DEESME

National schemes for energy efficiency in SMEs

Deliverable 3.6

Investments analysis according to the Multiple Benefits approach

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Project information

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About

Improving energy efficiency is the most cost-effective way to reduce energy-related emissions, improve economic competitiveness and increase energy security. In the European Union, several pieces of legislation aim at guiding states and companies, regardless of their size, on ways to improve their energy efficiency: one of them is the Energy Efficiency Directive (EED), establishing a common framework of measures and requirements with the goal to remove market barriers and promote a more efficient use of energy in supply and demand. Article 8 of the Directive offers ways to achieve this, requiring Member States to promote and facilitate the implementation of energy audits and energy management systems. The audits are compulsory for large companies and recommended for small and medium enterprises (SMEs). National Authorities (NA) should encourage both to implement the resulting recommendations.

Member States have all chosen different approaches to transpose the requirements into national laws and to support companies (trainings, websites, helplines and funding support schemes). SMEs have less workforce, technical and financial capacity to perform energy audits, and therefore rarely do so: it is Key to make them aware of the multiple benefits that can derive from improving their energy efficiency and to accompany them in the energy transition, with knowledge and funding from both the public and private sectors. This is the aim of DEESME, a Horizon 2020-funded project (September 2020 – September 2023).

DEESME enables companies, especially SMEs to manage the energy transition by taking profit of multiple benefits from energy management and audit approaches and provides national authorities with guidelines and recommendations to empower their schemes under article 8, using the multiple benefits' approach.

The project identifies and shares good practices from national schemes, EU projects, and other initiatives with national authorities and supports them in developing more effective schemes dealing with energy audits and energy management systems. It assists SMEs to develop and test the technical DEESME solutions by organizing information and training initiatives, realizing energy audits, and implementing EMSs starting from international standard and adding the multiple benefits energy efficiency approach.

The project is built on a consortium of academics, research organizations, consultancies and government offices from Belgium, Bulgaria, Germany, Italy, the Netherlands and Poland, namely: IEECP (NL, coordinator), FIRE (IT), SOGESCA (IT), Fraunhofer ISI (DE), CLEOPA (DE), SEDA (BG), ECQ (BG), KAPE (PL), EEIP (BE).

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Abbreviations

EU EED - EU Energy Efficiency Directive 2012/27/EU
EMS – Energy Management System
NA - National Authorities
SME – Small and Medium-sized Enterprises
MB – Multiple Benefits (to be intended with the same meaning as NEB)
NEB - Non-Energy-Benefits (to be intended with the same meaning as MB)
WP – Work Package

List of figures

1. Introduction to the investments analysis according to the Multiple benefits approach

WP3 "Enabling companies to take profit of multiple benefits and energy management approach" includes tasks aimed at:

Raising awareness among companies of direct relations between energy efficiency and its multiple benefits

Showing to companies how to take profit of energy efficiency by assessing and managing the integrated aspects according to multiple benefits approach

Developing several working models such case histories, templates, methods, energy management procedures (see the WP3 deliverables) to allow the involvement of as many companies as possible in national schemes after the project

Obtaining at least case studies of energy audits and energy management system based on ISO 50001 and multiple benefits' approach, in each country during the project, and energy efficiency low costs and management solutions.

The project foresees that, in the framework of the energy audit conclusions and of the energy management systems (ISO 50001), energy investments shall be encouraged on the basis of the analysis based on the multiple benefits' approach.
The purpose is to enhance the uptake of the recommended energy efficiency measures as it is well known that, even if obliged to carry out an energy audit, the companies (the large ones and obliged SMEs in some schemes) don't invest accordingly as expected.
Focusing on MB together with companies, the DEESME project aims to clarify whether the wider approach of the audit and the management system are helpful to trigger some investments or low-cost solutions.

The present document illustrates the tool developed by PP SOGESCA, T3.4 leader, for the investments analysis according to the MB approach and the results of its implementation in some of the target companies in pilot countries where the energy audits were conducted in the framework of WP3, T.3.2.

