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BESS
Benchmarking and Energy management Schemes in SMEs

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INTRODUCTION

This is the final report covering workpackage 5, the pilots. It contains the feedback on policy and organisational level, supplied by each of the National Pilot Coordination Groups (NPCG's), including the pilot companies, and a number of industrial associations.

In this report attention will be paid to the feedback received on the tools and the organisation of the project. The feedback is presented at an observation level. The practical side of the feedback, the consequences for the tools, is laid down as recommendations in the reports by the respective work package leaders for WP's 2 (energy management), 3 (benchmarking), 4 (E-learning) and 6 (dissemination).

The aim of this report is to summarize the experiences during work package 5, the pilots. The report can be seen as lessons learned and may contain recommendations that can be of benefit for future projects in which companies are involved for testing new developments that are not part of their core business.

The following 11 countries participated in the pilot of the BESS project: Austria, Greece, Spain, Slovenia, Lithuania, Finland, Norway, Ireland, the Netherlands, Sweden and Bulgaria.

Quotes from the feedback are presented in italics between quotation marks.

SUMMARY & RECOMMENDATIONS

This report is a review of a European pilot project, where more than 50 companies in the food and drink industry, their associations and national governments gave feedback on tools developed in the frame of Benchmarking and Energy Management Schemes in SMEs (BESS).

The evaluated tools aim to improve energy efficiency in SME companies by Benchmarking, Energy Management combined with E-learning. Use of the tools results in energy savings and potential for profit growth.

The lessons learned during this pilot project are of benefit for future projects in which companies are involved for testing tools that are not part of their core business.

Where associations were involved they were very helpful, even essential in communication with the candidate companies. Some countries organised, together with the associations, large scale meetings for the SMEs. In other countries companies has been contacted direct without involvement of associations. All methods worked well.

Personal contact remains the backbone of pilot project, which in principle relies on information supplied by computer and the Internet. Especially at the introduction of the BESS tools, personal contact between the company, consultant and the National Pilot Coordinator is essential. These contacts, and the other activities, need to be well planned and while planning, the summer and Christmas periods should be taken into account.

An important success factor for projects inside companies is commitment of the highest manager. Ideally during the first stage of the implementation, the energy representative and a higher manager should both be involved.

Lack of time and insufficient human resources seem to be the toughest barriers for implementing energy management. Most of the pilot companies see external consultancy as a necessity for implementation. The consultants assisted the companies in understanding the concepts of energy management, performed audits and helped drawing up energy conservation plans.

Benchmarking is the main trigger for companies to consider their energy management. We must exploit this knowledge in the reach out and the possible ex-BESS project by using this sequence: create awareness and interest via Benchmarking and then start implementing energy management by the Plan Do Check Act cycle via E-learning.

The pilot companies are predominantly positive about continuation of the benchmarking and E-learning scheme. Participating member states want to give the BESS project a follow up on a national or European level.

OVERALL DESCRIPTION OF THE PILOT

Recruitment

Because it took a relatively long time to develop the tools that were going to be implemented during the pilot phase, it was difficult to find the right moment to start recruiting companies. The general rule that companies should be able to start working immediately following the agreement to participate, could not always be followed. In some countries, this gap of time made it necessary to renew the interest of the pilot companies.

Initial contact and communication with companies took place in many different forms. Each country having its own preference, mainly determined by the local way of working. Involvement of associations in BESS was not necessarily obvious. Of the eleven BESS countries, four consider its involvement as useful or conditional. Sometimes the involvement of an association has been seen as contra productive for the project.

Where associations were involved they were very helpful, even essential in communication with the candidate companies. Some countries organised, together with the associations, large scale meetings for food & drink companies. Others contacted companies directly and did not directly involve associations. All methods worked well.

