businesses and provided financial support of €1.5 million.

### 3.1.5 **Free Energy Assessment for SMEs**

Until around 2 years ago, SEAI ran a programme to help businesses increase their energy efficiency by offering free energy assessments for SME's. The assessment included an analysis of the current energy consumption of the business, the opportunities for energy savings and advice on appropriate energy management and monitoring. A panel of qualified energy advisors was appointed by SEAI to deliver the programme. SMEs that registered with SEAI were matched with an Energy Advisor who then contacted them to talk through their issues by phone in the first instance. If considered appropriate, an on-site assessment of opportunities for energy savings was then arranged allowing the Energy Advisor to make a more detailed site assessment and enabling them to recommend the most appropriate energy conservation measures. The Energy Advisor would issue a report to the SME and then stay in touch for a period of three months in order to provide a mentoring service of technical support and advice. Whilst many SMEs took advantage of the free energy audits on offer, few of them went on to implement any of the recommended energy conservation measures, so the decision was taken to close the scheme and re-evaluate the best approach to engaging with SMEs.

### **EXEED Grant Scheme**

Excellence in Energy Efficiency Design (EXEED) is a program run by SEAI for incentivising, rewarding and facilitating energy efficiency in business. The EXEED grant scheme is designed for organisations that are planning an energy investment project. The scheme provides grant support of up to €500,000 per year to cover up to 50% of the cost of professional services linked to investments in energy efficiency projects and up to 30% of the capital costs of an



energy efficient retrofit. The grant amount can be extended by 20% for small enterprises and 10% for medium enterprises.

The main objective of the EXEED grant scheme is to incentivise the uptake of EXEED certified process and support the development of the EXEED certified program. Projects can be of any scale or complexity and can relate to new design projects or major energy upgrades of existing buildings and assets however discrete energy retrofit projects (e.g. a lighting upgrade alone) are not eligible.

EXEED helps to lower financial risks to investors by following a robust design process and has been proven to lower capital and operating costs of design projects. The scheme provides funding towards implementing and certifying EXEED processes. This includes professional services during the design and implementation phases. EXEED is open to all organisations planning an investment in an energy project including public and private sector organisations of any size.

There are three levels of SEAI EXEED certification:

- 1) SEAI EXEED Designed - This certifies that the assets have been designed, constructed, commissioned and put into operation, to the standard required by SEAI EXEED.
- 2) SEAI EXEED Verified - This certifies that the energy performance of the asset in the real world has been measured and verified. Generally, this requires one year's worth of data to verify the energy performance of each asset.
- 3) SEAI EXEED Managed - This certifies that assets are being managed in the best energy efficient way on an on-going basis.

### **2.1.7 National Energy Efficiency Action Plan (2007-2020)**

Ireland's first National Energy Efficiency Action Plan (NEEAP) (2007-2020) set out the path to achieving a 20% reduction in energy demand across the whole economy by 2020, including the electricity, transport and heating sectors, in line with Government commitments in the 2007 Government White Paper 'Delivering a Sustainable Energy Future for Ireland' and the Programme for Government. It also sets a specific national target of 33% improvement in the public sector.

Energy efficiency is a central component of Ireland's sustainable energy policy, as set out in the Sustainable Energy White Paper. The White Paper sets out the energy policy framework for 2007-2020, designed to steer Ireland to a new and sustainable energy future.

The Public Sector Energy Programme is an essential pillar in the National Energy Efficiency Action Plan and the government's Public Sector Energy Efficiency Strategy. The SEAI provide the tools, training, and advice to integrate energy management into the general management of public sector organisations. Every public service organisation is required to achieve a 33% energy efficiency improvement.

The plan also demonstrates Ireland's commitment to meeting the 20% energy savings target set out in the EU Energy Efficiency Action Plan, published in October 2006. The Irish Government welcomed the EU's ambitious Action Plan to save 20% of EU annual primary energy usage by 2020 and, together with the other Member States, endorses the need for a

multi-annual programme of priority actions. Ireland have agreed a shared goal to realise a 20% energy saving for Europe by 2020, which will potentially mean annual savings of €100 billion and 390 Million tonnes oil equivalent.

This Action Plan serves as Ireland's response to the requirements of Article 14(2) of the Energy End-Use Efficiency and Energy Services Directive (ESD) (Directive 2006/32/EC). This Action Plan demonstrates how Ireland will achieve and exceed its ESD and national energy efficiency targets through a mixture of known actions and identified potential that will be captured as the wider technological and policy context evolves.

Under the EU Energy Efficiency Directive, the NEEAP was updated every 3 years covering the period between 2007 and 2020. The NEEAP is now being replaced by the National Energy and Climate Plan (NECP). Ireland's first draft NECP was developed early in 2019 and put out for consultation. The final plan will be submitted by the end of 2019 and will outline how Ireland will contribute to achieving the EU's main climate targets in the period from 2020 to 2030.

## 3.2 Italy

The main regulations for energy efficiency in Italy are the following:

1. National Fund for Energy Efficiency (legislative decree n. 102/2014)
2. White Certificates Decree (Ministerial Decree 10 July 2018)
3. Energy Efficiency Decree (ministerial decree 21 December 2017)
4. Energy audits Decree (legislative decree n. 102/2014)
5. Integrated National Plan for Energy and Climate (Regulation of the European Parliament 2016/0375).

### 3.2.1

#### National Fund for Energy Efficiency

The National Fund for Energy Efficiency was established by the legislative decree n. 102/2014 by the Ministry of Economic Development and is regulated by the decree 22nd December 2017. The Fund aims to achieve the EU's energy efficiency policy objectives and promote the energy efficiency measures carried out by companies, energy service companies (ESCO) and Public Administration. The interventions supported by the Fund are as follows:

- Reduction of energy consumption in industrial processes,
- Realisation and network enhancement of district heating and cooling,
- Efficiency of services and public infrastructure,
- Energy efficiency in buildings.

The Fund's budget is €185 million, to which will be added resources of approximately €125 million between 2019 and 2020. The Fund will reach € 310 million at December 2020 and may be increased with voluntary payments by other central and regional administrations, organizations and public bodies. It is estimated that the Fund will mobilize over €1.7 billion in investments in the efficiency sector and will have a leverage effect of around €5.5 billion with the creation of jobs and opportunity for the whole value chain.

For companies, the fund provides grants for improving the energy efficiency of public buildings and improving energy efficiency of buildings destined for public housing, as well for improving the energy efficiency of the services and/or public infrastructure, including public lighting. For ESCOs, the fund provides grants for improving the energy efficiency of the services and / or



public infrastructure, including public lighting; improving energy efficiency of buildings intended for residential use, specifically with regard to social housing; as well as improving energy efficiency of the buildings owned by the Public Administration.

### Integrated National Plan for Energy and Climate

3.2.2 The Integrated National Plan for Energy and Climate (PNIEC) will bring a cumulative reduction of final energy consumption over the period 2021-2030 estimated to be approximately 2.75 Mtep. The Plan envisages a target of primary and final energy consumption equal to 132 Mtep and 103.8 Mtep respectively in 2030. To reach this target, PNIEC foresees a goal of reducing final consumption by 0.8% per year in the period 2021-2030 calculated on the basis of final energy consumption for the three-year period 2016-2018 equal to 116.9 Mtoe. The target percentage of 0.8% per year represents an annual incremental savings target of 0.935 Mtoe over the period 2021-2030.

### White Certificates Decree

3.2.3 The White Certificates Decree published guidelines to support the white certificates mechanism that was approved in April 2019. The approved guidelines are made up of two parts. The first part consists of Annex 1 with the objective of promoting the identification and definition of projects under the mechanism of White Certificates. The second part, the Annex2, identifies the types of eligible energy efficiency projects. Annex 1 of the Guidelines can be divided into three sections:

- **Part One** contains supporting information, useful in the presentation of requests for access to incentives;
- **Part Two** describes the production processes of six distinct production sectors (glassware, plastics processing, ceramics, production of thermal and cooling energy, the integrated water service) presenting the technologies used in the production process and energy efficiency measures achievable in each sector;
- 3.2.4 • **Part Three** presents a non-exhaustive list of ineligible energy efficiency measures.

### Energy Intensive Companies Scheme

Following the reform of the Energy Intensive Companies Scheme in October 2018, 3,651 companies had submitted their application to register to access the incentives provided to energy-intensive companies. Most of these companies are considered to be SMEs, which are expected to benefit from savings in electricity bills of approximately 15%. By the end of 2017, approximately 15,400 production site energy audits had been carried out, relating to approximately 8,600 companies. More than 45% of the audits concerned manufacturing companies. The potential energy saving deriving from interventions with pay back times equal to a maximum of 3 years is approximately 0.78 Mtoe / year of which 0.6 Mtoe / year derives from the manufacturing sector.

The amendment of the legislation concerning energy-intensive companies introduced with the decree of 21 December 2017 has had relevant consequences on the ESCOs. The impact of the new decree was in fact negative for ESCOs, as it limited the willingness of managers of energy-intensive companies to make their company more efficient. The legislation has indeed reduced the implementation of both energy efficiency measures on production processes and auxiliary services and reduced the willingness to adopt self-

consumption measures concerning for example co-generation, since it has increased the overall Pay Back Time.

### **Energy Audit Implementation by Legislative Decree 102, 2014**

3.2.5 The obligation to undertake energy audits every four years introduced by Legislative Decree 102, 2014 has resulted in an increase in awareness regarding the energy consumption of companies. Whilst the Energy Efficiency Directive only requires large companies (i.e. not SMEs) to undertake energy audits, in Italy, Legislative Decree 102 expanded the definition of a 'large company' to also include energy intensive companies, regardless of the number of employees or turnover. This means that several SMEs are obligated to undertake energy audits in Italy.

The energy audit leads to the adoption of energy efficiency measures concerning specifically general services and ancillary services. In addition, there has been an increase in the adoption of energy management systems ISO 50001 since the first compliance period in 2015, as this is another way to meet the requirements of the legislation. Many companies have opted to implement ISO 50001 in time for the second compliance period deadline at the end of 2019 instead of repeating the energy audit. For the second compliance period, the obligation is based on actually measured consumption data and not on estimated consumption data as it was in 2015.

### **3.2.6 Industry 4.0 Plan**

The Industry 4.0 plan has been developed with the aim of giving a chance to companies to seize the opportunities related to the fourth industrial revolution. The Industry 4.0 Plan is made of numerous regulations, which aim to favour investments in innovation and competitiveness. These are both pre-existing measures and measures developed to respond to emerging needs. The guidelines with which the measurements were developed are as follows:

- Operate in a logic of technological neutrality,
- Intervene with horizontal and not vertical or sectorial actions,
- Act on enabling factors

The measures envisaged by the Industry 4.0 Plan can be activated automatically and without dimensional, sectorial or territorial constraints. The "Industry 4.0 Plan" is made of constantly evolving measures. The already planned measures so far have already helped to increase the investments made by companies and have encouraged the propensity to invest in technological innovation of many companies, from SMEs to large ones. The Plan has little impact on ESCOs, but it affects the most specialized hardware / software technology providers.

## **3.3 Spain**

During the last few decades, primary energy consumption in Spain has become more diversified, with renewable energy sources and natural gas accounting for greater proportions. After a long upward trend in energy demand, 2007 marked a change and the beginning of a downturn, mainly due to the drop in demand for coal and petroleum products. This decreasing

trend intensified from 2008 onwards, affected by the economic crisis, the impact of which became most evident in 2009 when primary energy demand dropped by 8%.

Thereafter, although demand continued to fall, the decrease slowed and stabilised. This downward trend was reversed in 2015 by a 4.1 % increase in consumption. Consequently, 2015 appeared to mark a new turning point after seven consecutive years of shrinking energy demand, which contracted by 20% between the start of the financial crisis and 2014.

The decrease in energy demand by the industrial sector as a whole in 2014 derives primarily from the drops in demand for gas (-3.1 %) and petroleum products (-4.9 %), which, together, represent 57.1 % of the sector's entire energy demand. Between 2005 and 2009, there was a drop in industrial energy demand (which exceeded the decline experienced by Gross Value Added (GVA)), which was essentially due to the adoption of energy-saving measures. Electricity intensity likewise decreased. However, a surge in overall energy intensity occurred between 2009 and 2013, followed by another decline in 2014 and 2015. Energy demand in the industrial sector continues to be covered primarily by fossil fuels. Consequently, this energy source has a significant impact on intensity (which is evolving in parallel with thermal intensity) in this sector. All of this was compounded by the increases in energy prices for industrial consumers from 2008 onwards, which, in the case of electricity, meant a slightly steeper decline in its demand during the first years of the financial crisis.

When compared at European level, and taking into consideration the industrial sector as a whole (including construction), the evaluation of energy intensity in Spain is more favourable, showing intensity below that of the EU average. However, from 2010 onwards, coinciding with the financial crisis, the indicator worsened. The following direct actions were carried out with the aim of reducing final energy consumption in the industrial sector:

3.3.1

#### **Industrial competitiveness incentive programme (Ministry of Economy, Industry and Competitiveness)**

The aim of the Industrial Competitiveness Incentive Programme was to stimulate business investment that would contribute significantly to generating added value in the industrial sector. With this objective, this programme has supported investment plans to improve industrial facilities in operation by making changes and modifications intended to have a significant impact on their competitiveness. More specifically, the purpose of the aid was to help beneficiary companies shift towards newer production models, which were more advanced, efficient and environmentally friendly, and towards the manufacture of products and the provision of services with greater added value, enabling the companies to gain access to and increase their presence in international markets.

Enterprises operating in the categories below were eligible for the aid:

- Manufacturing industry in general.
- Manufacture of vehicles powered by alternative energies, their equipment and parts; and manufacture of products linked to their associated infrastructure.
- Aerospace industry.

Support came in the form of reimbursable loans, with a 10-year repayment period, for industrial investment to improve and/or modify previously existing production lines. These improvements/modifications were defined as a piece or set of equipment intended to replace previously installed elements on the line or to supplement the line, with the aim of improving its characteristics or modifying production characteristics.

These modifications could comprise changes to the line's production capacity but could not constitute new production lines separate from the older ones. In all cases, companies eligible for support through this programme had to report on final energy savings for the projects for which support was provided. Since 2015, the industrial competitiveness incentive programme has quantified the energy savings of approved projects. That year, 297 projects were approved, representing investment of EUR 548 million and an estimated saving of 47515 toe/year.

### **Aid programme for energy efficiency measures in SMEs and large industrial enterprises**

3.3.2 The Aid Programme for Energy Efficiency Measures in SMEs and Large Industrial Enterprises financed by the EENF (National Energy Efficiency Fund) was approved on 28th April 2015 in order to provide incentives for, and to promote policies in, the industrial sector which reduce CO<sub>2</sub> emissions by improving energy efficiency, with the aim of reducing final energy consumption. This Aid Program is aimed at Small and Medium Enterprises (SMEs) and large companies in the industrial sector to carry out actions to improve energy efficiency and implement energy management systems.

This aid program will facilitate the implementation of energy saving and efficiency measures detected by the industrialist or proposed by energy audits to reduce energy consumption in industrial processes. This reinforces and gives continuity to the obligation imposed on large companies by Article 8 of Directive 2012/27 / EU, to conduct an energy audit before December 5th, 2015 and, at least, every four years to from the date of its realization. This same article indicates that companies that have implemented an energy management system, certified by an independent body in accordance with European or international standards, will be exempted from the obligation to perform an energy audit periodically.

The programme was initially allocated a budget of EUR 49,016,421, which was increased by EUR 66,200,000 by Decision of the IDAE Board of Directors of 27th December 2015, bringing the total budget — financed by the EENF — to EUR 115,216,421.

Aid will be provided in the form of monetary grants without consideration, the maximum amount being 30 % of the corresponding eligible investment up to a ceiling of EUR 4 million. The measures for which support was provided fall into one or more of the following categories:

- 3.3.3 • Policy measure 1: Improvement of industrial equipment and process technology (minimum eligible investment of EUR 75,000).
- Policy measure 2: Implementation of energy management systems (minimum eligible investment of EUR 30,000).

### **Energy audits and management systems (Article 8)**

Article 8 of Directive 2012/27/EU on energy efficiency was transposed into Spanish law by adoption of Royal Decree 56/2016 of 12th February 2016 transposing the above Directive's provisions on energy audits, accreditation of energy service providers and energy auditors, and promotion of efficiency in energy supply.

In accordance with Article 2 of the aforementioned Royal Decree 56/2016, the obligation to perform an audit is applicable to companies that employ a minimum of 250 people and to those that, although not fulfilling this requirement, have an annual turnover in excess of EUR

50 million and, at the same time, an annual balance sheet in excess of EUR 43 million. These large enterprises or corporate groups must undergo an energy audit every four years, counted from the date of the previous energy audit.

### 3.4 Romania

Following Romania's accession to the European Union in 2007, the Government of Romania adopted the National Reform Programme for 2007-2010, which sets the priorities for the development of the country, taking into account the guidelines of the Lisbon Strategy of the European Union for growth and jobs, aiming at reducing the gaps compared to other member states of the European Union.

Thus, for Romania, the **National Reform Programme (NRP)** represents the framework for defining and enforcing economic development policies in line with the EU policies, which allow concentration of efforts and national resources to modernize Romanian economy and society, and support economic and social convergence with the other EU member states.

The Romanian **National Energy Regulation Authority (ANRE)** is an autonomous administrative body under Parliamentary control, entirely self-financed and independent with regard to its decision-making process, organisation and functioning. ANRE's scope of activity is to issue, approve and monitor the implementation of the nation-wide binding regulatory framework required for the proper functioning of the electricity, heat and natural gas sectors and markets in terms of efficiency, competition, transparency and consumer protection.