This document contains in Chapter 2 a detailed description of the xls spreadsheet created to analyze energy efficiency investments including an economic evaluation of their associated MB, when feasible. Chapter 3 illustrates the xls spreadsheet completed for the specific case of the installation of an energy efficient heat pump for winter and summer conditioning in an Italian SME that produces and prints flexible, integral and rigid polyurethanes. The Appendix reports some examples of the main outcomes of the investment analysis tool application by PPs to case studies in Italy, Bulgaria, Poland and Germany.

It is expecetd that the information to complete the evaluation is gathered during the audit by energy auditors and analyzed together with the companies representatives involved in the audit activities.

2. The DEESME investments analysis tool to analyze investments according to the Multiple benefits approach – general description

The xls spreadsheet, created to analyze investments according to the MB approach, is made up of 6 sheets:

1. Cover (illustrating the analysis main results)
2. Introduction
3. Specifications
4. Economic analysis
5. MB
6. MBs quantification

The color coding supports the compilation of the "01.Introduction", 02.Specifications" and "03.Economic Analysis" sheets showing which part of the spreadsheet needs to be completed by the auditor/company, which part contains the instruction and finally also give some examples to support the implementation of the tool. Sheet 04.MBs does also contain indications for its compilation.

It is important to notice that the xls tool allows the analysis of one investment only. In case of more energy efficiency investments a new spreadsheet should be completed.

2.1. Cover

The "00.Cover" sheet consists of six main parts.

The first part is a graphic presentation and contains the tool name "Investments analysis according to the Multiple Benefit Approach" and the project logo. This first part is fixed and does not require any input.

The second part reports the name of the company and the type of energy efficiency investment analyzed as reported in sheet "01.Introduction" cells C23 and C27.

The third part contains the main results of the "03.Economic Analysis" sheets cells J196 to J201 for the results without taking into consideration the MBs associated with analyzed investments and cells J243 to J248 for the results taking into consideration the MBs.

The fourth part does report the MBs associated with the analyzed investments that have been selected in the "03. Economic Analysis" from the lists contained in rows 84 to 96 and the expected annual savings as obtained in cells H92, K92, N92, H104, K104 of the "03.Economic analysis" sheet.

The fifth part of the Cover sheet is a graphic presentation of the impact of the identified MBs on Costs, Value Proposition and Risks and does not require any input.

The sixth part of the Cover sheet reports the MBs associated with the analyzed investments that have been selected in the "04MB" sheet from the lists contained in rows 13 to 35 of columns G, H and J.

2.2. Introduction

The “01.Introduction” sheet consists of three main parts.

The Introduction sheet of the xls tool is divided in three parts and has an introductory infographic which supports in the compilation of the information. The infographic of the sheet “Introduction” is reported in Figure 1 below.

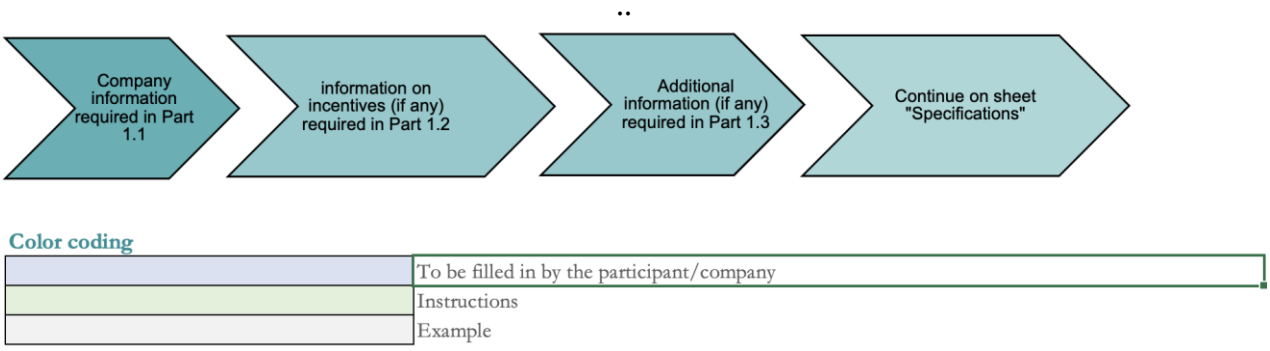


Figure 1: Investment analysis tool according to the MB approach: Introduction

Being an introductory sheet the compilation is straightforward.