An important success factor for projects inside companies is commitment of the highest manager. In the Netherlands for example, it's a general rule that the national agency does not give its support to implementing energy management if the manager does not show full commitment to the project. In principle, the contacts of the national coordinators of the BESS project went via the energy coordinators of the companies. In some countries this functionary already had the proper mandate for executing energy efficiency projects. In some countries where this person within the pilot company had not the authority to do so, management disagreed with the proposals of the energy coordinator, and thus frustrated progress. So, ideally during the first stage of the implementation, both the energy representative and higher manager should be involved together.

The national pilot leaders consider that most of the pilot companies have been represented by the right contact persons: people who are sufficiently acquainted with the principles of energy management. However a small number of pilot companies forwarded too high ranked representatives with a lack of time. A few pilot companies send energy management experts without responsibility for other management standards/activities.

To be able to participate in Benchmarking was the most important motivator for companies to participate in BESS. E-learning was considered interesting too especially by pilots in new member states, as was the possibility to receive an audit. In this respect, the interest in the tool Measure Lists was generally high. We do not consider this favourable because it seems the companies may think that a measure list can be seen as a replacement of an audit, and this is definitely not the case. An audit is essential in establishing the actual energy saving potential of a company.

Apparently, for no company financial reasons were the motivation to start participating in BESS. We conclude that they fail to see the possible financial benefits of increasing energy efficiency before they actually explore the possibilities. Now energy costs are raising, energy savings immediately result in an increase of profit. This is one of the outcomes of

BESS. Data analysed from a number of pilot companies show a profit increase of 3 up to 10%. In one case the profit could be multiplied by more than a factor of 2.5 (250%) as a result of energy saving measures!

The pilot company recruitment, assistance and evaluation finally results in the following BESS pilot involvement:

<i>Country</i>	<i>Initial BESS Participating Pilot companies</i>	<i>Completed the pilot participation</i>	<i>Sectors</i>			<i>Additional</i>
			<i>dairy</i>	<i>meat</i>	<i>bakery</i>	
<i>Netherlands</i>	3	3 ¹	2	1		15 ²
<i>Norway</i>	6	3	3			82 ³
<i>Austria</i>	8	8	8			
<i>Greece</i>	2	2 ¹	2			
<i>Finland</i>	5	5		5		
<i>Slovenia</i>	6 ⁴	5	5			
<i>Lithuania</i>	5	5			5	
<i>Ireland</i>	7	3		3		
<i>Spain</i>	7	7	7			
<i>Bulgaria</i>	4	2	2			
<i>Sweden</i>	10	9	4		5	
<i>Total</i>	63	52	33	9	10	97

Although we initially started with sufficient pilot companies to meet the required number of 55 companies that should complete the project and continue working with the package, this number has been reduced to 52 companies. However this has been compensated by additional feed back (energy data and review of tools similar with BESS) from 15 Dutch SMEs (dairy, fruit & vegetable) and 82 Norwegian dairy SMEs providing their energy and production data for the BESS Benchmarking.

¹ Most of the tools including benchmarking

² SME's of the Dutch dairy (8) and fruit & vegetable (7) gave feed back on tools similar with BESS.

³ Energy and production data of 82 Norwegian dairy companies has been included in the BESS Benchmarking

⁴ One of the 6 companies is a brewery

PILOT COMPANIES' FEEDBACK ON BESS

GENERAL FEEDBACK ON BESS

The pilot companies valued the support by the national pilot coordinators as very helpful. Despite the fact that all information is available on the Internet via the E-learning system and the Benchmark tool, personal contacts between the experts and companies were essential in order to clarify navigation and to assist and overcome reluctance in the use of certain tools. Personal contacts also help in maintaining progress at the companies and giving the assurance of having backup.

Some countries made use of an external consultant. The consultant assisted the companies in understanding the concepts of energy management, performed an audit and helped drawing up the energy conservation plan. An important added value of the external consultant is the fact that he guards the progress at the company and he is regarded as independent and a 'natural help' and thus he is able to keep pace in the project.

Regular meetings work. To provide the companies with the possibility to attend to meetings, gives them support and helps them to stay motivated. Several countries have organised workshops that are aimed at the organisational aspects of energy management or at more technically oriented subjects like auditing or benchmarking. Ideal is a combination of organisational and technical aspects. It is also possible to organise technical working groups that consist of people with similar interests, for example for product heating, cooling, steam, compressed air or ventilation.

