Promoting industrial energy efficiency to SMEs

Business model

Deliverable 5.2

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Sommario

1 Introduction

The present report is a market analysis conducted in the frame of the PINE project to outline possible scenarios and identify sustainable way to achieve a continuation of energy audits also beyond project life time.

A benchmark analysis has been carried out at the very early stages to identify the various business models most commonly used by energy audit providers.

The topic has been widely discussed by project partners during the implementation of the project comparing also the opportunities and threats that the specific situation of each country involves.

After the PINE energy audits have been performed a survey was carried out to investigate customer satisfaction and explore market potential.

The outcomes of this survey contributed significantly to investigate in further details each of the possible business models and leading to the setting up of the “PINE network for the promotion of energy efficiency in industry”.

In the spirit of transparency that has marked the whole life of the project, this analysis is shared with any private or policy makers interested in the topic of industrial energy efficiency.

2 Background information

By the point of view of a SME an energy audit is a service that should encourage investments that are supposed to lead in a short time (usually 3 years is considered a threshold) to energy savings higher than the costs of the investment and of the audit itself.

An audit is therefore a risky activity by the point of view of the company. The audit could possibly not identify relevant opportunities to improve energy efficiency and the investment could not lead to the expected savings due to several potential factors.

There are several business models related to energy efficiency whose main difference is how profits and risks are shared between the different actors involved in the project. And it is noteworthy to remind that SMEs proved to be extremely reluctant to perform energy audits due to the uncertainty of the service. Therefore in the EU and in the world there are several public scheme and benefits that directly or indirectly drive SMEs to perform energy audits.

CIRCE, one of the partner of the PINE project, carried out at the beginning of the project a benchmark analysis of the existing business models and public policies promoting energy audits: “Analysis of the different working models” available on the project web site among “resources”.

The key findings of this research were the following:

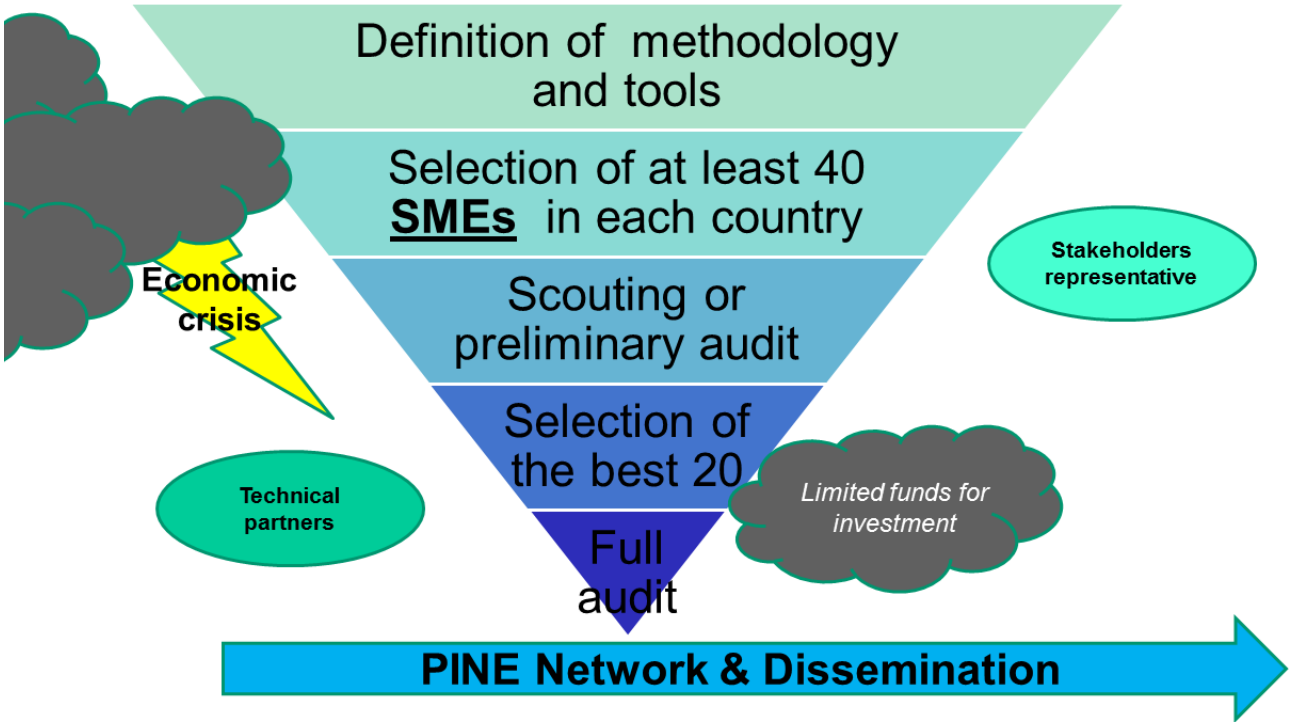
As a result of this analysis it is possible to underline different promising potential business scheme to be pursued in order to achieve the long term sustainability of the PINE network and model:

