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Proposal number: **101076459**

Proposal acronym: **EnergyEfficiency4SME**

Proposal title: **Accompanying SMEs in implementing energy efficiency measures**

Summary

D2.1 Methodology for the analysis of energy efficiency practice in large companies

The overarching objective of the project Life Energy Efficiency for SMEs is to identify and transfer highly effective energy efficiency practices from large companies in the Accommodation and Food Service activities (NACE Code: I55 to I56.3.0), Manufacturing - Agri-food (NACE Code: C10 to C11.0.7), and Metal Work (NACE Code: C24 to C25.9.9) sectors to small and medium-sized enterprises (SMEs) operating within the project's territories.

To achieve this goal, the Fenice Foundation has developed a rigorous methodology to identify the best energy efficiency practices within the participating countries across Europe. The technical conception of the questionnaire took as reference the principles of the Energy Auditor Certification according to the UNI EN 16247 series part 1-2-3-4-5.
This methodology serves as a basis for assessing the current state of energy efficiency in each country, establishing a starting point from which effective efficiency measures can be proposed and implemented.

To gather the necessary data, the Fenice Foundation, in collaboration with a team of experienced energy experts, has devised a meticulously crafted questionnaire.
To tackle the task assigned, Fenice has set up an internal task force of experts made up of 4 people:
1- Technical Director of Fenice with 15 years of experience in environmental and energy audits;
2- Project manager research contract with decennial experience in the management of environmental projects;
3- Professor of Technical Physics at the University of Padua;
4-Energy Expert, UN EGE certified according to the UNI CEI 11339 standard

The team regularly confronted the LP (Eurochambres) and the project partners assigned to WP2, through periodic discussion meetings to verify if the direction and the tools adopted were understandable and suitable for all the realities involved in the project.

The methodology has been specifically tailored to address the unique characteristics of the project overall scope and the requirements of the three identified sectors. With careful selection, the questionnaire was distributed to a total of 170 companies, across the 10 countries involved in the project, ensuring a representative sample from each sector.

The responses received through this comprehensive questionnaire provide valuable insights and information regarding successful energy efficiency practices. These findings will serve as the bedrock for proposing and implementing tailored efficiency measures in SMEs, thereby promoting sustainable energy consumption and resource optimization across the project's territories.

The questionnaire comprises two distinct parts: a common, cross-sectoral section and sector-specific sections. The common section focuses on capturing fundamental aspects of energy efficiency that are relevant across all sectors. It aims to gather essential information that transcends industry boundaries, providing a comprehensive understanding of energy management practices.

In addition to the common section, sector-specific sections have been developed to delve deeper into the unique challenges and opportunities within each sector. These tailored sections ensure a targeted approach to addressing energy efficiency, taking into account the specific needs and requirements of each industry.

By employing a combination of a common framework and sector-specific considerations, the questionnaire facilitates a holistic and focused assessment of energy efficiency practices across Europe. This approach enables the project to identify both commonalities and specificities across sectors, fostering the transfer of best practices to SMEs in a manner that is both effective and customized to their respective contexts.
The project team conducted a thorough analysis of previous energy consumption analysis practices in the target companies of the project, considering all aspects of an energy audit. Several notable projects were reviewed, including:
- Desmee (Aeneas)
- Leap4Sme (Enea)
- TranspArEEnS (Cribis)
- ReMap: (Irena)
- EEI: (Combi)
- Refined: (E7)

The development of the questionnaire for the big companies and energy experts was undertaken by FGEP, with the expertise and guidance of Ph.D. Michele De Carli, a distinguished professor at the University of Padua. Dr. De Carli holds membership in TC228WG5 of the CEN (Standard European Commission) and is recognized as an expert in the field of energy efficiency, boasting a portfolio of over 250 scientific publications.
The work team adopted a systematic approach that recognized the importance of considering three dimensions of energy efficiency in the analysis of consumption in large companies. These dimensions include:

1. Technological Improvements: The team recognized the significance of implementing advanced technologies and equipment that promote energy efficiency. This dimension emphasizes the adoption of energy-efficient machinery, systems, and processes that can reduce energy consumption and optimize performance.

2. Behavioral Practices: The team acknowledged the role of virtuous behaviors in achieving energy efficiency goals. This dimension focuses on raising awareness among employees and promoting energy-conscious behaviors and practices within the company. It involves

training programs, employee engagement initiatives, and the establishment of energy-saving guidelines and protocols.