A suggestion that was made is to make a detailed resource system for questions and answers ('FAQ'). The system could be available on the website and could help each of the national pilot leaders to exchange the questions they receive and advice they give.

Time and human resource constraints

*"...personal resources in most companies
are not sufficient to spend much time on this issue...."*

Lack of time and human resources seems to be the hardest barrier to implement energy management. Most of the pilot companies see external consultancy as a necessity for implementation. However we wonder whether this consultancy will be purchased by the company itself, since energy management has not been given top priority in SMEs. It would be worthwhile to consider the possibility of free consultancy when companies are willing to implement energy management.

Another general observation is that during the summer period and around Christmas companies are understaffed, and it is realistic not to expect any progress in any project. It is recommended to put important project-deadlines in spring and autumn, and to consider these holiday periods explicitly in project planning.

FEEDBACK ON TOOLS

EMIM

Generally the EMIM was found average with a number of very helpful aspects. There is no consensus between the countries on the appraisal of the aspects like clearness, steps and sequence of steps and the results in the companies. Where companies find it very helpful, others find the same aspect average or in a single case insufficient. One country commented that the EMIM was not very well fitted to small enterprises because it was too complicated.

A general observation is that as soon as an activity costs time (like acquiring the knowledge and understanding of the energy management system), or requires internal changes of the organisational structure of the company (as for example with organising an energy team), the appraisal of the respective tools is less positive.

One country reported:

“The BESS EMIM is made on a high professional level”

That can be seen as a compliment. On the other hand, it may mean the model is too polished to be of good use to SMEs. In this respect, one remark was to have it simplified for real small companies. And others suggested improving the practical use of the model by adding a roadmap (consistent with the remarks of a ‘sequential approach’) or a guide on the steps that someone has to take in order to implement an EM project. We believe the handbook provides this solution. After the pilot the EMIM has slightly improved and a simple version of it including the implementation sequence was added to the introduction text of the “getting started” module of the E-learning scheme

Feedback about the compatibility of BESS and ISO 14001 was unanimous in that BESS is consistent with the principles of ISO.

The EMIM is not seen as perfectly suitable to act as a self running scheme for companies that want to implement energy management. The reasons for this are:

- an external drive, like a consultant, is needed to act as a catalyser;
- it only works if there is commitment from top level management;
- the company has to provide the necessary resources:
 - time for the employees to do their job;
 - budget to execute energy efficiency improvement projects;
- the company has to give priority to energy efficiency;
- people must be trained.

In countries where energy management is more common, it is very customary to use external consultants to assist the companies in implementing energy management. Their impact reaches further: they can perform audits, draw up energy conservation plans, help evaluate the economical feasibility of projects, give advice on monitoring and targeting, help defining energy efficiency indicators and evaluate the yearly progress.

The tools that are valued most are: the measure lists, the format for the energy action plan, the linking lists, information on energy audits and the benchmarking. These tools are actually the most practical tools from BESS. Tools that are related to the organisation of energy management are not so highly valued, despite the fact, that the way energy management is organised within a company should secure sustainability of the energy management process: it is the backbone of continual attention for energy matters and the drive for constant energy efficiency improvement.

BENCHMARKING

Most countries appraised the benchmarking tool as very helpful. For many companies it was clearly the most important part of the project. The large majority of companies valued the Benchmarking as very useful. It motivates them to work on their energy efficiency, knowing how their energy efficiency stands against that of their competitors. Actually, sometimes it seemed they were more interested in the energy efficiency of their competitor than in that of their own.

There were some typical hitches in using the Benchmark tool. These apparent problems are very common in Benchmarking, were predicted and pose a continual challenge for benchmarkers. The first one is the use of the energy units. Each country has use of its own units, although there is an international standard! Some use MWh, some MJ or TOE, and in the Netherlands it is even common to use primary energy units. It is relatively easy to mutually convert the units, but it still is considered cumbersome do have to do so.