1. *The services are provided on a mere commercial basis as an ESCO service and three commercial options can be identified:*
    a. *The price of the service is fixed (which could be perceived by companies as a lack of committed from the auditors).*
    b. *The price of the service is a % of the savings achieved (which makes the income only slightly predictable).*
    c. *The price of the service include a small fixed amount and a % of the savings achieved.*

2. *The services offered, and consequently the commercial mode defined above, are combined with some public subsidy that partially cover the cost of the audit. In this case a tax benefit can be more appreciated since these sort of the scheme are more predictable, constant and reliable. Grants depends on a limited amounts of funds and consequently companies could not be able to benefit from them and postpone indefinitely the investment until it is able to win the public funds. It is also paramount to lobby local authorities in order to include in the fiscal benefits not just the investments in energy efficiency but also the energy audit that are the basis for an effective energy efficiency plan*

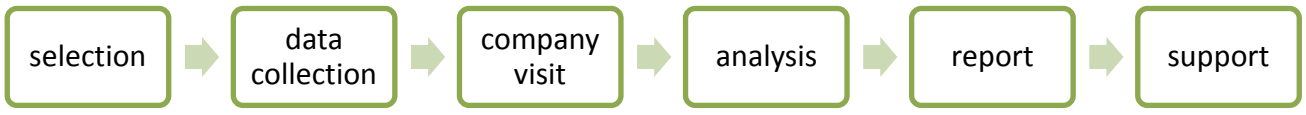
3 The PINE energy audit process

PINE developed a specific approach to energy auditing based on three key ideas: selection of SMEs with a high energy saving potential, standard auditing methodology and strong support for implementation of energy efficiency measures.



During the first part of the project a common methodology has been developed, and the stakeholder representative project partners focused on the **selection of at least 40 SMEs** in each country. The initial selection identified 280 SMEs with high energy consumption, high energy intensity (defined as cost of energy on turnover) and willingness to invest in energy efficiency. Each company received a preliminary energy audit, that provided an overview of the energy use, defined the areas of significant consumptions and a rough estimate of potential savings, pointing out the most promising companies for the next phase. In the next phase 140 SMEs were selected for a comprehensive energy audit. The **audit methodology** is based on the PINE Audit tool, a complex worksheet to analyse data on the overall consumption of heat and electricity, load profiles, evaluation of equipment and assessment of different options for energy efficiency.

The companies were requested to provide basic data on energy consumption prior to company visit. An energy auditor visited the company to collect further information on equipment and processes, measuring relevant parameters and identifying critical areas for intervention. After the visit, several options for energy savings were analysed, their feasibility assessed and work plans elaborated. A final report was delivered to the company and discussed with key stakeholders (internal auditor, technical staff, management).



A strong **support for implementation** of energy efficiency measures was crucial to achieve project results since it helped companies in overcoming any unforeseen difficulties arising after the audit, when they were

expected to implement the energy efficiency measures. The energy auditors took action, helping the company to install monitoring systems, overcome technical issues, compare quality and price from different providers and offer further insight on organisational measures.

