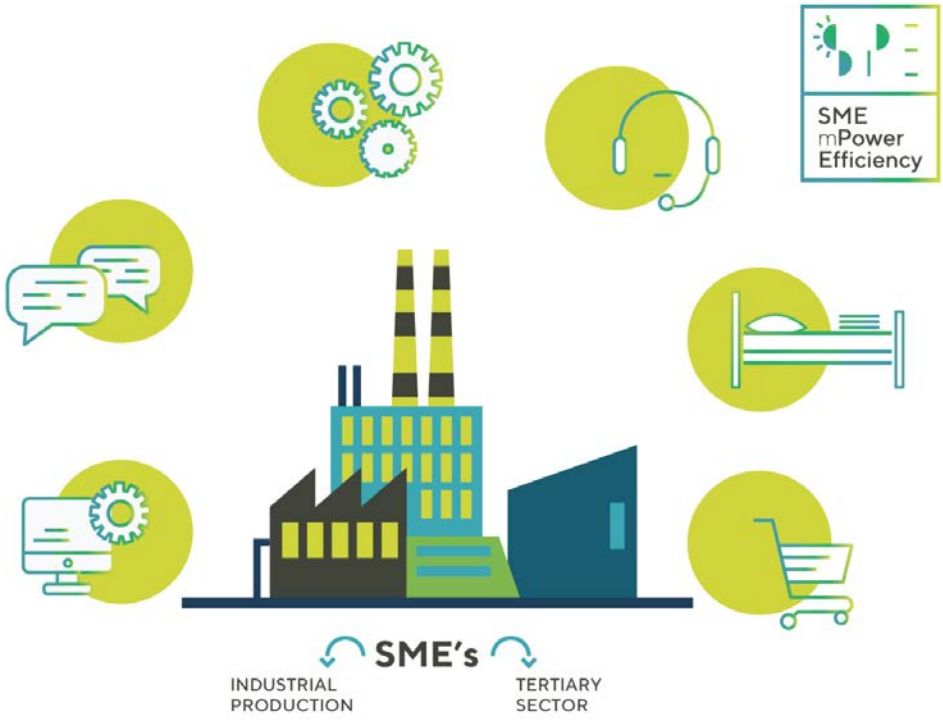
A holistic framework for Empowering SME's capacity to increase their energy efficiency

Framework Report Analysis

Identification of the current Energy Efficiency level in SMEs



March 2020

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List of Acronyms

Acronym	Meaning
a	annum
ANRE	National Energy Regulatory Authority of Romania
EE	Energy Efficiency
EED	Energy Efficiency Directive
EEDEPC	Energy Performance Certificate
GW	Gigawatt
GWh	Gigawatt hour
kW	Kilowatt
kWh	Kilowatt hour
LPG	Liquefied petroleum gas
MW	Megawatt
MWh	Megawatt hour
nZEB	Near Zero Energy Building
SMEs	Small and Medium-sized Enterprises
toe	Tons of oil equivalent

Executive summary

The SMEmPower Efficiency project is based on a holistic framework to support Small and Medium-sized Enterprises (SMEs) to undergo energy audits or detailed going through audits by energy managers and to implement the recommended energy-efficiency measures. The SMEmPower Efficiency project targets SMEs in 8 EU countries: Cyprus, Germany, Greece, Italy, Romania, Slovenia, Spain and the UK.

At the early stage of SMEmPower Efficiency, the consortium developed a methodology to gather data on SMEs energy cost, energy efficiency and other important parameters. Thus, a questionnaire was developed, which was used to conduct a survey among **213 SMEs located in the 8 participating EU countries.** Moreover, **targeted workshops** were organized in order to identify which are the main barriers (Legislative, Institutional, Technical, Financial, Communication) that prohibit the implementation of energy efficiency measures in SMEs and to propose solutions. The aim of this report is to present the current situation in SMEs - based on the survey results - regarding energy efficiency and the barriers that influence the further promotion of energy audits/energy management and the implementation of energy efficiency measures.

Following the survey and analysis of the collected data, it is worth mentioning that there are **many similarities among the SMEs** from different regions. For example, **most of the SMEs have not appointed an energy manager, they have not implemented environmental/ energy standards and energy audits have never been carried out in the 50% of the SMEs that participated in the survey**. The results confirm that **SMEs do not put energy efficiency in high priority** and that there is a need for training to increase the skills and qualifications of SMEs personnel. Since in most countries SMEs are not obliged to assign an energy manager or to carry out energy audits, it is expected the lack of interest and motivation on energy efficiency issues. The SMEs participated in the survey would implement energy efficiency measures to reduce their energy bill and in general to cut energy cost.

Regarding the financing of energy efficiency measures, the survey results show that **SMEs use their own resources to fund energy efficiency investments** and that the majority of SMEs are not well informed about the funding opportunities in their country, including EU grants, loans, national support schemes etc. In general, SMEs participated in the survey, consider it difficult, bureaucratic and complex to apply for grants or bank loans.

The energy efficiency measures already implemented in some SMEs participated in the survey, are those with low payback time e.g. LED lighting, ventilation, heating/cooling, and automation especially in buildings, showing that these types of investment have lower risk and do not affect processes and product quality. In some cases, SMEs are reluctant to implement energy efficiency measures as it is believed that these can affect the businesses daily routine and profitability. All the above have been identified as the main technical barriers in Germany, Romania, and Spain.

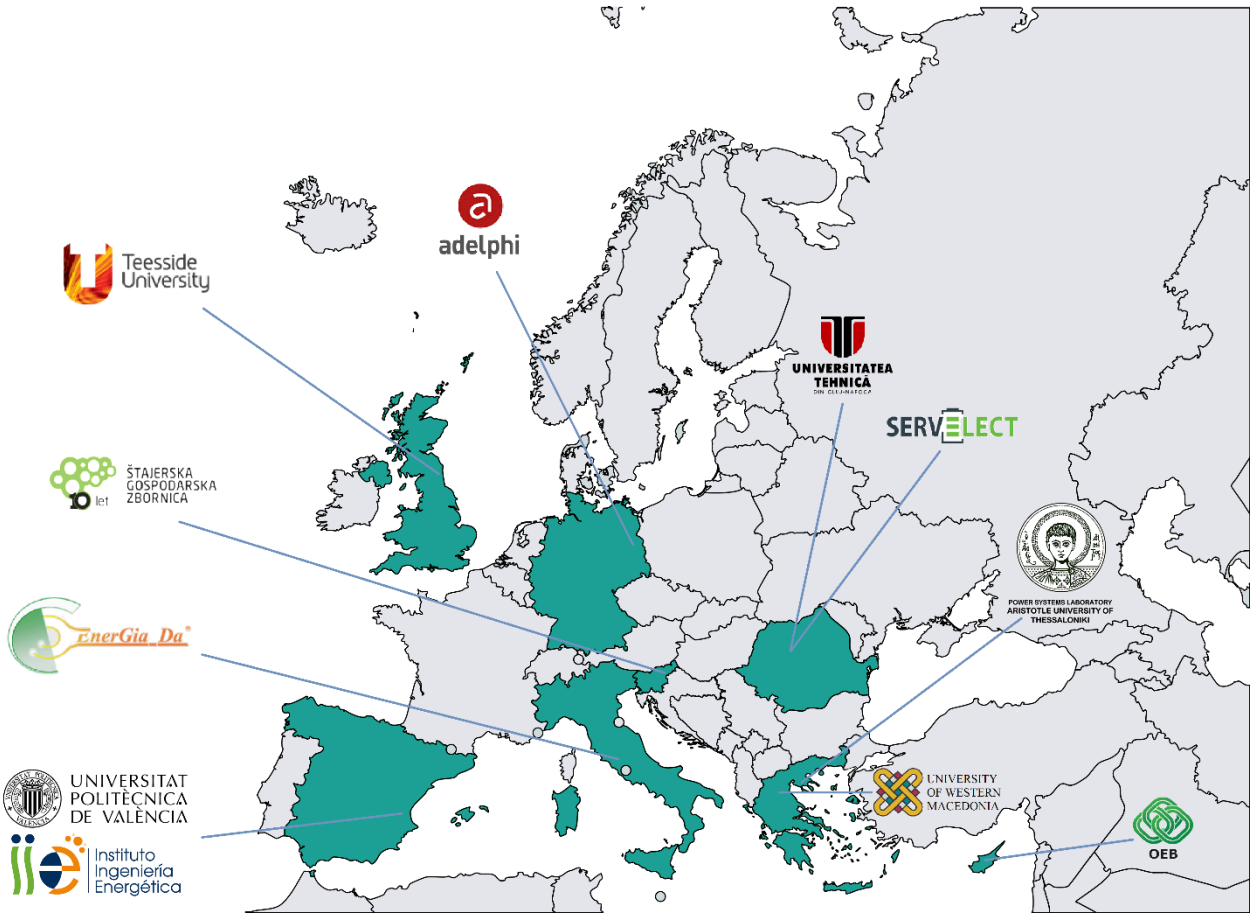
In some countries, e.g. Germany, Romania, Slovenia and Spain, the SMEs have not developed an energy strategy for the next 3 years. Communication barrier among the staff and management has been identified as the main barrier in this aspect.

Another finding of the survey results analysis is that the SMEs staff is generally motivated to attend further training to improve skills and competences. This is a gap that the SMEmPower Efficiency project will bridge.

A positive outcome from the survey is **that the level of awareness of SMEs regarding environmental issues is high** and this will be taken into consideration when designing the SMEmPower Efficiency training course.

Other highlighted main barriers that might limit SMEs investments in energy efficiency are: the pay-back period, which is usually too long; the difficulties in accessing financing/grants. It can be concluded that some of the respondents are willing to invest in energy efficiency measures, only if the investment **has a short pay-back period**, and most of the respondents are expecting to see an energy bill reduction in a short time.

More information about the SMEmPower Efficiency project can be found at https://smempower.com/.