ANRE, through the Energy Efficiency Department, in collaboration with other competent authorities, promotes the development of the energy services market and regulates access to it, especially for SMEs by disseminating clear and easily accessible information on the available energy services contracts and provisions that must be included in such contracts, to guarantee energy savings and end users' rights. In addition to legal implementation, ANRE conducted awareness-raising campaigns. This included a series of **training courses** for energy managers in 4 different cities – Bucharest, Craiova, Iasi and Brasov. The courses introduced a new platform for energy managers to upload the annual energy consumption data onto ANRE's portal. Approximately 300 energy managers from companies with a total energy consumption exceeding 1,000 MWh per year participated in **workshop** addressed to the representatives of public local authorities, which have the obligation to elaborate energy efficiency improvement programmes, including short term (less than 3 years) and medium

#### 3.4.1 term (3 to 6 years) measures.

The main sources of financing for energy efficiency projects are listed below:-

#### **Funding granted under agreements signed between the Swiss Government and the Romanian Government**

The Cohesion Fund has available a €24.39 million grant for loans to SMEs. The purpose of the project is to grant loans in 4 priority sectors: production, healthcare, services, and tourism. The project markets specific energy saving systems/equipment and systems/equipment using renewable energy sources to streamline SMEs activities. The Intermediary Body is the Ministry of Energy, Small and Medium-sized Enterprises and Business Environment – Directorate for the Implementation of Programmes for Small and Medium sized Enterprises.



### **RO 05 program "Energy efficiency" financed by the Financial Mechanism of the European Economic Area (EEA)**

The aim of this mechanism is to support energy efficiency projects in industrial sectors with a focus on high pollution and high energy consumption industries. The responsibility for the administration and implementation of the program rested with the Implementation Unit / Program Operator (OP) within the Directorate of Industrial Policies and Competitiveness of the Ministry of Economy, in accordance with Order no. 2462/2013 of the Ministry of Economy. The specific objective of the Program is to increase energy efficiency in the industrial field, especially in industries with a high degree of pollution and energy consumption.

The eligible applicants are SMEs in the industrial sectors in accordance with the provisions of Law no. 346/2004, and where their fields of activity do not include the sectors excluded in the state aid scheme.

### **Romanian Energy Efficiency Fund (FREE)**

In Romania, the Romanian Energy Efficiency Fund, (FREE) has been developed. With an initial availability of about \$10 million, obtained as a grant from GEF (Global Environment Fund) through IBRD. The Fund finances investment projects to increase the efficient use of energy in Romania, according to the priorities established by the annual energy efficiency programs, approved by the Government.

The major advantage of FREE is that small projects can be financed. Eligible beneficiaries can be companies with private or public-private capital in the residential sector, industry, transport, agriculture, services and tourism or public institutions of local or national interest. The financing services offered by FREE can cover up to 80% of the value of the approved energy efficiency projects, making it especially attractive to SMEs.

### **Sustainable Energy Financing Facility (RoSEFF)**


The funding programme 'Sustainable Energy Financing Facility' (RoSEFF) is currently active and supports SMEs in Romania to invest in energy efficiency and renewable energy by providing technical and financial facilities. In 2013, RoSEFF together with Business Advisory Services (BAS) in Romania and ANRE organised several training programmes on practical solutions to reduce energy costs for SMEs. RoSEFF is a financing program developed by the European Union and EBRD. RoSEFF supports SMEs to invest in energy efficiency and renewable energy by granting:

- loans through the participating financial institutions (banking institutions),
- free technical advice,
- EU grants.

Investments are made in sectors such as agriculture, metal processing, plastic injection, wood processing, printing industry, agri-food industry, hotels and more.

### **Facilities for preparing energy efficiency projects for financing**

Assistance is offered to SMEs through the BAS EBRD Program, administered by the EBRD and funded by the Austrian Ministry of Finance. Co-financing is provided for consultancy projects carried out by local consultants for small and medium-sized enterprises in Romania. Through the BAS Program, eligible Romanian companies can obtain grants that cover up to



75% of the cost of a consulting project, up to a maximum value of €10,000. The eligibility criteria for beneficiaries of the grant include:

- They have a majority Romanian ownership;
- Have at least two years of activity;
- Do not exceed 250 employees;

Firms operating in the services and production sectors are eligible. The beneficiary companies of the BAS Program can participate in a second project financed by BAS only after the successful completion of the previous project including post-project monitoring, and if the field of consultancy is different from the previous one.

## 4 Analysis of Relevant Projects

### 4.1 EneRgy in SMEs (ERASME)

<b>Name:</b>	EneRgy Audits in SMEs (ERASME)	<b>Location:</b>	Seven EU regions, all belonging to the same area (Central Europe), including Italy.
<b>Type:</b>	PROJECT	<b>Funding:</b>	Intelligent Energy Europe
<b>Start date:</b>	March 2012	<b>End date:</b>	Sept. 2014
<b>Website:</b>	<a href="https://ec.europa.eu/energy/intelligent/projects/en/projects/erasme">https://ec.europa.eu/energy/intelligent/projects/en/projects/erasme</a>		
<b>Description:</b>			
ERASME has developed and demonstrated a new scheme for energy audits based on a 2-step approach. The demonstration was operated by a network of SME associations or regional development agencies, in seven EU regions, all belonging to the same area (Central Europe). The project tackled the 3 main barriers that prevent smaller companies from implementing energy audits: unwillingness to spend money for the audit without certainty of the results; concern regarding disclosing data about production processes; lack of financing for energy efficiency investments.			
<b>Achievements/Impact:</b>			
<ul style="list-style-type: none"><li>• 258 first-step and 35 second-step energy audits implemented, and a total of 6104 SMEs contacted.</li><li>• 102 ERASME Energy Auditors were trained (target was 140). The capacity of the auditors was largely appreciated in all regions, even when audits were the practical part of the training course.</li><li>• An accurate review of the best public financial schemes running in the various regions was completed.</li></ul>			
<b>Barriers:</b>			
The main difficulties in running energy audits were concentrated in the Czech Republic and Northern Black Forest (Germany). In the Czech Republic the lack of public interest was the main barrier and in Northern Black Forest (Germany) the main barrier was that the ERASME programme competed with the official public programme.			
<b>Key learning points:</b>			
The main lesson learned was that SMEs appreciate energy audit as the first step. They are aware that this simple analysis can indicate the weakest aspects of the energy efficiency of process and facilities, and suggest a deeper analysis of possible interventions. Several zero- or low cost-actions were suggested, and very often these were put into practice by the SME immediately after the energy audit. The conclusion is that an energy audit campaign should be supported by an energy management obligation or strong incentives.			
<b>Relevance to SPEEDIER:</b>			
The project revealed that the energy audit does not in itself produce the willingness to invest in energy efficiency improvements. The main reasons for this are that the SME: has other priorities; is in a period of reduction of production; lacks the financial resources required; prefers to wait for some time to better plan the required expenditure.			
We need to find ways to overcome the aforementioned barriers to create momentum and engage the SMEs to take action in the SPEEDIER project.			



## 4.2 Promoting Industrial Energy Efficiency (PINE)

<b>Name:</b>	Promoting Industrial Energy Efficiency (PINE)	<b>Location:</b>	Italy
<b>Type:</b>	PROJECT	<b>Funding:</b>	The intelligent Energy Europe Programme.
<b>Start date:</b>	March 2012	<b>End date:</b>	March 2015
<b>Website:</b>	<a href="http://www.pineaudit.eu/eng/resources.aspx">http://www.pineaudit.eu/eng/resources.aspx</a>		
<b>Description:</b>	<p>PlnE aims to increase energy efficiency in industrial SMEs by means of auditing schemes and subsequent provision of professional technical advice for the implementation of customized measures, with the long-term goal to create a self-sustaining model capable of expanding project-specific measures.</p>		
<b>Achievements/Impact:</b>	<ul style="list-style-type: none"> <li>• A common definition and guide for energy audits was prepared that presents the project methodology and tools to guide the work of auditors and scouts across European countries.</li> <li>• 280 preliminary audits were undertaken in selected SMEs (out of 1,400 SMEs contacted). SME selection criteria concerned the potential for energy savings and the willingness of the SME to implement the system on their premises.</li> <li>• 140 full audits were undertaken in selected SMEs (out of the 280 SMEs with preliminary audits).</li> <li>• Cumulative investments in energy efficient equipment and other energy savings devices made by industrial SMEs benefitting from PlnE exceeded the target of € 700,000 raising up to € 1,614,000. PlnE's actions lead to 1,668 toe in energy savings in SMEs that benefitted from PlnE's full audits.</li> <li>• The project set up the "PINE network for the Promotion of Energy Efficiency", to promote and increase energy efficiency in companies through energy audits, promotion of innovative technologies, improvement of company management, training and any other services that could contribute to manage energy in more effective way.</li> </ul>		
<b>Barriers:</b>	<p>The decision to start an energy audit is based on the perceived value of the audit which is often underestimated due to several "soft barriers" including: key decision makers don't believe in using external consultants; excessively high or low expectations of the achievable savings; perception that the energy audit may be biased due to previous experiences focused on a single commercial solution; SMEs fear that energy efficiency measures may adversely affect product quality.</p>		
<b>Key learning points:</b>	<ul style="list-style-type: none"> <li>• The key factor to successful energy auditing campaigns is a good communication.</li> <li>• It is crucial to inform companies about the actual potential of energy efficiency measures</li> <li>• An energy audit campaign aimed at long term success needs to provide long term support to companies and go well beyond delivering the energy audit report.</li> <li>• No data = no savings. The available data - or the lack of it - affects the level of analysis that can be performed.</li> </ul>		
<b>Relevance to SPEEDIER:</b>	<p>Lessons learned from this project are relevant to the deployment of SPEEDIER and ensure its effectiveness, specifically with regard to the training sessions, the engagement of SME and the active participation of the reference point within the SMEs involved. Care must be taken to ensure that robust data is available from SMEs to ensure savings can be measured. SPEEDIER Experts must also be prepared to provide long term support of SMEs beyond the initial energy audit.</p>		

## 4.3 THE4BEES

<b>Name:</b>	THE4BEES - TRANSNATIONAL HOLISTIC ECOSYSTEM 4 BETTER ENERGY EFFICIENCY THROUGH SOCIAL INNOVATION	<b>Location:</b>	Italy plus other 5 EU Countries in the Alpine region
<b>Type:</b>	PROJECT	<b>Funding:</b>	Interreg Alpine Space Program
<b>Start date:</b>	December 2015	<b>End date:</b>	December 2018
<b>Website:</b>	<a href="https://www.alpine-space.eu/projects/thefourbees/en/home">https://www.alpine-space.eu/projects/thefourbees/en/home</a>		
<b>Description:</b>	<p>THE4BEES builds on the hypothesis that energy is consumed by people rather than by buildings. Although most of the strategies to achieve energy efficiency in buildings focus on technical mitigation measures, to reach the ambitious goals on Low Carbon set by EU and Alpine Strategy (EUSALP), both structural and soft approaches were considered complementarily across the Alpine Space.</p> <p>THE4BEES focused on the behavioural changes of users in public buildings needed to achieve reduction of energy consumption. Such changes will be originated by the use of innovative ICT applications developed by a transnational ecosystem. Those applications will be used by the target groups in the demonstration sites (schools, houses, factories) to encourage behavioural changes for energy efficiency and carbon footprint reduction.</p>		
<b>Achievements/Impact:</b>	<ul style="list-style-type: none"> <li>• <b>Raising awareness of target groups on low carbon behaviour.</b> Awareness was raised thanks to innovative and effective methods and tools (bar camps, digital storytelling, and infographics) based on a socio-economic study on virtuous behaviours and capitalization of previous/current initiatives.</li> <li>• <b>Reducing energy consumption in target buildings.</b> Reduction of energy consumption and low carbon behaviours in buildings by target groups obtained through the improved awareness and use of IT tools jointly designed during transnational Co-Creation Labs.</li> <li>• <b>Improving low carbon and spatial development policies.</b> Low Carbon/Energy Efficiency policies improved based on study and analysis of other initiatives and the results of Co-Creation Labs and of the experimental phase. Also exploitation plans have been suggested.</li> </ul>		
<b>Barriers:</b>	<ul style="list-style-type: none"> <li>• Low prominence of energy efficiency – energy is invisible and saving energy is often a low priority.</li> <li>• Low cost of energy – efficiency measures can be, or are perceived to be relatively expensive.</li> <li>• Availability of energy efficient technology.</li> <li>• Lack of knowledge and understanding of energy saving behaviour and efficiency measures available.</li> <li>• Hassle factor of installing efficiency measures, such as the need to clear out the loft before insulation.</li> <li>• Aesthetics, for example where people are concerned about the attractiveness of energy saving alterations.</li> <li>• Social norms influence people's behaviour and can prevent them from adopting new efficiency measures.</li> <li>• Policy acceptability, for example, Government is unlikely to heavily regulate energy use because of lack of acceptability within the electorate.</li> <li>• Barriers have been overcome by involving all key actors responsible for energy uses at regional level, i.e. citizens and households, businesses, trade associations, cooperatives and social operators.</li> </ul>		
<b>Key learning points:</b>	<ul style="list-style-type: none"> <li>• Awareness and involvement of all stakeholders is almost as important as monitoring a building.</li> <li>• Digital solutions designed for and by users contribute to energy and CO2 savings, comfort and health improvement.</li> <li>• Behaviour change by users is a key element of the sustainable energy management of buildings.</li> </ul>		
<b>Relevance to SPEEDIER:</b>	<p>Strategies and methodologies for user engagement through co-creation activities are of the utmost importance. SPEEDIER will overcome some of the identified barriers by removing the hassle factor for SMEs and using the capacity building workshops for staff at different levels to improve knowledge of staff. The proposed SPEEDIER mobile app will be key to encouraging energy efficient behaviours among staff through creating social norms.</p>		

## 4.4 HEART – The Sum of All Things

<b>Name:</b>	HEART – The Sum of All Things	<b>Location:</b>	Italy plus other 9 countries. Geographical focus: central and Southern Europe
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.2.1.5.2. € 6 638 687,50
<b>Start date:</b>	October 2017	<b>End date:</b>	September 2021
<b>Website:</b>	<a href="https://heartproject.eu/">https://heartproject.eu/</a>		
<b>Description:</b>	<p>HEART focuses on improving energy efficiency in the building sector and aims to develop, test and validate a holistic and multi-technological integrated and interconnected system for the deep rehabilitation of residential buildings. The HEART toolkit incorporates different components and technologies, which cooperate to transform an existing building into a smart building. The core of HEART is a cloud-based computing platform that includes decision-making and energy management features. The HEART toolkit thus becomes the heart of a building, regulating its energy consumption and energy flow.</p>		
<b>Achievements/Impact:</b>	<p>The HEART objectives are to:</p> <ul style="list-style-type: none"> <li>• Inform and raise awareness of the integrated multi-energy and Smart Grid-interactive system, the innovation of the product and technologies used.</li> <li>• Raise awareness and inform of the expected impact of the product in terms of organic integration, optimizing synergies, maximizing energy efficiency and affordability.</li> <li>• To disseminate effectively the HEART product and features through various communication channels.</li> <li>• To translate technical language and research findings into appropriate messages for different audiences.</li> </ul>		
<b>Barriers:</b>	<ul style="list-style-type: none"> <li>• Retrofit interventions are mostly carried out in isolation and in a fragmented manner, which results in the mere addition of ameliorative envelope or HVAC solutions rather than their systemic and effective integration. Such inefficiencies and mutual interferences can seriously inhibit the actual achievable energy saving potential of the building.</li> <li>• Barriers related to building regulation frameworks in the target countries can be considered among the main obstacles to HEART's implementation.</li> <li>• Additional barriers relate to the interaction of the building with the Smart Grid.</li> <li>• Behavioural barriers prevent uptake of the proposed solution.</li> </ul>		
<b>Key learning points:</b>	<p>The project is ongoing so key learning points have yet to be finalised. However early learnings from the project's aims are that:</p> <ul style="list-style-type: none"> <li>• Influencing and educating relevant stakeholders with the aim of positively affecting technology uptake, research and legislative framework development will increase potential for deployment of the technology.</li> <li>• Simplifying the European building renovation process will improve uptake.</li> <li>• Involvement of stakeholders, and supporting energy efficiency financing as well as the exploitation of renewable energy are important factors to consider</li> </ul>		
<b>Relevance to SPEEDIER:</b>	<p>We can leverage specifically on two main topics of the HEART project:</p> <ul style="list-style-type: none"> <li>• Active involvement of stakeholders is important;</li> <li>• Support for energy efficiency financing is important.</li> </ul>		

## 4.5 EPC\_PLUS

<b>Name:</b>	EPC_PLUS	<b>Location:</b>	GREECE
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.7.
<b>Start date:</b>	March 2015	<b>End date:</b>	March 2018
<b>Website:</b>	<a href="http://epcplus.org/">http://epcplus.org/</a>		

### Description:

The EPC Plus project aims at developing and promoting new business models for the implementation of innovative energy efficiency services through cooperation of Small and Medium-sized Enterprises (SMEs) and reducing the transaction costs of energy service packages drastically so that smaller investments and projects in SMEs become possible for companies offering energy services. A main aspect in this project is providing a guarantee to SME with regard to the technical risks.

### Achievements/Impact:

- The development of commercial, standardized energy service packages for SMEs in each participant country.
- The implementation of pilot projects for the EPC Plus packages in each participant country.
- The set-up and management of clusters of companies SPINS (SME Partnerships for Innovative Energy Services) in each participating country. These clusters will offer energy services to the SME market.
- The training of clusters of companies in each participant country.
- The development of an international e-market for energy service providers.

### Barriers:

Decision maker's lack of knowledge, the low priority of energy efficiency implementation compared to other business needs, lack of available finance to invest in Energy Efficiency upgrades and complexity of Energy Performance Contracts were the major barriers that the project had to deal with. EPC Plus also faced other challenges like a lot of time was needed in the promotion and in explaining the concept of EPC, inactivity of the SPINs, organizational structure of the client's company and disagreement between decision makers. Modernization of buildings was also one of the challenges to deal with as in some buildings the existing technologies were working properly and were efficient enough that only a few luminaries needed to be replaced and no further actions were necessary.

### Key learning points:

- It is necessary to build up a well-established and professional marketing strategy
- Easy and smooth communication with clients is important
- Contracts and agreements between the partners need to be very simple.
- The checklist can be very useful tool to demonstrate the client that all necessary steps have been taken.
- It is almost impossible to establish one-size-fits-all standard solutions and contracts, hence the project needs continuous improvements.
- The national regulatory/technical framework in which the tools are adapted should be continuously updated and shared by members.
- Regional preferences can play an important role when it comes to the EPC. Having trusted and well-known partners was driver for success.

