DEESME 2050

Developing Energy Efficiency Projects in SMEs for European 2050 targets

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Final publishable report

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1. Summary

Over the past three and a half years, the DEESME 2050 project has worked towards creating favourable conditions for smaller companies to implement energy efficiency measures in line with Article 11 of the Energy Efficiency Directive.

To achieve this, we focused on the furniture sector, a representative case of small, dispersed, non-energy-intensive, and often hard-to-reach enterprises. This presented both a challenge and an opportunity to design solutions that are realistic, transferable, and scalable.

This report presents the results of our collective efforts and aims to provide useful insights and practical guidance for future work on advancing energy efficiency in small and medium-sized enterprises across Europe.

2. Introduction

2.1 The motivation

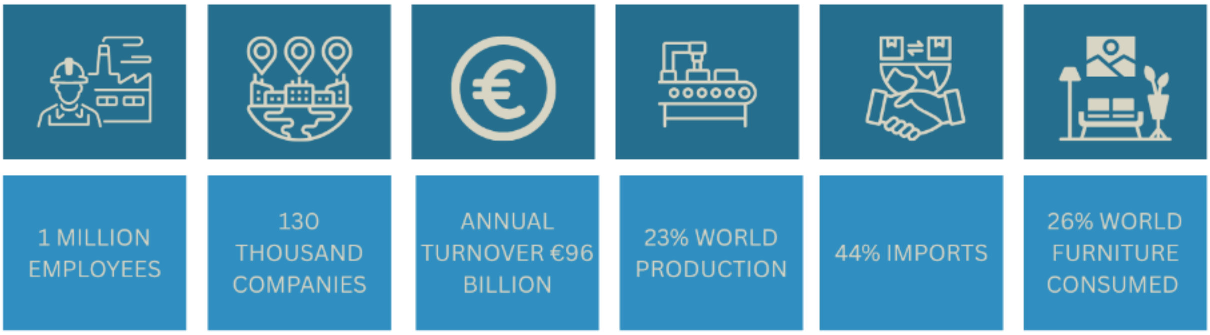
Improving energy efficiency is the most cost-effective way to reduce energy-related emissions, strengthen economic competitiveness, and enhance energy security. Competitiveness is in this context not limited to price competition, but rather reflects a broad combination of productivity, innovation capacity, investment, and institutional quality that enables businesses to operate efficiently, adapt to change, and create value.

The Energy Efficiency Directive (EED) establishes a common framework of measures and requirements to remove market barriers and promote the efficient use of energy in both supply and demand. Under Article 11 of the Directive, Member States are required to promote and facilitate the implementation of energy audits and energy management systems (EMS). New changes include shifts from a size-based logic (large enterprise vs. SME) to a consumption-based logic that applies to all enterprises, including SMEs. Enterprises with an average annual energy consumption between 10 TJ and 85 TJ are required to carry out an energy audit, unless they choose to implement an EMS instead.

However, despite the policy framework and clear economic rationale, most SMEs have not undergone an energy audit in the last five years, do not employ an energy manager, and lack a formal energy policy. The research reveals recurring barriers: low awareness of energy efficiency opportunities, limited access to capital and financing, uncertainty about the real saving potential, and a shortage of technical expertise. Support mechanisms are often unavailable or fragmented, and the concept of multiple benefits–such as improved productivity, quality, and employee comfort–remains poorly understood among SMEs. Competing business priorities frequently override energy efficiency considerations, and without quantitative EU-level targets or mandatory obligations for SMEs, motivation to act remains weak.

Why piloting in the furniture sector?

The furniture manufacturing sector is a major industrial employer in the EU, comprising over 130,000 companies (European Commission DG GROW, 2025), the vast majority of which are SMEs. The sector employs more than 1 million people across Europe and contributes nearly EUR 100 billion annually to the EU economy.



2.2 Rationale for DEESME 2050

During the implementation of H2020 DEESME project, an interaction with a few hundred key stakeholders was facilitated to answer the question: How to create circumstances and motivate companies in the implementation of the energy efficiency measures? It was complemented by the research identifying what could be the most relevant motivations for the companies.