1. INTRODUCTION

Photo: https://s3.amazonaws.com

This report **"Identification of the current Energy Efficiency level in SMEs"** has been developed through the implementation of the "SMEmPower Efficiency" project, funded by the European Union Horizon 2020 programme, under the Grant Agreement No. 847132.

The goal of this report is the identification of the current situation regarding the implementation of Energy Efficiency Directive (EED) in SMEs in the participating countries **(Cyprus, Germany, Greece, Italy, Romania, Slovenia, Spain and the UK).** In other words, the aim is two-fold: it aims the identification of the current situation in regard to energy cost, energy efficiency measures and energy efficiency undertaken in SMEs and at understanding and identifying barriers that decelerate the implementation of EED in SMEs.

In order to prepare this report, the project consortium has developed a questionnaire which was used to conduct a survey among SMEs. The online survey was conducted in the period from January to March 2020. The survey was targeted to SMEs, to be able to collect reliable data feedback.

To identify the main existing barriers in each of the eight participating countries, targeted workshops were organized. Relevant stakeholders were invited to participate, to exchange views and ideas and to suggest possible solutions. Through the workshops, the main legislative, institutional, technical, financial and communication barriers have been identified.

2. METHODOLOGY DEVELOPMENT & CONDUCTION OF THE SURVEY

The consortium has developed a questionnaire that was distributed to the SMEs in the participating countries. The data collection was designed in such a way to obtain the information needed to achieve the survey objectives. Google Forms was chosen as the hosting platform for conducting and facilitating the survey. The questionnaire used in this study can be found in Appendix 1 or online.

The following Figure 1 shows the methodology followed (design of the questionnaire, distribution to SMEs, data collection, data analysis and results reporting). In detail, the questionnaire was designed to contain closed-ended questions: a combination of multiple selection questions (the respondent could select several answers); multiple-choice questions (the respondent could only select one option). Such closed-ended questions facilitated the data collection, made easier the data analysis and finally provided comparable results. The questionnaire also contained some open-ended questions. To ensure the success of the survey this was translated to partners local languages. In total, **213 SMEs responded** to the online survey from all the participating countries (Cyprus, Germany, Greece, Italy, Romania, Slovenia, Spain and the UK).

Figure 1. Methodology development

Finally, to comply with General Data Protection Regulations (GDPR), the first page of the survey included an information sheet, which informed the target group about the subject of the survey, how the collected data will be used and how the data will be stored.

3.SURVEY OBJECTIVES

The target group of the survey was SMEs. **The SMEs have been recognized as the most challenging target in the energy-efficiency effort.** The main reasons relate to their diversity: they are active in all sectors of economic activity, operate in different types of buildings, can employ from one to two persons up to 250 persons with industrial activity. The understanding of the energy consumption in many cases of SMEs is limited: where the SME consumes the highest amounts of energy, when and how. SMEs are defined by one parameter according to European regulations, their size i.e. to employ less than 250 persons and an annual turnover of less than 50 million Euros or total balance sheet less than 43 million Euros. The following Figure 2 provides an overview of the survey's objectives.

Figure 2. Objectives of the survey

More details about the survey objectives and information to be collected are provided below:

Objective	The information to be collected
Objective 1: Identifying the energy profile of the SME.	• the annual final energy consumption; • the share of energy costs in the turnover; • the energy-intensive sectors within the SME.
Objective 2: Identifying the current level of energy management/energy efficiency within SMEs.	• when an energy audit and/or other energy assessment was last performed in the SME; • if energy efficiency measures were implemented as a result of the energy audit and/or other energy assessment; • which environmental/energy standards are implemented within the company; • what types of energy efficiency measures were implemented in the last 2 years; • the main sources of funding when investing in energy efficiency measures.
Objective 3: Identifying the barriers in implementing energy efficiency measures	• the main obstacles that hinder or limit investments in energy efficiency within SME.
Objective 4: Identifying the reasons why SMEs implement energy efficiency solutions	• the main reasons why SMEs invest in energy efficiency**.**
Objective 5: Identifying the level of energy efficiency awareness among SMEs	• the SME's policy regarding investments made in energy efficiency; • the SME's policy regarding motivating staff to reduce energy consumption.
Objective 6: Identifying the intentions of SMEs in implementing energy efficiency measures in their own production.	• energy efficiency strategy for the next 3 years; • energy efficiency budget planned for the next 3 years.
Objective 7: Determining the cost effectiveness of the implemented energy efficiency measures.	• cost/effectiveness of the implemented energy efficiency measures.

4. IDENTIFICATION OF CURRENT ENERGY EFFICIENCY SITUATION IN SMEs

4.1. Survey results analysis

The SMEs sample

In total, 213 SMEs participated in the survey from the 8 participating countries, out of which the 41% employ between 50 and 249 people, 29% employ between 10 and 49, 27% less than 10 people. In addition, there was 3% which employ over 250 (1% from Germany with less than 500 employees and 2% from Cyprus).

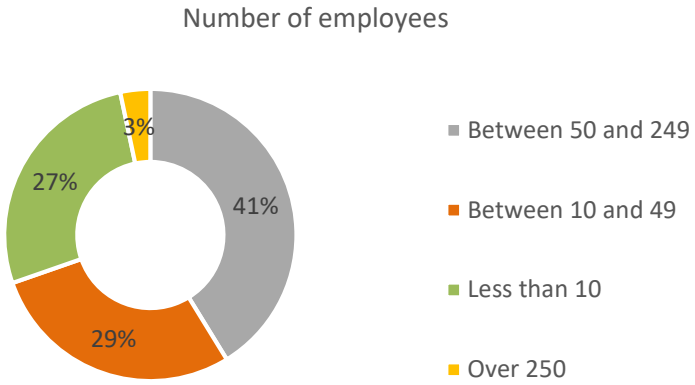


Figure 3. Number of SMEs employees participated in the survey

The energy profile of the SMEs sample

One of the main objectives of the survey was to identify the current situation of the energy profile of the SMEs located in the participating countries. As shown in Figure 4, most of the SMEs show low energy consumption (49%), followed by companies with an energy consumption between 100 and 500 toe/year (23%) and companies with a consumption greater than 1,000 toe/year (16%). The companies with a consumption between 500 and 1,000 are a minority in this survey (12%).

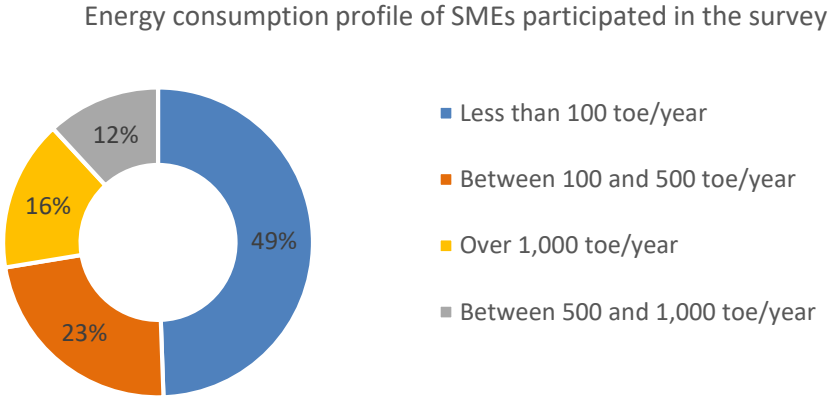


Figure 4. What is the annual final energy consumption of your company for 2018?

This indicates that most of the SMEs participated in the survey have low energy consumption and the training courses and tools that will be developed through SMEmpower efficiency project should be tailored according to this conclusion. Also, it is difficult to address most energy efficiency issues in SMEs thus the training modules should be addressed to a wide range of SMEs activities

Electricity tariffs

Regarding the electricity tariff, the 48% of the SMEs participated in the survey have a fixed rate (Romania-88%, UK-72%, Greece-70%, Germany-47%), the 28% have a Time of Use tariff**,** the 11% have dynamic pricing, 6% have a power component based on max power demand per billing period and 7% are not aware of their electricity tariff. The survey results on SMEs electricity tariffs participated in the survey are indicated in Figure 5.

It is worth mentioning that the Slovenian SMEs opted for time of use tariff (78%). In Cyprus, a high number of respondents did not know their electricity tariff (53%).

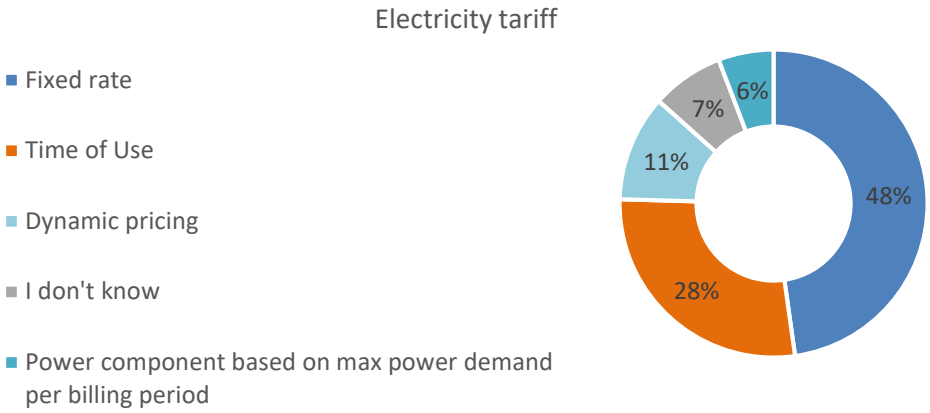


Figure 5. What is your electricity tariff?

The current level of energy management/energy efficiency within SMEs

Even though the legislative framework exists for both energy auditors and energy managers, it does not oblige SMEs to assign an energy manager within their company, to conduct an energy audit and to implement the suggested energy efficiency measures.

This might be the reason **why the current level of energy management/energy efficiency within SMEs is low**, and more than half of the SMEs (57%) do not have an appointed Energy Manager (Romania-73%, Germany-52%, Slovenia-70%) and just 21% have appointed an energy manager in their companies. The overall results are shown in Figure 6. The one fifth (20%) of the respondent SMEs have a member of the staff in charge of the energy related issues (except Cyprus-47%, Greece-50% which indicate higher share).