A more fundamental issue is the use of correction factors, or adjustment factors. These factors are necessary to take into account the differences between companies in respect of climate, product mix, utilization factor and boiler efficiency. The input of the adjustment factors is necessary to be able to compare different companies in a proper way. The use of these factors influences the results of the benchmark. Most companies found the use of the adjustment factors difficult and some failed to see the importance. They all received instructions from the national pilot coordinators.

Because it is a fundamental issue, it was a bit surprising that not all energy managers knew the concept of cooling- and heating degree days. And some, who knew, didn't know where to obtain the information. Here, the help from our national pilot leaders was essential.

Thus the subject of heating and cooling degree days, and the correction factors received a lot of attention. It is apparent that for a European wide system, these issues should be resolved.

Some companies had initial difficulties in understanding the user interface of the benchmarking tool. They also received support.

One country presented the interesting idea of developing a "technology benchmark": a tool that helps companies to assess their level of *technology* against other available (energy efficient) technologies.

Most countries will continue to use Benchmarking after completion of the BESS project. Benchmarking will also be expanded to other sectors, outside the food & drink industry, the

pilot sector of BESS. This not only makes Benchmarking a successful BESS tool, but also provides the European Industry with a powerful tool that can be used to assess and compare energy efficiency. On policy level one might be able to ascertain levels of latent energy efficiency improvement, thus helping to set realistic goals in relation to national incentives and the Kyoto Protocol.

After the pilot some additional explanatory information has been included to cope with the problems regarding the correction factors and to avoid misinterpretation of the results by third parties.

E-LEARNING

The E-Learning system of BESS consists of a website with information and tools that are needed for the implementation of energy management. The benchmarking scheme is linked to the E-Learning scheme.

Most companies requested assistance from the national BESS contact persons. Assistance was given by E-mail, telephone and by face to face contact. And it appeared that the personal contacts between the BESS contact persons and the people from the companies were, at least in some countries, essential to help keeping up momentum. One country reported:

“The company visit was seen as useful by both parties, since it seems to be the quickest way to produce results”.

The availability of time is a major issue for the majority of the pilot companies. People do not get time, or do not get enough time to deal with energy efficiency issues. Energy is considered not important. We conclude that although in politics climate change is relatively high on the agenda, and clear programs that are aimed at reaching the goals that are stated in the Kyoto Protocol exist, this feeling of urgency is absent at the level of companies. A fact that worries us because those are the origins of CO₂ emissions. BESS helps to create awareness among the people who are involved, but not directly at higher management.

A number of practical improvements was suggested by the pilot companies. These ideas will help to reduce the apparent complexity, as it was perceived by some companies, the presentation of the website and improving navigation. As people became more aware of the contents and the structure of the Energy Implementation Model itself, it automatically made navigating in the dashboard much easier.

The animated introductory to the E-learning scheme helped the companies very much in understanding the concept.

“The introductory animation is a simple and fast interactive way of understanding the operating principles of the dashboard.”

The assessment of the dashboard is interesting because there are conflicting ideas about it that do not seem logical. The dashboard is the interface by which the BESS energy management is presented. In principle and in general it is considered a nice approach to presenting energy management. One country comments it is quite complicated.

Half the number of countries suggests presenting the model in a linear way. This is contrary to one of the philosophies of implementing energy management because it was thought that companies should be able to pick out of the implementation model whatever they would need at that moment, and also would allow for activities that would take place simultaneously. The idea behind this was that actual implementation of energy management is not a *fixed* sequential approach. The BESS handbook can serve as a more linear approach to the implementation of energy management. In order to improve the E-learning scheme after the pilot experience the implementation sequence was added to the introduction text of the “getting started” module.