DEESME 2050 was built on the answers to those questions:

- Use benchmarks, motivate companies to compare,
- Overcome the information barrier, make the situation clear,
- Make guidelines and information structured, standardised and comprehensive,
- Simplify the life of companies,
- Find tangible financial and non-energy benefits,
- Help with funding.

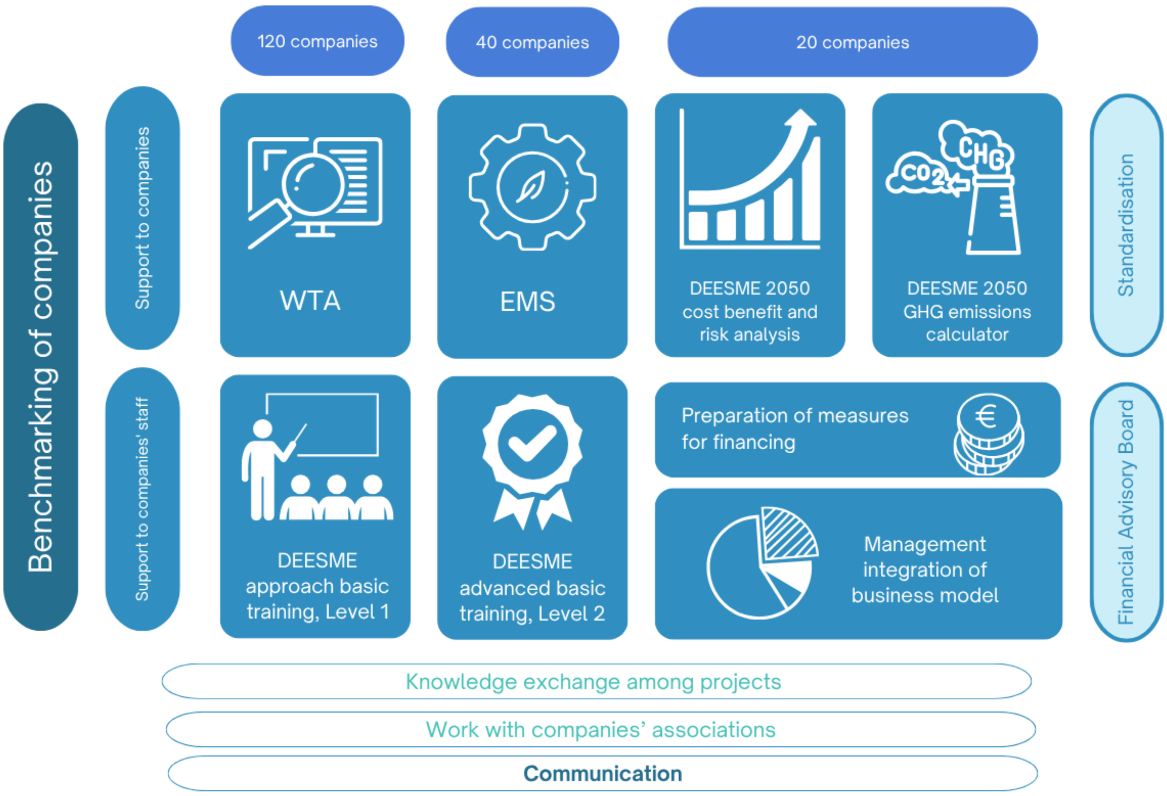
Zoom in DEESME 2050

For more details, listen to our introductory webinar.

We used those findings and our knowledge to assist and motivate companies to overcome the obstacles in energy efficiency measures uptake in the furniture sector and its value chain, mainly in Bulgaria, France, Italy and Poland. But from it, we created solutions to be used in other countries, other companies, and other sectors across Europe.