4 The feedback from the 140 companies that benefitted from a PINE energy audit

Throughout the project a constant dialogue has been maintained with SMEs and a lot of feedback has been collected both during public events and informally by direct contacts . At the end of the energy audits a survey was performed to explore the satisfaction of the companies, in relation to the energy audits offered by the PINE partners, but also to investigate the potential market for offering PINE style services after the end of the project.

The experience with the hundreds of companies that were contacted throughout the various phases of the project (from the promotion of PINE services to the follow up of the full energy audits) suggests that the decision whether to start an energy audit is based on the perceived value of the audit, which is often underestimated in SMEs due to several “soft barriers”:

- SMEs relies on internal staff to optimize production processes, to achieve quality, and reduce cost. Key decision makers are not used to rely on external consultants and they do not believe that an external consultant can identify any improvement which the staff had not have identified before;
- the concept of Energy Audit is biased due to previous experiences with “energy audits” focused on a single commercial solution (e.g. selling a new piece of equipment, a new material or solution) instead of analysing the whole production process to identify the best opportunities for energy efficiency because the energy audits are offered by companies selling a limited set of technologies. It may happen, for example, that an "energy audit" is focused only on the compressed air system, concluding that the best action is to buy a new compressor, overlooking other options such as: reducing air pressure, turn off idle equipment and use a smaller compressor;
- The decision makers may have excessively high expectations – e.g. expecting a new technology leading to a huge leap forward in terms of efficiency, resulting in dramatic energy savings with limited investment and a negligible risk. This could happen, but only in few cases, such as replacement of old electric motors and pumps, substitution of conventional drying with microwave or infrared drying, replacement of conventional fans by backward bent fans;
- SMEs fear that energy efficiency measures may adversely affect product quality, overlooking the potential scope for energy efficiency in cross cutting technologies. This is particularly true for companies focused on high quality products.

The results of the survey carried out among the companies that benefitted from the PINE energy audits are summarized in the table included in the following page.

On page 8 a table summarizes also the savings achieved in each country at the end of the project, those that will be achieved in 3 years’ time according to the investments plans of the 140 SMEs, and the potential savings that could have been achieved if all of the suggested measures would have been implemented.

	Austria	Bulgaria	Cyprus	Italy	Romania	Slovakia	Spain	Average
Overall positive assessment of the PINE audits	100%	100%	100%	94%	90%	100%	100%	**98%**
Overall assessment of PINE audits*	4,4	4,5	4,6	4,1	4,5	4,5	4,2	**4,4**
The PINE energy auditor was able to cope with the company's situation and needs (average evaluation) *	4,7	4,6	4,7	4,3	4,9	4,6	4,7	**4,6**
The results of the consulting (actions to be taken, recommendations) (average evaluation) *	4,6	4,7	4,7	4,1	4,9	4,6	4,5	**4,6**
The consultant's report/documentation (average evaluation)*	4,3	4,6	4,7	3,9	4,3	4,9	4,1	**4,4**
Would have you carried out an energy audit even if it was not for free?	25%	90%	20%	33%	50%	20%	60%	**43%**
We will repeat an energy audit	79%	90%	100%	83%	100%	70%	85%	**87%**
Years for repetition of audits	1,8	3,2	1,6	3,0	NA	NA	2,5	**2,4**
Average price SMEs would be willing to pay foran energy audit	€ 1.556	€ 2.550	€ 3.025	€ 2.400	€ 1.800	€ 800	€ 1.800	**€ 1.990**

Table 1 - Summary of the main results of the survey carried out among the 140 SMEs that benefitted from the PINE full audits

* Scale 1 to 5 (positive 4 or 5, 3 neutral, 1-2 negative)