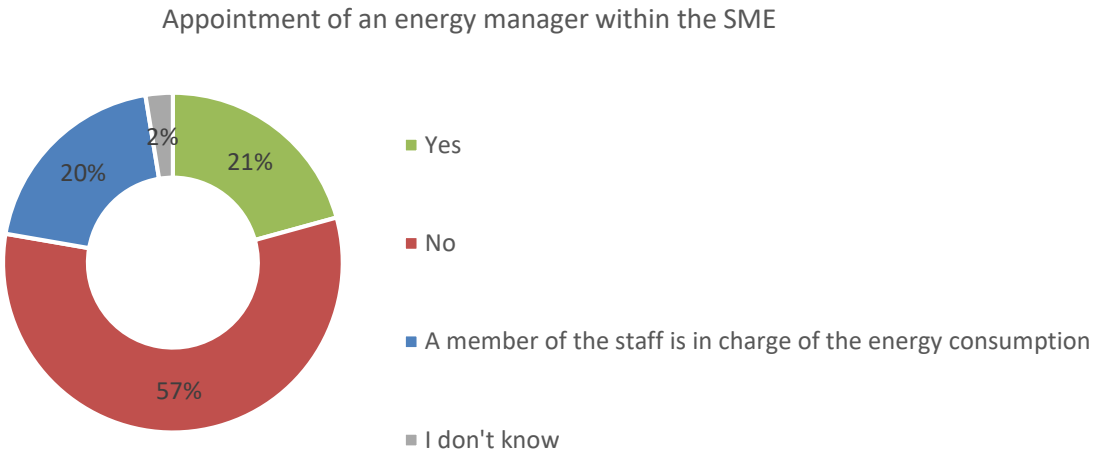


Figure 6. Has an Energy Manager been appointed in your company?

Environmental/energy standards implemented in SMEs

The 45% of the responded SMEs have implemented environmental/energy standards (Figure 7). However, in some countries (Cyprus, Greece and Slovenia) there is an absence of standards implementation.

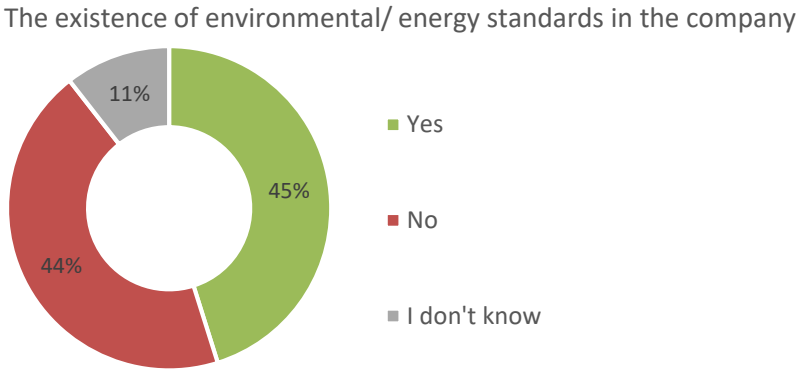


Figure 7. Are any environmental/ energy standards implemented within the company?

Implementation of an energy audit

Regarding the implementation of an energy audit in SMEs, **the majority (54%) has not carried out an energy audit**, as shown in Figure 8.

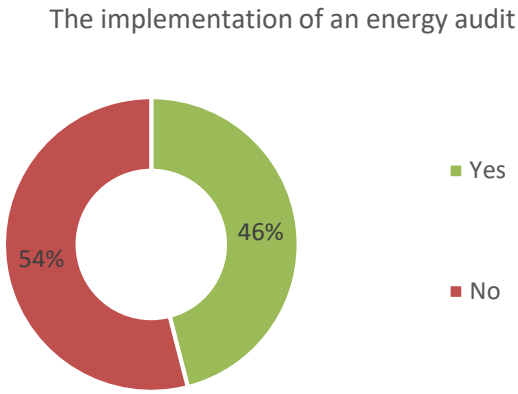


Figure 8. Has an energy audit been carried out in your company?

The implementation of an energy audit varies between the countries participated in the survey (Figure 9). Most SMEs have not carried out an energy audit (Slovenia – 70%, Romania – 57%, Spain – 55%, Greece – 53%), there are some SMEs indicated that are willing to undertake an energy audit.

In contrary, SMEs in Italy, UK, Germany and Cyprus more than the half of the companies participated in the survey have already carried out an energy audit (Italy – 83%, UK – 57%, Germany – 56%, Cyprus – 50%).

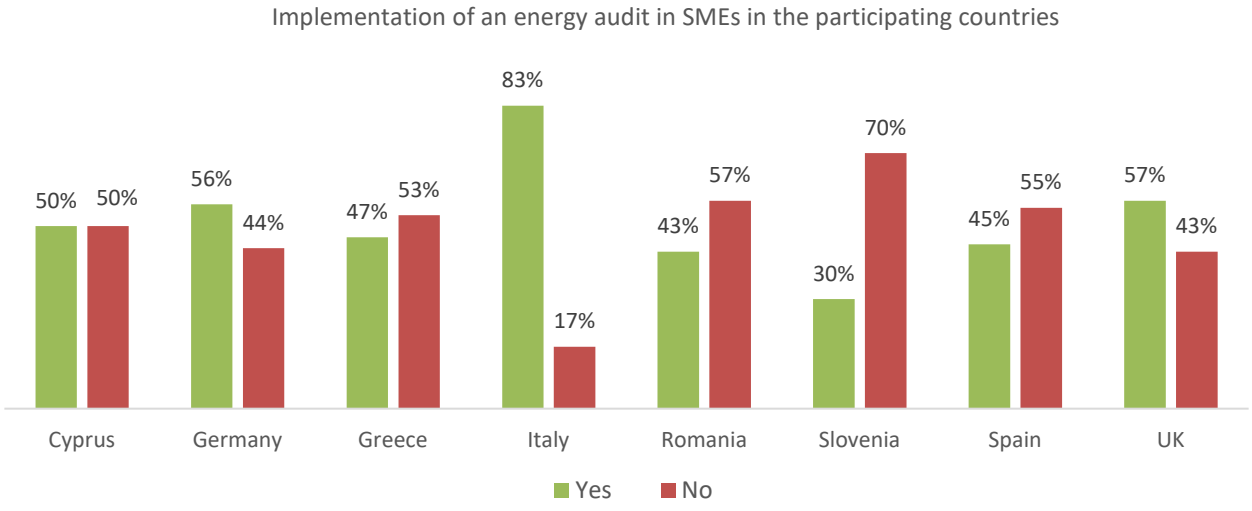


Figure 9. Has your company carried out an energy audit?

Implementation of EE measures

It is worth mentioning that even though SMEs are not obliged to implement the suggested energy efficiency measures from the energy audit, **the proposed measures have been implemented by SMEs in almost all the participating countries (67%).**

As presented in Figure 11 below, most SMEs in the participating countries (excluding Romania with lower percentage), **have implemented the suggested energy efficiency measures** proposed by the energy audits (Spain-82%, Cyprus-81%, Germany-80%, Italy-80%, Slovenia-75%, UK-75%, Greece-58%).

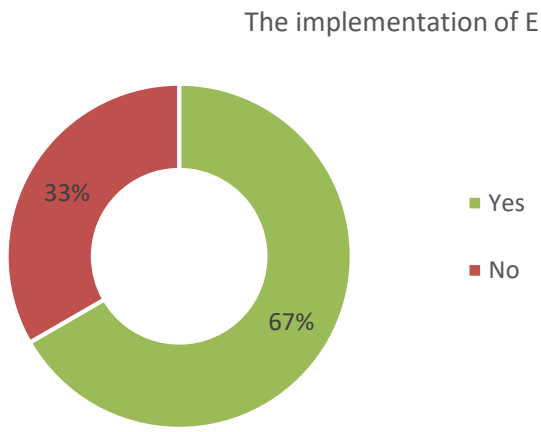


Figure 10. Has your company implemented any measures proposed in the energy audit?

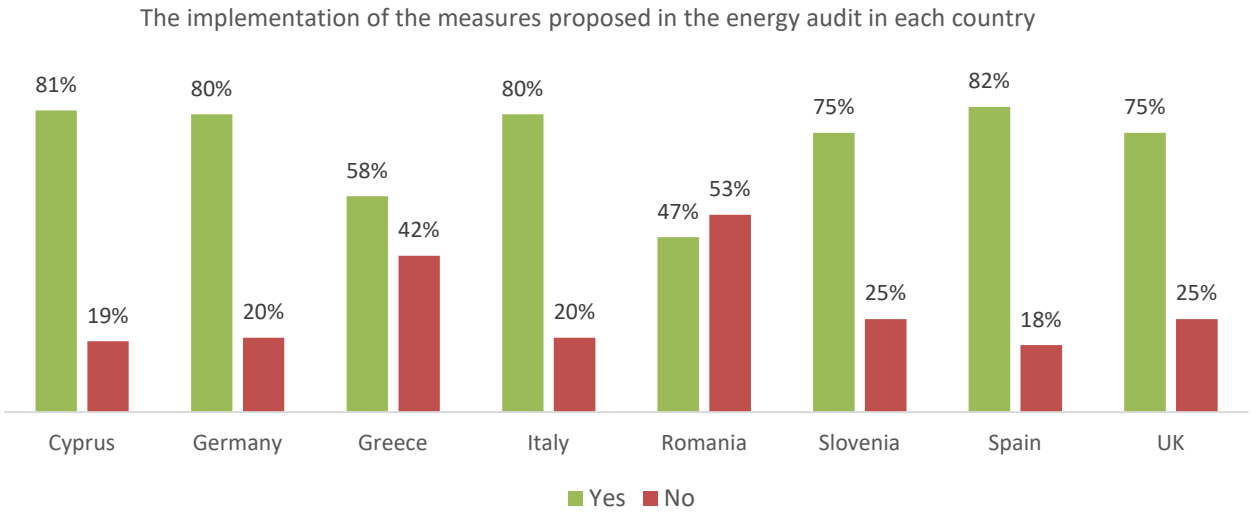


Figure 11. Has your company implemented any measures proposed in the energy audit?