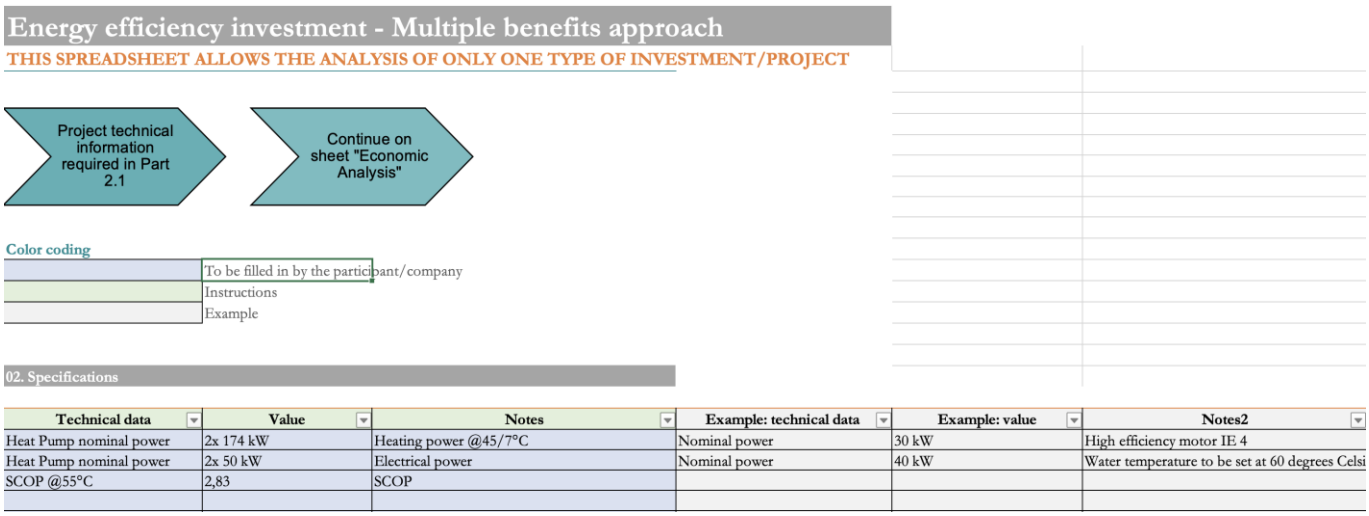
In rows 23 to 28 the main data regarding the company and the analyzed investment should be completed. Rows 30 to 35, part two, should be completed naming the incentives that might be used to support the investment, if any. The last part is at the disposal of the person completing the analysis for any notes.

2.3. Specifications

The “03.Specifications” sheet consists in one single block of rows (rows 22 to 34) that should be completed with the technical specifications of the analyzed energy efficiency investment

The infographic and the color coding supports the compilation of the “03.Specifications” sheet showing which part of the spreadsheet needs to be completed by the auditor/company, which part contains the instruction and finally also gives some examples to support the implementation of the tool in columns E to G.

The infographic and an example of the information required in the sheet “03.Specifications” are reported in Figure 2 below.



Technical data	Value	Notes	Example: technical data	Example: value	Notes2
Heat Pump nominal power	2x 174 kW	Heating power @45/7°C	Nominal power	30 kW	High efficiency motor IE 4
Heat Pump nominal power	2x 50 kW	Electrical power	Nominal power	40 kW	Water temperature to be set at 60 degrees Celsi
SCOP @55°C	2,83	SCOP			

Figure 2: Investment analysis tool according to the MB approach: Specifications

2.4. Economic Analysis

The "04.Economic Analysis" sheet is the core of the investment analysis tool as it contains all the formulas to calculate the main economic results of the energy efficiency investment both with and without taking MBs into consideration.

The infographic and the color coding supports the compilation of the information required in the sheet "Economic Analysis" are reported in Figure 3 below.