### Relevance to SPEEDIER:

Learnings from the EPC Plus project will be very useful for the SPEEDIER as EPC Plus was dealing with SMEs for implementation of Energy Efficiency Services and it addresses the challenges and barriers faced with the SMEs during the project tenure. SPEEDIER should take note of the learning points relating to contracts and agreements, national frameworks and regional preferences as the barriers faced by SPEEDIER are likely to be similar to those faced by EPC Plus.

## 4.6 Financing Energy Efficiency at MSMEs

<b>Name:</b>	Financing Energy Efficiency at MSMEs	<b>Location:</b>	INDIA
<b>Type:</b>	PROJECT	<b>Funding:</b>	World Bank
<b>Start date:</b>	May 2010	<b>End date:</b>	May 2019
<b>Website:</b>	<a href="http://www.indiasavesenergy.in/">http://www.indiasavesenergy.in/</a>		

### Description:

The project is part of the Global Environmental Facility (GEF) Programmatic Framework for Energy Efficiency in India with an objective to increase demand for energy efficiency investments in target micro, small and medium enterprise clusters and to build their capacity to access commercial finance. The project aspires to address the current gap in understanding between energy auditors and bank loan officers and demonstrate a viable mechanism of synergic tie up between SMEs, energy auditors, financial consultants/ chartered accountants, local industrial or MSME associations and local bankers.

### Achievements/Impact:

- 4.6 million Life Time Emission Reduction Units (1 ERU = 1 tonne of CO<sub>2</sub> equivalent) Carbon Reductions.
- 959 investment grade Detailed Project Reports were prepared.
- Direct Energy Efficiency (EE) investment of INR 1600 million confirmed by Measurement & Verification reports.
- 5746 EE outreach activities and training of 750 Energy Auditors, 1400 Financial Institution sector personal training took place and 4 EE demonstration videos prepared for capacity building.

### Barriers:

- Lack of capacity in SME unit to implement identified measures.
- Lack of interest of SMEs to uptake EE improvements
- Delay in procurement of external energy auditors/consultant
- Inability of auditors to provide quality and independent opinion
- Absence of mid-term review of Monitoring and Evaluation framework
- Lack of appropriate communication to public and communities on results

### Key learning points:

- EE financing projects need to incorporate, in a balanced way, a function that efficiently packages project design including marketing, development, and technical scoping with a financing function.
- EE financing projects should be based on commercial principles, should be investment driven and should avoid unduly distorting the market.
- Technical assistance to commercial financial institutions is an important element of building institutional capacity.
- A comprehensive and holistic market assessment is a key project pre-condition required for the early identification of a robust pipeline of projects to be financed.
- EE loans for SMEs are typically small, particularly when potential clients are from the SME sector. This poses major challenges to keep transaction costs reasonable.
- Robust monitoring and evaluation plans should be created upfront, incorporating periodic project review.

### Relevance to SPEEDIER:

This project is relevant to SPEEDIER in terms of addressing the barriers around lack of finance for Energy Efficiency Improvement projects among the SMEs and focusing on capacity building activities to build awareness on EE improvement benefits among SMEs, Banks and Energy Auditors. SPEEDIER should aim to address these during the design and implementation of the programme.

## 4.7 ICTFOOTPRINT

<b>Name:</b>	ICTFOOTPRINT	<b>Location:</b>	UK
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.
<b>Start date:</b>	February 2016	<b>End date:</b>	January 2019
<b>Website:</b>	<a href="https://www.ictfootprint.eu/">https://www.ictfootprint.eu/</a>		
<b>Description:</b>			
<p>The project's main objective is to promote the adoption of carbon footprint calculation methodologies in the ICT sector. ICTFOOTPRINT.eu will help ICT sector by calculating its carbon footprint in an easy way, in order to decrease environmental impact and at the same time improve competitiveness. ICTFOOTPRINT.eu also plays a key role in raising awareness of energy efficiency issues through outreach and events.</p>			
<b>Achievements/Impact:</b>			
<p>ICTFOOTPRINT.eu has provided ICT organisations with:</p> <ul style="list-style-type: none"><li>• Guidance and tools to calculate energy and carbon footprint of ICT using standards and methodologies.</li><li>• Information on certifications, best practice reports and how to customise to core business.</li><li>• Support for ICTFootprint services through helpdesk.</li><li>• Documents focussing on methodologies and success stories to raise awareness on benefits of adopting measures to reduce carbon footprint.</li><li>• Access to the ICTFOOTPRINT.eu marketplace where users can access a database of sustainable ICT service offers.</li></ul>			
<b>Barriers:</b>			
<p>The difficulty to identify clear benefits other than direct economic savings, was the major barrier identified and other challenges faced includes lack of resources (time, budget) and lack of awareness of appropriate energy efficiency upgrades, lack of data and information on current energy consumption, lack of internal expertise and retrofitting of existing services.</p>			
<b>Key learning points:</b>			
<ul style="list-style-type: none"><li>• Community engagement is a core aspect in the project and the project team is involved in the identification of relevant stakeholders.</li><li>• An important aspect for awareness raising is the availability of educational and training material.</li><li>• It will also help to collate existing European best practices and success stories relevant to the ICT sector. Collected success stories, along with a literature review, will help ICT based SMEs to gain a better insight into the green players in the European ICT market, and their best practices.</li><li>• One more learning point is that convergence, consistency and complementarity between existing methodologies for calculating carbon footprint should be encouraged to simplify the choice of methodology for use, while ensuring higher consistency between distinct assessments.</li></ul>			
<b>Relevance to SPEEDIER:</b>			
<p>ICTFOOTPRINT.eu is relevant to SPEEDIER in terms of learning more about energy efficiency and carbon footprint methodologies for the ICT SME sector as the project has provided tools, knowledge and support to all those who want to address high levels of energy efficiency and decrease their carbon footprint.</p>			



## 4.8 EEMETAL

<b>Name:</b>	EEMETAL	<b>Location:</b>	SPAIN
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU3.3.7.
<b>Start date:</b>	March 2016	<b>End date:</b>	February 2019
<b>Website:</b>	<a href="https://www.ee-metal.com/">https://www.ee-metal.com/</a>		
<b>Description:</b>			
<p>EE-METAL is a European project which aims at increasing energy efficiency and energy savings in SMEs in the metal and metalworking industries. The project was launched in March 2016 and lasted 3 years, with the main aim of providing enterprises with several tools (such as managerial, technical, financial and training) to overcome the existing barriers that hinder the adoption of the energy saving measures. A network of seven partners comprising of enterprises and associations, located in Spain, France, Italy and Poland, gathered more than 7000 companies.</p>			
<b>Achievements/Impact:</b>			
<p>The project team created a database of Best Available Techniques (BATs) applicable in the MMA sector. They developed a Common audit methodology for determining the potential energy saving measures in SMEs in the MMA sector that is applicable at EU level.</p> <p>All relevant documentation is available on (<a href="https://www.ee-metal.com/documentations/">https://www.ee-metal.com/documentations/</a>)</p>			
<b>Barriers:</b>			
<p>Lack of knowledge of industries about financing instruments, together with propensity of companies towards projects with short payback time and low market confidence in ESCOs prevented uptake of energy efficiency measures. The project team developed a SWOT analysis, and the EE-METAL project enhanced connections between the SMEs involved in the metalworking sector and ESCOs or financial institutions.</p>			
<b>Key learning points:</b>			
<p>The project team have acted on a large number of levers to encourage the uptake of energy efficiency actions. This includes: energy audits; training of energy champions in companies; promotion of SCADA systems benefits such as monitoring and controlling the manufacturing process; awareness raising regarding Energy Efficiency upgrades and ongoing dialogue with decision-makers; provision of information on energy consumption to enable manufacturers to compare their current position with their previous position; provision of databases on the best available technologies; contacts with potential ESCO partners (ESCO interventions in meetings; facilitation of business-to-business meetings; direct contact on a case-by-case basis).</p>			
<b>Relevance to SPEEDIER:</b>			
<p>The project team carried out extensive research on the local legislation (that could be useful especially as they worked in Italy and Spain), they have targeted several SMEs, and they have a local/national SMEs ESCOs and stakeholders extensive network. The specific learning points relating to the manufacturing sector could be especially relevant to the Irish pilot region in the SPEEDIER project.</p>			

## 4.9 IMPAWATT

<b>Name:</b>	IMPAWATT	<b>Location:</b>	SWITZERLAND
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.7. H2020-EU.3.3.1.
<b>Start date:</b>	June 2018	<b>End date:</b>	November 2020
<b>Website:</b>	<a href="https://www.impawatt.com/">https://www.impawatt.com/</a>		
<b>Description:</b>	<p>IMPAWATT is an ongoing project aiming to create staff training and capacity building programs on energy efficiency in companies of different sizes, in order to overcome barriers in implementation of energy efficiency recommendations from audits through a learning and teaching effort. The IMPAWATT Project first targets the energy managers inside the firms, who receive training before going on to training the employees themselves.</p> <p>This program will be developed as an online toolbox with a smart search engine for different resources/content/tools for capacity building and staff training material tailored to companies. The expected outputs of the program include webinars, factsheets, white label presentations, calculation tools, staff training games and an energy efficiency measures database. In addition, the platform will allow companies to exchange energy efficiency related experiences and to benchmark their energy efficiency. The platform will also give access to an energy monitoring portal where companies can enter and follow their main energy consumptions and energy efficiency measures.</p>		
<b>Achievements/Impact:</b>	<p>The IMPAWATT platform will be tested in 6 countries, materials in 4 languages will be provided. In total 245 companies will test the platform including user surveys and assessment of energy efficiency improvements and shifts towards more green company policies and culture due to the platform usage.</p>		
<b>Barriers:</b>	<p>In the proposal it was foreseen to apply an external quiz tool for multiple choice tests and quizzes on energy issues which is accessible via link from the platform. Two different tools were mentioned in the proposal: iAcademy and Knowledge Fox. But both the tools have high license fees of advanced versions and missing API for transferring the quiz' results to the IMPAWATT platform. Therefore other tools needs to be reviewed.</p>		
<b>Key learning points:</b>	<p>A key learning point at this stage is the crucial need for training, not only for managers on energy efficiency, but also for the other actors in the company, in order to get valuable results in terms of actual implementation of energy efficiency measures.</p> <p>One more learning point is that profitability and success of energy management is not only related to energy efficiency in relation to the technologies adopted, but also to other important factors like the connected improvements in operation and process integration.</p>		
<b>Relevance to SPEEDIER:</b>	<p>Having to do with staff training, this project is of relevance to SPEEDIER in its later stages, after the assessment tools have been developed, in order to ensure their applicability and use by a wider audience of stakeholders inside the SMEs.</p>		



## 4.10 3STEAM-UP

<b>Name:</b>	STEAM-UP	<b>Location:</b>	NETHERLAND
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.7.
<b>Start date:</b>	March 2015	<b>End date:</b>	February 2018
<b>Website:</b>	<a href="https://www.steam-up.eu/en">https://www.steam-up.eu/en</a>		
<b>Description:</b>	<p>STEAM-UP aims specifically at improving the energy efficiency of steam based systems. The project is designed to bridge the significant gap between promising audit results on the one hand, and implementation of cost-effective and easy to implement measures on the other. Steam Up will address these barriers by: building a business case on the basis of 75 in-depth steam audits that cover state-of-the-art steam technology and expertise; including the non-energy benefits of implementing such measures; reducing the organizational costs by providing integrated solutions for implementation and reporting; and implementing a capacity building program that includes training and coaching-on-the-job of over 500 energy auditors, ESCOs, internal energy managers and energy management training providers.</p>		
<b>Achievements/Impact:</b>	<p>In total 77 audits were carried out in the 8 countries (Austria, Czech Republic, Denmark, Germany, Greece, Italy, Netherlands and Spain). 44 of the audits were carried out in SMEs and 33 in large enterprises. The total estimated energy saving potential is 167,074 GWh (which is in monetary terms €6,412,876 per year). The total estimated investment needed will be approximately €29,000,000. In total approximately 400 energy experts were trained in the Steam Up methodology in all the participating countries, coming from all types of sectors and different sizes of companies.</p>		
<b>Barriers:</b>	<p>Access to capital and making Non Energy Benefits (NEB) countable was the major challenges faced during the project implementation. As Energy Conservation Measures (ECM) for steam based systems are on higher side of cost as compared to ECMs for other systems and NEBs are traditionally not included in energy efficiency project implementation economics since there is no commonly recognised method calculating their value.</p>		
<b>Key learning points:</b>	<ul style="list-style-type: none"> <li>• Get the best from existing technology by the use of the best management techniques.</li> <li>• Investigate which technologies are available and applicable to get TOTAL cost reduction (Never miss an opportunity to consider energy efficiency to any project).</li> <li>• All the identified proposals must undergo a technical and financial evaluation.</li> </ul>		
<b>Relevance to SPEEDIER:</b>	<p>STEAM-UP is very much relevant to SPEEDIER as the aim of both the projects are very similar:-</p> <ul style="list-style-type: none"> <li>• Addressing gap between Energy Audit results and ECMS implementation</li> <li>• Capacity Building Program of Energy Auditor, ESCOs and Organisations</li> </ul>		

## 4.11 ENERWATER

<b>Name:</b>	ENERWATER	<b>Location:</b>	SPAIN
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.7
<b>Start date:</b>	March 2015	<b>End date:</b>	October 2018
<b>Website:</b>	<a href="http://www.enerwater.eu/">http://www.enerwater.eu/</a>		
<b>Description:</b>			
<p>The Horizon 2020 ENERWATER Project aimed to develop and validate a universal assessment methodology and an online tool for evaluating, labelling and improving energy efficiency in waste water treatment plants (WWTPs). A subsequent goal was to promote dialogue aimed at creating specific European legislation where energy and water issues were coordinated. The approach of this methodology was to help auditors and experts to evaluate the energy performance of WWTPs through an easy to use methodology and a user-friendly energy auditing tool. The methodology describes in a systematic way the various steps required to establish the Water Treatment Energy Index (WTEI) and the energy labels of a WWTP. It also includes guidelines on how to select equipment and processes to install energy monitors, how to monitor the WWTP and how data should be reported. The Energy Audit Tool aims to evaluate the energy consumption of a WWTP, identify the KPIs and define the WTEI and Energy Labels.</p>			
<b>Achievements/Impact:</b>			
<ul style="list-style-type: none"><li>• An online tool to measure the energy efficiency of a WWTP was developed. This tool assigns the WWTP with an energy label attending to a parameter named WTEI (Water Treatment Energy Index). The classification goes from A, if WTEI is lower than 0.5, to G if WTEI is higher than 3. It is based on the definition of several indicators of energy efficiency in WWTPs.</li><li>• An energy efficiency benchmarking system to support routine measurements and monitoring controls of critical energy points (“energy hotspots”) in plants.</li><li>• A benchmark database with energy data from more than 600 waste water treatment plants.</li><li>• Monitoring energy efficiency in 50 WWTPs and training of 20/30 professionals on the online tool.</li></ul>			
<b>Barriers:</b>			
<p>There is no specific standardisation framework for energy efficiency within the waste water sector. As a consequence a consultation was made to CEN/TC 165, an engineering Committee on waste water that produced a technical report which could be used as a basis for training energy auditors. The project’s ambition is that the developed methodology will be approved as a European standard. Difficulties on the installation of the equipment and delays due to the different water treatment plant layouts also restricted the ability to implement energy efficiency measures.</p>			
<b>Key learning points:</b>			
<ul style="list-style-type: none"><li>• It was necessary to develop 2 versions of the methodology in order to facilitate its application by different users: a rapid audit methodology which uses routine measurements and energy bills to assign an energy label and a WTEI and; a Decision Support methodology that provides a diagnosis and identification of energy hotspots at the WWTP sections.</li><li>• Presentation of partial and complete results of the project in international conferences could be a positive dissemination tool.</li><li>• Standards and legislation are significant instruments to demonstrate commitment and address issues on energy efficiency. The developed method aims at becoming a standard energy audit tool.</li><li>• It is of critical importance to involve key stakeholders and gather their inputs. This was mainly achieved through the organization of national events.</li></ul>			
<b>Relevance to SPEEDIER:</b>			
<p>There are many similarities between this project and SPEEDIER in terms of the delivery of training for experts, the development of a tool to measure energy efficiency and support the experts and SMEs. SPEEDIER will benefit from involving stakeholders from the beginning, informing them of the project and using their feedback to tailor the service. The importance of standardisation to different sectors should also be considered in SPEEDIER</p>			

## 4.12 EUREMNext – European EnergyManager

<b>Name:</b>	EUREMNext – European EnergyManager	<b>Location:</b>	GERMANY
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.7. H2020-EU.3.3.1.
<b>Start date:</b>	March 2018	<b>End date:</b>	February 2021
<b>Website:</b>	<a href="https://www.energymanager.eu/en/euremnext-project/">https://www.energymanager.eu/en/euremnext-project/</a>		
<b>Description:</b>	<p>The overarching strategic objective of the EUREMNext project is to contribute to both environmental protection and competitiveness in business by increasing the quality of energy audits and thereby the rate of implementation of energy efficiency measures. EUREMnext project is the continuity of the EUREMplus project. The target group for the Energy Manager Training are technical experts and companies' executives as well as energy consultants and ESCOs. This shall be achieved by providing training to increase the availability of qualified and accredited experts with a holistic view of both the technical/engineering and the economic/financial aspects of environmental protection. The EUREM programme is offered in about 30 countries and covers nearly all energy-relevant issues which can arise in companies.</p>		
<b>Achievements/Impact:</b>	<p>The project has the following objectives and is currently ongoing:</p> <ul style="list-style-type: none"> <li>• To transfer the training to 6 new countries to a total of 30 states.</li> <li>• To train 100 qualified Energy Managers.</li> </ul>		
<b>Barriers:</b>	<p>The project is still running, although a main difficulty could be that some of these 6 countries show lack of interest in the scope of the project, including how to motivate the trainees and the trainers.</p>		
<b>Key learning points:</b>	<p>The training is carried out through an extra-occupational programme and consists of face-to-face sessions, online-learning and a final project, plus an exam to complete the learning. The 160 teaching units (45 min each) are held by experienced teachers and professionals. The project work covers 80 teaching units and is accompanied by a professional coach. The units include the following topics: energy technical basics, project management, economic calculation, energy management, energy and emissions trading, building energy requirements, heating technology, heat recovery, cogeneration of heat and power and ventilation and air conditioning, refrigeration technology, electrical engineering, lighting, and compressed air. After having successfully completed all these tasks the EUREM training receive the title of European Energy Manager. The project reveals that the training contents are standardized and therefore worldwide comparable.</p>		
<b>Relevance to SPEEDIER:</b>	<p>A similar methodology could be interesting to include into SPEEDIER training workshops for Trainers and Experts, for example the online-learning or the final exam to ensure that the concepts have been correctly assimilated.</p>		