The impact of the implemented EE measures in the SMEs energy bill

Unfortunately, the 33% of the respondents did not monitor the impact of the energy efficiency measures implemented, reflecting the gap of not appointing an **energy manager** among the SMEs staff. The 35% of the SMEs claimed reduction of the energy bill between 1% and 10%, the 12% of the SMEs claimed reduction between 10% and 20%, the 6% indicated reduction greater than 30%, and only 2% of the SMEs the reduction was between 20% and 30% (Figure 12).

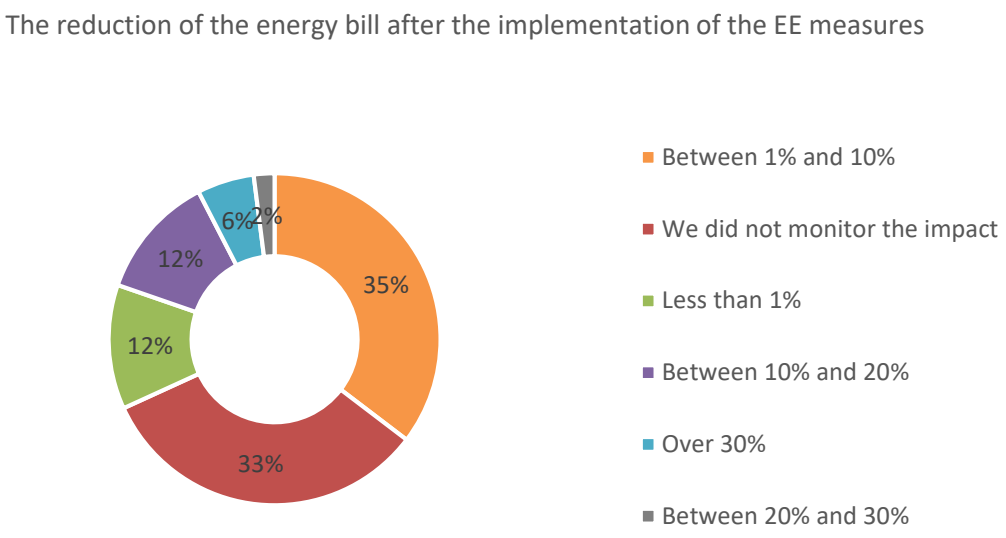


Figure 12. How much has the energy bill been reduced after implementing the EE measures?

Energy efficiency measures implemented in the SMEs

The following Figure 13 indicates the most common energy efficiency measures implemented in the SMEs participated in the survey.

The SMEs prefer to implement measures related with the increase of energy efficiency in technical systems (60%) (e.g. lighting, ventilation, heating, cooling and ventilation), 28% of measures which were implemented are related with improvements in technological processes, equally, 28% of measures are related with improvement of energy efficiency in building envelope, 21% are demand response measures and lastly, 14% are energy management measures.

The 60% of SMEs responded that prefer to implement measures to increase energy efficiency in technical systems (e.g. lighting, ventilation, heating, cooling and ventilation)

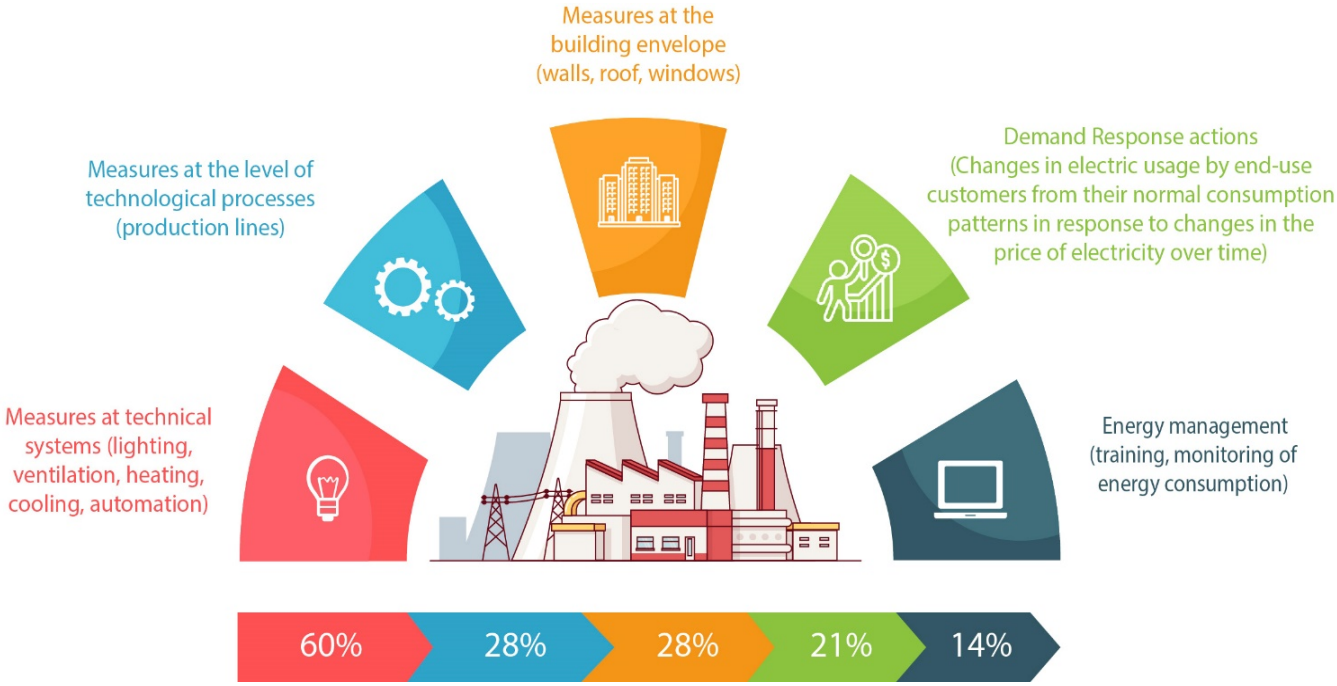


Figure 13. What energy efficiency measures have been implemented in order to reduce the energy consumption in your company during the last 2 years?

Existence of energy strategy in SMEs

Regarding the **future energy efficiency strategy of SMEs**, the 46% responded the absence of **energy strategy within the SME for the next 3 years**. The 39% of the SMEs have an energy efficiency strategy for the next 3 years; and finally, 15% do not know if there is an energy efficiency strategy within the company (Figure 14).

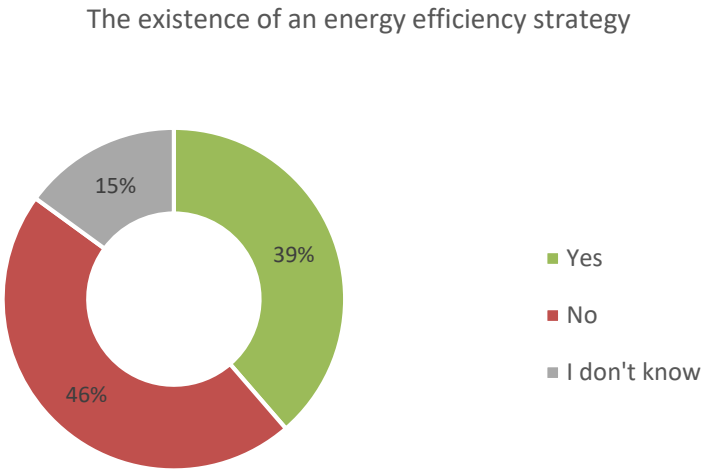


Figure 14. Is there an energy efficiency strategy within the company for the next 3 years?

In Cyprus and Italy there is higher interest for EE measures as more than 60% of SMEs have an energy efficiency strategy for the next 3 years. In other countries, lack of interest was identified as only few SMEs have an EE strategy (Germany-44%, Slovenia-33%, Romania-31%, UK-29% and Spain-21%). In Greece, 46% of the SMEs do not know if there is an EE strategy within the company for the next 3 years.

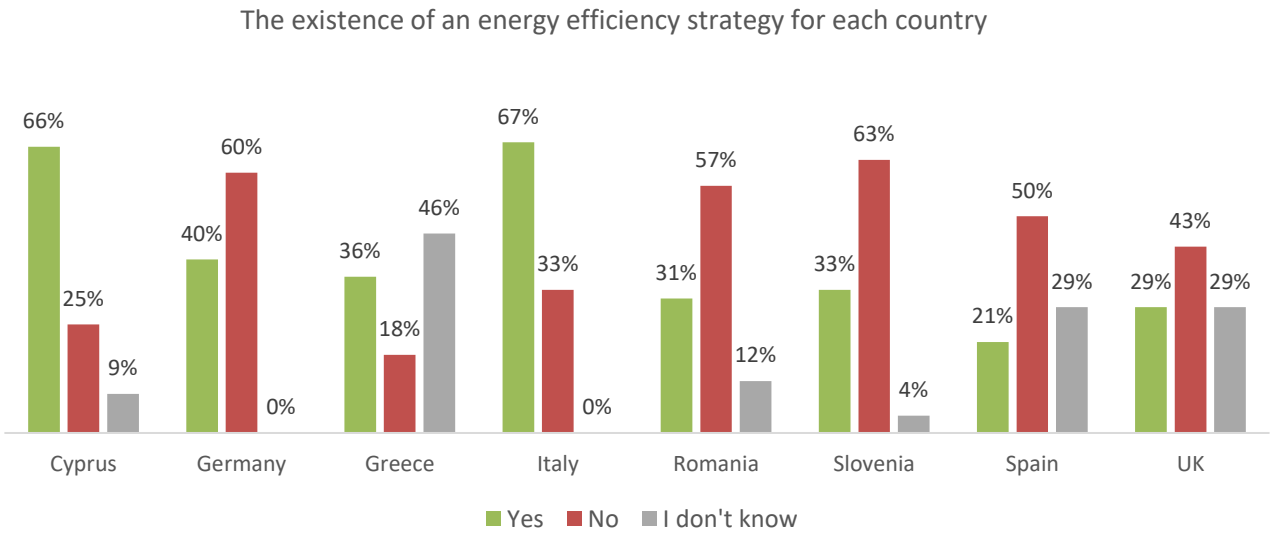


Figure 15. Is there an energy efficiency strategy within the company for the next 3 years?