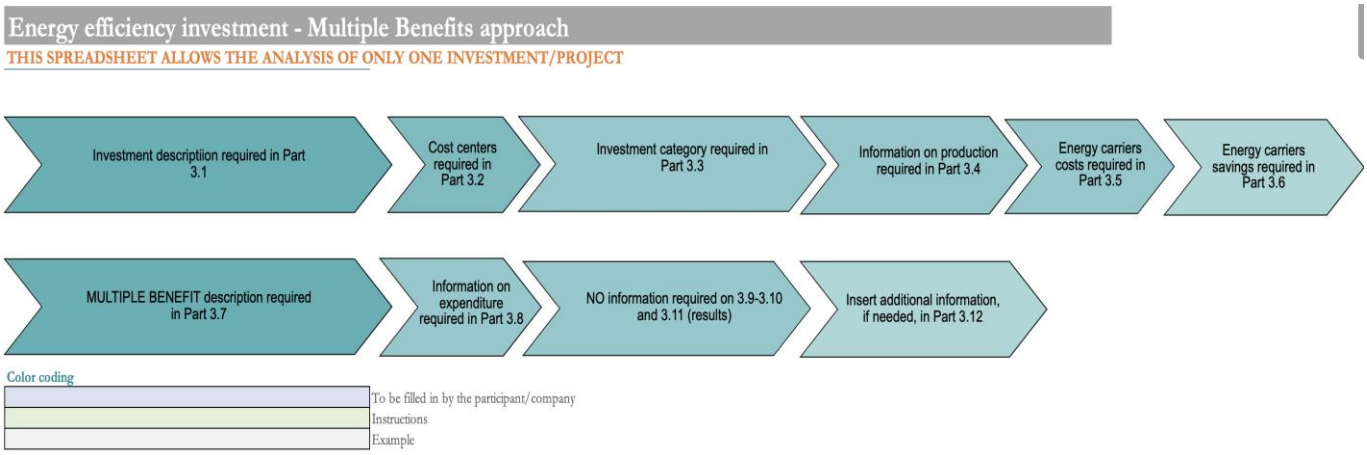


Figure 3: Investment analysis tool according to the MB approach: Economic Analysis

The "04.Economic Analysis" sheet consists of 15 parts as follows:

1. Description of the proposed investment

Rows 31 to 33 requires to insert a brief the description of the proposed intervention

2. Cost centers

In row 36 the costs centers affected by the intervention should be selected by ticking the appropriate box (cells D36: process, I36: auxiliary services, N36: general services/other)

3. Category centers

In row 39 and 40 there are the categories affected by the intervention and these should be selected by ticking the appropriate box (cells D39: hardware, D40: maintenance I39: software, I40: precedures/behaviour change, N39: energy management, N40: others)

4.Production / output

In order to "normalize" saving to the level of production (t, liters, cm, sqm,etc)/other parameter, cell C43 shall be completed by explaining what product / output has been used while values for production/other parameters before and after the investment shall be input in rows 35 (before intervention) and 46 (after intervention). Cells E45 and E46 should specify the unit while data should be reported with monthly values in rows 45 and 46 columns F to Q.

In row 39 and 40 there are the categories affected by the intervention and these should be selected by ticking the appropriate box (cells D39: hardware, D40: maintenance I39: software, I40: procedures/behavior change, N39: energy management, N40: others)

Rows 48 to 63 report a graphical representation of the input data regarding production.

5. Energy carriers and other costs and incentives

Rows 65 and 66 should be completed respectively with an indication of the current costs of energy vectors, other costs and incentives and their expected annual variation (positive or negative) in percentage. Cells H65 and H66 for electricity, K65 and K66 for gas, N65 and N66 for other energy vectors.

6. Energy carriers savings

Expected annual consumption before and after the investment for each energy vector should be indicated in cells H71 and H72 for electricity, K71 and K72 for gas and N71 and N72 for other energy carriers. Specific consumption is calculated automatically by formulas that divide the consumption by the total production data before and after intervention contained in cells N49 and N50. Formulas are visible by clicking on the cells H73 to H79 for electricity, K73 to K79 for gas and N73 to N79 for other energy vectors. The specific consumption difference is calculated in cells H75(=H73-H74), K75 (=K73-K74) and N75(=N73-N74).