3. Contractual and Supply Chain Considerations: The team understood that energy efficiency efforts should extend beyond the company's boundaries. This dimension emphasizes the importance of reviewing contracts and engaging with suppliers to ensure the procurement of environmentally friendly and energy-efficient products and services. It also includes exploring opportunities for renewable energy sourcing and sustainable supply chain practices.

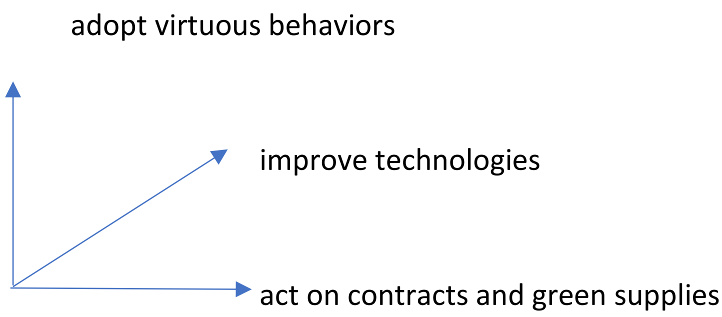

Figure 1: the three approaches of energy efficiency

The methodology employed in designing the questionnaire drew upon a combination of extensive literature review, in-depth discussions with sectoral energy experts from the three identified NACE sectors, and collaborative exchanges within the project partnership. This comprehensive approach ensured that the questionnaire was thoughtfully crafted to elicit valuable insights from the participating companies.

Throughout the development process, a significant emphasis was placed on harmonization and fine-tuning of the methodology. Dialogue and consultations with the project partners were held to identify the most suitable and effective solution, one that could cater to the diverse needs and requirements of the Chambers of Commerce and Industries across Europe.

After careful consideration and extensive deliberation among the project partnership, it was recognized that valuable input could be derived from fostering an open dialogue with companies and energy experts. In line with this perspective, multiple rounds of constructive discussions were conducted to shape the structure of the questionnaire.

As a result of these collaborative efforts, a strategic decision was made to incorporate both open-ended and closed-ended questions into the questionnaire. This deliberate approach serves two distinct purposes within the questionnaire.

The initial section of the questionnaire features open-ended questions, allowing respondents the opportunity to provide qualitative insights, share experiences, and express their perspectives freely. This format encourages a rich and diverse range of responses, providing in-depth information and valuable qualitative data.

Subsequently, the second part of the questionnaire introduces closed-ended questions. These questions are designed to gather specific and quantifiable information from the respondents, offering a structured format that allows for easier analysis and comparison of responses. The closed-ended questions aim to capture standardized data, facilitating the identification of patterns, trends, and benchmarking opportunities across the participating companies.

By combining both open and closed question formats, the questionnaire strikes a balance between capturing nuanced qualitative insights and facilitating quantitative analysis. This comprehensive approach ensures that a broad spectrum of information is gathered, enabling the project to obtain a holistic understanding of the energy efficiency landscape and identify promising practices to be transferred to small and medium-sized enterprises.

The methodology adopted adheres to the principles outlined in ISO 21500 for project management and the Deming cycle. This iterative approach allowed for continual improvement of the implemented plan (i.e., the methodology) by identifying opportunities for enhancement through open collaboration with project partners. By continuously refining and iterating upon the methodology, the project ensures that the final version delivered is robust, effective, and responsive to the evolving needs of the participating stakeholders.

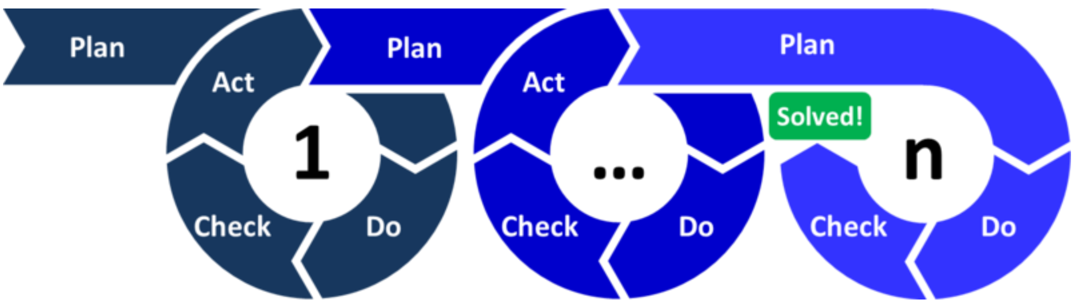

Figure 2: Deming cycle

Upon initiation of the project, first step was taken with the identification of the Task Force, also referred to as the Project Scientific Committee. This esteemed committee consisted of experts and professionals in the field of energy efficiency. Their role encompassed providing invaluable guidance, expertise, and strategic direction throughout the project's duration.