Budget availability for energy efficiency investments

The Figure 16 shows that most of the SMEs (57%) do not have approved budget allocation for EE investments. This is related also with the number of SMEs that do not have comprehensive energy strategy as indicated in Figure 14.

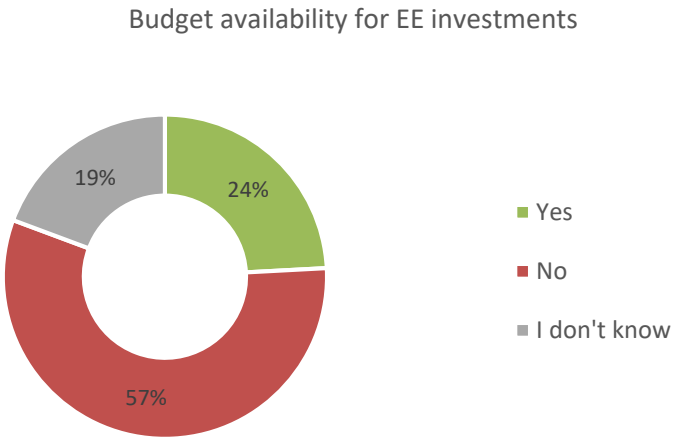


Figure 16. Is there a budget approved for investments in reducing energy consumption in the company for the next 3 years?

Furthermore, Figure 17 shows that the number of SMEs that have available budget for energy efficiency investments is not very high (Germany – 30%, Slovenia – 26%, Romania – 22%, Greece – 21%, Spain – 7%, Italy – 0%, and UK – 0%). Only in Cyprus, the percentage is higher, where 44% of SMEs responded that have approved budget for energy efficiency investments for the next 3 years.

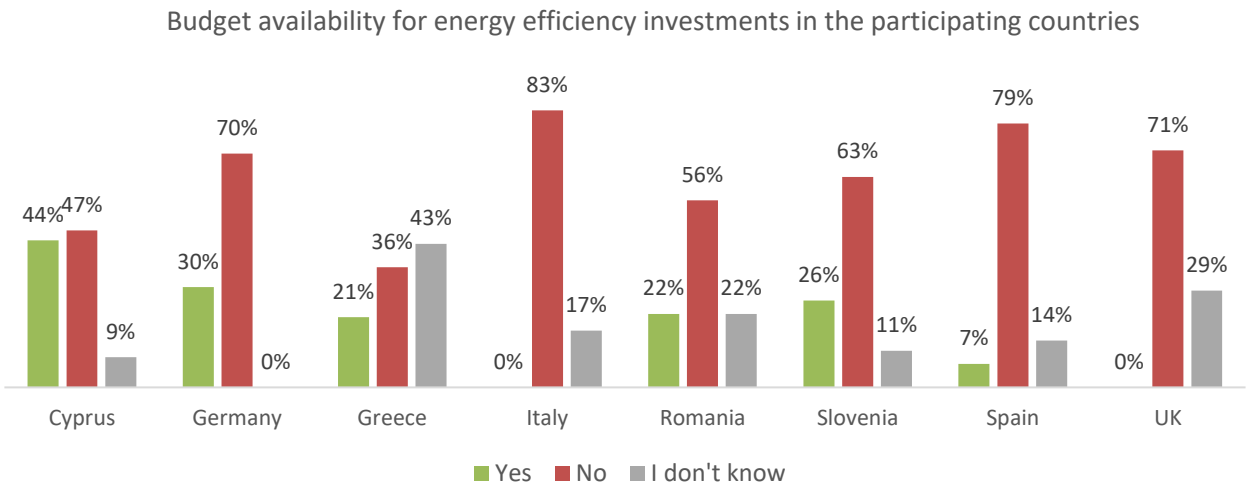


Figure 17. Is there a budget approved for investments in reducing energy consumption in the company for the next 3 years?

Funding sources energy efficiency investments

Most of the SMEs (60%) use their own funds to invest in energy efficiency and 21% of the SMEs indicated that have accessed European or other grants. Only the 11% of the SMEs claimed that they are using bank loans as a funding source and the 8% have applied to the National Support Schemes.

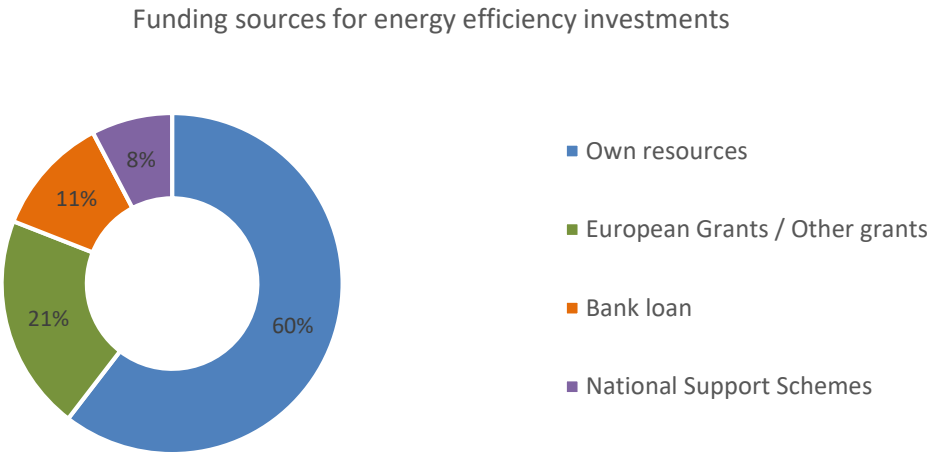


Figure 18. Which are the funding sources when investing in EE measures?

The Figure 19 below, shows that most of the SMEs from all the participating countries are using their **own financial resources** to implement energy efficiency measures (Spain – 79%, UK – 75%, Italy – 72%, Slovenia – 71%, Romania – 57%, Greece – 54%, Germany – 53%, Cyprus – 41%).

Few SMEs have tried to **access European grants or other grants** (Romania – 27%, Greece – 23%, Cyprus – 19%, Italy – 14%, Germany – 13%, UK – 12%, Slovenia – 9% and Spain – 7%).

In addition, **bank loans** are used by some SMEs in order to implement EE measures (Cyprus – 17%, Germany – 16%, Italy – 14%) and also national support schemes (Germany – 18%, Greece – 15%, UK – 13%).

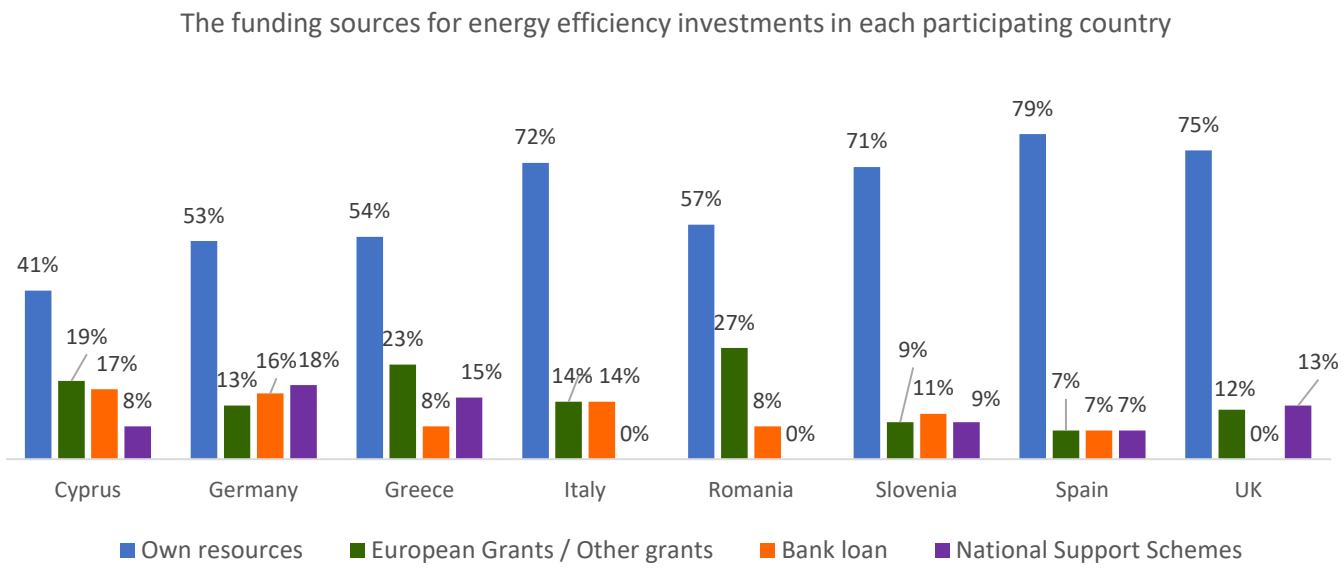


Figure 19. Which are the funding sources for EE investments in the participating countries?

SMEs employees' motivation in energy efficiency

In general, **in all participating countries, the staff is motivated to reduce energy consumption** (Germany-60%, Greece-60%, UK-38%, Slovenia-37%, Cyprus-30%). However, in some countries, there is only a sporadic motivation among the SMEs' staff to save energy (Spain -57%, Cyprus-37%).

In Romania the opinions are divided - the 31% of the respondents declared that the entire staff is motivated to reduce energy consumption and on the other hand, 26% of the SMEs claimed that their team is not motivated to reduce energy consumption.

