



Evaluation and validation report consolidated through all pilot projects

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1. Introduction and Method

M-Benefits - Valuing & Communicating the Multiple Benefits of Energy Efficiency project aims at creating a framework for the inclusion of the multiple benefits of energy efficiency in investment assessment and decision-making of companies and relevant stakeholders. This is achieved, through the collection of evidence-based information on the positive impact of multiple benefits to the industrial and service sectors, and through the development of a an Excel based toolbox enabling to identify, categorise and value those benefits in any type of investment project.

The development and implementation of the M-Benefit Tools were continuously accompanied and improved by the experts of the project team. After the implementation phase, the pilot companies were asked to fill in questionnaires aiming to collect feedback and ideas for improvement.

The questionnaire included a quantitative and a qualitative part to evaluate the tool box and the implementation process, as well as questions about the general decision-making process of investments.

2. Results of the evaluation of questionnaires

2.1 Sample

We received feedback from 20 pilot companies located in Switzerland (8), Germany (4), Poland (3), Greece (3) and Italy (2). The companies can be ascribed to different sectors: 6 from the food sector, 3 from the retail sector and the rest belonging to other sectors like aluminium industry, watchmaker, life sciences, technical maintenance or oil and gas companies. The companies' sizes were about 10.000 employees in average with a wide range from 12 to 100.000 employees in total. In most cases, the questionnaires were filled in by the energy manager of the company (10), a project leader (3) or technical manager (3). In the other cases, the questionnaires were filled in by the owner or executive director, an engineer or the health, safety and environmental coordinator.

The participating companies' representatives stated that they supported the project (4.21 on a scale from 1 to 5, MD=5) and most of them attended 1 – 2 project related meetings during the project cycle. All except one stated that they were requested to answer questions regarding the evaluation of the multiple (non-energy) benefits of energy efficiency measures within the pilot project in your company and that they were able to provide this information. They were all able to cite at least two energy efficiency measures that were able to reduce the energy consumption in the company.

2.2 Motivation to participate

The pilot participants were asked about their motivation to join the project as a pilot company. They had the option to give their answers as free text.

<i>What was your motivation to participate in the pilot projects?</i>	
find multiple benefits	To better understand non-energy benefits and how to implement and measure them.
	Find new energy efficient solutions adapted to our needs
	getting to know and quantify multiple use and the work of others
	Large, any solution allowing better valorisation of energy purification projects deserves to be evaluated.
	Systematic analysis of multi-benefits
	Interest in potential benefits; participation in international project
	To continue exploring non-energy benefits evaluation
learn methods, skills and improve processes	Energy-efficiency pilot project on machine and contacts & training have fully convinced us (i.e. the internal project team) of the method
	Development of new skills for evaluation of energy projects
	Better understand this method and define the interest of its use in our future projects

	Methology, new software, teamwork
	Improve the process and the decision making for the implementation of Energy Efficiency Projects in our company
	Collecting arguments for measures, broaden our horizon
	Open to learn something new, improve communication with CEOs
	Always interested in new innovative programs, get ideas and inputs to improve decision process
	To get to know new evaluation methods
special interest in certain measures	Obtaining an independent feasibility study on PV system deployment.
	Interest in PV and offer.
recommendation	Department provider determined this
	Third party recommendation

Table 1: Motivation to participate as a pilot company

Most of the pilot companies stated their general interest in an analysis and finding of the multiple benefits in their company and the wish to understand the multiple benefits concept in general. Also the chance to learn the method of assessing the multiple benefits to improve the (decision-making) processes in the company were often mentioned as a major motivation for participation. Besides these reasons, also recommendations to participate or certain interests in specific methods played a role in the decision to be part of the M-Benefits project.

2.3 Investment decisions

14 of the 20 companies answered this part of the questionnaire and all of them agreed that “a project must contribute to the realization of the company’s strategic goals”. Being asked about profitability analyses, 9 companies stated that it depends on the lifetime of the equipment, 8 that it depends on the strategic character of the project (multiple answers were possible). Two companies stated that they have not conducted such analyses before or that the decision-making process is always the same, no matter what project.