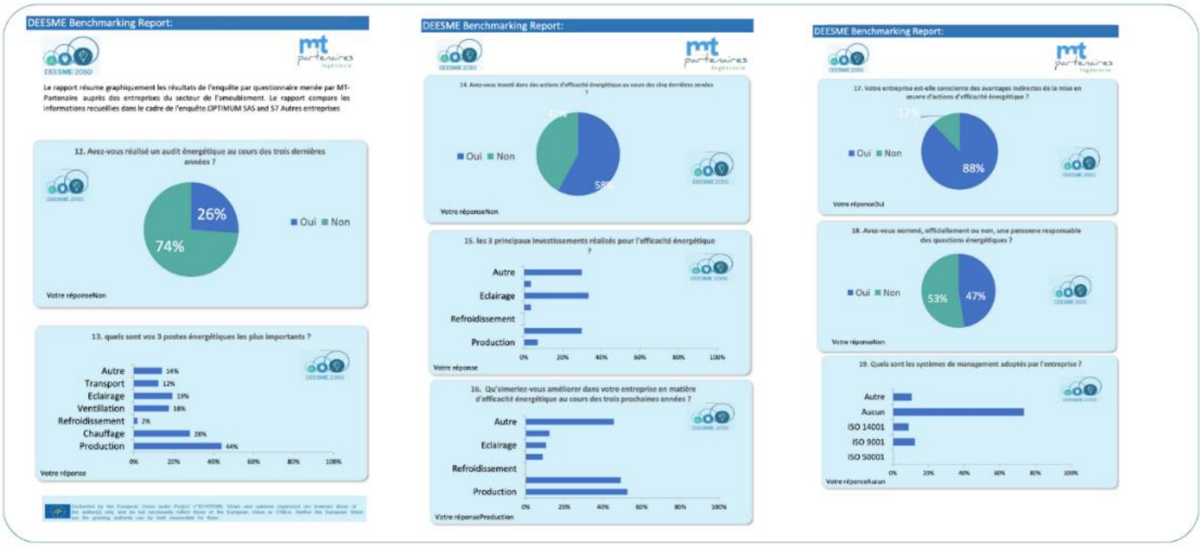
And how?

The methodology outlined below summarises the main elements of our implementation approach, with detailed explanations in every of the following chapters.



3. Working with companies

3.1 Benchmarking approach

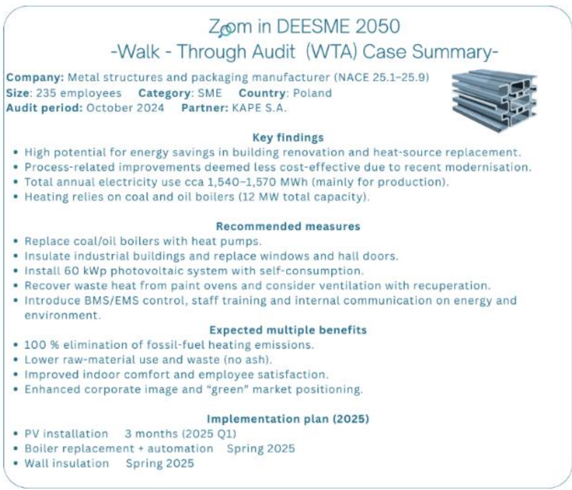


The benchmark compared energy consumption patterns and efficiency levels within the furniture industry and its supply chains to identify best practices and areas for improvement. The analysis supported the development of strategies to enhance energy performance, reduce operational costs and environmental impact, and highlight the multiple benefits of energy efficiency investments.

Through benchmarking, individual companies were able to assess how their performance compared with national and European peers while maintaining full data confidentiality. The resulting database also served to identify candidates for subsequent walk-through audits. 60 companies per country were included in the benchmark.