## 4.13 SME Energy CheckUp; making the most out of energy

<b>Name:</b>	SME Energy CheckUp; making the most out of energy	<b>Location:</b>	NETHERLANDS
<b>Type:</b>	PROJECT	<b>Funding:</b>	Intelligent Energy Europe
<b>Start date:</b>	April 2014	<b>End date:</b>	March 2017
<b>Website:</b>	<a href="http://energycheckup.eu/en/home/">http://energycheckup.eu/en/home/</a>		
<b>Description:</b>	<p>SME Energy CheckUp project provides a free online analytic tool that provides benchmarking, advice, and information on energy saving measures for small and medium sized enterprises in the following sectors: hotels, restaurants, bars, fast food/ice-cream, food retail, non-food retail and offices. SME Energy CheckUp offers a comparative of the energy consumption between similar sized companies in the same sector, helps to assess the costs and potential savings of specific energy saving solutions, and reports an analysis with relevant information subsidies, preferential loans, and other sources of financing available in different regions.</p>		
<b>Achievements/Impact:</b>	<p>The expected results of the project were:</p> <ul style="list-style-type: none"> <li>• Approximately 6000 SMEs using the energy saving tool.</li> <li>• Approximately 600 SMEs implementing energy saving measures (no cost or very low cost investments).</li> <li>• Approximately 150 SMEs implementing serious energy saving measures for which it is necessary to own the building.</li> <li>• Energy saving of 54 GWh in 2017 and an expected 240 GWh by 2020.</li> </ul> <p>No information was found regarding the degree of fulfilment of these expected results.</p>		
<b>Barriers:</b>	<p>Scarce information was found on the website of the project to address this aspect.</p>		
<b>Key learning points:</b>	<p>SMEs Energy CheckUp offers several outputs that are very useful for the customer: a brochure on benchmark data per sector, a brochure on relevant energy saving measures per sector, videos on energy saving measures, a handbook to implement the project in other regions, articles on best examples in the project and a presentation on energy saving that can be used by SMEs organizations.</p>		
<b>Relevance to SPEEDIER:</b>	<p>To carry out the SPEEDIER model in other European countries (apart of Ireland, Spain, France and Romania), as SMEs Energy CheckUp done, we can make a short handbook or brief guide to implement the SPEEDIER tool in other European countries. Additionally the handbook produced by SME Energy CheckUp was focussed on the hospitality sector, which is the focus of the SPEEDIER pilot in Romania.</p>		

## 4.14 ENERGYWATER

<b>Name:</b>	ENERGYWATER	<b>Location:</b>	SPAIN
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EE-2015-3
<b>Start date:</b>	February 2016	<b>End date:</b>	January 2019
<b>Website:</b>	<a href="http://www.energywater-project.eu/">http://www.energywater-project.eu/</a>		
<b>Description:</b>	<p>The EnergyWater project aims to provide support to European manufacturing industries by enabling energy efficient water processing, through the development of an Energy Management Self-Assessment (EMSA) web tool and the creation of an “Energy Angels” Network composed of companies and professionals (ESCOs, Research Centres, Energy auditors, etc.) that advise on best practices and ways to use innovative technologies and aims to create links with strategic partners that can lead to project funding. The objective was to have 115-175 Energy Angels (EAs) registered and supporting companies.</p>		
<b>Achievements/Impact:</b>	<p>A web tool was developed and is available on <a href="https://energywater-emsa.eu/">https://energywater-emsa.eu/</a>. Its key functions are: 1) Initial assessment of industrial water processes efficiency and energy management; 2) guidelines with tailored measures, prioritised by ROI, to improve the Energy Performance (EP); 3) Benchmarking the EP among industrial companies using the tool; 4) a network of 125 Energy Angels that provides a support function to companies in entering data and understanding the outputs of the web-tool.</p>		
<b>Barriers:</b>	<p>The main barrier was finding and motivating high quality consultants to act as Energy Angels. The network provides experts with visibility and potential commercial opportunities. At the same time the network increases engagement and use of the EMSA web-tool by companies.</p>		
<b>Key learning points:</b>	<ul style="list-style-type: none"> <li>• Strategies to get EAs involved (webinars (<a href="http://www.energywater-project.eu/energy-angels/">http://www.energywater-project.eu/energy-angels/</a>), MOOC, survey, etc.), criteria to allow EAs to provide specific services (attending a course and passing an online test) to provide web-tool support, etc.</li> <li>• Business model to maintain the services after the lifetime of the project.</li> <li>• The operational procedure of the network of EAs: All the EAs are documented in an online database which is available via the EMSA web-tool web page. The commercial use of the tool is at the discretion of the EA. Companies will have free access to the database, and can search for an EA according to a number of sub-criteria (spoken language, country, type of company etc.). The network of EAs is autonomous and is based on evaluations and ratings from companies.</li> <li>• The EMSA tool has 2 versions (Lite and Professional)</li> </ul>		
<b>Relevance to SPEEDIER:</b>	<ul style="list-style-type: none"> <li>• A Business model to maintain the tool and network beyond the lifetime of the project was drafted. This could help to analyse how the implementation of the SPEEDIER service could be successful.</li> <li>• The services provided by Energy Angels (EAs) are: 1) Support for the use of the EMSA tool, 2) Energy audits &amp; consultancy, 3) Support for implementation and innovation within companies’ water processes, 4) Financial advice. A Code of Conduct for EAs was stated. Both aspects could help to clarify what is expected from our SPEEDIER experts and appropriately define the scope of the services to be provided by them.</li> <li>• Simple and more detailed versions of the SPEEDIER tool may be required.</li> </ul>		

## 4.15 GreenPlay

<b>Name:</b>	Greenplay	<b>Location:</b>	FRANCE
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.1
<b>Start date:</b>	March 2015	<b>End date:</b>	August 2018
<b>Website:</b>	<a href="http://www.greenplay-project.eu/#home">http://www.greenplay-project.eu/#home</a>		
<b>Description:</b>			

The Green Play Project is an EU funded project involving a Consortium of 7 organizations and three countries, led by ESTIA (Advanced Industrial Technologies Superior School) in France. Its aim is to raise awareness among citizens of the energy efficiency issues and choices they make in their everyday life through the implementation of a monitoring system of their energy consumption and the creation of a serious game to educate people and create sustainable habits of energy efficiency that go beyond the project.

<b>Achievements/Impact:</b>
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The project managed to make demonstrators in 157 homes as opposed to more than 200 European homes that were initially planned. Although the energy savings planned were not really achieved through the serious game, the project gives some interesting insights into behavioural change and energy consumption patterns. The conclusion of the D6.3. Deliverable is that the “objective of the project, to save energy using a serious game initiating a behavioural change, could be achieved and justified only partly”. However, the project was able to find consumption patterns of dwellers of European homes and better understand people’s behaviour in terms of energy saving and consumption.

<b>Barriers:</b>
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The project faced different barriers, such as the overestimated home database, the fact that some home dwellers were not educated to keep their monitoring appliances up and running, especially in France, the fact that no substantial energy consumption reduction was monitored throughout the project. Some efforts in education and of handling the connection issue were better performed in Spain than in France. By the end of the project, only data from around 50 homes was considered useful for the final analysis.

<b>Key learning points:</b>
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- There is a substantial difference between wishful thinking – what you declare your energy reduction will be – and real life. A game, even if it is marketed as a serious one, often stays only a game.
- Sometimes different results are achieved to those that were expected, but these may still turn out to be useful.

<b>Relevance to SPEEDIER:</b>
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Designing a serious game for SPEEDIER could be more efficient for tracking consumption patterns, but may not result in achievement of reductions in energy consumption, unless it is the game resulted in real rewards for SME personnel and teams. In this way it could be both fun and serious. A game approach could be useful for design of the SPEEDIER mobile app to encourage staff at SMEs to use it and learn more about energy auditing and energy efficiency.



## 4.16 TRIBE

<b>Name:</b>	TRIBE	<b>Location:</b>	SPAIN
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.1.
<b>Start date:</b>	March 2015	<b>End date:</b>	February 2018
<b>Website:</b>	<a href="http://tribe-h2020.eu/">http://tribe-h2020.eu/</a>		
<b>Description:</b>			
<p>TRIBE project aimed to contribute to citizens' behaviour change towards energy efficiency in public buildings, through their engagement in the experience of playing a social game, linked by ICT to real time data collected from 5 pilot buildings hosting around 1,300 regular users (employees, tenants etc.) and almost 12,000 eventual users (visitors). The targeted average energy savings in the pilots was 24.8% of the previous energy consumption.</p> <p>The approach taken by the TRIBE project in tackling energy inefficiency is to encourage building users to change their behaviour. TRIBE created a management pack, which included an energy audit, a virtual pilot's design (energy model of the real building), an ICT deployment plan, user engagement campaigns and funding schemes. Perhaps the most innovative aspect was the creation of a social game, available for iOS and Android devices, linked to data collected from five European pilot buildings, including a university, public offices and social housing. The target groups of this project were public building owners and users.</p>			
<b>Achievements/Impact:</b>			
<ul style="list-style-type: none"><li>• Systemic energy consumption, production and emissions reduction between 15% and 30%.</li><li>• Accelerate wide deployment of innovative ICT solutions for energy efficiency.</li><li>• Greater consumer understanding and engagement in energy efficiency.</li><li>• There were about 1,300 regular users directly participating in TRIBE through the pilots. Additionally, 12,000 public building eventual users were involved in TRIBE's pilots. This has constituted a perfect seedbed for TRIBE impacts to start growing, serving for the design and validation of the TRIBE results before its deployment in the EU market. One point of note is that the energy savings results are not very accurate. This implies that some adjustments may have been carried out to fit the obtained results to the expected impact.</li></ul>			
<b>Barriers:</b>			
<p>In the summary CORDIS fact sheet, it was said that TRIBE project would carry out serious game aiming to engage more than 750,000 players by the end of the project, involving users of the targeted pilot facilities and their social networks. However, on the project website, there is no mention of the number of players, and 5 months after finishing the project, there is no obvious way to download the game (no active link, nor android or iOS app in app store). Therefore, it does not seem to be available and as the number of player is not included as an impact in the project, we can assume that the project did not reach the expected objective. Despite this, the consortium found other valuable results during the execution of the project that can be of high impact in future approaches to improve energy efficiency (250 measures) – described in the following point.</p>			
<b>Key learning points:</b>			
<p>Sometimes the expected results cannot be reached, but there is always valuable knowledge that can be drawn from the execution of the projects and initiatives. We have to be watchful to the extra knowledge that sometimes can be even more valuable than the expected impacts, previously defined.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>TRIBE has identified 250 energy efficiency measures that public building users, owners and operators can apply to maximize energy savings in buildings. These 250 energy efficiency measures can be useful for SPEEDIER experts, to make recommendations to the audited SMEs. <a href="http://tribe-h2020.eu/250measures/">http://tribe-h2020.eu/250measures/</a></p>			

## 4.17 EnerGAware

<b>Name:</b>	ENERGAWARE	<b>Location:</b>	SPAIN
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3.1.
<b>Start date:</b>	February 2015	<b>End date:</b>	April 2018
<b>Website:</b>	<a href="http://energaware.eu/#">http://energaware.eu/#</a>		
<b>Description:</b>			
<p>The main objective of the EnerGAware project was to decrease energy consumption and emissions in an affordable housing pilot and increase the affordable housing tenants’ understanding and engagement in energy efficiency. The EnerGAware project was supposed to develop and test, in 100 affordable homes, a serious game that would be linked to the actual energy consumption (smart meter data) of the game user’s home and embedded in social media and networking tools.</p>			
<b>Achievements/Impact:</b>			
<p>The beta version of the serious game, including the building energy consumption and thermal comfort simulation engine, was launched and deployed in the 44 pilot homes of the experimental group. However, searching for results and impact of the project, no real data about reduction of energy consumption has been found.</p>			
<b>Barriers:</b>			
<p>The pilot implementation evaluation report shows up that only 10 players used the serious game (called Energy Cat) developed by this project. This number of game users is not large enough to extract valuable conclusions and accurate results regarding the potential reduction in energy consumption. However, this project seems to have quite numerous results in communication and dissemination activities. Moreover, the serious game is still available for iOS at Apple Store.</p>			
<b>Key learning points:</b>			
<p>It is necessary to ensure that stakeholders are effectively engaged and that the tools developed are useful to them in order to attract participants to our pilots so that valuable and significant results and conclusions can be obtained.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>The target groups of this project were homes, so it is quite different from the organisations targeted by SPEEDIER, which are mainly SMEs and some Large Enterprises. But, the key learning point of this project is still valid: SPEEDIER needs to attract enough participants in the pilots regions, in order to be able to measure the reductions of energy consumption and obtain valuable and significant results and impacts of our project.</p>			



## 4.18 REMBAP

<b>Name:</b>	REMBAP	<b>Location:</b>	SPAIN
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020-EU.3.3. H2020-EU.2.3.1
<b>Start date:</b>	February 2015	<b>End date:</b>	April 2015
<b>Website:</b>	<a href="https://cordis.europa.eu/project/rcn/196185/factsheet/en">https://cordis.europa.eu/project/rcn/196185/factsheet/en</a>		
<b>Description:</b>	<p>This project is an SME Instrument from a company named DEXMA, in SPAIN. DEXMA is a leading provider of Energy Management Software for buildings in the commercial and industry sectors. DEXCell Energy Manager is their main product: a cloud-based software tool that is hardware-neutral, which help organizations reduce energy use and cost, through utility bill tracking, continuous monitoring, submetering, analysis, alarms, reports and controls. The REMBAP project was developed because customers of the company requested artificial intelligence capabilities in their software platform allowing personalized recommendations to be issued remotely by the system to end users. RemBAP is the answer to this demand. It will simplify and reduce the implementation and maintenance costs of efficiency optimization.</p>		
<b>Achievements/Impact:</b>	<p>Thanks to this SME instrument project, the company DEXMA defined and developed the business plan for a new product: RemBAP. They validated the feasibility of their objective to widely reach SME customers with the innovative features of the new product. The European context as well as several target national markets were analysed in order to assess the business opportunities and risks considering the particular political, economic and social factors affecting the adoption of RemBAP in each of these markets. The requirements and features of the new software product were also deeply analysed. With the gained knowledge on the technologies available to bring RemBAP to the reality, they set up an accurate plan for product development and product validation in real operational environments. Following product definition and customer identification, they worked out the business model that they would use during the first period of the commercialization phase and which was the base to build the business plan.</p>		
<b>Barriers:</b>	<p>This was a very short term project to develop a business plan for a new product therefore, no significant barriers were faced by the project. However, today - 4 years after the project was completed, no reference to the RemBAP product is included on the DEXMA website (<a href="https://www.dexma.com/es/">https://www.dexma.com/es/</a>), indicating that the result of this project has not become a commercial product. It is likely that the outcomes of RemBAP have been used to improve their main product (DEXCell Energy Manager) instead.</p>		
<b>Key learning points:</b>	<p>The initial request from customers that initiated this project, was to include in their previous product personalized recommendations to improve reductions of energy use and cost.</p>		
<b>Relevance to SPEEDIER:</b>	<p>As it was mentioned before, it seems that personalized recommendations to improve reductions of energy use and cost of buildings is an important issue that SPEEDIER project should include, potentially through the tool for SPEEDIER Experts, during the energy audits in the pilots regions and through recommendations given by the SPEEDIER Experts.</p>		

## 4.19 PRIORITEE

<b>Name:</b>	PRIORITEE	<b>Location:</b>	ITALY
<b>Type:</b>	PROJECT	<b>Funding:</b>	INTERREG MED
<b>Start date:</b>	February 2017	<b>End date:</b>	July 2019
<b>Website:</b>	<a href="https://prioritee.interreg-med.eu/">https://prioritee.interreg-med.eu/</a>		
<b>Description:</b>			

PRIORITEE will prioritize energy efficiency measures (EEM) in public buildings and will create a decision support tool for regional and local public authorities. PRIORITEE aims to enhance the policy making and strategic planning competences of local and regional public authorities in the energy management of public buildings in 5 Mediterranean countries: Italy, Portugal, Spain, Greece and Croatia.

<b>Achievements/Impact:</b>
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The project aimed to deliver two main outputs:

- The PrioritEE toolbox that can be used by local administrations to manage and monitor energy consumption, to assess the cost-effectiveness of a predefined set of EE and RES measures and alternatives, and to prioritize investments. <http://dst.thorium.software/>
- Common strategies in the Mediterranean area to develop energy consumption management plans for municipal public buildings (MPBs).

To this end, local and regional public authorities and professional institutions have been working in strict synergy on three main pillars: Capacity building, Development of decision-making support tools, Communication and knowledge transfer. In particular, they have identified a comprehensive set of decision-making support tools, good practices and strategies which converge in the PrioritEE toolbox, they have defined and prepared 5 pilot activities in each region involved in the project, tested the toolbox in these regions and finally gathered and reviewed the experience from each one. In total, 103 users evaluated the PrioritEE Tool box, obtaining a very positive evaluation in the overall tool.

<b>Barriers:</b>
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Testing of the PRIORITEE toolbox in the DP Teruel in Spain was challenging. The main problem was low density of population so municipalities reused the public building for entrepreneurs trying to make more dynamic the economy in this area. When they made changes they did not take into account the Energy Efficiency and they had quite high fixed costs, hence prioritisation of energy efficiency measures was quite difficult.