Most companies use the payback time as a financial evaluation method (8, between 3 and 8 years), 4 companies mentioned that the internal rate of return (IRR), 3 net present value (NPV) and two others return on capital (ROC) is used as an indicator. Some companies stated to use more than one method. The research on barriers for energy efficiency investments highlights that the use of the amortization time is not correct, as it is only a measure for risk but do not show the profitability of investments. In addition, the investments in EE are also coupled with the life cycle and time life of these investments with an important impact on the cash flows.

The survey participants were asked to rate the importance of energy efficiency/energy consumption in investment decisions on a scale from 1 (not important at all) to 5 (very important). In average, the importance was rated with 3,5, which is a slightly bit above a medium relevance.

7 of 14 companies stated that they already included a qualitative evaluation of multiple benefits in their analyses even before the M-Benefits project. In this

context, environmental impact, working condition (2x), health, image of the state or company (e.g. to attract employees), maintenance costs and emission reduction, emission reduction and marketing of CO₂ neutral products were mentioned. CO₂ reductions and savings in replacement investments were even financially evaluated.

2.4 Evaluation of the tool and the pilot participation

The survey included questions to rate the usefulness of the tool and the general participation in the pilots of the M-Benefits project. The participants rated each question on a scale from 1 (totally disagree) to 5 (totally agree). 16 of 20 pilots answered this part of the survey.

The tool itself obtained a good rating. The effort and time needed to use the tool was criticised and seen as a possibility to improve the tool, but the tool in general was experienced mostly by energy managers and/or facility managers as generally understandably, useful to provide a overview of multiple benefits and the strategic value and increasing the chances to adopt energy efficiency measures at their companies – noting that especially the latter was a major goal of the tool and the M-Benefits project. However, the quantification of Multiple benefits prove to be difficult in many cases requiring additional search for data and guidance in the pilots.

Evaluation of the tool		
Item	mean	median
It is not too much effort/ time needed to use the tools	2.6	2
We are going to use the Multiple Benefits toolbox in the future	3.3	4
The tools fit the characteristics of our company	3.3	3
The tools are easy to use	3.3	3
The templates are easy to fill in/ the data needed are easy available	3.1	3
I like the look and appearance of the tool	3.5	4
The tools are useful for us	3.7	4
Thanks to MB toolbox we have a better chance to adopt energy efficiency projects in our company	3.7	4
The tools facilitate the evaluation of energy efficiency measures	3.9	4
The steps in the tool are understandably related to each other	3.9	4

Table 2: Evaluation of the tool

The questionnaire also covered an evaluation of the overall process of being a pilot company of the project.

Evaluation of the pilot participation		
Item	mean	median

The pilot project improved the communication with other departments	3.1	3
The participation in the pilots was much effort	3.3	3
The experiences in the pilot projects and the results from the tools improve the quality of our future decision-making regarding energy efficiency measures	3.9	4
The experiences and results of the pilot projects increased the relevance of “Multiple Benefits” of energy efficiency measures in our decision-making processes	3.4	4
The benefit justifies the effort	3.7	4
The participation in the pilots fulfilled our expectations	4.2	4
I would recommend other companies to participate in the pilots	4.0	4
The outcomes of the tools and the experiences from the pilot phase brought us new insights in energy issues	4.0	4
The participation in the pilots was useful for us	4.2	4

Table 3: Evaluation of the pilot participation

Comparable to the evaluation of the tool, the process was experienced as rather effortful (a large effort was needed) to explain the tool, and go to the proposed steps, but it was in general evaluated as useful. The experiences brought new insights and was even able to change the decision-making process to some extent.

2.5 Most useful and valuable aspects

The participants were asked to describe in retrospect the most useful and valuable aspects of the project from their point of view. Table 4 and Table 5 give an overview of their answers.

<i>Which element of the pilot project process would you rate as most useful?</i>	
all	All of it
	The basic idea
method and tools	The methodical approach in general and the analysis of the process.
	Global company approach, multi-domain and costing of concrete gains (financial).
	The methodology, the software toolkit
	The software
	Business model canvas was an interesting and useful tool that we had not known.
	Business model canvas and mapping non-energy benefits
	Financial tool
	The use of a comprehensive approach

identify and quantify multiple benefits	Evaluation of suggested solutions
	Feasibility study
	Indication of possibilities energy efficiency quantifying.
	List of M-Benefits, automation of the final financial calculation
	Quantification of multiple uses
	Listing of multiple use and quantification
	The identification of NEB with relative knowledge sharing and critical thinking
	Looking to different topics and benefits
	evaluation of benefits, focus on relevant data

Table 4: Most useful element of the pilot process

Besides those companies that found “all of it” resp. the general idea of the pilots useful, most comments refer either to the methods and tools provided or the identification/ quantification of multiple benefits. Both aspects – the training on the tool and methods as well as the identification of the multiple benefits as outcome of the use of the tool – were main goals of the pilot process, which could obviously be achieved.