With the Task Force in place, the subsequent step involved the creation of the Project Working Group. Comprising individuals from various partner organizations involved in the project, this group was entrusted with the active implementation of the assigned work packages. Their collaborative efforts ensured effective coordination and harmonious collaboration among the project partners.

To gather valuable insights and draw from previous experiences, the project team embarked on an extensive analysis of other EU projects. By meticulously studying the methodologies, outcomes, and best practices of similar initiatives, they aimed to accumulate a wealth of knowledge that could be adapted and applied to their own project. This comprehensive analysis served as a cornerstone for informed decision-making and optimizing the project's approach.

Building upon the knowledge garnered from the analysis of previous projects, the team proceeded to develop a comprehensive questionnaire. The primary objective of this questionnaire was to collect pertinent information and data from large companies regarding their energy efficiency practices. It delved into various aspects, including technology adoption, behavioral patterns, contractual considerations, and supply chain dynamics.

Following the development of the questionnaire, the project team diligently compared and adapted it to cater to the specific needs and objectives of the project partners. This meticulous process ensured that the questionnaire effectively addressed the desired outcomes and fulfilled the requirements of the stakeholders involved. By aligning the questionnaire with the project's objectives, it became a valuable tool for data collection and analysis.

Once the questionnaire was finalized, it was administered to a targeted group of large companies. The team actively engaged with these companies, requesting their participation and encouraging them to provide their responses based on their energy efficiency practices and experiences. This step played a pivotal role in gathering valuable data and insights directly from the companies involved, enhancing the project's robustness.

With the responses from the participating companies collected, the project team embarked on a meticulous analysis phase. They diligently examined and scrutinized the answers, searching for patterns, trends, and key insights. This comprehensive analysis provided a deeper understanding of the energy efficiency practices implemented by the large companies and identified areas of improvement or best practices that could be transferred to smaller enterprises. It served as the foundation for informed decision-making and strategic recommendations.

Based on the thorough analysis of the answers, the team calibrated and integrated the responses to meet the specific needs of the project. This involved careful review of the findings and making any necessary adjustments or refinements to ensure their effective contribution to the project's intended outcomes. This calibration process ensured that the project's recommendations and interventions were tailored to the specific context and requirements of the involved stakeholders.

Drawing from the analyzed responses, the team proceeded to define a comprehensive framework comprising more than 20 practices divided by NACE sector. This framework served as a guiding structure for identifying and transferring the most effective energy efficiency practices to small and medium-sized enterprises within each sector. By categorizing and organizing the practices, the framework aims to facilitate the dissemination of best practices and foster sustainable energy consumption and resource optimization across the territories involved.

Lastly, the team established a set of system indicators to transfer the best practices to SMEs in the second phase of the project. These indicators serves as performance metrics, enabling the partnership to track progress, identify areas of success, and continuously monitor and improve the project's outcomes. The definition of these system indicators ensures a systematic and evidence-based approach to measuring the project's impact and success, guiding the partnership towards the achievement of project’s main objectives.