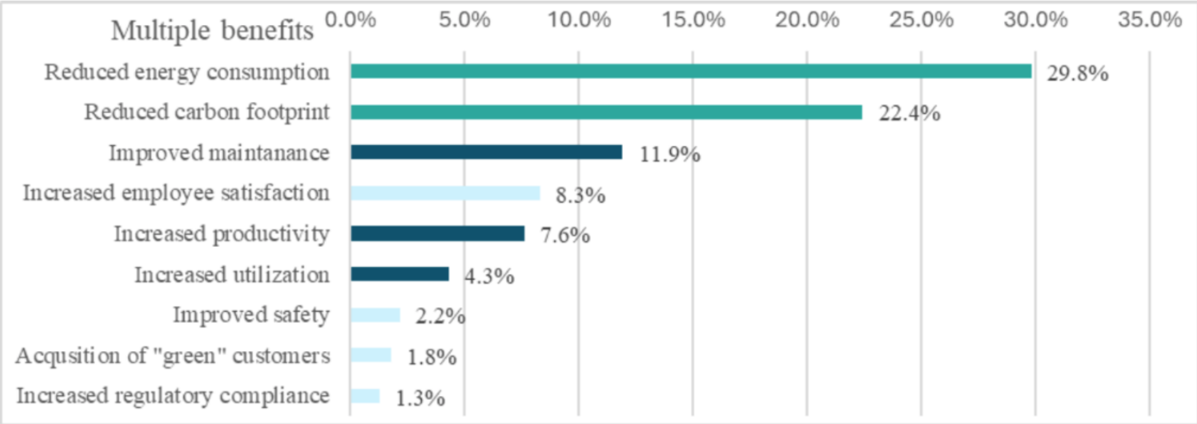
3.2 Implementation of the WTAs

The Walk-Through Audit (WTA) helped company managers and technicians identify practical energy efficiency opportunities and their multiple benefits, from cost savings to productivity and competitiveness gains. It demonstrated how energy efficiency fits into European policy goals and market trends, highlighting its strategic value for SMEs. More than 70 companies received WTAs.



The WTA followed three simple phases:

- Before the visit: Collect basic company information (processes, energy use, audit reports) to understand key challenges and priorities.
- During the visit: Discuss energy efficiency measures, explore related multiple benefits and possible financing options, and inspect relevant production areas.
- After the visit: Deliver a short WTA report (in national language) summarising findings, followed by an Excel summary.



Each WTA involved both management and technical staff, ensuring alignment between strategy and operations. The process encouraged companies to see energy efficiency not as a technical exercise, but as a driver of innovation, competitiveness, and resilience.

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Results from the companies' WTAs with multiple benefits approach

3.3 Energy audit and Energy management approach

21 companies completed full energy audits, and 12 implemented ISO 50001-based EMSs. We developed standard templates, data tools, and advanced training to guide companies through the process and to introduce the Multiple Benefits (MB) approach, showing how energy efficiency links to competitiveness, comfort, and ESG goals.

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Through this work, we identified key barriers such as long payback times, tenant-related investment issues, and limited in-house resources, but also major opportunities driven by rising energy prices, new EU regulations, and customer demand for sustainable production. The most significant energy uses across companies were heating, vehicle fleets, and lighting, each monitored

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Read more on energy audits and EMS implemented through tailored performance indicators. Across 48 energy-saving actions identified, most focused on heating, renewables, and ventilation, with an average investment of 78,600 EUR and an average payback of 7.2 years. When considering multiple benefits—such as reduced carbon footprint, improved maintenance and productivity, and better employee satisfaction, these measures proved far more attractive to managers.