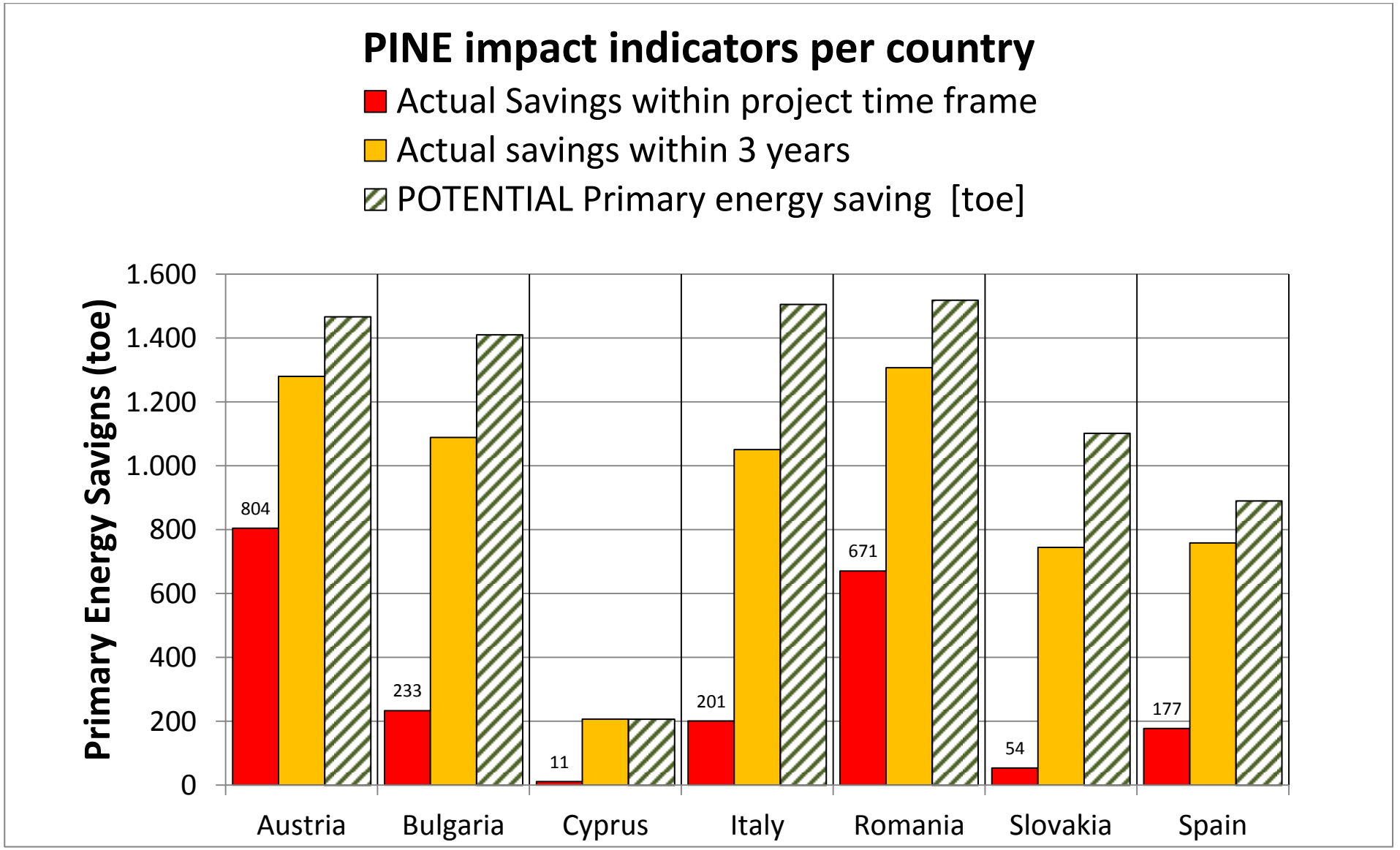


Table 2 – PINE impact indicators per country

Overall the satisfaction of the SMEs for the PINE services is very positive demonstrating the quality and consistency of the PINE methodology and the competences of the energy auditors.

A comparative analysis of the customer satisfaction with the energy savings achieved in each company and the type of the actions and investments done, provides remarkable insights on SMEs attitude towards energy efficiency and energy audits.

Customer satisfaction is closely related to the energy savings that were achieved in each single SMEs in the **short time**. This confirms the perception project partners had during the previous stages of the project of companies expectations on the outcomes of the energy audits. Most of them were expecting considerable energy savings achieved with limited investment and a ROI (return on investment) of maximum 3 years.