One main conclusion of the survey regarding the staff motivation and knowledge is that **the staff is not well-trained in the topic of EE** and most of them are not aware of the energy efficiency potential within their companies.

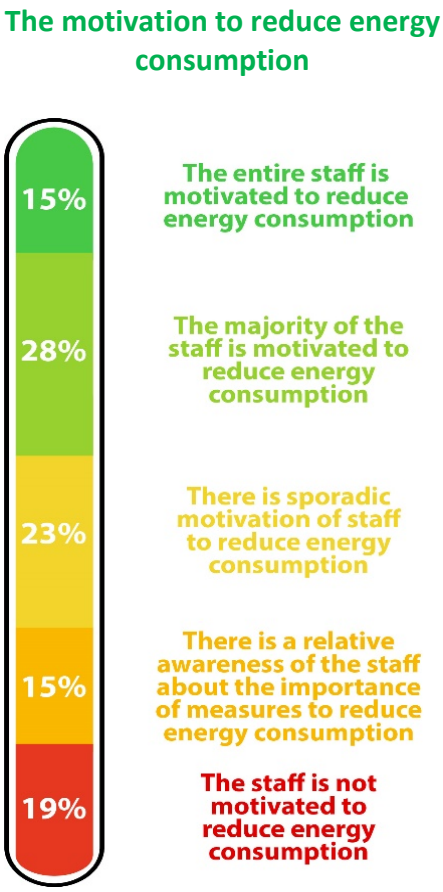


Figure 20. SMEs staff motivation to reduce energy consumption

The reasons to implement EE measures within SMEs

As expected, the main driver to implement energy efficiency measures in SMEs is **to cut energy cost (87%).** In addition, **the implementation of energy efficiency measures contributes to the fight against climate change (65%)** and has been identified that there is a strong interest among SMEs on this topic, which reflects the level of awareness of SMEs about the environmental problems. It is important to note that for almost all of the respondent SMEs (except Slovenia), the climate change is ranked second in priorities and most of the SMEs are ready to take actions to reduce their carbon footprint.

For **47%** of the SMEs the opinion that clients have about them is very important and they will implement energy efficiency measures in order to **improve the reputation of the company**.

Other reasons why the SMEs choose to implement EE solutions are the following: prepare for future increase in energy prices (43%), legislative obligations (24%), improve product quality (20%), increase the value of buildings through efficient facilities (19%) and increase the safety of operations (11%) (Figure 21).

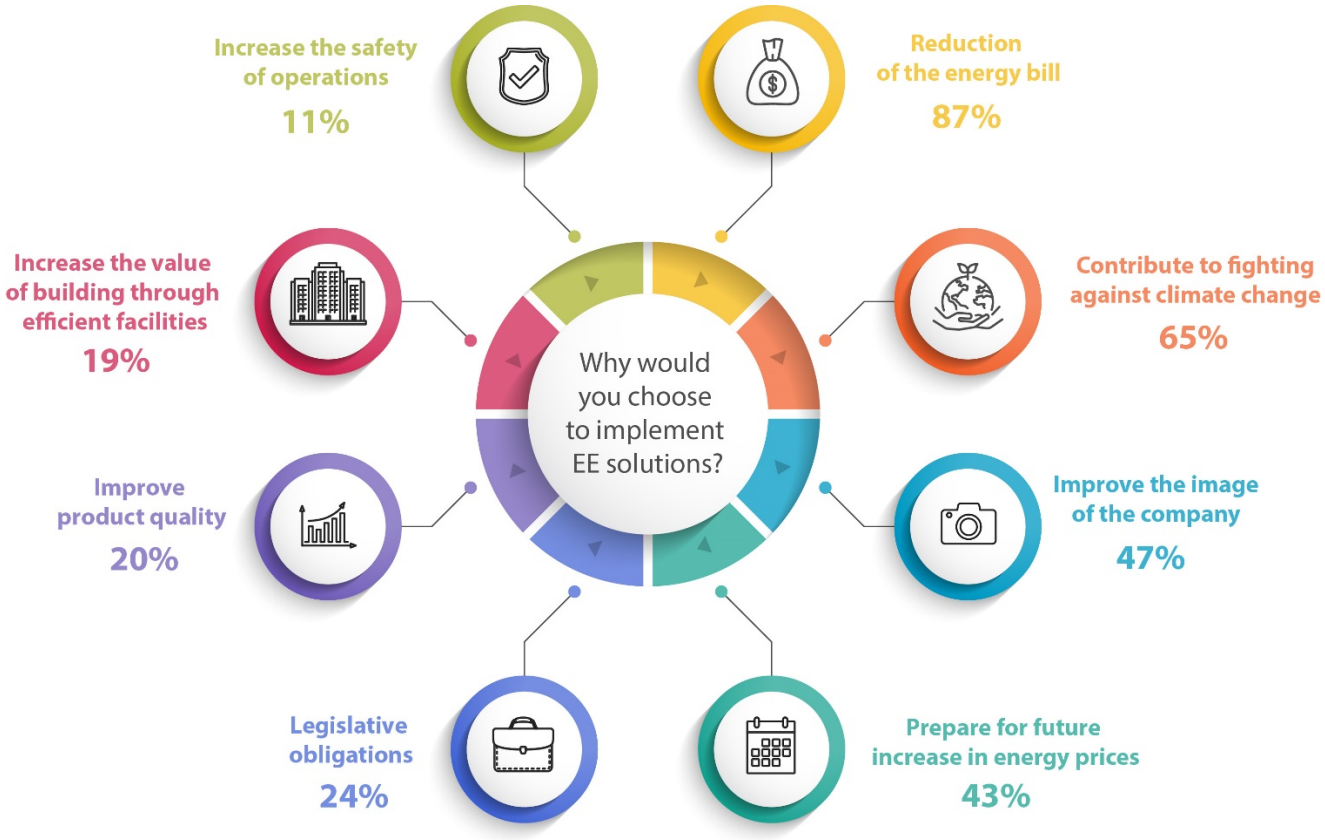


Figure 21. Why would you choose to implement energy efficiency measures?

5.Identification of barriers and solutions

It is well known that there are existing barriers that prevent the implementation of energy efficiency measures in SMEs (lack of trust, industry and technology dynamics, budget construction, EE not a priority etc.).

In order to identify the main barriers (legislative, institutional, technical, financial and communication) in the eight participating countries restricting the EE in SMEs, targeted workshops with stakeholders were organized.

The findings of this report show that there are barriers in the implementation of energy efficiency measures classified in five different **types: legislative, institutional, technical, financial and communication.** Some barriers could be removed by authorities, through the implementation of a stable and clear legal framework, with well-established targets for energy efficiency.

Moreover, it was shown that the ownership of the property could be one of the reasons why companies do not implement energy efficiency measures or do not carry out an energy audit. In order to test this hypothesis, the correlation between the following questions was analyzed: “Are your building/ premises rented or owned by you?” and “When was the last energy audit carried out within

the company?". As a result of this analysis, the correlation between the two questions demonstrates that the ownership of the property where the SMEs carry out their main activities influences the decision to implement an energy audit.

Another correlation was found between the following two questions: "Are your building/ premises rented or owned by you?" and "Is there an energy efficiency strategy within the company for the next 3 years?". Thus, not owning the building may be one of the reasons why companies do not have an energy efficiency strategy for the next 3 years and they don't choose to invest in EE.

Figure 22. The factors that influence the decisions of the SMEs regarding energy efficiency

Some SMEs in Slovenia, Germany and Spain, mentioned that **not owning the building is a major barrier that discourage them to invest on energy efficiency measures.**

The main barriers that limit investments in EE measures by SMEs are shown in Figure 23. Besides the **long pay-back period of some energy efficiency investments,** other problems have also been identified e.g. **difficulties in accessing financing or grants, bureaucratic organizational procedures, lack of budget for energy efficiency measures and lack of awareness or know-how, lack of knowledge for the EE suppliers.**

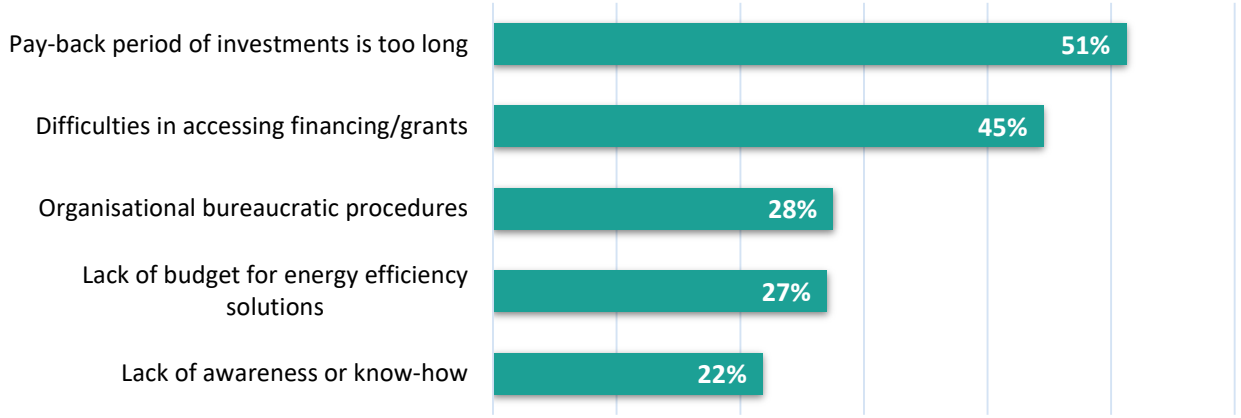


Figure 23. Which are the main barriers that hinder or limit investments in energy efficiency?

A wide range of SMEs does not have the necessary budget to make investments in energy efficiency. The authorities could make the non-refundable or partially refundable funding sources more attractive if they reduce the bureaucratic procedures regarding the access of the financing solutions.

Bureaucracy is often too complicated for SMEs to have an easy way of implementing energy efficiency policies. As the processes are complicated, this results in a lack of motivation in implementing energy efficiency measures.