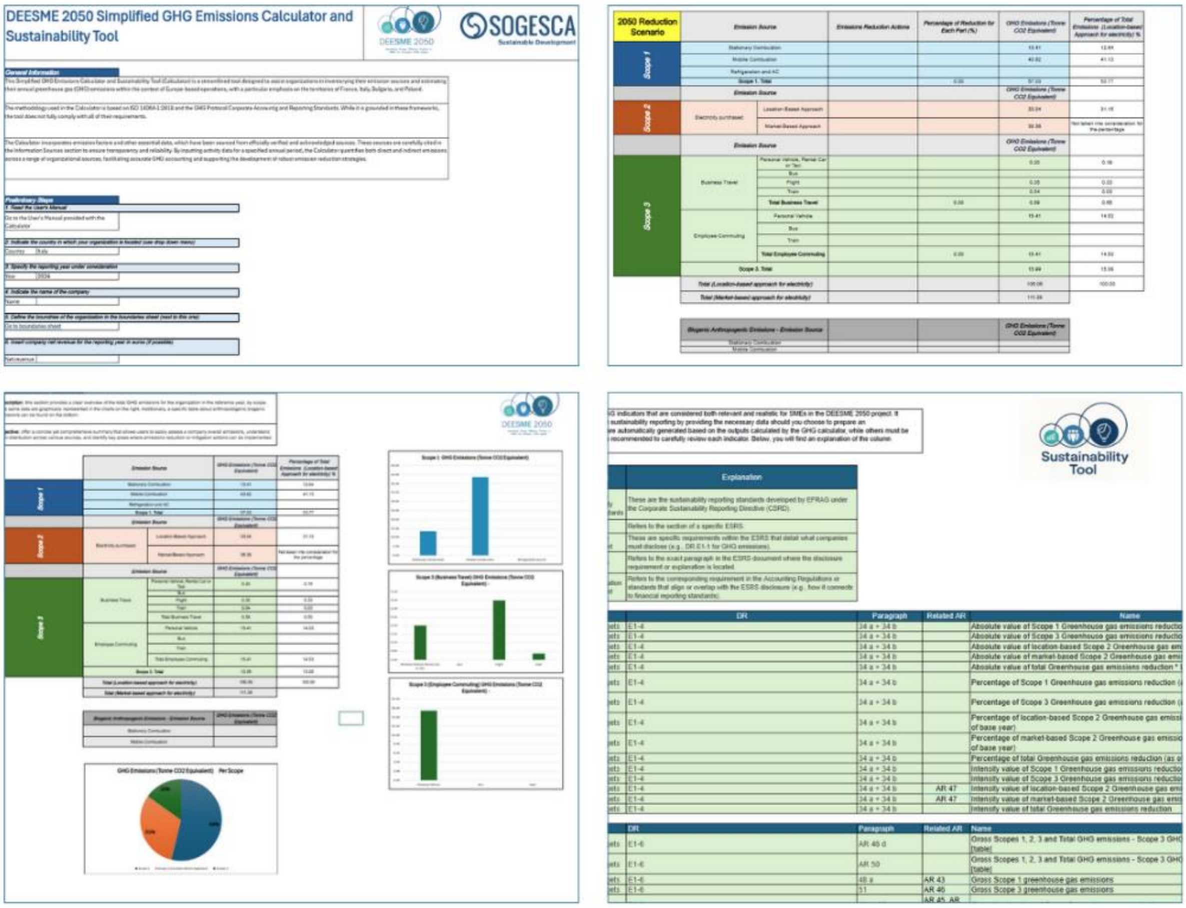
4. Calculations and modelling

4.1 Carbon footprint calculation and sustainability tool

We developed a Simplified GHG Emissions Calculator and Sustainability Tool to help SMEs in the wood-based and furniture sectors understand, estimate, and manage their greenhouse gas emissions in a practical way. Created by SOGESCA, the tool guides companies through identifying emission sources, quantifying them, and setting reduction targets for 2030 and 2050, while aligning with EU sustainability and CSRD reporting requirements.

It covers Scopes 1, 2, and 3, including stationary and mobile combustion, refrigerant leakage, electricity use, business travel, and employee commuting. Predefined emission factors for each country (Italy, France, Bulgaria, and Poland) ensure reliable calculations, while built-in charts and summaries make results easy to interpret.