Some of the negative feedback of the audits were indeed provided by companies where it was possible to identify potential saving actions that had ROI of 4 or more years.

The strategy of the Cypriots partners to focus mostly on short ROI and limited investments actions lead in most cases to a relatively higher satisfaction and relatively lower savings. Of course this is a simplification of the several factors that affects both satisfactions answers and investments, but it is still an inspiring representation of the low risk attitude of most SMEs at the time of the present economic crisis.

An investigation has been carried out also on the reason why the audited SMEs have decided not to implement all the suggested measures. According to the feedback received, the main reasons for not implementing the recommendations is the payback period and the investment costs respectively. Generally, payback periods beyond 4 years are not attractive to most of the company managements.

The current financial-economic crisis has a remarkable impact on economic viability and bankability of investment on energy efficiency in the industrial sectors that goes far beyond the difficulties many SMEs face in getting bank loans for investment. This is due to several factors including: the limited financial resources, the very low risk profile of the banks in several of the countries involved in PINE, and a lack of skills both from the bank side, in assessing business plans related to energy efficiency, and by SMEs on the other hand in drafting clear plans that clearly identify the risks and the profitability of the investment. Besides these concrete issues there is also a psychological barrier and lack of confidence that prevent SMEs for even trying to apply for a loan.

Primarily businesses are less keen on investments, due to the fact that the demand projections are declining and less financial resources are available. As market demand decreases, production lines operate well below their capacity. Consequently any investment will pay off in the longer times.

It is noteworthy also the fact that 87% of the SMEs are willing to replicate an energy audits (on an average time span of 2,4 years) but just half of them (43%) would have paid for the energy audits.

We can assume that some of the SMEs that are going to replicate an energy audits, but are at the same time not available at paying for it, are expecting to benefit from some other free energy audits offered by some public initiatives.

The others took the PINE audits as an opportunity for improvement. The energy audit is actually carried out to improve the skills of the production manager or energy manager (most SMEs do not have an energy manager), who learn how to manage in future the energy audits by themselves without relying (and paying) on external consultants.

The high differences in the availability of paying for an energy audits ranging from 20% to 90% with an average of 43% is due to several factors. Probably the most remarkable was the existence in the present or in the past of free or subsidized energy audits. Other factors include a combination of relevance of energy costs in the overall company budget and management culture.

Another remarkable factor is that the average price companies would be willing to pay for an energy audits is considerably lower than the actual cost PINE partners faced for the implementation of the audits.

At this point it is important to add also that the costs of the energy audits include the cost for the acquisition of customers, the staff costs of the team involved in the energy audits, travel costs and indirect costs. Travel costs could had a significant impact in the larger countries where longer and consequently more costly travel were required, suggesting a more regional focus for offering energy audits.

Such considerations (as well as the experience of the promotion of the PINE services) suggest that the commercialisation of the auditing services will have a significant impact on the total costs of the audits. A very large number of companies should in fact be contacted to find a customer interested in the energy audit service. This is because only few SMEs, among those reached by the communication, would be willing to pay for the offered service a price that provides to the supplier an appropriate profit.

5 SWOT analysis

To explore the market potential the results illustrated in the previous section were elaborated in SWOT analysis applied to the four business models outlined in section 2:

- Commercial plan with fixed price according to complexity of production system;
- Commercial plan with price defined according to the actual saving achieved;
- Commercial agreement with an ESCO;
- Public funding scheme based on a two steps audits scheme and public loans granted presenting a business plan and an energy audit.

5.1 Commercial plan with fixed price

STRENGHT The cost of the audits are clear both to the company and the auditor, but the risk of the investment is all on the company side Profits in the short time Tested methodology and auditors	WEAKNESS Very limited number of SMEs willing to pay for an energy audit Public bodies PINE project partners are often not used or efficient to act on a commercial basis
OPPORTUNITIES EU and national policies support industrial energy efficiency Some of the PINE partners are already active in this market	THREATS Many competitors are already active in the energy audits market EU legislation more focused on large companies rather than SMEs Limited funds available to SMEs for investments

In this model the auditing services are offered on a commercial basis. The price for the service is not linked to the actual energy savings that will be achieved by the suggested energy saving actions but on the complexity of the industrial pant and production process to be offered.