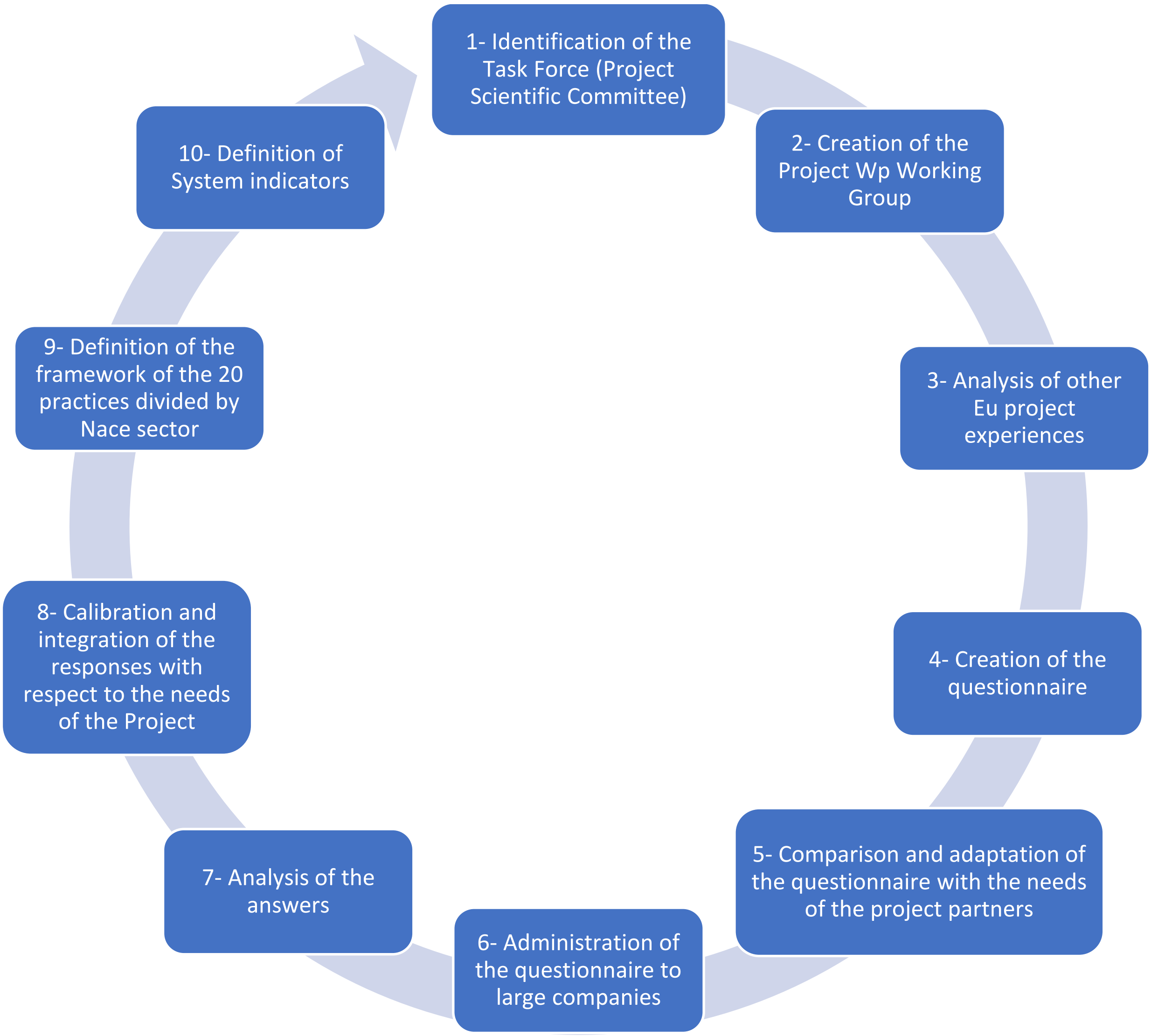

Figure 3: Process cycle implemented. Within the project

D2.2 Collection of good energy practices of large companies to support the ecological transition of SMEs

The questionnaire built with the tool Google Form and visible at the following link:
https://www.fondazionefenice.it/wp-content/uploads/Questionnaire-self-assessment-on-the-actions-to-improve-the-energy-efficiency-in-the-company_rev-Moduli-Google.pdf
was administered to carefully selected participants across the eight countries, yielding a total of 163 insightful responses, averaging 25 per country. These responses have provided valuable perspectives on the implementation of best practice measures, which are currently not widely adopted within each respective country visible at the following link:
https://www.fondazionefenice.it/wp-content/uploads/Questionnaire-self-assessment-on-the-actions-to-improve-the-energy-efficiency-in-the-company_FINAL-VERSION.xlsx

The project involved the active participation of all Chambers of Commerce and Industry, who played a crucial role in identifying the most suitable local stakeholders to be involved in the questionnaire. This meticulous selection process ensured that the questionnaire reached the targeted individuals and organizations with the necessary expertise and knowledge in the relevant sectors.

The Chambers of Commerce and Industry, with their in-depth understanding of the local business landscape, leveraged their extensive networks and contacts to identify and engage the key stakeholders. These stakeholders encompassed a wide range of industry representatives, energy experts, and professionals who possessed the requisite insights and experience in the fields of energy efficiency and sustainability.

By involving these carefully chosen local stakeholders, the questionnaire was able to capture a comprehensive and diverse perspective on energy efficiency practices within each region. The engagement of these stakeholders fostered a collaborative environment, where valuable insights and best practices could be shared and exchanged, contributing to the overall success of the project.