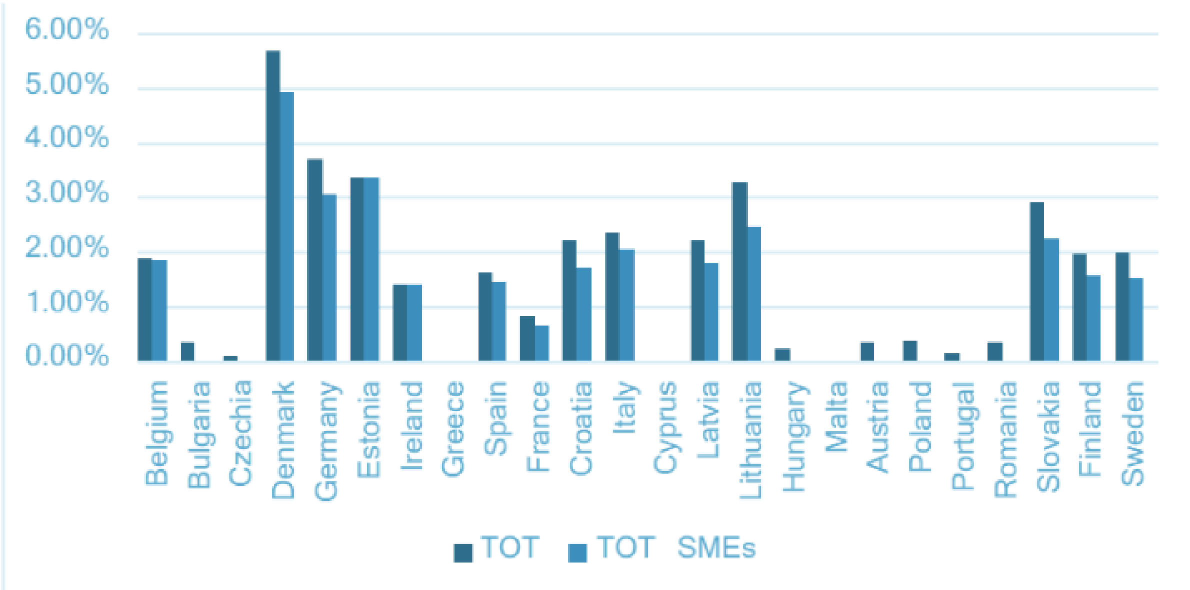
The tool allows SMEs to simulate emission-reduction scenarios, evaluate the impact of specific actions, and automatically generate indicators compatible with EFRAG ESRS standards. Supporting sheets on conversion factors, emission sources, and data collection simplify use even for non-experts. Overall, this practical calculator helps SMEs take concrete steps toward decarbonisation, integrate GHG accounting into energy audits, and align their operations with EU 2050 climate neutrality objectives.



4.2 Energy consumption in small and medium companies

We set out to pin down SME energy use and who crosses the 10 TJ audit threshold. The core obstacle is data: Europe lacks precise, systematic SME consumption records, so we built a harmonised estimation using Eurostat/JRC sector data, SME counts and employees by size-class, back-checks for internal consistency, and targeted fixes for gaps. We modelled manufacturing and services across EU-27, then estimated the share of SMEs likely above 10 TJ. Patterns are clear: SMEs dominate numerically in every subsector, but only small fractions exceed 10 TJ, typically in chemicals, non-metallic minerals, metal processing, and parts of food & beverage; most furniture, wood, textiles, electronics SMEs sit well below the threshold.

Share of SMEs and large companies with an annual energy consumption exceeding 10 TJ – Manufacturing of furniture



We validated the model against research and EU projects: typical SMEs use low amount of energy, with even many manufacturing SMEs being in the range from 2-10 TJ, and only 5-10% surpass 10 TJ. Crucially, a tiny cohort of energy-intensive SMEs accounts for a disproportionate load. These are the prime targets for audits, EMS, and investment, while wider uptake improves when multiple benefits (productivity, quality, safety, ESG) are counted alongside kWh. We suggest other solutions for smaller SMEs.

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Read more on our recommendation for SMEs and audit implementation

5. Financing of energy efficiency measures

5.1 CBA tool and risk analysis tool

Partners took the opportunity to update, upgrade and adapt to standards the tool that they already have developed in H2020 DEESME project. The tool has already been recommended by the European Commission as the relevant tool for the quantification of the Multiple Benefits.