A solution for the barriers described above would be the appointment of an energy manager in the SME (with proper energy efficiency training). The energy manager, in some cases, may also be the decision-maker of the SME.

Another barrier that is often reported by the SMEs with regards to energy efficiency measures refers to the technical risk. The risk of production failure and the risk of product quality issues represent a significant concern for SMEs and they usually reflect the lack of trust and confidence of the available technical solutions. If this barrier is combined with the lack of skilled personnel responsible for proposing and evaluating energy improvements within the SMEs, then it will be obvious that most of the SMEs are not potentially ready to adopt the solutions provided by the market, from a technical point of view.

For all the barriers described above, communication plays an essential role among all the participants in the energy efficiency domain.

Table 1. Identification of barriers in the participating countries to promote energy efficiency in SMEs

COUNTRY	BARRIERS				
	LEGISLATIVE	INSTITUTIONAL	TECHNICAL	FINANCIAL	COMMUNICATION
CYPRUS 	Strict legislative procedures and the high expectations of qualifications required to become a certified energy auditor; Low interest in the support schemes to promote energy audits in SMEs; SMEs are not obliged to assign an energy manager and to carry out energy audits, however there is legal framework on voluntary appointment of energy manager.	Lack of integrated long-term EE strategy within the SMEs; Lack of attention and prioritization to EE projects in SMEs by the financial institutions; Bureaucratic procedure of the Ministries blocks quick and efficient decisions; Lack of data and electronic databases and the weak cooperation between governmental departments.	Absence of energy manager due to low number of staff in SMEs; Duration of the training program; Lacking capacity on energy issues in the limited staff of SMEs.	High cost of the energy manager training program; Lack of attractive financing structures; Lack of effective support and supplementary support schemes; Lack of any tax incentives.	Low awareness and lack of information; Lack of informative campaigns and need for capacity building workshops for the personal development of bankers.
GERMANY 	The discounted energy prices should be conditional on proven efforts to increase EE; Constant change in the regulative frameworks and incentive programmes; Bureaucracy and administrative complications of most of state programme applications; SMEs are not obliged to assign an energy manager.	Resource and organisational capacity limitations of SMEs; Implementation of EE measures is not priority for SMEs; High information costs for the energy manager.	Introducing new technologies could disrupt existing production process costs involved with learning to operate new machinery and technology; Lack of staff member with the technical know-how.	The investment cost is too high; The short term saving on energy costs are not large enough to justify the investment in EE measures; Long and tedious application processes with increased transaction costs for receiving credit; Lack of credit possibilities from local banks.	Lack of information; knowledge gap on investment support programmes; Lack of focus on regional components of support programs; Lack of networks where experiences are shared; Poor communication between energy service providers and the legislators.

COUNTRY	BARRIERS				
	LEGISLATIVE	INSTITUTIONAL	TECHNICAL	FINANCIAL	COMMUNICATION
GREECE 	Lack of ongoing policy measure for energy programmes referring directly to SMEs; Lack of standardized Measurement & Verification (M&V) practices of ESCOs.	Relatively recent legislation on the EE performance of the building stock; Lack of established national standard for adequate measurements on the actual energy consumption of buildings; Low commitment by the Greek state towards smart metering deployment; Lack of standards and specifications on the definition of nZEBs; Complexity of regulation for the implementation of Energy Supply Contracting (ESC) projects in the public sector; Complexity on the categorization of ESCOs; Lack of ongoing projects of EPC in public buildings.	Technical constraints in the residential buildings, such as building architecture, infrastructure accessibility, etc.; Difficulties of decision making in cases of blocks of flats, due to outdated or lack of regulations for residents; Lack of an adequate supply chain for renovation services; Lack of energy labeling, energy standards and certification materials used in construction.; Lack of technical support and reliability of energy services; Several types of EE measures with varying quality levels can coexist in some markets; Lack of metering/monitoring mechanisms.	Long period of time required to amortize EE interventions; Special regulations to protect the cultural and architectural heritage of many residential areas; Extremely low energy gain and capital re-accumulation rate from the recommended renovation; Difficulty in implementing energy interventions in properties with numerous owners due to obsolete decision-making procedures; Economic and social pressure on low income parts of the populations.	Lack of skills and training of stakeholders; Lack of reliable and appropriate information about EE; Limited communication actions, e.g. workshops, seminars, etc.
ITALY 	Lack of support for the SMEs in the implementation of EE solutions; SMEs are not obliged to carry out energy audits.	Energy assessment and reporting audit on the institutional systems are a long administrative process.	Regional variation that exists in the implementation of procedures and requirements; Handling of the application procedure for the Italian EE Action Plan; Lack of standardized documents for applications;	Lack of subsidies funding; Difficulty and complexity to obtain bank loans for deep renovation; Uncertainty of cash flows, in particular in projects implemented via ESCOs; Difficulties in accessing public funding and tax relief; Significant fluctuation in energy costs.	SME owners and staff do not yet know where to find information about data and costs; Missing links between institutions, professionals and SMEs owners and staff; Lack of trust.

COUNTRY	BARRIERS				
	LEGISLATIVE	INSTITUTIONAL	TECHNICAL	FINANCIAL	COMMUNICATION
ROMANIA	Changes in the legal framework; Legal framework that provides a methodology for the implementation of Energy Performance Contracts with ESCOs; Unclear current situation regarding the transition of the EED department from ANRE to the Ministry; SMEs are not obliged to assign an energy manager and to carry out energy audits; Bureaucracy.	Inadequate decision structure at local or national level; Lack of standards and energy labeling; Lack of laws and regulations for EE; Lack of energy management in enterprises; Comparison between short term EE measure's investment and other investments with higher returns.	Lack of regulation and verification of the quality of the energy audit; Lack of tools and mathematical models for arguing the benefit of the EE measures; Lack of equipment / technology; Lack of training and experience in the field of energy management of consumers; Lack of knowledge of the SMEs regarding to the EE possibilities in the technological process; Considering EE measures a threat for the production process and product quality; Energy efficiency usually is not considered a priority in SMEs.	Limited funds for investments in the energy economy; Lack of financial and fiscal facilities for investments in energy economy; Strict eligibility criteria imposed by the financing programs; National priorities for energy investments.	Lack of knowledge of the staff regarding technical language; Lack of communication between staff and executives about EE measures and possibilities; Lack of curiosity to learn from other SMEs about EE measures and their results.
SLOVENIA	Lack of motivation of implementing EE measures and Complicated processes for the implementation of EE measures; Limited building restoration or refurbishment due to building's cultural heritage; Complex legislative concepts that are difficult to understand; Bureaucracy;	Changes in European and Slovenian policies; Lack in providing information or any other aid regarding EE by some institutions; Lack of monitoring when it comes to some crucial indicators of evaluating EE; Short-term public aid and limited duration of the grants.	Poorly built infrastructure; Different demand of assessment of EE measures in different geographical areas; Changes in building's properties at the level of auxiliary processes.	Limited funds for investments in the energy economy; Lack of financial and fiscal facilities for investments in energy economy; Strict eligibility criteria imposed by the financing programs; National priorities for energy investments.	Low awareness about the benefits of EE projects; Lack of commitment by the staff; The adaptation of employees to a "new" working environment.

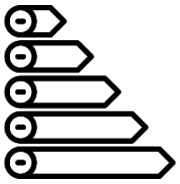
COUNTRY	BARRIERS				
	LEGISLATIVE	INSTITUTIONAL	TECHNICAL	FINANCIAL	COMMUNICATION
SPAIN 	Restrictive criteria and conditions for grants; Lack of interest regarding grants; Complex legislative concepts that are difficul t to understand; Complex legal administrative procedures.	Inaccessible/absence of information on energy saving in companies; Shortage of institutional and governmental support in public aid for EE in SMEs; Short-term public aid and limited duration of the grants; Lack of stability and continuity in public EE programs; Lack of practical training and commitment in EE by the management of the company; Not considering sustainability as a business strategy.	Lack of knowledge of the factors regarding energy reduction Ignorance of consumption and electricity bills by SMEs; Lack of time and dedication to the issue of EE by executives and owners of SMEs; There are doubts on the part of the entrepreneurs about the real savings of the measures; Lack of " recycle and reuse" mentality; Not having flexibility in companies (e.g. in technology) Lack of training.	Access to economic capital and funding; Financial risks evaluation is complex due to lack of evidence in investments in EE; Difficulties in financing taxes; Energy management is not a priority in investments; Discontinuity in the publication of public aid; The fear of not achieving real savings after applying energy efficiency measures.	Internet access is required to request aid and fill in the requested data and information; Lack of motivation due to the lack of information for staff about progress in the energy topics ; No information flows between departments of the company; Difficulties in understanding technicalities and energy vocabulary; Companies ignore the sources of energy savings possibilities.
UK 	Lack of legislation or standardization in business models/contracts; Lack of clarity/certainty on government policy (e.g. due to Brexit); Lack of information and consultation on policy with SME representatives.	Lack of stable and reliable funding schemes for training, certification and recertification; Lack of confidence in the own capabilities, due to skills fragmentation among different SME; Uncertainty on the level of market demand; Confusion on requirements for certification and registration; High costs of upskilling; Lack of networking structures to act as intermediators.	Lack of information and consultation on policy with SME representatives; Lack of confidence in the own capabilities, due to skills fragmentation among different SME; Benefits for SME are not clear; Lack of delivery capacity.	Lack of stable and reliable funding schemes for training, certification and recertification in relation to new technologies; Fear of the scheme to be undertaken mostly by big companies; Benefits for SME are not clear; Uncertainty on the level of market demand.	Lack of knowledge of the staff regarding technical language; Lack of communication between staff and executives about EE; Lack of priority to learn from other SMEs about EE measures and their results; Confusion on requirements for certification and registration; Regular changes to specific aspects of the scheme causing confusion; High level of paper work and administration required;

6. CONCLUSIONS AND FURTHER ACTIONS

The main conclusions of this report are summarized below:

The energy profile of the SMEs is mostly based on companies with small number of employees up to 10 people.