<b>Key learning points:</b>
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Resources allocated to a particular Energy Efficiency Measures should include the investment costs covered by municipality, the cost associated with municipality staff engagement (if any, or alternatively the number of staff involved) and the costs external to municipality (eg. From external funding).

<b>Relevance to SPEEDIER:</b>
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As it was mentioned before, this project has designed a very positively evaluated Decision Tool Box (part of the PrioritEE toolbox), specially oriented to public buildings in the Mediterranean countries. Redesigning some specifications regarding Mediterranean areas and the use of buildings (public), this decision toolbox could be an interesting input for the design of the SPEEDIER tool.

<http://dst.thorium.software/>

## 4.20 SESCOM

<b>Name:</b>	SESCOM (SES-BI)	<b>Location:</b>	POLAND/INTERNATIONAL
<b>Type:</b>	PROJECT	<b>Funding:</b>	H2020 – SME Instrument
<b>Start date:</b>	September 2016	<b>End date:</b>	December 2016
<b>Website:</b>	<a href="https://www.sesbi.eu/">https://www.sesbi.eu/</a>		
<b>Description:</b>			
<p>SESCOM successfully executed the SES-BI project for the delivery of a business intelligence platform to cater for energy saving and smart facility management. As such the project took an existing SESCOM IT solution and redesigned/developed it into a full-grade Business Intelligence platform. A business intelligence service based on data exchange between all relevant stakeholders in the operations network was thus established to enable informed recommendations and decision-making in the energy efficiency domain to be realised. A market campaign targeted specifically at the global retail brands was established and included was the prestigious H&amp;M retail outlet. Based on proof of concept and trials, SESCOM subsequently expanded in the international markets starting from Europe, deploying into branded retail outlets such as MANGO, LPP, C&amp;A and ORSAY.</p>			
<b>Achievements/Impact:</b>			
<p>The model led to substantial reduction of operational expenses and energy costs. SESCOM took the decision to put business intelligence software in the very core of its services in order to provide facility owners with tools to optimize energy use on the basis of their data analytical approach. The model has been successfully applied in the management of premises of global leading companies like H&amp;M and LPP. The expected, targeted outcome of this innovation project is a commercially mature, fully validated business intelligence model/tool (system) for facility management that is deployed on a global basis. SESCOM conducted a thorough feasibility study related to maturing of the system and delivered a business plan and an assessment of economic viability of the deployment of the project outcome.</p>			
<b>Barriers:</b>			
<p>Take up and trust were key consideration for the transformation of the existing system. From our research, it was clear that the barriers and challenges were primarily market and commercial viability driven. It is indicative that technical challenges (as in all IT-projects) existed but they were overcome. So the real challenge was market penetration and take-up. To overcome the market challenges, SESCOM used a branded retail outlet (H&amp;M) to help penetrate the market for global acceptance. It is assumed that H&amp;M were an existing customer, but nevertheless, it opened the doors for international market acceptance. The target market was well known and a business plan was produced as the springboard to monitor the progress of the system in the market for use beyond the life of the project.</p>			
<b>Key learning points:</b>			
<p>The project was an extremely short in terms of duration and low cost. Yet their achievements and investment are positively acknowledged. The project was ‘market-driven’ and ‘technology-enabled’. This is an important message for SPEEDIER. We must know what the market needs and understand if we are delivering what the market wants? Before we get heavily into WP3 design/development, how can we be sure that we will deliver what the market needs?</p>			
<b>Relevance to SPEEDIER:</b>			
<p>The project took an existing IT solution and redesigned it. They marketed an existing solution but differently. In effect, the project undertaken was based on route to market needs and decision. It was market / commercially driven. Perhaps, the SPEEDIER project team could strengthen the ties between WP2 and WP3 with WP7 commencing earlier in the project than initially anticipated to ensure that the project delivers what the market wants. It definitely puts more onus on the SPEEDIER project to strengthen the market watch process, so that we don't fall into the trap of delivering a great solution that nobody wants. Given that a decision was taken by SESCOM to redesign/develop an existing IT solution, we should ensure that interoperability is also well considered in WP3 to ensure the solution remains relevant beyond the life of the project. By giving much care and consideration to interoperability, we will widen the opportunity net for greater technological engagements with other platforms and thus, the attractiveness of SPEEDIER to the market and potential future investors.</p>			

## 4.21 Enginency

<b>Name:</b>	Enginency - A Holistic System for Building Inspection and Energy Efficiency Management	<b>Location:</b>	Three EU regions (Spain, Netherland and Germany), all belonging to the same area (Central Europe), coordinated by Spain.
<b>Type:</b>	PROJECT	<b>Funding:</b>	Horizon 2020
<b>Start date:</b>	July 2016	<b>End date:</b>	November 2018
<b>Website:</b>	<a href="http://www.enginency-project.eu/Main.aspx?uri=1,2,3">http://www.enginency-project.eu/Main.aspx?uri=1,2,3</a>		
<b>Description:</b>	<p>Enginency has developed a toolset (software) to improve building energy efficiency. The toolset was operated by a network of three industrial SMEs and public universities from Spain, France and Netherlands all belonging to the same area (Central Europe). This project supports energy managers and experts to make decisions through the integration of energy audit with advanced technological solutions. The project offers a toolset to inspect building, and measure, manage report and improve their energy efficiency.</p>		
<b>Achievements/Impact:</b>	<ul style="list-style-type: none"> <li>• Wide scope: Enginency is capable of managing both isolated buildings and small groups of interacting buildings, while supporting management of both new facilities and retrofitting of existing ones.</li> <li>• Innovative approach and technology: Enginency leverages a unique holistic approach and innovative inspection and monitoring technologies to drastically reduce the energy expenditure, (by more than 50%), and the associated energy footprint. Enginency pursues energy efficiency through ALL the four available energy-efficiency approaches (i.e., Inspection, Monitoring, Data processing and simulation, and Management).</li> <li>• Market differentiation: Enginency will differentiate itself in the market by being offered as a Software as a Service (SaaS) to ESCO/EECs, enabling valuable improvement of productivity in delivering their services, and directly commercializing the product to end-users, leveraging on the existing consortium experience and market channels. Direct commercialization to end-users is made possible by the Expert System support and by the unique self-calibration algorithm, which open the usage of the service to end-users which cannot afford to contract with a physical expert.</li> </ul>		
<b>Barriers:</b>	<p>How to commercialize this software to the end-user is the main difficulty in this project. Enginency has overcome this barrier offering it to end-users with an attractive zero-risk formula, not including initial costs, and allowing a return of eventual refurbishment investments in less than two years.</p>		
<b>Key learning points:</b>	<p>The main learned lesson was that Enginency is a software solution with a database of different energy solutions and it will allow the end-user to reduce the energy consumption of buildings by more than 50%, using a zero-risk formula, while allowing Energy Service Companies (ESCOs) a 94% reduction of the inspection costs and an 88% reduction of the inspection duration, obtaining 15% more accurate results, with a payback time of only 12.4 months.</p>		
<b>Relevance to SPEEDIER:</b>	<p>The project built a toolset of energy saving solutions that could be useful in SPEEDIER and also creates a platform where the user can define their building. The toolset could be useful to use when auditing the buildings of the SMEs in the SPEEDIER pilot regions, however, the software is not free to use, so it will be difficult to review how suitable it is for SPEEDIER.</p>		

## 4.22 EU-MERCI

<b>Name:</b>	EU-MERCI	<b>Location:</b>	AUSTRIA, BULGARIA, GREECE, NETHERLAND, UNITED KINGDOM, POLAND, ROMANIA, SLOVENIA, ITALY
<b>Type:</b>	PROJECT	<b>Funding:</b>	European Union's Horizon 2020 research and innovation programme
<b>Start date:</b>	February 2016	<b>End date:</b>	January 2018
<b>Website:</b>	<a href="http://www.eumerci.eu/">http://www.eumerci.eu/</a>		
<b>Description:</b>			
EU-MERCI stands for EU coordinated MEthods and procedures based on Real Cases for the effective implementation of policies and measures supporting energy efficiency in the Industry. Its main aim has been to provide industrial enterprises and policy makers with best practices and tools to increase the competitiveness of the EU industry by improving the efficient use of energy. EU-MERCI has identified good practices of implementation of energy efficiency projects, drawing from the experience of thousands of real cases of application of energy efficiency support schemes in Europe in order to support the effective implementation of the EU Energy Efficiency Directive. In addition, the analysis of the existing energy efficiency support schemes will help policy makers in designing new support schemes or improving the existing ones.			
<b>Achievements/Impact:</b>			
It is one of the world's biggest database on energy efficiency in industries and includes analysis of around 3 000 energy-saving projects. From that analysis some 200 'good practice' examples of energy efficiency measures that can be implemented has been developed, along with their associated costs.			
<b>Barriers:</b>			
The main challenge was to harmonise data from different countries, as the information was provided in different units.			
<b>Key learning points:</b>			
<ul style="list-style-type: none"><li>• Most SMEs make investment decisions with a payback time of 2–3 years, but if the data can show additional benefits can be gained over a longer period, then they are more likely to make those additional investments.</li><li>• Energy savings can be high under specific conditions. The variation is huge across the different industries, but depending on energy prices, savings can be around 5 % in some industries, or up to 50 % for example in the food and beverage industry</li></ul>			
<b>Relevance to SPEEDIER:</b>			
Reports and online surveys produced by project can help SPEEDIER in the development phase. The EU-MERCI database on Energy Efficiency Measures case study could be helpful in developing SPEEDIER tool.			

## 4.23 EUKI-Mem

<b>Name:</b>	EUKI-Mem	<b>Location:</b>	BULGARIA, SLOVENIA, LITHUANIA, GERMANY
<b>Type:</b>	PROJECT	<b>Funding:</b>	The European Climate Initiative (EUKI) of the German Federal Environment Ministry (BMUB)
<b>Start date:</b>	October 2017	<b>End date:</b>	February 2020
<b>Website:</b>	<a href="https://www.euki-mem.eu/kopie-home">https://www.euki-mem.eu/kopie-home</a>		
<b>Description:</b>	<p>The European Climate Initiative (EUKI) is a project financing instrument by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. Energy consumption in administrative buildings amounts to almost 15% of the annual CO<sub>2</sub> emissions in Germany. The EU building directive is therefore focusing also on public buildings, especially since they function as important role models with a multiplier effect. The implementation of a systematic municipal energy management (MEM) programme contributes greatly to long-term energy savings and a sustainable facility management for public authorities. However, smaller municipalities face many obstacles in implementing a systematic approach. This is where the project EUKI MEM takes a starting point. Within the project, a pilot implementation of MEM will be started in the participating regions supported by transnational exchange, networking and coaching.</p> <p>The project proposes the employment of energy managers and technical experts in municipal administration bodies as organisational measures. Until now, there has often been a lack of experts and competencies have been spread across different departments.</p>		
<b>Achievements/Impact:</b>	<p>A key aim of EUKI MEM will be to optimize and reduce the energy consumption of all selected demonstration buildings. The focus will be on no and low cost technical efficiency measures, but will also include non-technical measures. The benefits of municipal energy management will be shown by introducing it in 60 municipal demonstration buildings across the target regions. By the end of the project, the partners aim to have worked with a total of 400 people, who will have been provided with training and information on how to deal with municipal energy management.</p>		
<b>Barriers:</b>	<p>Raising awareness among the administrative people working in the municipal agency's building regarding the energy efficiency was major challenge faced by project team.</p>		
<b>Key learning points:</b>	<p>For project's successful implementation, training programmes are necessary for administrative employees, municipal decision makers as well as building occupants such as teachers, caretakers and children. Training topics should include energy management in buildings, energy audits, energy standards and energy efficiency requirements.</p>		
<b>Relevance to SPEEDIER:</b>	<p>Although the MEM project is dedicated to Municipal Buildings, insights of the project will be helpful to SPEEDIER to compare the no-cost and low-cost Energy Conservation Measures identified and which were the most successful.</p>		



## 5 Analysis of Relevant Tools

### 5.1 ExpertMV

Name:	ExpertMV	Location:	IRELAND
Type:	TOOL	Funding:	
Developer:	International Energy Research Centre		
Website:	<a href="http://www.expertmv.com/">http://www.expertmv.com/</a>		
Description:			
The ExpertMV project intends to address the barriers to EPC by developing a reliable, trustworthy, transparent and cost-effective means of collecting and analysing energy data, and of measuring and verifying energy savings. ExpertMV will develop an intuitive software tool that will provide (1) a systematic approach to executing investment grade energy audits and (2) a transparent, innovative and scientific means of M&V of savings in buildings and industry.			
Commercial details			
ExpertMV is a web-based system, meaning that all that is required is a system capable of connecting to the internet and running a browser, to be able to use it on another device. No exports or installs are required. It is not commercially available at the moment but is available to the SPEEDIER project for review and use via the project coordinator IERC.			
Features & Benefits			
<ul style="list-style-type: none"><li>• ExpertMV will combine energy auditing and M&amp;V on one software platform.</li><li>• This tool will help to reduce the time and lower the costs associated with energy auditing and M&amp;V by automating activities and offering libraries of calculation tools and preconfigured templates.</li><li>• For M&amp;V, ECMs can be configured from the ECM library or ECM data already captured in an energy audit</li><li>• For all fuels ExpertMV will use the conversion factors for calorific values and CO<sub>2</sub> emissions to convert consumption figures to kWh and tCO<sub>2</sub>eq.</li></ul>			
Drawbacks and Limitations			
<ul style="list-style-type: none"><li>• Process of creating equipment data annual profile is very complex and provision for creating tariff profiles for entering seasonal-time-of-day tariffs is not available.</li><li>• ECMs and calculations are related to specific equipment so the tool it cannot calculate the energy and cost saving arising from additional equipment through implementation of one ECM</li><li>• Does not have any features to import data from a Building Management System.</li></ul>			
Relevance to SPEEDIER:			
The ExpertMV tool could be useful to SPEEDIER in terms of helping Energy Auditors in WP5 to carry out Energy Audits of participating SMEs. It may be possible to incorporate features of ExpertMV into the SPEEDIER tool for experts.			



## 5.2 EA-QUIP Multifamily Building Energy Modelling Tool

<b>Name:</b>	EA-QUIP Multifamily Building Energy Modelling Tool	<b>Location:</b>	NORTH AMERICA
<b>Type:</b>	TOOL	<b>Funding:</b>	Weatherization Assistance Program (WAP)
<b>Developer:</b>	U.S. Department of the Energy (DOE)		
<b>Website:</b>	<a href="http://www.ea-quip.com">www.ea-quip.com</a>		
<b>Description:</b>			
EA-QUIP is an internet-based energy modelling tool to support energy auditing and work scope development for existing multifamily buildings. EA-QUIP has been approved by the U.S. Department of Energy (DOE) for use by weatherization agencies to audit multi-family buildings, defined by DOE as buildings containing 5 or more residential units. EA-QUIP is most often used by energy professionals in states with heating climates that include centrally heated buildings that have 2-3 stories or more.			
<b>Commercial details</b>			
Energy auditors and modellers interested in EA-QUIP must contact the Association for Energy Affordability (AEA) for access to a demo account to determine if EA-QUIP will meet the needs of the particular building types and program requirements. After a demo period, AEA licenses EA-QUIP by charging a fee for each building modelled. There is a discount given for audits performed in EA-QUIP for the Weatherization Assistance Program (WAP). Also, AEA provides technical training webinars and other energy modelling training opportunities. Interested organisations can enquire by email for more details: <a href="mailto:eaquipsupport@aea.us.org">eaquipsupport@aea.us.org</a>			
<b>Features &amp; Benefits</b>			
EA-QUIP determines economically optimal mixes of energy-saving measures for a given building and within a chosen budget asking questions related with the building, for example: interior day/night temperature, domestic hot water usage, etc. After that EA-QUIP provides pre-formatted energy and economics reports such as: applicable energy conservation measures rated by life-time savings per investment, existing condition, energy savings, savings and costs, and investment analysis report.			
<b>Drawbacks and Limitations</b>			
<ul style="list-style-type: none"><li>• Currently this tool can only be used in U.S.</li><li>• The maintenance costs associated with maintaining the database and keeping it updated (interest and inflation rates, etc.) is high.</li></ul>			
<b>Relevance to SPEEDIER:</b>			
<ul style="list-style-type: none"><li>• This tool can be analysed to determine whether elements of it can be integrated into the standardised methodology developed by ITEC that will help SPEEDIER Experts to carry out energy audits.</li><li>• The building typology implemented in the EA-QUIP tool could be useful to improve the tool developed by the SPEEDIER Consortium.</li><li>• Contact with expert auditors who provide ideas to improve our tool (content, implementation phase, interface, etc.) could be a useful way to gain feedback on the SPEEDIER tool for Experts.</li></ul>			

### 5.3 e-Bench: Energy Management Software

<b>Name:</b>	e-Bench: Energy Management Software	<b>Location:</b>	WELLINGTON, NEW ZEALAND
<b>Type:</b>	TOOL	<b>Funding:</b>	Energy and Technical Services, LTD.
<b>Developer:</b>	Energy and Technical Services, LTD.		
<b>Website:</b>	<a href="https://www.energyts.com/e-bench">https://www.energyts.com/e-bench</a>		
<b>Description:</b>			
<p>e-Bench is an internet enabled audit and simulation/modelling tool that is used to record systematically all the energy or utilities that an organization is consuming and to relate these to the core business activity. The system then benchmarks these input factors to identify how efficiently they are being used compared with all other similar users on the whole database. e-Bench is suitable for use by any organization or consultancies that seeks to manage energy and utilities as effectively as possible. e-Bench creates financial savings through reduced energy use and improved indoor environmental quality (IEQ) (and consequent staff productivity). e-Bench can monitor all types of energy and carbon emissions data, including electricity, reticulated gas, diesel, gasoline, steam, LPG, medical gases, coal, biomass, solar, photovoltaics, waste and vehicles.</p>			
<b>Commercial details</b>			
<p>It is possible to test e-Bench by logging in to the website for a free trial. There is no further information regarding the tool cost to use provided by vendor. After the free trial the customer have to pay for an annual subscription fee and must enquire about the price. e-Bench offers online support during business hours.</p>			
<b>Features &amp; Benefits</b>			
<p>e-Bench helps the user to identify issues early and easily – by appliance, floor or building – and make informed decisions to reduce energy use and carbon emissions. e-Bench provides an impressive range of functionality, including targeting and monitoring, invoice reconciliation, management reporting, carbon emission tracking and reporting, continuous commissioning, benchmarking and simulation in a single integrated software system. e-Bench sends automatic alerts when usage is higher than expected and the user can receive recommendations from the Energy TS team, so they can set a new course of action.</p>			
<b>Drawbacks and Limitations</b>			
<p>This tool is only available in Australia, New Zealand and the United States.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>e-Bench offers a continuously support and recommendation service from the Energy TS team, this allows the customer to take decisions on time and change their actions if necessary. This is a competitive advantage over other tools in the market. The implementation of this type of service into the SPEEDIER tool could add value to the potential users.</p>			