Commission Recommendation (EU) 2024/2002 of 24 July 2024 setting out guidelines for the interpretation of Article 11 of Directive (EU) 2023/1791 of the European Parliament and of the Council as regards energy management systems and energy audits (notified under document C(2024) 5155)

It is a macro-enabled Excel tool designed to evaluate a single energy efficiency investment by combining cost-benefit analysis (CBA) with risk assessment (RA) and integrating the Multiple Benefits (NEBs) approach. It guides users through the full evaluation process: from entering technical and economic data to quantifying non-energy benefits such as improved comfort, maintenance savings, quality, and safety.

The tool includes structured sections for general investment information, technical specifications, and energy data (before and after the measure), leading to key financial indicators such as NPV, payback time, and profitability index. It also features sensitivity analyses to test how results change under different assumptions (energy prices, discount rates, or NEB inclusion) and a detailed risk analysis module with predefined risk categories like regulatory, performance, and price risks. Each risk sheet allows users to model potential variations, estimate their consequences, and compare worst-case outcomes with or without mitigation actions. Overall, this tool provides a comprehensive and practical framework to support SMEs and auditors in assessing the financial and strategic value of energy efficiency measures.

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Check the prepared analysis of an examplary company

5.2 Financial market, matchmaking and the Financial Board

The inventory and analysis of funding opportunities aimed to enhance SMEs' willingness to implement energy efficiency measures. Funding programmes, models, and tools were categorised by context to support decision-making and compiled from public, private, and financial institutions at international, European, and national levels. Drawing on EU projects and publications, the report mapped national and regional funding schemes and loans, providing clear, structured information on practical financing options for energy efficiency. There was a focus on the support of the European Investment Bank and the national banks that work with it. This has been enhanced since the EIB, and the European Commission presented a €17.5 billion financing initiative to aid over 350,000 SMEs across Europe in improving energy efficiency. This works to the advantage of companies in the DEESME 2050 project. There was a focus on the support of the European Investment Bank and the national banks that work with it. This has been enhanced since the EIB, and the European Commission presented a €17.5 billion financing initiative to aid over 350,000 SMEs across Europe in improving energy efficiency. This works to the advantage of companies in the DEESME 2050 project.

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Check the available funding

Once energy efficiency measures were identified and prepared for financing, the next step was to align the needs of SMEs with the expectations of financial institutions. This process was supported through a pipeline of investment-ready projects, helping both sides understand each other's requirements and building mutual trust. Awareness-raising and capacity-building activities were essential to improve understanding of financing options and criteria. Intermediaries and facilitators, such as energy agencies or specialised organisations, played a key role in connecting companies with financiers and reducing perceived risks.

Within the task, partners organised national roundtables and meetings with banks and financial institutions, participation in meetings with European initiatives and set up the SmFin - Financial Advisory Board, meeting several times during the project implementation. Case studies from our partners were discussed by the SmFin to help those business cases be better prepared for financing.

The partners were also introduced to the European Commission's European Energy Efficiency Financing Coalition, bringing together EU countries, financial institutions and relevant stakeholders, to identify actions to concretely improve private financing for energy efficiency. EEEFC works at both the EU and national levels. There will be a working group dedicated to SMEs and that will benefit DEESME 2050 partners. EEEFC is also setting up national hubs. Partners have been informed about these hubs and introduced to them once the hubs are established. That process is on-going, but partners can already benefit. The EEEFC will also help the financial institutions be better prepared for when our partners, and other SMEs, present their business cases.

6. Working with standards

Ensuring full alignment with recognised international standards is a cornerstone of our work. It guarantees that the methodologies, data, and tools we develop are transparent, comparable, and credible across different contexts.

ISO 14064-1 & GHG Protocol Corporate Accounting and Reporting

These frameworks provide internationally recognised principles and requirements for quantifying and reporting greenhouse gas emissions at the organisational level, ensuring consistency, accuracy, and comparability. We used it as reference for the development of the GHG calculation tool.