"In all of the participating countries, SMEs consumes less than 100 toe/year"



"The current level of energy management/ energy efficiency within the SME is low, more than half of the SMEs (57%) do not have an appointed **Energy Manager** in their company."

Environmental/energy standards are implemented in around 45% of the total SMEs responded.

54% of the SMEs did not carry out energy audits. However, 67% of those who carried out have implemented some of the proposed measures.

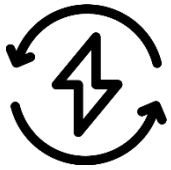
The importance of energy audits should be further promoted in SMEs.

The main source of funding when investing in energy efficiency measures are the SMEs **own budget**.

There is a need of promoting financing models, energy performance contracts and facilitate access to finance.

In all of the participating countries, the SMEs staff is motivated to reduce energy consumption.

Employees need to be trained to increase their skills and competences. As most of the SMEs are small sized and the majority has no technical personnel, the training courses will support energy efficiency actions.



The main reasons why the SMEs would implement energy efficiency measures are:

- The reduction of energy cost;
- contribution to fight against climate change.

Barriers that limit investments in energy efficiency are:

- long pay-back period,
- difficulties in accessing financing/grants,
- organizational bureaucratic procedures.

For all the barriers in the implementation of energy efficiency solutions identified and described in this report, communication plays an essential role among the participants in the energy efficiency market. Therefore, there is a clear need to integrate training courses and case studies in each member country of the SMEmPower Efficiency project.

The conclusion is that the barriers described in this document can be overcome and the energy consumers will have the opportunity and confidence to implement energy efficiency solutions.

Finally, the following illustration shows the techniques which were chosen by the respondents from the participating countries to facilitate access to information regarding the energy efficiency solutions. The answers show a strong desire of SMEs for case studies and examples of projects to shape ideas, a web platform with different materials and training courses that could facilitate the networking between professionals, events, in-house training courses and regular emails about the topic.

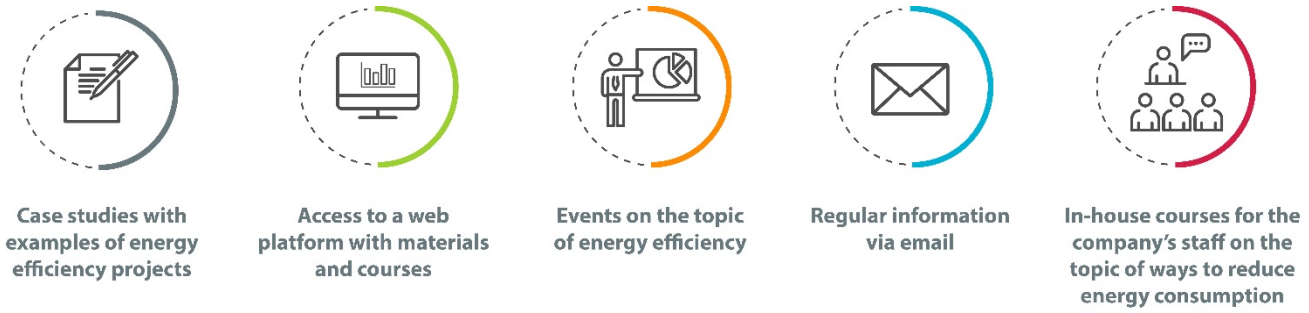


Figure 24. How would you like to receive information regarding the energy efficiency solutions?

Appendix 1. Survey Questionnaire

We invite you to take part in a survey conducted by SMEmPower, a Horizon 2020 project. The project aims to "Empower" SMEs to undergo energy audits, implement the proposed energy efficiency solutions and to enhance the SME skills of building managers such as engineers and architects through a series of accredited training activities developed by 9 universities and 3 market players.

The data from this survey will be analysed and used for project reports and presentations and potentially in academic publications. All data collected and processed in this activity will be handled in compliance with the GDPR. When necessary, the information will be anonymised and stored in a secure location.

Part 1 - Identification data

Country: .....

Name of Company: .....

NACE code (major activity sector): .....

Secondary activity:.....

1. How many employees does your company have?
   - Less than 10;
   - Between 10 and 49;
   - Between 50 and 249;
   - Over 250.

2. Are your buildings/premises rented or owned by you?
   - Rented;
   - Property.

Part 2 – The energy profile of the company

3. What is the annual final energy consumption of your company for 2018? (100toe= 1.16 GWh)
   - Less than 100 toe/year;
   - Between 100 and 500 toe/year;
   - Between 500 and 1,000 toe/year;
   - Over 1,000 toe/year.

4. What is the share of energy costs in the company's turnover for 2018?
   - Low (<2%);
   - Moderate (2-10%);
   - High (> 10%).

5. From the energy bill, please fill in the total consumption according to the energy resource used:

	0-30%	30-60%	60-90%
Purchased Electricity			
Purchased Natural gas			
Purchased Liquid fuel (gasoline, diesel, light fuel oil, etc.)			
Purchased thermal energy (steam, hot water)			
Energy produced and consumed locally from renewable sources (biomass, solar energy from photovoltaic and solar panels, geothermal power plant, wind turbine and others)			

6. What do you think about the annual energy bill of your company?
   - The energy cost is low;
   - The energy cost is moderate;
   - The energy cost is high;
   - I do not know.

7. Your electricity tariff is based on:

	Yes	No
Fixed rate		
Time of Use		
Dynamic pricing		
Power component based on max power demand per billing period		

8. What standards are implemented within your company?
   - ISO 14001;
   - ISO 50001;
   - IPMVP;
   - Not certified with any standards.
   - Other (please specify)
   - I don’t know

9. Has an Energy Performance Certificate (EPC) been issued for your building/premises?
   - Yes; What is the energy class? .....
   - No;
   - I don’t know

10. Has an Energy Manager been appointed/employed in your company?
    - Yes;
    - No;
    - No, but we have a staff member in charge of the energy consumption in the company.

11. How do you monitor energy consumption within your company?

Energy consumption monitoring system	Liquid Fuels	Electricity	Thermal energy	Natural Gas
There are separate meters on the main production sections, installations, machinery and equipment				
There is only one general utility meter				
Building management system				

12. When was the last energy audit carried out within the company?
    - Less than 1 year ago;
    - More than 1 year ago, but less than 5 years ago;
    - More than 5 years ago, but less than 10 years ago;
    - More than 10 years ago;
    - We did not carry out an energy audit.

13. Have you implemented any energy efficiency measures proposed in the energy audit?
    - Yes;
    - No;
    - We did not carry out an energy audit.

14. What energy efficiency measures have been implemented in order to reduce the energy consumption in your company during the last 2 years? (multiple choices)
    - Measures at the level of technological processes (production lines);
    - Measures at the level of auxiliary processes (lighting, compressed air, exhaust, ventilation, thermal installation, etc.);
    - Measures at the building level (refurbishment of the building);
    - Energy management (training, monitoring of energy consumption, actions following the results from the energy monitoring system);
    - Demand Response actions (Changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time).

15. How much has the energy bill been reduced as a result of implementing energy efficiency measures?
    - Less than1%;
    - Between 1% and 5%;
    - Between 6% and 10%;
    - Between 11% and 15%;
    - Between 16% and 20%;
    - Between 21% and 30%;
    - Over 30%;
    - We did not monitor the impact.

16. Is there an energy efficiency strategy within the company for the next 3 years?
    - Yes;
    - No;
    - I do not know.

17. Is there a budget approved for investments in reducing energy consumption in the company for the next 3 years?
    - Yes;
    - No;
    - I do not know.

18. Which are the main sources of funding when investing in energy efficiency measures?
    - Own resources;
    - Bank loan;
    - European Grants / Other grants;
    - National Support Schemes;
    - Other (please specify):

Part 3 – Factors that influence the implementation of energy efficiency measures

17. Why would you choose to implement energy efficiency solutions? (multiple choices)
    - Reduction of the energy bill;
    - Prepare for future increases in energy prices;
    - Contribute to fighting against climate change/protection of the environment;
    - Improve image;
    - Increase the safety of operations;
    - Increase the value of building through efficient facilities;
    - Improve product quality;
    - Legislative obligations;
    - So far, we have not implemented energy efficiency measures.

18. In your opinion, which are the obstacles that hinder or limit investments in energy efficiency?
    - Pay-back period of investments is too long;
    - Difficulties in accessing financing/grants;
    - Inadequate banking environment;
    - Organisational bureaucratic procedures;
    - External bureaucratic procedures;
    - Inadequate internal organisation;
    - Fears about production disruption;
    - Uncertain market developments for the products made;

- Lack of budget for energy efficiency solutions;
- Lack of awareness or specific knowledge
- Other (please specify):

19. What is the policy of your company regarding the investments made in energy efficiency?
    - Energy efficiency investments have priority;
    - For investments in energy efficiency, the same criteria of appreciation are used for all investments within the company;
    - Investments in energy efficiency are proposed only if they have a short pay-back period;
    - Investments in energy efficiency are proposed only if they consider low costs measures;
    - There are other investments with a higher priority than investments in energy efficiency.

20. What is your company's policy regarding motivating staff to reduce energy consumption?

1	2	3	4	5
The staff is not motivated to reduce energy consumption	There is a relative awareness of the staff about the importance of measures to reduce energy consumption	There is sporadic motivation of staff to reduce energy consumption	The majority of the staff is motivated to reduce energy consumption	The entire staff is motivated to reduce energy consumption

21. How would you like to facilitate access to information regarding the energy efficiency solutions?
    - By organising events in the topic of energy efficiency;
    - By organising in – house training courses for the company's staff on the topic of ways to reduce energy consumption;
    - By regular information via email;
    - Case studies published periodically with examples of energy efficiency projects implemented in different companies;
    - Access to a web platform with materials and courses;
    - Other (please specify):

Job title: .....
Email address: .....