## 5.4 e-Quest

<b>Name:</b>	eQuest	<b>Location:</b>	NORTH AMERICA
<b>Type:</b>	TOOL	<b>Funding:</b>	N/A
<b>Developer:</b>	James J. Hirsch		
<b>Website:</b>	<a href="http://www.doe2.com/equest/">http://www.doe2.com/equest/</a>		
<b>Description:</b>			
<p>eQuest is free software that targets building professionals and aims to analyse energy use in buildings. The software is available on line for free via a download accessed through the website indicated above. While it gives a professional insight, it is also relatively easy to use and affordable. The building creation "wizard" guides the user through the process of creating an effective building energy model. This involves following a series of steps that help the user to describe the features of the design that would impact energy use, such as: architectural design, HVAC equipment, building type and size, floor plan layout, construction materials, area usage and occupancy, lighting system.</p>			
<b>Commercial details</b>			
<p>The tool is provided for free, upon acceptance of the licence and conditions by the user. It was seemingly part of a university project.</p>			
<b>Features &amp; Benefits</b>			
<p>eQuest is a useful tool for a quick and easy to perform and use assessment of a building project. A main benefit is that it simplifies complex calculations for the user through a simple and accessible software interface that works like a “wizard” and guides the professional towards the end result by selecting different options which help “dimension” their building project.</p>			
<b>Drawbacks and Limitations</b>			
<p>Probably the most important drawback of the tool is that it is primarily targeting the US and North American market and seems therefore less suited to the European building sector realities, despite a declared international positioning. This means that the built-in features and options of choice when creating an assessment are fit for a North American reality, for example the measurement system uses feet and inches instead of meters and millimetres.</p>			
<b>Relevance to SPEEDIER</b>			
<p>While the tool may be interesting for SMEs due to its professional yet easy to use features, it is nevertheless limited to the building sector and specialised in that sector. This gives the tool a moderate interest for the SPEEDIER project. However, the tool can be an inspiration on how to design a more generic tool relative for SMEs from all economic sectors.</p>			

## 5.5 ENERGY AUDITOR

<b>Name:</b>	ENERGY AUDITOR APP	<b>Location:</b>	SPAIN
<b>Type:</b>	TOOL	<b>Funding:</b>	--
<b>Developer:</b>	Energy Auditor		
<b>Website:</b>	<a href="https://www.energyauditor.es/">https://www.energyauditor.es/</a>		
<b>Description:</b>			

This app is specifically designed for carrying out energy audits as an alternative to using an Excel spreadsheet, which is the most commonly used format for this purpose. It is oriented to professional auditors and claims to help auditors by reducing the time taken to carry out audits and write up audit reports by over 70%.

<b>Commercial details</b>
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This tool is a product of the company Energy Auditor. It is restricted to professional use and it is not available free of charge.

There are two potential clients of this company:

- Professionals in the energy sector (main clients):
  - Energy auditors: that can use the app and pay for it.
  - Installers, material suppliers, electricians, and other relevant professionals that can join the network of Energy Auditors, to improve the whole product to the final client and that can benefit from attracting new clients through this network.
- Final clients of the energy audits: (Building landlords, resident's associations or SMEs):
  - These clients can contact Energy Auditor to request an energy audit. In this case, the company will send the clients the list of professionals available in their geographical area.

<b>Features &amp; Benefits</b>
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The product of the company Energy Auditor consists not only of the app, but also a network of professionals in this sector: installers, material suppliers, auditors, etc. Thus, a building landlord can contact Energy Auditor and request an energy audit, and depending on the result of this audit, the landlords can contract directly with the required professionals (installers, material suppliers, and electricians, etc.-) to complete the recommended measures to improve the energy efficiency of their buildings. This app and network were launched in May 2017, and 6 months later, 120 professionals had joined the network and over 5.500 buildings had been audited in Spain.

<b>Drawbacks and Limitations</b>
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It is restricted to professional use and it is not available free of charge.

<b>Relevance to SPEEDIER:</b>
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This tool=app+network can be relevant to SPEEDIER as it is a *one-stop shop* for building landlords to improve their energy efficiency, where they can carry out energy audits and then contact with professionals to implement the recommended measures found out in the audit. The way to finance the costs of the measures to be implemented depends on the auditor, (although this network tries to promote the ESCO model), which facilitates the implementation of the measures to the clients.

## 5.6 TOPAS

<b>Name:</b>	TOPAs - Tools for Continuous Building Performance Auditing	<b>Location:</b>	ISRAEL
<b>Type:</b>	TOOL	<b>Funding:</b>	Grant ID: 676760
<b>Developer:</b>	Consortium coordinated by Motorola Solutions Israel Ltd		
<b>Website:</b>	<a href="https://www.topas-eeb.eu/">https://www.topas-eeb.eu/</a>		
<b>Description:</b>	<p>TOPAs is developing an open, cloud-based platform of analytic tools to minimize the gap between the predicted and the actual energy usage in blocks of buildings. The TOPAs target is to reduce the existing gap to 10% and approach additional energy savings in the pilot regions of up to 20%.</p> <p>The TOPAs continuous performance auditing framework enables a better understanding of the actual energy performance in and across existing buildings and facilitates continuous performance improvement based on real operational use. The typical users of the TOPAs tool suite are building and facilities managers, owners and ESCOs. The tool suite helps them to more effectively manage their site, providing visibility on how energy related decisions impact cost, occupant comfort and health and general management processes. TOPAs has demonstrated the benefits of continuous auditing process using the TOPAs solution under real operating conditions and scenarios in both private and public commercial building blocks in Ireland and France.</p>		
<b>Commercial details</b>			
<p>The business model should most probably work on a subscription or SaaS basis, but further details need to be seen in order to better understand how it works.</p>			
<b>Features &amp; Benefits</b>			
<p>The tool suite helps building owners to manage their site more effectively, providing visibility on how energy related decisions impact cost, occupant comfort and health and general management processes. TOPAs has demonstrated the benefits of continuous auditing process through the use of the TOPAs solution under real operating conditions and scenarios in both private and public commercial building blocks in Ireland and France.</p>			
<b>Drawbacks and Limitations</b>			
<p>The limitations are more due to the environment surrounding the tool rather than the tool itself. In fact, cheap cost of energy can render the Cost / ROI ratio prohibitive for investors and financially not viable. Secondly, technological lock-ins or training need and path dependency could be other obstacles to the success of the tool and its widespread adoption.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>The tool is relevant to SPEEDIER in many respects. It deals with Energy Efficiency, which is the raison d'être of the SPEEDIER project. It can be useful as a benchmark tool to position effectively the tools that will further on be developed during the project. In addition, it is developed through an innovative stakeholder dialogue, with the aim of removing some important barriers to actual energy efficiency vs. declared one.</p>			

## 5.7 GENERATION

<b>Name:</b>	GENERATION tool for simplified energy audits in public buildings	<b>Location:</b>	SPAIN, UK, ITALY, POLAND
<b>Type:</b>	TOOL/BUILDUP	<b>Funding:</b>	POWER / InterregIVC regional programme.
<b>Start date:</b>		<b>End date:</b>	2011
<b>Website:</b>	1. <a href="https://www.buildup.eu/en/learn/tools/generation-tool-simplified-energy-audits-public-buildings">https://www.buildup.eu/en/learn/tools/generation-tool-simplified-energy-audits-public-buildings</a> 2. <a href="https://www.aess-modena.it/en/">https://www.aess-modena.it/en/</a>		
<b>Description:</b>			
<p>The GENERATION project primarily delivered a free to use energy audit model tool that was designed for energy auditing of public buildings. The intention was to enable the user to review results in order to achieve reliable outcomes in a low cost and time effective manner in comparison to a full/complete energy audit. Factors that impacted the results included climatic conditions, the audit building itself and related energy consumption data. The output from the execution of the tool identified weak points of the building and a provision of suggestions for energy efficiency improvement measures. The approach was based on the development of a tool that used calculation simulation supported through the provision of a user guide. The tool is available in the English language only. Target groups were local, regional, national authorities and facilitators as well as building professionals. Activities included the development of the energy audit model tool, trial and use as well as the development of a supporting User Guide. Ultimately, the tool offered free to use energy auditing model with simulation calculation results that were quickly produced.</p>			
<b>Achievements/Impact:</b>			
<p>Project GENERATION, delivered a free to use energy auditing model. Driven under the leadership of AESS – Agency for Energy and Sustainable Development - (Modena, Italy), coverage was international and the tool was trialled in Italy, Poland, Spain and the United Kingdom. However, details beyond these points are presently not well evident.</p>			
<b>Barriers:</b>			
<p>The project leaders are of solid repute but there does not seem to be a well built up professional marketing strategy in place for the GENERATION tool.</p>			
<b>Key learning points:</b>			
<p>The lack of evidence for an advancement of the GENERATION energy audit model tool, would seem to suggest that the impact on the market was limited and the take-up short lived. This may somewhat be due to the business model being ‘free to use’ and that the tool was only available in the English language. The reason for the lack of evidence with the progression with the GENERATION tool is not clear. There is no evidence to suggest that regional and legislation issues had a negative impact on the project. Perhaps, the limitation of the applied auditing model capacity could also have had a negative impact on market take-up and the advancement of the GENERATION tool. Given that the User Guide is also not well evident at present, would seem to suggest that investments into the tool is negligible.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>The target groups in GENERATION are similar to SPEEDIER. The tool was ‘free to use’. It was only available in English and it is Windows based. It is unclear if the tool was available on Apple and by an Apple macOS / OS X. These on their own, provide much thinking, but additionally, we have to consider the right choice of business model for life of the SPEEDIER beyond the end of the project. Sustainability, reliability and maintainability are key consideration attributes for SPEEDIER going forward and the business plan need to have these attributes to the forefront of the business/commercial thinking process.</p>			

## 5.8 neZEH

<b>Name:</b>	nearly Zero Energy Hotels (neZEH) eToolkit	<b>Location:</b>	EUROPE
<b>Type:</b>	TOOL/BUILDUP	<b>Funding:</b>	IEE programme
<b>Start date:</b>		<b>End date:</b>	2017
<b>Website:</b>	<a href="https://www.buildup.eu/en/learn/tools/nearly-zero-energy-hotels-nezeh-e-toolkit-0">https://www.buildup.eu/en/learn/tools/nearly-zero-energy-hotels-nezeh-e-toolkit-0</a> <a href="http://www.nezeh.eu/etoolkit/index.html">http://www.nezeh.eu/etoolkit/index.html</a>		
<b>Description:</b>			
<p>The benchmarking eToolkit was developed in a neZEH project under the framework of the nearly Zero Energy Hotels (neZEH) initiative. The project was aimed at providing a practical tool to help hotel owners benchmark their energy consumption comparing to the neZEH levels and to suggest some appropriate measures for the improvement of energy efficiency as well as renewable energy integration in order to transform their hotels into nearly Zero Energy Hotels.</p>			
<b>Achievements/Impact:</b>			
<p>Collectively, the participating 16 hoteliers across Europe obtained a 70% reduction of their primary energy consumption. This was obtained through energy efficiency measures, renewable energy sources as well as behavioural changes of staff and clients. The project specifically benefited the hospitality sector.</p>			
<b>Barriers:</b>			
<p>Each end user had different needs and shared different experiences. There may also be legal issues as a country factsheet on legal framework was produced thus highlighting potential legal concerns across different national countries. Likewise, take up of the eToolkit did not deliver the anticipated results. In this context, the European Committee of the Regions (CoR), recently included neZEH among its policy recommendations published in its opinion document “Tourism as a driving force for regional cooperation across the EU” (2017/C 185/03).</p>			
<b>Key learning points:</b>			
<p>The importance of business connectivity and influences cannot be overlooked. We can see from the above that the Committee of Regions promoted the primary project result (i.e. the neZEH eToolkit). Significant partners with a high degree of influence such as World Tourism Organisation, Network of European Regions for a Sustainable and Competitive Tourism and Federation of European Heating, Ventilation and Air-conditioning Associations, were ingrained into the project. The position of these partners in their respective and associated niche markets made their outreach proposition easier. Likewise, as detailed in the end user hotelier interviews, each hotel gain significant benefits from this project - be it a reduction in gas consumption for laundry through to solar panels, etc. The energy audit provided valuable knowledge and information to justify their investment/energy efficiency improvement consumption. This is more recently echoed by the EIB Investment Survey data about energy audits and energy-efficiency investments of some 12,500 signatures from EU28 Member States per year. It too suggests that energy audits are a useful tool for overcoming the information barriers and facilitating investments in energy-efficiency measures (i.e. June 2019). Staff buy-in is equally important and the training programme clearly made significant inroads to secure their commitment.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>The value of engagement with key influencers cannot be under-estimated. Likewise, effective training is deemed quite significant to help ensure staff buy-in and perhaps we can obtain more information about this project so that the wider benchmarking that was undertaken can be obtained. Some of the publications, including the ‘Tips for SME hotel owners’ would be helpful during the course of SPEEDIER delivery (particularly in the Romanian pilot which focusses on the hotels sector) and at the very least provides good reference material. Furthermore, the ‘plaque-on-the-wall’ for achievement can further help their marketing and attractiveness campaigns.</p>			



## 5.9 HKGBC BESTCOM

<b>Name:</b>	<b>HKGBC</b>	<b>Location:</b>	CHINA
<b>Type:</b>	TOOL	<b>Funding:</b>	
<b>Developer:</b>			
<b>Website:</b>	<a href="https://www.buildup.eu/en/learn/tools/hkgbc-benchmarking-and-energy-saving-tool-hk-best">https://www.buildup.eu/en/learn/tools/hkgbc-benchmarking-and-energy-saving-tool-hk-best</a>		
<b>Description:</b>			
<p>The objective of the HKGBC Benchmarking and Energy Saving Tool - Commercial Buildings (Office/Retail) (BESTCOM) is to promote better energy performance for commercial buildings by:</p> <ul style="list-style-type: none"><li>• Providing an online tool for building owners to measure and compare their energy consumption to their market peers and to identify potential energy improvement measures to enhance performance;</li><li>• Giving an appropriate class of recognition to those that have achieved outstanding energy performance amongst their market peers while accounting for variations in energy consumption across different building types through the issuance of a Certificate and Label.</li><li>• Providing a detailed assessment of building energy performance from an Authorised Assessor.</li><li>• Providing building owners with specific energy efficiency improvement recommendations via a “What-If” assessment that provides quantified improvement estimations for various aspects of building operational performance, revealing potential reduction in operation cost.</li></ul>			
<b>Commercial details</b>			
<p>This is a free online tool available to any building owner to use to achieve Hong Kong Green Building Council certification.</p>			
<b>Features &amp; Benefits</b>			
<p>The BESTCOM Tool also includes the HKGBC Benchmarking and Energy Saving Tool - Office Occupants (BESTOO) also developed by HKGBC, aims to promote energy efficiency for multi-tenant office buildings. There are two types of online assessment tools under BESTOO:</p> <ul style="list-style-type: none"><li>• Free Benchmarking Tool, to assess the general energy efficiency performance of a building free of charge</li><li>• Benchmarking and Energy Saving Tool (BEST) – to benchmark and identify potential energy saving actions.</li></ul> <p>Building owners wishing to have a more detailed assessment in order to obtain specific recommendations for improving the energy efficiency performance of a building must go through a two-step approach, which takes 18 months to complete. The online tool it is very useful to know the building energy efficiency level in the context of HKGBC certification but is not useful in other context.</p>			
<b>Drawbacks and Limitations</b>			
<p>There are only two building types available for analysis by this tool:</p> <ul style="list-style-type: none"><li>• Commercial Building (office/retail) Served by Centralised Air-conditioning System. This option covers pure office building, pure retail building, composite building with both office and retail portions</li><li>• Office Building Served by Decentralised Air-conditioning System. It is a simplified methodology to calculate the HKGBC certificate.</li></ul> <p>The tool is, therefore, not suitable for carrying out energy audits, and can only be used to benchmark building performance</p>			
<b>Relevance to SPEEDIER:</b>			
<p>The HKGBC is a simplified benchmarking tool that is not suitable to be used by SPEEDIER Experts for auditing. It is also based on a Chinese certification, therefore, it is scored according to this certification. One important feature of the tool is the ability to access to energy efficiency ratios of existing buildings and thus compare performance with other buildings. This could also be very useful feature of any tool that was developed for SPEEDIER Experts.</p>			

## 5.10 IT-ToolKit

<b>Name:</b>	EnERGo IT-TOOLKIT	<b>Location:</b>	INTERNATIONAL
<b>Type:</b>	TOOL/BUILDUP	<b>Funding:</b>	IEA
<b>Start date:</b>	2005	<b>End date:</b>	2010
<b>Website:</b>	<a href="http://www.annex46.de/tool_e.html">http://www.annex46.de/tool_e.html</a>		
<b>Description:</b>			
<p>IT-ToolKit for Energy Efficient Retrofit Measures developed through IEA Annex 46 is a collection of computer tools for public buildings. The free of charge toolkit supports owners and planners of public buildings in the following tasks: Identification of buildings with high energy consumption, energy efficient operation of buildings, detailed inventory and building documentation, ideas for energy efficient refurbishments, development of an energy efficient retrofit concept based on DIN V 18599 (compatible to EPBD CEN standards) and economical evaluation of energy performance contracts. The IT-Toolkit offers support in different ways, e.g. by providing reports and guidelines, an interactive performance rating of energy uses, more than 70 exemplary retrofit projects, structured similarly to a website, calculation tools with building specific input by the user and a detailed checklist for a building inventory.</p>			
<b>Achievements/Impact:</b>			
<p>IT-Toolkit covered a wide area on the topic of energy efficient retrofit of public buildings, primarily governmental. The building owner or the planner are offered a variety of support instruments (see above) to ensure an energy efficient operation or else an energy efficient refurbishment of buildings, including some case studies with exemplary retrofit projects and a financial assessment of possible ESCO projects.</p>			
<b>Barriers:</b>			
<p>The business model of the project outcomes is unclear. It is a free to use system. One of the issues, is the ‘free’ approach. How can a better return of investment to all stakeholders be realised (e.g. equity owners, fund managers, building owners, etc.). The approach for free to use, may not sit well with the direction of SPEEDIER and the market/business orientated deliverables were not well evident. It is only available for Windows operating system.</p>			
<b>Key learning points:</b>			
<p>The IT model was well regarded by the users and the site is well supported by the hosting organisation, presently understood to be, <i>Fraunhofer Institute for Building Physics - Schiller Engineering</i>. The funding support provided by the German government may have strengthened the long-term sustainability of the project. Registration for the use of the tool is easy, although downloading the files took longer than anticipated.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>Implement a feasibility study for the appropriate business model to apply for SPEEDIER. Key considerations are sustainability, reliability and cost vs return on investment.</p>			

## 5.11 A2PBEER

<b>Name:</b>	A2PBEER	<b>Location:</b>	21 partners from 11 European countries
<b>Type:</b>	TOOL	<b>Funding:</b>	FP7-NMP
<b>Developer:</b>	Affordable and Adaptable Public Buildings through Energy Efficient Retrofitting (A2PBEER)		
<b>Website:</b>	<a href="http://www.a2pbeer.eu/">http://www.a2pbeer.eu/</a>		
<b>Description:</b>			

A2PBEER is a web-tool designed to develop a retrofitting methodology for public buildings, concentrated at the district level, using both pre-existing, as well as newly developed techniques. The project methodology to design an energy efficiency 'kit' for buildings, was developed principally with public building managers and owners in mind as they grapple with the high energy consumption, and so high maintenance costs, of their buildings.