The active involvement of the Chambers of Commerce and Industry in identifying the appropriate local stakeholders exemplifies the project's commitment to inclusivity and local engagement. This collaborative approach ensured that the questionnaire reached the right individuals and organizations, maximizing the likelihood of obtaining accurate and relevant responses.

The analysis of the questionnaire presented a significant undertaking, encompassing a meticulous process of harmonization and extraction of valuable insights from the open-ended responses. This critical phase played a pivotal role in transforming the diverse range of input into a cohesive and actionable set of measures that can be effectively transferred to small and medium-sized enterprises (SMEs) across Europe.

To ensure consistency and coherence in the analysis, a thorough examination of the open answers was conducted. This involved carefully reviewing and categorizing the responses based on their relevance, applicability, and potential for transferability to SMEs. By identifying common themes, recurring patterns, and innovative ideas within the open answers, a comprehensive set of measures was derived.

The harmonization and identification of valuable input from the open answers were instrumental in shaping the final set of measures (D2.3). By distilling and synthesizing the diverse range of input into a cohesive framework, the project can effectively transfer the best practices and recommendations to SMEs, fostering energy efficiency improvements and sustainable practices across the European landscape.

The analysis revealed that slightly over half of the surveyed companies (80 out of 158) had established an energy efficiency plan. However, it was observed that only two-thirds of the companies that had implemented energy efficiency measures (98 out of 161) had undergone an energy consumption audit. Furthermore, it was noted that 108 out of 162 companies had received support from dedicated business support organizations to access funding opportunities.

Additionally, it was found that only two-thirds of the companies had implemented explicit policies aimed at raising employee awareness regarding energy efficiency. It is worth noting that the implementation of such policies can yield significant energy consumption reductions, particularly for small and medium-sized enterprises (SMEs).

Surprisingly, nearly 83% of the surveyed companies had not taken the initiative to compare different energy providers, limiting their ability to explore sustainable and cost-effective options.

These findings underscore areas that warrant improvement and represent potential focal points for the project. By addressing these identified gaps and facilitating the adoption of best practices, the project can effectively assist companies in enhancing their energy efficiency, reducing operational costs, and actively contributing to the achievement of sustainability objectives.

NACE AGRIFOOD MANUFACTURING (Nace Code: C10 to C11.0.7)

The agrifood industry, with its diverse sectors engaged in the production, processing, and distribution of agricultural and food products, exhibits distinct energy consumption patterns primarily associated with food processing, heating and refrigeration, and transportation processes.

Food Processing: The energy consumption in the agrifood industry is significant during food processing operations. These encompass a range of activities such as washing, sorting, cutting, grinding, mixing, heating, baking and packaging of agricultural and food products. Machinery, equipment, conveyors, and processing lines play crucial roles in these processes, requiring energy to enable efficient operations.

Heating and Refrigeration: Maintaining precise temperature conditions is essential in the agrifood industry to ensure product quality and safety. Heating systems, such as boilers or heat pumps, are employed to provide the necessary thermal energy for specific operations like cooking, drying, or sterilization. Refrigeration systems are utilized to control temperatures in cold storage facilities, refrigerated warehouses, and transportation vehicles, thereby preserving the freshness and integrity of perishable food products.

The analysis of the questionnaire responses revealed significant opportunities for replacing outdated equipment with more energy-efficient alternatives across the agrifood manufacturing companies. Specifically, the areas where considerable potential for improvement was identified included boilers, coolers, ovens, washing systems, and ventilation systems.

While the adoption of LED lights was relatively widespread among the industries surveyed, the use of photovoltaic panels was found to be less common, with only 50% of the sample reporting their implementation.

Solar thermal panels, on the other hand, exhibited very low levels of adoption, with only 6 out of 39 respondents indicating their use.

Heat recovery technology, which has the potential to significantly reduce energy consumption, was found to be adopted by less than 50% of the sample.

Interestingly, energy monitoring systems were not widely employed, with only one-third of the interviewed companies having implemented such systems to track and optimize energy usage.

These findings highlight opportunities for enhancing energy efficiency through the replacement of outdated equipment, expanding the use of renewable energy sources such as photovoltaic and solar thermal panels, promoting the adoption of heat recovery technology, and encouraging the implementation of energy monitoring systems. By addressing these areas, significant energy savings and operational improvements can be achieved by the surveyed industries, contributing to their overall sustainability goals and reducing their environmental impact.