For first time users there is too much information. It is suggested that this could be overcome by introducing the information in 2 or more different levels that the companies could choose, based on their experience and the results from their pre-self assessment checklists. At the end of the pilot the dashboard page was extended with a separate choice menu which enables to pick out directly a certain tool from the tools list. Future experiments should give an answer whether offering more information levels will be an improvement or the contrary. After the pilot the consortium has decided to improve the dashboard slightly and introduce an additional (introduction) page which makes companies visiting the project website more curious to go to the E-learning scheme.

The need for written information i.c. a handbook varies from country to country. Approximately half of the number of companies would like to have the information of the website also on paper. Either as a replacement of the website or as an accompaniment to the website. This leads us to the conclusion that, at least for number employees of the pilot companies, the use of a computer is not the preferred way of working. This notion should be considered when developing other computer based learning tools. For really interactive tools, the computer is essential. For all other types of transfer of information, it seems paper is preferred.

About E-learning in general it is obvious from the feedback, that the smallest details in the design of the website can play an important role. The ‘getting started’ link is an example thereof. It was visible, but it was, despite the correct text, not obvious that this was the place to start.

The consortium area is useful. It could be improved when it would be possible to sort files by alphabet, date or subject.

At least 29 pilot companies have implemented the EMIM using the E-learning scheme and/or have set up an energy (conservation) action plan.

OTHER TOOLS

The feedback from the pilot companies contained an evaluation of BESS tools. The tools could be rated very helpful, average and insufficient. The table below gives an overview of the feedback on the tools. The developers of the tools will use the feedback of the NPCGs and the companies to give the tools an update.

<i>Tool</i>	<i>General comment and appraisal</i>
Business Case	The business case was considered averagely/good helpful. The business case was one of the first tools the companies used. At that state, the companies found it difficult to provide data concerning the expected savings and the expected investments. Some companies were reluctant to provide the data that they considered confidential. Some mentioned that it would be advantageous when analysis of energy savings potentials would be facilitated more.
Pre Self Assessment	The pre-self assessment was considered between averagely helpful and very helpful. The countries were not specific in their appraisal. We speculate that the companies do not fully appreciate the use of the outcome of the self assessment (i.e. what can be done in order to improve the organisation of energy management), or do not yet understand the jargon of energy management.
Measure lists	The measure lists were very helpful to the companies. The lists were found interesting, detailed and were found to highlight the most promising and efficient ways for energy savings. We fear, though, that many companies regard a measure list as a full substitute for an audit. A list can not replace an audit. An audit takes the specific conditions of the production process into account, whereas a measure list, from its nature, can only be general.
Declaration of the management	The declaration of the management gives the manager of a company the opportunity to show commitment to the initial stages of implementing energy management. The declaration of the management is of a general nature and can be considered as the predecessor of the energy policy declaration that is more specific in goals and means. Most countries valued the declaration as average, some as very helpful.
Audit	The audit was one of the favourite tools, although it was not an elaborate tool and it was not intended to be a major tool for BESS. More detailing including additional explanations would be appreciated as a possible improvement.
Energy Conservation Plan	Same as for audit: it was a favourite tool, although not initially intended to be part of the scope of BESS.
Specification and Linking List	Especially the linking list was very useful because it helped the people from the companies to see that the energy management system can be combined with existing management systems like the quality system, HACCP or EMAS.
Energy Team	The tool for energy coordinator or energy team was generally scored average. This means it fulfils its purpose. We conclude that the score was not 'very helpful', despite the tool itself is good, but because company internal affairs cause problems in organising an energy team: lack of suitable employees, lack of time. One comment was that personal resources in most companies are not sufficient to spend much time on this issue.
Energy Policy Declaration	The energy policy declaration is a statement by the (general) manager in which he states the quantitative targets and the means by which to reach them. It is usually drawn up after a thorough audit. It is not clear why the appraisals from the countries are so different from each other. We suspect that it is not common that in every country the (general) manager is involved in energy matters, and that it was therefore difficult to apply the tool. This conclusion requires verifying.

FEEDBACK BY ASSOCIATIONS AND AUTHORITIES

Involvement of associations in BESS is necessarily obvious. Only 4 of the 11 BESS countries consider its involvement as useful. Sometimes the involvement of an association has been seen as contra productive for the project. National energy agencies are always coordinating and facilitating in BESS. Therefore they were assigned by the national governments.