### Commercial details

A2PBEER has produced the A2PBEER Retrofitting App, a web application for quick energy calculations which is a guide with a toolbox that is linked to a financial calculation tool. The tool is free to use once the user registers via the website. However, it is unclear whether this tool is being maintained as the project is now complete. The financial calculation tool can be downloaded from the project website free of charge and is an Excel spreadsheet, so it is possible to modify it as needed for specific projects.

### Features & Benefits

All A2PBEER's solutions underwent analysis using simulations and then were implemented in three demo buildings, representing different climatic conditions (continental, oceanic and Mediterranean). The technical solutions of the kit concept are intended to be versatile enough to be adapted to the requirements of all building types.

### Drawbacks and Limitations

The main drawback is that a lot of building information is needed to come up with solutions. In addition, the economic calculation does not take place within the tool. Instead, the user is directed to another application to complete the cost calculations.

### Relevance to SPEEDIER:

If we can access to the tool we can see the scope it has and if it serves to link building types with specific characteristics with the best energy rehabilitation solutions. The financial tool will also be useful to evaluate the cost that they have determined for each energy rehabilitation measure.

## 5.12 EINSTEIN

<b>Name:</b>	EINSTEIN	<b>Location:</b>	SPAIN
<b>Type:</b>	TOOL	<b>Funding:</b>	In the Framework of the energy audit campaign carried out within the project EINSTEIN-II
<b>Developer:</b>	Expert system for an INtelligent Supply of Thermal Energy in INdustry and other large scale applications		
<b>Website:</b>	http://einstein.sourceforge.net/		
<b>Description:</b>			
EINSTEIN is a tool-kit for fast and high quality thermal energy audits in industry, composed of an audit guide describing the methodology and of a software tool that guides the auditor through all the audit steps. It's a software tool that includes modules for benchmarking, automatic design of heat exchanger networks, and design assistants for the heat and cold supply system. The target group is Local/regional/national authorities and facilitators, and building professionals.			
<b>Commercial details</b>			
The base version of the EINSTEIN expert system software tool is available for free, as an open source software project. Since Version 2.3, in parallel a commercial version EINSTEIN Plus is being developed by energyXperts.NET as a means of fund raising for maintenance and continuous development of the EINSTEIN project. Software from EINSTEIN Project is free download in <a href="https://sourceforge.net/projects/einstein/">https://sourceforge.net/projects/einstein/</a> Free version 2.4 not works, just demo version 2.5 have a working Software			
<b>Features &amp; Benefits</b>			
It is an auditory tool; it has all the information we need in the SPEEDIER project to develop an energy analysis of a building. The tool has several alternative proposals; It is very useful for auditors to increase the possibilities of reducing energy consumption. The tool has a visual section to incorporate a complete design of the active part of the building.			
<b>Drawbacks and Limitations</b>			
The full version is not available, the introduction of data to do the calculation is not introduced in an easy way. It can't use standard data for climate values and you need to incorporate it in a manual way. Is not an online tool, so you can't share results neither compare your results with other companies The software cost is too expensive compared with the energy building savings. The tool has a private database for Equipment, Fuels, Fluids, Electricity Mix or Benchmark, so you can't share this information or improve this data for future projects. It isn't scalable.			
<b>Relevance to SPEEDIER:</b>			
Yes, it may be relevant if we can access at free software version 2.4 database, as it has the necessary information to perform a deep audit for the necessary SPEEDIER project level. We need to access the free software programming to use in the SPEEDIER project and create an online tool. If it is not possible, it will not be useful. Based on the decision of SPEEDIER Consortium partners, it is possible to investigate which part can be used in the SPEEDIER project.			

## 5.13 ENSI-EAB

<b>Name:</b>	ENSI-EAB	<b>Location:</b>	BULGARIA, NORWAY
<b>Type:</b>	Tool	<b>Funding:</b>	“Action plan supporting the countries applying for EU membership” at the Norwegian Ministry of Foreign Affairs
<b>Developer</b>	Energy Saving International AS -ENSI		
<b>Website:</b>	<a href="http://www.ensi.no/uploads/050613.td.lt.completion_report.pdf">http://www.ensi.no/uploads/050613.td.lt.completion_report.pdf</a>		
<b>Description:</b>			
ENSI EAB Software is used for calculating the energy performance of buildings in energy audits and for preparing building energy certificates. It can be applied to new and existing residential and non-residential buildings. The tool has been developed in accordance with EU standards and uses the algorithms and reference standards of EN ISO 13790. The calculation is carried out using technical (e.g. U-values), user specific (e.g. occupancy schedule) and climate data.			
<b>Commercial Details</b>			
It is not available commercially for free, it is a paid tool. In order for the software to function correctly, the installation must be carried out from the original compact discs with the ENSI_ EAB Software. In order to install the software you need to double click the file “EAB 8.1.exe”.			
<b>Features &amp; Benefits</b>			
The programme has very successfully been completed, and the aim fully reached. Following are the features of the tool:-			
<ul style="list-style-type: none"><li>• User friendly tool for calculating the energy performance of buildings</li><li>• Tailored for Energy Auditing of new and existing buildings and for Building Energy Certification</li><li>• Quick calculations, reflecting the influence between parameters</li><li>• Results presented as heat transfer coefficients, energy need, energy use, energy saved</li><li>• Generates energy performance indicators( kWh/m²) for use in Energy Certification</li></ul>			
<b>Drawbacks and Limitations</b>			
As ENSI-EAB tool is not available for free to use, hence finding its drawbacks and limitation is not possible.			
<b>Relevance to SPEEDIER:</b>			
Features of ENSI-EAB tool can be useful to SPEEDIER in terms of helping Energy Auditors in WP5 to carryout Energy Audits of participating SMEs.			

## 6 Analysis of Relevant Policies

### 6.1 Energy Efficiency Plan 2011

<b>Name:</b>	Energy Efficiency Plan 2011	<b>Location:</b>	EU
<b>Type:</b>	POLICY	<b>Status</b>	Ongoing
<b>Website:</b>	<a href="https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0109:FIN:EN:PDF">https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0109:FIN:EN:PDF</a>		
<b>Description:</b>			
<p>The Energy Efficiency Plan 2011 is a Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions. This new plan for energy efficiency is at the heart of EU's 2020 Strategy for “smart, sustainable and inclusive growth” and its aim is to secure the objective of the EU of “saving 20% of its primary energy consumption compared to projections by 2020”. This objective is to be achieved through combined efforts of all EU stakeholders, public and private, and especially in the areas of Buildings (public and private), Transport and Industry. The 2011 Plan continues work based on the 2006 Energy Efficiency Action Plan.</p>			
<b>Impact</b>			
<p>The short-term impact of the Plan was to bring the Energy Efficiency issue back to the table of the EU, following the plan from 2006. In the mid-term, it led to initiatives like the Energy Efficiency Directive and its amendment. Like those Directives, in spite of its non-legally binding character, the Plan is supposed to contribute to a more climate change resilient, resource efficient and carbon free European Union. It also sets the example for the rest of the world.</p>			
<b>Costs and Gains</b>			
<p>It is rather difficult to estimate the costs of this policy without a formal cost-benefit analysis and a multi-stakeholder perspective for doing that. However, there was the major benefit of raising awareness for Energy Efficiency at EU level.</p>			
<b>Limitations</b>			
<p>A major limitation of this Plan is its non-binding character, making the EU Directives of 2012 and 2018 much more efficient as Policy Instruments. However, the Plan achieved its intended impact of raising awareness EU-wide about Energy Efficiency issues in both the public and private sector.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>This policy is of somewhat moderate relevance to SPEEDIER, as it gives the overall EU directions for energy efficiency, rather than any specific goals for SMEs. However, its knowledge is important in securing an outcome for SPEEDIER which is in line with wider EU goals in Energy Efficiency.</p>			

## 6.2 Energy Efficiency Directive 2012/27/EU

<b>Name:</b>	Energy Efficiency Directive 2012	<b>Location:</b>	EU
<b>Type:</b>	POLICY	<b>Status</b>	Ongoing
<b>Website:</b>	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32012L0027&amp;from=ES">https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32012L0027&amp;from=ES</a>		
<b>Description:</b>			
<p>The Energy Efficiency Directive of 2012 is a Directive of the European Commission aiming at improving Energy Efficiency across the EU, with the main objective of saving 20% of the Union's primary energy consumption by 2020 compared to projections. Its main purpose is to invite Member States to commit to energy efficiency targets and to hold them accountable for those, in an effort to achieve 1474 Mtoe in 2020. It has been implemented through transposition in national legislations of Member States.</p>			
<b>Impact</b>			
<p>The short-term impact of this policy is to secure a framework and an impulse for Member States to take energy efficiency seriously, by measuring it, setting targets for national performance by 2020 and thus contributing to the overall EU objective target of 20% by 2020. The mid-term goal is to secure Member States' contributions and trajectories are consistent with the goals initially set by the Commission. The long-term objectives range from economic benefits, energy security for the EU, a better footprint on our planet and a more resource efficient economy. The 2016 stakeholder evaluation of the Directive outlined that the EED has successfully established a comprehensive energy efficiency framework for the EU, especially through the Energy Efficiency Obligation Schemes (EEOS).</p>			
<b>Costs and Gains</b>			
<p>It is rather difficult to estimate the costs of this policy without a formal cost-benefit analysis and a multi-stakeholder perspective for doing that. However, there was the major benefit of putting energy efficiency on the table through legally binding figures. The EED evaluations also pointed out the EU was not on track compared to its ambitions, which led to the more ambitious Amendment of the Directive.</p>			
<b>Limitations</b>			
<p>Some limitations of the EED include the lack of sufficient inclusion of the transport sector (to which the Transport White Paper somewhat responds), the limited timeframe which does not always allow all actors to perform for such long term goals and the lack of guidance on the "how to do it" to Member States, which has meanwhile been improved.</p>			
<b>Relevance to SPEEDIER:</b>			
<p>This policy is of somewhat moderate relevance to SPEEDIER, as it gives the overall EU directions for energy efficiency, rather than any specific goals for SMEs. Only Article 8 of the directive is directly relevant to SPEEDIER as it requires Member States to ensure the development of programmes to encourage SMEs to undergo energy audits and to implement the recommendations from these audits. SPEEDIER aims to develop a programme that could be used by Members States to fulfil this requirement, however the lack of specific targets on energy efficiency for SMEs means that there is only a moderate driver on national policy makers to develop suitable policies to support this.</p>			



## 6.3 2012/27/EU amendment (EU) 2018/1999

<b>Name:</b>	Amendment of EED of 2018	<b>Location:</b>	EU
<b>Type:</b>	POLICY	<b>Status</b>	Ongoing
<b>Website:</b>	<a href="https://eur-lex.europa.eu/eli/reg/2018/1999/oj">https://eur-lex.europa.eu/eli/reg/2018/1999/oj</a>		
<b>Description:</b>	<p>The 2018 Amendment of the Commission's Energy Efficiency Directive of 2012 is a revised version of the Energy Efficiency Directive of 2012, which sets new rules and targets for energy efficiency to be achieved by the European Union by 2030. The newly revised target is ambitious: 32,5% by 2030, building substantially on the previous one (20% by 2020). In fact, energy efficiency targets encourage industry to innovate and invest. The Amendment targets directly Member States but indirectly businesses, citizens and governments, all of whom can contribute to the overall EU energy efficiency objectives. Like the EED, the Amendment has been transposed in national law of Member States.</p>		
<b>Impact</b>	<p>The short-term policy objective is to build on the momentum created by the EED before the amendment in order to secure the effort of Member States is sustained and goes in the right direction. In the medium-term, the Amendment should help create more R&amp;D and Innovation in Europe around the energy efficiency issue, resulting in the long term in both a legitimate response to the Paris Agreement on Climate Change and the leadership of the EU in EE.</p>		
<b>Costs and Gains</b>	<p>It is rather difficult to estimate the costs of this policy without a formal cost-benefit analysis and a multi-stakeholder perspective for doing that. However, there was the major benefit of setting even more ambitious reduction targets than the 2020 Strategy and of clearly showing the pathway for the EU towards an energy efficient and carbon neutral economy.</p>		
<b>Limitations</b>	<p>Although there has not been a sufficient timeframe after the Amendment was approved to assess drawbacks, neither to assess impacts, some limitations might be cited here, such as the macro-level focus of the Amendment and therefore its relatively little impact to SMEs, albeit indirectly.</p>		
<b>Relevance to SPEEDIER:</b>	<p>This policy is of somewhat moderate relevance to SPEEDIER, as it gives the overall EU directions for energy efficiency, rather than any specific goals for SMEs. However, its knowledge is important in securing an outcome for SPEEDIER which is in line with wider EU goals in Energy Efficiency. The higher energy efficiency targets set out to 2030 put more pressure on Member States to implement policies that drive energy efficiency which will help support the development of SPEEDIER in a general way, although there are no specific additional requirements to focus on SMEs.</p>		

## 7 Other Relevant Projects

There are several other projects related to increasing uptake of energy audits and implementation of energy efficiency recommendations that were funded as part of the same Horizon 2020 call as SPEEDIER. These projects have also only just begun within the last few months and therefore do not yet have results to share. The SPEEDIER project team will keep a close eye on the market progress of those projects along with their achievements and any challenges they face during their delivery, in order to learn from them, share experiences and use them to make SPEEDIER more successful.

### 7.1 INNOVEAS

**Start Date:** - June 2019

**End Date:** - May 2022

**Funding:** - H2020

**Location:** - Italy

**Description:** - The INNOVEAS (INNOVating the uptake of Energy Auditing Schemes for SMEs) project is an initiative promoted by 10 partners, from 6 EU countries, to build and deliver a capacity building programme, aiming at addressing the major non-technical barriers that most often hamper the adoption the energy auditing practice, in particular among those actors, such as SMEs where such audits are not required by law.

The project aims at designing and deploying staff training and capacity building programmes to enhance corporate policy towards energy efficiency, energy culture (motivations, behaviour change, mitigation of perceived risks and barriers) and sustainable supply-chain initiatives.

It therefore intends to: i) Carry out advanced analysis of behavioural barriers to energy audits, to identify and analyse the enabling conditions and non-technical barriers hindering the adoption of energy auditing practice; ii) Deliver self-sustainable capacity building programmes, in order to systematise awareness raising procedures to overcome the psychological and organisational barriers to energy audits in SMEs, deliver a training offering to SMEs and formulate a capacity building programme that targets stakeholders such as intermediaries, policy makers and financing institutes; iii) Create an institutional structure to sustain the project's objectives and results and lay the basis for the creation and consolidation of a pan-European network of enablers likely to support in the coming years the growth and expansion of the training offering on energy efficiency for European businesses.

### 7.2 ICCEE

**Start Date:** - September 2019

**End Date:** - August 2022

**Funding:** - H2020

**Location:** - Italy

**Description:** - The ICCEE (Improving Cold Chain Energy Efficiency) project will facilitate Small and Medium Enterprises (SMEs) in the cold chains of the food and beverage sector to undertake energy efficiency measures (EEMs) after carrying out supply chain energy audits. The focus on the cold chains of the sector is due to the significant energy requirements (refrigerated transport, processing and storage) with large potentials for energy savings. The implementation of the holistic approach, shifting from the single company perspective to the chain assessment, leads to increased opportunities for EEMs.

Non-energy benefits and behavioural aspects will also be addressed and recommendations on financing schemes for SMEs will be assessed. The first part of the training will reach 300 companies through 20 national workshops thanks to the collaboration of associations in the consortium. 32 companies will be trained in the use of the analytical energy efficiency tool in 4 EU workshops. As a final step, ICCEE will launch e-learning courses, which will be available beyond the project's lifetime reaching at least an additional 64 companies. ICCEE will introduce primary energy savings (118 GWh/year), increase invested capital in sustainable energy (64 million €), and reduce GHG emissions (40,376 tonCO<sub>2</sub>/year). Capacity building activities will increase stakeholders' knowledge and enhance their energy culture (2000 people). Outcomes from ICCEE will also support policymakers in defining tailored policies for the sector.