METALWORK MANUFACTURING (Nace Code: C24 to C25.9.9)

In the metalwork manufacturing industry, the main energy consumption can be attributed to various processes and equipment involved in metal fabrication and production.

Metalwork manufacturing typically requires the use of heavy machinery and equipment for processes such as metal cutting, shaping, bending, welding, and assembly. These machines, such as CNC machines, hydraulic presses, forging equipment, and welding equipment, often require substantial amounts of electrical power to operate efficiently.
Metalwork manufacturing processes often involve heat treatment, tempering, annealing, and other thermal processes to modify the properties of metals. Furnaces, ovens, and kilns are used to heat metal components to high temperatures, which can consume significant amounts of energy. Cooling systems, such as chillers, are also necessary to control the temperature of equipment and workpieces.

Compressed air is widely used in the metalwork manufacturing industry for various purposes, including powering pneumatic tools, operating machinery, and providing pressurized air for cleaning and cooling. Compressed air systems can be energy-intensive due to the energy required for compressing and maintaining air pressure.

Adequate lighting in metalwork manufacturing facilities ensure safe and efficient operations. Large manufacturing spaces often require significant lighting installations, which contribute to overall energy consumption. Additionally, heating, ventilation, and air conditioning (HVAC) systems are necessary to maintain comfortable working conditions, especially in large industrial facilities, and can consume substantial energy.

Moving raw materials, workpieces, and finished products within the manufacturing facility or transporting them to customers or distribution centers can also involve energy consumption. Equipment such as cranes, forklifts, conveyors, and transportation vehicles require energy to handle and transport metal components or finished products.

Out of the 52 companies that participated in the metalwork manufacturing questionnaire, the sector demonstrated relatively lower levels of attention towards energy efficiency compared to the agrifood industry. However, certain positive practices were observed among the surveyed companies.

LED lighting was adopted by a significant majority, with approximately 80% of the interviewed companies having implemented this energy-efficient lighting solution. Additionally, around half of the companies incorporated heat recovery systems, electrical peak reduction measures, and improved the efficiency of their spatial cooling equipment.

Regarding the utilization of renewable energy sources, photovoltaic (PV) panels were installed by 21 out of the 52 companies, indicating a moderate level of adoption. In contrast, solar thermal panels were implemented by only 10 out of the 52 companies, indicating a lower level of utilization for this particular technology.

Approximately one-third of the surveyed companies reported purchasing certified renewable electricity, showcasing a commitment to supporting renewable energy generation. Furthermore, these companies implemented centralised consumption monitoring systems, such as Building Management Systems (BMS), to monitor and optimize their energy usage. Additionally, upgrades were made to the forklift fleet, contributing to energy efficiency improvements.

ACCOMMODATION AND FOOD SECTOR (Nace code: I55 to I56.3.0)

The accommodation and food sector encompasses a wide range of establishments, including hotels, restaurants, cafes, and catering services. In this sector, the main energy consumption fields can be identified as follows:

Maintaining a comfortable indoor environment for guests and staff is essential in the accommodation and food sector. HVAC systems, including heating, cooling, and ventilation, contribute to significant energy consumption. The heating and cooling of rooms, common areas, and kitchen spaces can require substantial energy inputs.

Adequate lighting ensures pleasant, safety, and enhancing the guest experience in accommodation and food establishments. Lighting systems, including both interior and exterior lighting, can consume a considerable amount of energy.

The food service aspect of the sector involves cooking and food preparation activities, which require energy for ovens, stoves, grills, fryers, and other kitchen appliances. Commercial kitchens typically have high energy demands due to the need for continuous food preparation and cooking.

The accommodation and food sector rely heavily on refrigeration and cooling systems to store perishable food items, beverages, and ingredients. Refrigeration equipment, such as walk-in coolers, freezers, and refrigerated display cases, consume significant amounts of energy to maintain proper temperature levels.

The provision of hot water for guest rooms, kitchens, and other facilities is essential in the accommodation and food sector. Water heaters, including boilers or tankless water heaters, consume energy to heat water for various purposes such as showering, dishwashing, and laundry

The questionnaire received responses from 74 organizations in the accommodation and food sector. Within the sample, it was found that 50% of the structures included swimming pools and wellness centers, while 75% had in-house kitchens.

The adoption of LED lighting was reported by over 90% of the sample, indicating a significant implementation of energy-efficient lighting solutions. However, the adoption of solar thermal panels for hot water generation was limited to only one-third of the organizations.