EN 17463 Valuation of Energy related investments (VALERI)

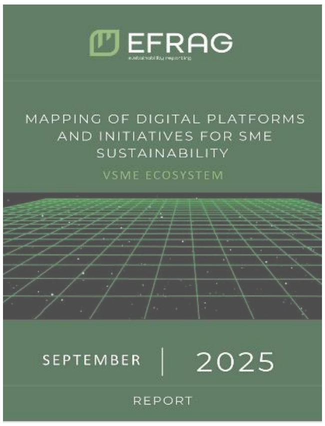
The VALERI framework supports the systematic identification and valuation of energy efficiency investments, including non-energy benefits (NEBs) of energy efficiency projects, integrating both quantitative and qualitative impacts into financial and strategic decision-making. The CBA and risk analysis are aligned with the VALERI standard.

Values and Benefits of Decarbonisation and Energy Performance Actions

The forthcoming CEN standard on Multiple Benefits (MB) provides a harmonised European methodology for identifying, classifying, and quantifying the additional benefits of energy efficiency measures, ensuring consistent and credible integration of these impacts into audits and decision-making. DEESME 2050 continuously provided technical information to CEN/CENELEC JTC 14.

11. Presentation of EU funded projects relevant for JTC 14 (INFO)
    a. LIFE project: DEESME 2050 "Developing Energy Efficiency Projects in SMEs for European 2050 targets"
    b. LIFE project: SMART2 "Smart Tools for Smart Buildings: Enhancing the intelligence of buildings in Europe" and the related deliverable as CEN/CLC CWA "Standardized On-site SRI Building Audits: Framework Development Workshop" *N 272*

EFRAG - voluntary sustainability reporting standard for small and medium-sized undertakings - VSME



EFRAG develops the sustainability reporting standards under the CSRD. Its voluntary SME standard will enable smaller companies to report key environmental and sustainability indicators in a simplified but comparable format. EFRAG released the mappings of digital tools, platforms and initiatives for SME sustainability reporting, including DEESME 2050 tool.

7. Knowledge creation, sharing and exchange

7.1 In the companies: DEESME 2050 trainings

The DEESME project established a structured training programme to promote and apply the Multiple Benefits (MB) approach among SMEs and energy experts. The objective was to raise awareness, build capacity, and prepare companies for practical implementation. Three complementary training types were developed: awareness-raising for managers (basic training), capacity-building for implementation, and hands-on preparation for SMEs.

Before the training, 61% of participants were unfamiliar with the concept and 93% had never applied it. The training effectively transformed awareness into action, with 66% of participants expressing a strong willingness to apply the MB methodology in their companies. Combining educational sessions with practical audits proved highly effective, with 89% of participants reporting improved competences and 91% recommending the programme. Overall, the results reveal significant untapped potential for energy efficiency, as 70% of participants believe substantial savings can be achieved. DEESME 2050 has laid a solid foundation for implementation and future replication of the approach across the industry.

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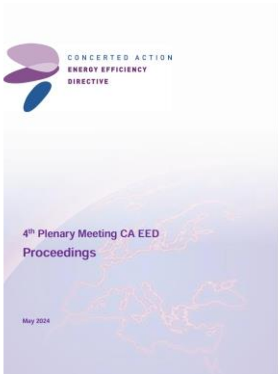
Training results

7.2 Cooperation and learning from sister projects

DEESME 2050 has also co-operated with other relevant LIFE projects in order to create a synergy effect, benefit from the learnings of others and share the experience of this project. There has been participation in other webinars. The networking has been enhanced by a new informal initiative from CINEA called the LIFE CET Community.

During the project implementation, we cooperated with most sister projects to exchange knowledge, align methodologies, and create synergies in promoting energy efficiency and sustainability across SMEs and industrial sectors.



7.3 Outside the companies: communication and knowledge sharing