### 7.3 SMEPower Efficiency

**Start Date:** - September 2019

**End Date:** - August 2022

**Funding:** - H2020

**Location:** - Greece

**Description:** - The objective of the project is to “Empower” SMEs to undergo energy audits and implement their proposals. A holistic methodology has been chosen to address different barriers based on three dimensions - Individual, Organizational and Institutional. The first concerns the design and delivery of an integrated Education & Training (E&T) programme targeting energy related SME staff. At least 720 experts will be trained. The E&T programme will focus on financial and technical data required to prove that specific measures are cost-effective, while the trainees will apply their acquired knowledge to at least 160 pilot installations as practical action. This is connected with the second dimension targeting SME decision makers. In-house short training sessions for decision makers of grouped SMEs according to their specificities will be delivered, during the practical action in pilots, by both partners and trainees. Such short trainings will be delivered to operational personnel as well, a total of at least 800 SME persons. Finally, the third dimension relates to targeted workshops where both SME decision makers and stakeholders from entities able to finance energy projects will come together and interact based on the real data provided from pilots, aiming to bridge the gap between energy audits and actual financing of measures. In addition, 4 long lasting training tools will be developed, a) an advanced training handbook in 7 languages, b) A web platform for energy analytics, c) a tool for Monitoring & Targeting, and d) a tool for Measurement & Verification. SMEPower's actions will result in estimated 24.87 GWh/year primary energy savings and trigger at least 4 mil € of investments.

### 7.4 E2DRIVER


**Start Date:** - June 2019

**End Date:** - May 2022

**Funding:** - H2020

**Location:** - Spain

**Description:** - E2DRIVER will develop a collaborative-cooperative training platform boosting the automotive supply industry collective intelligence on energy efficiency. The platform will provide access to training material, online lessons, guidelines, energy and financial tools, virtual reality modules and a community of key actors in the sector for SMEs to undergo energy audits and implement their recommendations. To this end, the E2DRIVER training methodology will enable the development of specific training plan itineraries based on the company's needs and trainees' role in the company, which will increase the effectiveness of



the training sessions and the awareness of energy issues among the staff. The development of E2DRIVER platform will not be a static action resulting from the project execution, but will enable a continuous update of the training material, best practices, benchmarking analysis and guidelines due to the implementation of an ontological flip teaching method, which enables trainees to generate their own knowledge and training materials to be shared through E2DRIVER cooperative networks.

E2DRIVER platform will be tested and validated in 40 companies from the automotive supply industry in four countries that represent over 50% of the EU employees in this sector: Spain, France, Italy and Germany. Moreover, a total of 60 trainers will be certified in E2DRIVER training methodology, which will ease the replication of the project results and the business consolidation of E2DRIVER platform.

## 8 Conclusion

This report identifies the 'State of the Art' projects, schemes, incentives and policies related to energy efficiency implementation in each of the SPEEDIER pilot countries (Ireland, Italy, Spain and Romania) and summarises the key learning points from the literature review of existing energy auditing projects, policies and energy auditing tools that was undertaken by the SPEEDIER team.

The review of relevant projects relating to energy auditing and implementation of energy efficiency measures among SMEs gave a brief summary of each project's aims and objectives before going on to identify the project's achievements, challenges faced and key learning points. The purpose of this was to identify any insights from past research that would be useful for SPEEDIER to refine the SPEEDIER service definition and build on the results of past research.

A similar analysis was undertaken for any available energy auditing tools, focussing more on the commercial availability of the tool, the features and benefits, and drawbacks and limitations of each one. Again, the purpose was to identify any existing tools on which the SPEEDIER project could build to avoid duplicating work.

Finally a review of the 'State of the Art' in each pilot country and relevant Europe-wide policies that relate to energy auditing and implementation of energy efficiency measures among SMEs sets the policy context in which the SPEEDIER project must be developed. The research outlined the existing frameworks and policy landscape in which the SPEEDIER project must operate in each of the pilot countries.

As a result of the analysis of projects, policies and tools the SPEEDIER team has identified a series of best practices that should be considered during the development and implementation of the SPEEDIER Service. The review of projects helped to have a basic understanding of challenges and key learning points from the past projects, which needs to be incorporated for the implementation of SPEEDIER.

### 8.1 Energy Auditing Tools

The review of existing energy auditing tools helped to identify whether any of the existing tools can be used to assist SPEEDIER Experts to deliver the SPEEDIER Service or easily modified for our purpose to avoid duplicating effort. Out of the tools reviewed, some are location specific, for example: EA-Quip is available only in the United States; e-Bench is designed for the Australian, New Zealand and United States markets; e-Quest has its primary targets in North American Market; and HKGBC' is a free online tool, but is based on Chinese certification system, therefore it is not applicable in Europe.

TOPAS is still in the piloting stage of development and therefore is not ready for commercial use. Generation is only available in English Language and its only Windows Operating System based. neZEH is a tool specifically designed for hotels. Energy Auditor App is combination of an energy auditing tool and a network of professionals in the sector such as technology installers, material supplier and energy auditors. IT Toolkit is comprises 10 different tools for consulting, assessment and information and focusses on energy efficient retrofit measures. ExpertMV is a web based tool but is not yet commercially available. EINSTEIN appears to be a tool that is most suited to carrying out energy audits but the full version is not available as

an online tool, so results cannot be easily shared or compared with others. In addition, the software cost is too high compared with the likely energy and cost savings that can be achieved by SMEs. The 'A2PBEER' tool is focussed mainly on public sector buildings. ENSI-EAB' appears to be a user friendly tool for calculating the energy performance of buildings and is a commercially available software tool. It serves with quick calculations, reflecting the influence between parameters and it generates EP indicators (kWh/m<sup>2</sup>) for use in Energy Certification.

Whilst it has been valuable to identify useful features from a review of other available software tools, it will not be possible to use these other tools in the SPEEDIER project unless they are available free of charge and on an open source basis. Commercially available tools cannot be modified to fit the needs of SPEEDIER, whereas open source software could be used as a starting point and modified as needed. Only EINSTEIN (being open source) and ExpertMV (having been developed by the SPEEDIER project coordinator) are available for the SPEEDIER team to modify for their purposes. These two tools will be evaluated further during work packages 3 and 4 to help the project team to decide on the most appropriate strategy for developing the SPEEDIER tool for experts.

## 8.2 Learning from past projects

Analysing the barriers that were faced by previous projects allows us to identify the potential obstacles to implementing the SPEEDIER project. In particular, the success of SPEEDIER will depend on being able to persuade SMEs to take up an energy audit, implement the recommended energy savings measures, ring fence the savings made and then reinvest them into more energy efficiency measures. The project team will need strategies for overcoming the common barriers to engagement that were faced by the other projects if SPEEDIER is to be a success. Table 8-1 lists the most common barrier and challenges faced during the implementation of the projects that have been reviewed and some ideas around how SPEEDIER will overcome these barriers:

**Table 8-1: List of key barriers identified and how SPEEDIER will overcome them**

Barrier identified	How SPEEDIER will overcome the barrier
Low priority of energy efficiency or lack of interest from stakeholders.	SPEEDIER will deliver an engagement event and capacity building training at all levels (senior management to operational staff) on the importance and benefits of energy efficiency including focussing on the non-energy benefits.
Lack of finance to invest in energy efficiency measures.	SPEEDIER Experts will be trained to advise on grant schemes, tax incentives and low interest loans that are available to SMEs in each country. The SPEEDIER self-financing mechanism also ensures that SMEs do not need any up front capital to begin making savings as long as the SME is prepared to ring-fence and re-invest the savings.
Competition with an official public program.	This review has highlighted the government policies and schemes that are already running in pilot countries that are suitable for SMEs. The SPEEDIER team will closely monitor these and other new projects, policies or programmes that begin over the course of SPEEDIER through a 'market watch' activity. Where possible, the



	SPEEDIER team will work with official public programmes to enhance the offering rather than compete with it.
Lack of trust of SMEs in external consultants.	SPEEDIER Experts will all be trained to deliver the SPEEDIER programme to a high standard. In addition, SMEs will work with the same Expert for the duration of the programme, allowing them to build trust and get to know their expert.
Fear of negatively affecting product quality and product supply during the implementation of ECMs.	By starting with the easy, no cost energy conservation measures and proving the concept, SMEs will begin to trust their SPEEDIER Expert and will be more willing to take bigger actions as the project progresses.
Lack of knowledge and understating of energy saving behaviour & efficiency measures.	SPEEDIER will provide training and capacity building to staff at all levels in each business supported. Staff will also have access to a wide range of training materials including a mobile app to help improve knowledge and understanding of energy related issues.
'Hassle factor' associated with installation or implementation of energy conservation measures.	The 'hassle factor' will be removed as energy management will be effectively outsourced to the SPEEDIER Expert assigned to the SME. The SPEEDIER Expert will handle all the time consuming jobs such as contacting potential suppliers and project managing installations on behalf of the SME.
Complexity of Energy Performance Contracts (EPC) leading to lack of understanding of how these contracts work, and therefore fear of engaging in this type of contract.	SPEEDIER will not use full EPCs but will introduce a service based model and the idea that payments to SPEEDIER Experts will be linked to the level of savings made (when the service is commercialised). This gives the SME confidence that the SPEEDIER Expert is acting in their best interests to maximise savings as the more energy is saved, the larger their share of the revenues will be.
Modern buildings with efficient technology have fewer opportunities for saving energy.	Even in modern buildings there are often simple energy and cost saving measures that can be taken e.g. switching energy supplier, ensuring staff understand how they can reduce energy usage, ensuring equipment controls are set correctly.
Lack of knowledge of industry about the financing instruments that are available in their country.	SPEEDIER Experts will also be experts in the financing instruments that are available in their country and can therefore advise SMEs on the most appropriate ones.
To find and motivate good consultants to work with SMEs.	SPEEDIER Experts will be trained to deliver the SPEEDIER Service in a standardised way. The project will also develop a standard to ensure high quality service delivery.
Market penetration and project take-up beyond the end of the project.	The SPEEDIER team have a draft exploitation plan which will be updated as the project progresses.

In addition to the barriers identified above, the review also identified a number of key learning points:

- SMEs are more likely to implement suggested no-cost and low-cost energy saving measures than medium-cost and high-cost energy saving measures.



- A key factor to ensure successful energy auditing campaigns is to facilitate easy communication with the client.
- Energy audit campaign should be supported by an energy management obligation or strong incentives.
- It is crucial to inform companies and help them understand the actual potential of energy efficiency measures implementation beyond the financial benefits.
- Long term support of organisations, well beyond delivering the energy audit report, is required to ensure that energy conservation measures are implemented. Long term support also helps to build trust in the auditor and confidence that the most appropriate measures are being recommended.
- Availability of data affects the level of analysis that can be performed. Lack of data leads to the auditor being unable to demonstrate the impact of the energy saving measures that have been implemented and lack of trust between the SME and the auditor.
- Awareness and involvement of all decision makers is vital to the success of any project. Buy-in from senior management is very important and ensures that action is taken at all levels of the organisation.
- Behaviour change by users is key element for implementation of energy saving measures and can lead to significant savings at very low or no cost.
- It is necessary to build a professional marketing strategy to ensure that the right people and organisations receive the messages that the project is trying to deliver.
- A checklist can be a very useful tool to demonstrate to clients that all necessary steps and actions have been taken.
- Robust monitoring and evaluation plans should be created upfront, incorporating periodic project review.
- An important aspect of awareness raising is availability of education and training (E&T) material.
- There is substantial difference between wishful thinking – what we declare our energy reduction will be – and real life. Even when the results are different to what was expected, there is always valuable knowledge that can be drawn from the execution of project and initiatives.
- Projects should be market-driven and technology-enabled.

### 8.3 Key learning points for each pilot country

8.3.1 In addition to above mentioned challenges faced and key lessons learned during the implementation of the projects in general, we also need to understand the barriers or challenges that are specific to each pilot country.

#### Italy

Looking specifically at the projects that took place **in Italy**, economic concerns appear by far the largest barrier to energy efficiency, followed by behavioural barriers, such as energy efficiency being a low priority for many SMEs and lack of interest in energy efficiency issues. This coupled with a lack of awareness of the available support options leads SMEs to neglect energy efficiency issues despite there being several support mechanisms available to SMEs in Italy wishing to improve their energy efficiency. The policy framework in Italy (as described in section 3.2) puts legal requirements on energy intensive SMEs to undertake energy audits and introduces incentives (such as the white certificate scheme) to follow through and implement the recommended savings. As such, there is excellent scope for SPEEDIER to

complement and enhance these policies by positioning itself as a service that can help SMEs to meet their legal obligations and take advantage of the available incentive schemes to reduce energy bills.

### Spain

8.3.2 Turning to **Spain**, the major barrier faced in the Spanish projects that were reviewed include a lack of knowledge of industries about the available financing instruments, together with propensity for companies to choose to implement only those energy conservation measures that have a short payback time. In addition some projects found difficulty in finding suitably qualified and motivated individual to act as energy experts. The Spanish policy landscape around energy auditing of SMEs focusses mainly on industrial businesses, meaning that there is little or no driver for SMEs in other sectors (e.g. commercial, retail, hospitality, service etc.) to undertake energy audits or implement energy efficiency measures. This means that there is enormous potential for the SPEEDIER Service in Spain as it delivers an opportunity to a market that is as yet untapped.

### Ireland

8.3.3 In **Ireland** there have been fewer specific projects that promoting uptake of energy saving measures among SMEs. All of the grant schemes and support programmes for energy efficiency have been run by the Sustainable Energy Authority of Ireland (SEAI), focussing on specific sectors (e.g. dairy farming sector) or specific technologies (LED lighting). Nevertheless informational barriers and the low priority of energy efficiency for most business owners appears to be problematic, particularly for smaller businesses in Ireland where energy management is generally part of a set of responsibilities of an individual who may lack the necessary resources, scientific expertise and knowledge regarding energy efficiency. Issues surrounding access to internal or external capital, can ultimately prevent the adoption of energy saving measures. Even where financial incentive schemes do exist, SMEs may not avail of these due to their lack of confidence in the approach. SEAI's new approach is to encourage a whole building approach through the EXEED scheme and facilitate long term support for SMEs through the roll out of a new support service that will launch in Q4 of 2019.

8.3.4 SPEEDIER is in an excellent position to complement these new support services and guide SMEs through the process of accessing this support.

### Romania

In **Romania**, the projects that have been reviewed show that building owners and contractors, are often unaware of best practices in energy efficiency. A lack of transparency about energy use and its costs prevents individuals from determining how and where energy is being used in their business. Investment in many energy efficiency measures often require large amounts of upfront capital or financing which can prevent engagement. The Romanian policy framework supports the uptake of energy audits and implementation of energy efficiency measures among SMEs through information provision, support services and grant schemes for energy efficiency projects. Again, this creates a significant opportunity for SPEEDIER as the SPEEDIER Service can be positioned as a solution for SMEs that helps them to access the most appropriate grants schemes and complements the support services that are already on offer.

## 9 Annex-1 Project Review Template

<b>Name:</b>		<b>Location:</b>	
<b>Type:</b>	PROJECT	<b>Funding:</b>	
<b>Start date:</b>		<b>End date:</b>	
<b>Website:</b>			
<b>Description:</b>			
<p><i>Briefly describe the project: What was the approach? Which groups were targeted? What activities were carried out? What did the project do/offer?</i></p>			
<b>Achievements/Impact:</b>			
<p><i>What did the project achieve? E.g. number of businesses supported, energy savings, CO2 savings, number of people engaged with etc.</i></p>			
<b>Barriers:</b>			
<p><i>What barriers and challenges did the project face? How were they overcome?</i></p>			
<b>Key learning points:</b>			
<p><i>What can we learn from this case study?</i></p>			
<b>Relevance to SPEEDIER:</b>			
<p><i>How can we apply these learning points to SPEEDIER?</i></p>			

## 10 Annex-2 Tool Review Template

<b>Name:</b>		<b>Location:</b>	(Country/Region)
<b>Type:</b>	TOOL	<b>Funding:</b>	(if applicable)
<b>Developer:</b>	(company or project name)		
<b>Website:</b>			
<b>Description:</b>			
<p><i>Briefly describe the tool. What does it do? What is it used for? Who typically uses it? What format does it take (download, online, mobile app etc)</i></p>			
<b>Commercial details</b>			
<p><i>Is the tool commercially available or restricted access? How much does the tool cost to use? What is the charging structure (free of charge, one-off cost or ongoing fees)?</i></p>			
<b>Features &amp; Benefits</b>			
<p><i>What are the features &amp; benefits of this tool? What problem does it solve for the user? What does it do well?</i></p>			
<b>Drawbacks and Limitations</b>			
<p><i>What are the drawbacks and limitations to this tool? What does it do badly?</i></p>			
<b>Relevance to SPEEDIER:</b>			
<p><i>Is it relevant to SPEEDIER? How could this tool be useful to SPEEDIER?</i></p>			

# 11 Annex-3 Policy Review Template

<b>Name:</b>		<b>Location:</b>	(Country/Region)
<b>Type:</b>	POLICY	<b>Status</b>	(Current/Past/Future)
<b>Website:</b>			
<b>Description:</b>			
<p><i>Briefly describe the policy. What is its purpose? Which stakeholders does it target? How has it been implemented?</i></p>			
<b>Impact</b>			
<p><i>What is/was the short, medium and long term impact of this policy? Give figures if available on energy/carbon savings achieved or other KPIs. Were there any unintended effects of the policy?</i></p>			
<b>Costs and Gains</b>			
<p><i>If known, what was the cost of implementing the policy and/or were any gains made from the policy? Look at the point of view of government and stakeholders.</i></p>			
<b>Limitations</b>			
<p><i>What are the limitations of this policy? Did it achieve the intended impacts? If not, why not?</i></p>			
<b>Relevance to SPEEDIER:</b>			
<p><i>How is this policy relevant to SPEEDIER?</i></p>			