Around one-third of the companies interviewed reported improvements in equipment efficiency and heating and cooling systems. The installation of Building Management Systems was observed in only one-third of the sample, while Room Management Systems were adopted by 18 out of 73 organizations.

Although over half of the structures installed double glazing windows and implemented insulation measures on walls or roofs, it was noted that 31 out of 73 organizations had not implemented these energy-saving measures.

These findings highlight the opportunities for energy efficiency improvements in the accommodation and food sector, particularly in areas such as building insulation, adoption of advanced management systems, and further exploration of renewable energy solutions.

D2.3 Selection of best practices suitable for transfer from large companies to SMEs

The selection of best practices to be transferred to SMEs in the three NACE sectors necessitated a rigorous and comprehensive process of comparison and validation. The input obtained from the questionnaire responses provided by companies was meticulously analysed, compared, and validated against relevant scientific literature and data derived from prominent EU platforms such as the European Energy Efficiency Platform, European Energy Efficiency Observatory, and European Energy Efficiency Best Practice Portal.

This demanding task was undertaken by Ph.D. Professor De Carli, along with the team of energy experts at FGEP. They conducted a thorough examination of the collected data and cross-referenced it with credible sources to ensure the accuracy and reliability of the identified best practices. Through this rigorous analysis, a set of indicators was established, delineating specific energy-efficient technologies and potential savings across the North, South, and Central regions of Europe.

This comprehensive approach, combining empirical data, expert knowledge, and scientific literature, ensures that the selected best practices are robust, well-founded, and applicable to SMEs operating in the designated sectors. By leveraging this wealth of information, the project aims to facilitate the effective transfer of energy efficiency measures, fostering sustainable practices and enabling SMEs to achieve tangible energy savings and operational improvements.

The working group identified and assessed a total of 26 energy efficiency measures, which have significant applicability across the three sectors: Accommodation and Food Service activities, Manufacturing - Agri-food, and Metal Work. The identification process involved extensive research, drawing from relevant literature and the collective experiences of the working group members. To provide a comprehensive overview and facilitate decision-making, two sets of indicators were developed. They effectively capture key parameters such as energy savings, associated costs, and the estimated payback time in three European macro regions: North, Centre, South.

The primary objective of these indicators is to equip project partners with a reliable toolset for identifying and implementing the most effective energy efficiency measures. By utilizing these indicators, project partners can support with informed decisions that align with the specific needs and conditions of SMEs within their respective regions.

Furthermore, the indicators play a strategic role in supporting the adoption of new practices and policies geared towards energy efficiency. By offering valuable insights into the potential benefits and feasibility of each measure, they empower project partners to guide SMEs in embracing sustainable energy practices. This proactive approach ensures that SMEs can effectively navigate the transition towards energy-efficient operations, thus fostering a more sustainable and environmentally responsible business landscape.

The complete set of indicators can be downloaded at the following link:

https://www.fondazionefenice.it/wp-content/uploads/SET-OF-INDICATORS-EE4SME-.xlsx