All participating NPCGs, who tested and evaluated the BESS instruments consider them sound and directly applicable

EMIM

Associations and authorities consider Energy Management Model as a useful harmonized European model for energy management. It should be part of regular company activities like quality management. It is an easy way to save energy use and costs. However, some judge this model as too complicated and should be less formal.

Benchmarking

Associations and authorities consider benchmarking as an important tool in the work of creating awareness of energy use and energy saving. Benchmarking enables to show the possibilities. The industry can see what other comparable companies have achieved and get a picture of what they themselves can do. The message of energy efficiency can easier be spread when there are good examples to compare with. International benchmarking will give added value, enlarge the number of companies and hopefully make it easier to establish homogenous benchmark-classes

Governments and associations in the longer existing member states consider the cross border benchmarking scheme as most added value of BESS. The organisations in the relative new member states consider the Energy Management most valuable BESS scheme

E-learning

Associations and authorities are generally positive about E-learning. It offers easy and low budget distribution of knowledge and tools. SMEs save time, because they don't have to develop their own system, don't have to participate in training programmes and can easy fit the efforts in their daily business.

FEEDBACK BY NATIONAL PILOT COORDINATORS

The national pilot coordinators' opinion on the project organisation is positive. However too much time has been spend on tool development and tool selection. As a result the tools were not timely at the moment the pilot started working with it. They also believe a smaller number of tools would be sufficient.

The National Pilot Coordinators evaluate the current BESS approach as well operating. At the start however some assistance and extra time is needed when companies are not familiar with energy management. It also helps when companies start with a limited number of carefully selected tools. Adaptation of the approach to national energy management standards (when available) is also recommended.

The National Pilot's Coordinators consider the relationship between the Implementation model, E-Learning and energy management standard as sufficient, mainly due to the handbook. Suggestions for improvement are: to make the tools more attractive by more real interactivity and automatic stored company energy management documentation.

The National Pilot's Coordinators rank the next BESS tools as most important:

- The Benchmark
- Measure List, Energy Action Plan and Energy Audit Collection Sheet
- Energy Management Checklist, Business Case and Energy Management
- Getting Started, Energy Policy Declaration Sheet, Energy Audit Collection Sheet, Energy Management Implementation Model and the Handbook

The relationship between the national pilot coordinators and the pilot companies was not always easy. Due to low priority of energy issues, companies had to be encouraged all the time to maintain deadlines for data delivery. Personal face to face contact was often a main condition to keep the companies on board.

Mutual communication among the NPCGs is generally considered as OK.

Most national pilot coordinators believe BESS results in worthwhile synergy with the national initiatives. Especially the international benchmarking but also energy management gives added value to the national programmes.

National pilot coordinators feel that BESS could be developed into a European standard tool for Energy Management and international Benchmarking. However therefore national support and follow up is required.

FUTURE OF BESS

Most of the BESS participants like the combination benchmarking and e-learning. As we have concluded that benchmarking is the main trigger for a company to consider its energy management we should utilize this theme in the reach out and possible ex-BESS project in the sequence: create awareness and interest via Benchmarking and then start the Plan Do Check Act cycle via E-learning.

The pilot companies are predominantly positive about continuation of the benchmarking and E-learning scheme. For the E-learning some companies consider to use only parts of it or national alternatives. Also most of the participating member states want to continue the BESS project some how at a national level.

Lack of time and human resources seems to be the hardest barrier to implement energy management. Most of the pilot companies see external consultancy as a condition for implementation. However we wonder whether this consultancy will be purchased by the company itself, since energy management has not been given top priority in SMEs. It would be worthwhile to consider the possibility of free consultancy when companies are willing to commence energy management.

This report defined some 'critical success factors' for international projects in which small and medium enterprises are involved. Thanks to the experiences in BESS, future projects become more effective if due attention is given to these important aspects.