The contract is a mere provision of service and the auditor is just committed to perform the audits in a professional and thorough way not to the achievement of a specific result.

5.2 Commercial plan with price depending on savings achieved

The model could include both a price of the service totally defined in proportion of the savings achieved or, more reliable option, as a fixed price plus a significant bonus in proportion of the actual saving achieved.

STRENGHT Scheme more attractive for SMEs since the risk of investments is shared between the auditor and the company Tested methodology and auditors	WEAKNESS The profit of the auditors is uncertain. Limited number of SMEs willing to pay for an energy audit Public bodies PINE project partners are not familiar with not fixed prices of service The assessment of the actual saving is a complex and costly process
OPPORTUNITIES EU and national policies support industrial energy efficiency Some of the PINE partners are already active in this market	THREATS Most of the SMEs do not have an appropriate energy monitoring system EU legislation more focused on large companies rather than SMEs Limited funds available to SMEs for investments

The major issue with this scheme is the difficulty in assessing the actual saving achieved that should be considered excluding the impact of variables such as: changes in the price of energy and fuels, change in the quantity of goods produced or in the production process itself.

Indeed a remarkable lack of data on energy consumption is common to all 280 companies participating at the project. The main sources of information on energy consumption is the data available through the energy bills, while the common effort to reduce energy cost is limited to negotiations on prices.

Data might not always precisely overlap in terms of detail and time frame: the PINE energy auditor had to be flexible and elaborate aggregation of data into a single energy baseline. Measurements taken during the company visit added important information, but they often were not enough to give a clear and complete picture of the company energy consumption.

When a comprehensive energy monitoring system is not available (as is often the case with SMEs), an in-depth monthly analysis of the data can provide additional information. This can be obtained by analysing load curves on a daily or hourly basis (e.g. during weekends, nights or holidays) to identify base loads. Linear regression on data available from general meters (e.g. monthly readings of electricity and gas meters) can provide further insights on the influence of production processes and external temperature on energy consumption. Linear regression proved to be a powerful tool to overcome the lack of energy consumption data, providing a clear insight on the use of energy within the company.

Therefore the implementation of such commercial scheme would require to install an *energy monitoring system*, with submeters as a key equipment, included in the infrastructure (buildings) and utilities (water treatment, air supply, vacuum generation, air handling, lighting, etc.) monitoring plan. The data on energy consumption should be processed to evaluate load curves, key performance indicators, and progress toward targets. Furthermore, the actual energy savings should be calculated excluding the effect of

external variables (such as seasonal fluctuations in production volumes or external temperatures), using a dynamic modelling of the production process.

The cost of the monitoring system and process modelling will consequently impact significantly the overall costs of the energy audits.

5.3 Commercial agreement with an ESCO

STRENGHT The risk of investments is shared between the auditor, the company and the ESCO Tested methodology and auditors It is easier to plan longer term investment Easier access to capital for SMEs	WEAKNESS The profit for the auditor is uncertain. Public bodies PINE project partners might face problems in selecting ESCO to sign a commercial agreement The assessment of the actual saving is a complex and costly process Profits in the long term
OPPORTUNITIES EU and national policies support industrial energy efficiency and ESCOs	THREATS Most of the SMEs do not have an appropriate energy monitoring system EU legislation more focused on large companies rather than SMEs In the PINE countries there's still a limited number of ESCO

In such model the auditor signs a commercial agreement with an ESCO performing the energy audits that make possible to identify the most profitable energy saving measures and assess the profitability and the ROI of the planned measure.

The profit of the auditor will be based on a fixed fee plus a share of the achieved savings.

None of the PINE partner has the financial resources required to act as an ESCO itself.

Several ESCO expressed their interest in cooperating with PINE partners.

5.4 Public funding scheme.

A public funding scheme based on a two steps audits scheme and public loans granted presenting a business plan and an energy audit.