NACE SECTOR		Energy Efficiency Measure	First Set of Indicators % of saved energy in South Europe	% of saved energy in Central Europe	% of saved energy in North Europe	% saved energy - measures climate independent	implementability	Cost		Energy saving in South Europe	Energy saving in Central Europe	Energy saving in North Europe	Energy saving independent on climate	Payback time in South Europe	Payback time in Central Europe	Payback time in North Europe	Payback time independent climate
								[€/m2]	[€/kW]	[kWh/m2]	[kWh/m2]	[kWh/m2]	[kWh/kW]	Years	Years	Years	Years
All sectors		PV cells	50%	38%	30%		medium	132,0		168,0	126,0	102,0		3,5	4,7	5,8	
Accomodation		BMS	15%	15%	15%		medium	50,0		4,5	4,0	5,0		11,0	13,0	10,0	
All sectors	Office	Led	60%	60%	60%		easy	24,0		19,0	25,3	41,7		5,0	3,8	2,3	
Accomodation		Led	60%	60%	60%		easy	5,0		2,0	2,0	2,0		2,0	2,0	2,0	
All sectors	Production zone	Led	60%	60%	60%		easy	21,5		17,0	22,7	37,3		5,0	3,8	2,3	
All sectors	Productive zone	Roof and walls	35%	35%	35%		medium	90,0		36,8	52,5	73,5		20,0	14,0	10,0	
All sectors	Buliding	Roof and walls + windows	40%	40%	40%		high	110,0		42,0	60,0	84,0		22,0	15,0	10,7	
Accomodation		Windows	15%	15%	15%		medium	45,0		19,5	24,5	34,0		21,0	14,0	10,0	
All sectors		Opaque envelope	45%	45%	45%		medium	65,0		40,0	70,0	100,0		15,0	8,0	5,7	
All sectors		All envelope	60%	60%	60%		medium	110,0		59,5	94,5	134,0		17,0	9,6	6,8	
All sectors		Solar thermal collectors	50%	50%	50%		medium	1300,0		700,0	550,0	450,0		9,4	12,0	14,7	
All sectors	Productive zone	Hybrid boilers	67%	47%	26%		easy	175,0		70,0	70,8	55,1		20,0	20,0	20,0	
All sectors	Office	Hybrid boilers	67%	47%	26%		easy	75,0		46,7	76,3	59,4		12,0	8,0	9,0	
Accomodation		Hybrid boilers	67%	47%	26%		easy	75,0		46,7	76,3	59,4		12,0	8,0	9,0	
Metal Work/ Food Industry	Production sites	Direct evaporation heat pumps	68%	65%	56%		easy	25,0		120,0	115,0	100,0		1,5	5,0	15,0	
All sectors		Inverter pumps				25%	easy		250,0				480,0				1,5
All sectors		Inverter fans				25%	easy		250,0				480,0				1,5
All sectors	Production site	Inverter compressors				15%	easy		250,0				230,0				4,0
All sectors	Production site	Heat recovery compressors				50%	medium		200,0				750,0				2,0
Food industry		Chillers				30%	easy		700,0				1000,0				7,0
Food industry		Heat pump & chillers (heat recovery)				80%	medium		850,0				2250,0				3,0
All sectors		Heat recovery ventilation	85%	85%	85%		medium	40,0		11,0	25,0	35,0		30,0	12,0	9,0	
All sectors		Electric vehicles				77%	easy		970,0				550,0				11,0
All sectors	Production site	Cogeneration	50%	50%	50%		medium	90,0		35,0	80,0	115,0		30,0	20,0	15,0	
All sectors		Green electricity			100%	easy		0,0									1,0
All sectors		Cosfi	5%	5%	5%	easy		80,0					100,0				1,5

NACE SECTOR		Energy Efficiency Measure	Second set of indicators
			Minumum Applicability Criteria
All sectors		**PV cells**	in tilted roofs South orientation
Accomodation		**BMS**	Integrate energy control with management of the hotel
All sectors	**Office**	**Led**	applicable in all the context
Accomodation		**Led**	applicable in all the context
All sectors	**Production zone**	**Led**	check production activity while working at height
All sectors	**Productive zone**	**Roof and walls**	timing for the works, space to locate the materials
All sectors	**Buliding**	**Roof and walls + windows**	timing for the works, space to locate the materials, presence of single glazings
Accomodation		**Windows**	presence of single glazings
All sectors		**Opaque envelope**	timing for the works, space to locate the materials
All sectors		**All envelope**	timing for the works, space to locate the materials, presence of single glazings
All sectors		**Solar thermal collectors**	check the amount of energy need for sanitary hot water
All sectors	**Productive zone**	**Hybrid boilers**	check the noise of the air to water heat pump
All sectors	**Office**	**Hybrid boilers**	site to locate the air to water heat pump, check the noise of the air to water heat pump
Accomodation		**Hybrid boilers**	site to locate the air to water heat pump, check the noise of the air to water heat pump
Metal Work/ Food Industry	**Production sites**	**Direct evaporation heat pumps**	check the noise of the air to water heat pump
All sectors		**Inverter pumps**	no particular limitation
All sectors		**Inverter fans**	no particular limitation
All sectors	**Production site**	**Inverter compressors**	no particular limitation
All sectors	**Production site**	**Heat recovery compressors**	check how to recovery the heat
Food industry		**Chillers**	no particular limitation
Food industry		**Heat pump & chillers (heat recovery)**	proper selection of temperatures for heating and cooling
All sectors		**Heat recovery ventilation**	check the feasibility of the heat recovery unit
All sectors		**Electric vehicles**	
All sectors	**Production site**	**Cogeneration**	check prices of elecrricity and gas. It is useful when heating and electricity demands are quite constant alolng the whole year
All sectors		**Green electricity**	check the costs of electricity
All sectors		**Cosfi**	if inverters on machiunes are present this technical solution is not relevant anymore