<i>In retrospect, what experience or insight from the pilots did you find most valuable?</i>	
relevance of MB	Strategic impacts of an energy-efficiency project
	Highlighting the non-energetic benefits of which I was little aware.
	As a result of M-Benefits exercise we have implemented decision-making process for energy-efficiency investments. We now treat energy-efficiency projects seriously.
method	Simple and effective methodology and tools.
	Evaluation of non-financial benefits
	Dynamic economic performance indicators – NPV and IRR
	Elaboration of the useful feasibility studies
	To get used to systematically analyse non energy impacts
	We learned how to calculate and use energy efficiency indicators
	Implementation of new skills, exchange of knowledge
	The strategic analysis (Cost / Risk / Value proposition Impacts)
new perspectives	Getting to know different perspectives on energy projects
	See daily processes from a different side using data collection
	Understanding costumers better
	Confrontation of the question without the customers support

	I think I learned a lot about the presumption of the results.
	Discussion with businesses and overall understanding of processes
	Networking and exchange with project team
	Different perspectives on energy efficiency, get to know more people working on that topic

Table 5: Most valuable experience from the pilots

When being asked about the most valuable experience of the pilot phase, some comments concerning the usefulness of the identification of multiple benefits and strategic method are repeated. In general, the answers are related to the learnings and insights of the pilot participants, e.g. becoming aware of the relevance of multiple benefits and taking new perspectives on the energy efficiency issue. From the viewpoint of the project team, seeing the participants to gain a more holistic view on the topic e.g. by not only focusing on the energy aspect of energy efficiency, is a success beyond providing companies with methods and tools.

2.6 Problems, solutions and improvements

The pilot participants were asked whether any problems occurred in implementing the method or tools and if they could be solved. The aim was to identify weaknesses of our approach and possible improvements.

8 of the 20 pilot mentioned that specific problems occurred of which 4 could directly be solved. These problems included difficulties in data gathering or obtaining certain values to calculate some multiple benefits impacts, problems indicated are the lack of time energy managers face to go through the analytical process, understanding/ handling of the tool and that the management had first to be convinced of the method. One company stated that they dislike to judge benefits in €. Another important aspect is the fact that some assumptions done for estimating multiple benefits for some investments relied on easily done assumptions. This situation made some of the companies and energy managers do not feel comfortable presenting these estimations to the board of directors. The plausibility of these estimations could also be very time intensive, reducing the interest on the approach. Technical issues with the tool concerned the use of macros or that it was only available in English language.

Suggestions for improvements were to simplify the use of the tool (e.g. automatic data transfer, increase readability) or to use another software (instead of Excel), a simplification of the method, so it needs less time to understand and to increase the influence of stakeholders. One company suggested to pre-evaluate the projects of interest to scope on projects that are suitable to be used with the tool.

3. Summary and Outlook

The objective of Work Package 6 on Implementation is to create exemplary real-life case studies and develop pilot cases in participating countries.

Overall the tool and the participation as pilot companies were rated as useful for energy managers evaluating energy efficiency investments for their companies. The methodology expands the perception and perspective on these investments with respect to strategic impacts and make EM more sensible of other internal stakeholders and interest. This is considered as an advantage to increase knowledge and expand insights as well as for the future evaluation of energy efficiency measures respectively the multiple benefits within the participating companies in the pilots from WP6 (over 20 pilots in 7 countries in Europe). Additionally, the participants highlighted the benefit of now having a systematic approach and also being aware of new perspectives of energy projects. The participants also agreed, that the benefit of the participation justified the effort, but the high effort and time to get used to the method (especially on quantification of the multiple benefits) and to use tool was the main point of criticism. Thus, suggestions for improvements especially related to simplify of the tool to decrease the time needed to make use of it and include automatized routines in future versions.