STRENGHT Tested and efficient methodology (not just the audit but also the selection procedure) Easier access to capital for SMEs Larger number of companies willing to perform an energy audits	WEAKNESS Also SMEs with limited energy saving potential could apply Bureaucracy could prevent the most dynamic from applying
OPPORTUNITIES EU and national policies support industrial energy efficiency Trigger investments in energy efficiency.	THREATS Regional authorities (or similar) have limited funds

The basic idea is that a regional authority (or similar), within the framework of EU state aid regulations, launches a service to improve energy efficiency in companies and boost investment and innovation as well with relevant benefits for the economy and the environment.

Access to subsidized loans will be granted only to SMEs that will have carried out energy audits fulfilling minimum standards set by the regional authority itself.

The granting public authority could also leave the energy audit up to market with smaller impact on competition but also leading to a smaller credibility of the audits themselves.

Another option, more close to the PINE model, would be that the granting authority selects the auditors which will perform the audits on its behalf. In this way they will answer directly to the regional authority and not to the audited company.

The two step PINE energy audit schemes in such case is definitely an efficient methodology to perform in deep audits only in those companies that have the higher potential.

6 The PINE network for the Promotion of Energy Efficiency

As the analysis of the business models progressed, deep differences emerged in the market potential of each of the seven countries involved in the project. At the same time the different typology of PINE partners including consulting companies, energy agencies, university and research institutions with different cultures, implied different attitudes towards the exploitation strategies due also to legal constrains commercial capacity.

On one hand the analysis of the companies feedback of each country suggested that different business models would have been appropriate since the attitude to risk, availability to pay for an energy audit and the related price vary considerably. On the other hand private partners were more prone to commercial plans, while public bodies are closer to the public schemes or at least at fixed price services.

All partners acknowledged consequently the impossibility of pursuing a common business model but at the same time declared their intention on keeping working in the field of industrial energy efficiency and improving the PINE tools. This will be achieved by sharing knowledge and experience and possibly build up new opportunities of common cooperation.

With an extremely cooperative attitude from all partners, the project coordinator drafted a Memorandum of Understanding based on the common interest of all partners.

The PINE network for the Promotion of Energy Efficiency aims at the promotion of energy efficiency in companies by means of energy audits, promotion of innovative technologies, improvement of company management, training and any other service that could contribute to increase the capacity of companies of managing energy in a more effective way.

The Network also aims at further improving the methodology and the tools developed in the frame of the PINE project by sharing know how and experiences among the parties and the implementation of new joint projects aimed at a constant improvement of the PINE methodologies and kit.

In particular the Network will work on developing special releases of the PINE tools focused on specific industrial sectors.

The Network will also further disseminate PINE methodology and tools in further regions and countries by means of training and admission of new members to the network. Shortly after the creation of the Network two energy agencies from countries not directly involved in the project (Croatia and Slovenia) have already joined the Network: the Regional Energy Agency of the Kvarner – REAK (www.reakvarner.hr) (Croatia) and the Goriška local energy agency – GOLEA (http://www.golea.si) (Slovenia).

In particular the following activities will be performed:

a. PINE methodology and tools

All partners are entitled of performing energy audits by applying the PINE methodology and tools and displaying the PINE logo. The audits can be performed by each party both on a commercial basis or with the support of public funds.

The members will share the knowledge on the methodology and tools accrued by the implementation of the audits.

b. Training

Training courses and similar activities related to energy efficiency in industrial companies or on the use of PINE methodology and tools will be also organized both in the original PINE countries than in other countries inside and outside Europe.

Considering the interest of many SMEs to perform energy audits themselves this could be also a potential market.

In the same way training auditors of other organization active in countries that are not already involved in the network could be a further business opportunity for the members of the network. In larger countries this could be done also in other regions since the cost for an implementing an energy audits is affected also by the distance, so having a commercial agreement with organizations operating in different and regions could be a profitable plan.

c. Development activities

The members of the Network are interested and committed in implementing further joint projects for further improvement of the methodology and tools.

d. Quality

The Network will further improve quality assurance and monitoring systems for the activities sub a) and b) and could define further minimum quality standards for offering these services displaying the PINE logo.