7. Multiple Benefits - MBs

In this part annual expenditure before and after the investment for up to 6 benefits are reported. Specific expenditure is calculated automatically by formulas that divide the consumption by the production data before and after intervention contained in cells N49 and N50. Cells H84 and H86, K84 and K86 and N84 and N86 contain a drop down menu which allows to select the MBs from the list reported in sheet “04.MB”. The difference in cells H91 and H103, K91 and K103 and N91

and N103 is calculated by subtracting the MBs indicators before and after the energy efficiency investment. The savings in cells H92, K104, and N92 and K104 and N92 and N104 are the results of multiplying the difference by the total production after the intervention (cell N50). The saving is also calculated in percentage in cells H93, H105, K93, K105, N93, N105, by dividing the saving by the total expenditure before the intervention.

8. Expenditure

In this part a value with negative sign should be inserted for each component of the investment - each row is a specific cost (material, design, etc.) and must be inserted for the number of years it will be supposed to occur

9. Revenues

Detailed economic results are reported here taken from sections 6 and 7 above.

10. Cash Flow

Detailed economic results without MBs are shown here. Row 158 reports the total revenues from section 9 (without including MBs) for each year while row 159 reports the total cost from section 8. Yearly cash flow in row 160 is obtained by subtracting cells in row 159 from cells in row 158. Row 161 is the cumulative cashflow obtained from summing the annual cashflows in row 160. Row 162 contains the discounted cashflow which is obtained with the discount formula (1/(1+discount rate)^year). The chosen discount rate is fixed in cell E166 and can vary according to the choice of discount rate that should be made by the energy auditor together with the company. Years are in row 157. Row 162 contains the cumulative discounted cashflow which is obtained obtained from summing the annual discounted cashflows in row 161.

11. Economic analysis results

This part of the xls tool simply reports a summary of the results obtained in section 10 illustrated above. In addition the cost of saved energy is calculated in cell J201with the following formula (J196*E166/(1-(1+E166)^-J202))/(H78+K78+N78) where J196 is the investment cost, E166 is the interest rate, while H78, K78 and N78 represent the savings as calculated in section expressed in toe/year. J202 should be input as the expected life time of the investment.

12. Cash Flow

Detailed economic results WITH MBs are shown here and calculated with the same procedure illustrated in section 10 for economic results calculation without MBs.

13. Economic analysis results - summarized economic results WITH MBs are reported here

This part of the xls tool simply reports a summary of the results obtained in section 12 illustrated above, including the calculation of the cost of saved energy as illustrated on section 11 above

14. MB indicators

The following indicators should be input by the company with the support of the energy auditor before and after the investment

- Energetic cost / product
- tep/ product
- kWh / product
- Smc / product
- Comfort level

15. Additional information

This last section leaves room for comments on the following:
- Additional benefits (indicate additional qualitative/non energy benefits, if any)
- Notes
- Critical issues
- Related Annexes
- Planned monitoring plan:

2.5. Multiple Benefits (MB)

Sheet "04.MB" consists in a list of MBs/MBs associated with the energy efficiency investment (rows 13 to 35). The sheet should be selected completing columns F,G, H and I by selecting which MB is generated by the analyzed energy efficiency investments, assigning a level of importance (column F allows a selection between none, low, medium, high) and by the input Yes or No in columns F, G, and H to determine if the Multiple benefit has an impact on Costs, Value Proposition or risk.

The infographic and the color coding supports the compilation of the information required in the sheet "MBs" are reported in Figure 4 below:

Please select the MBs you find relevant for the intervention/project analysed, assigning them a rate of importance and stating if they have an impact on cost, value proposition and risk.

Consider both the MBs that have been quantified in sheet 03.Economic Analysis and those that can have a qualitative relevance for the project.

Compile columns E, F, G, H following these instructions:

IMPORTANCE: assign a level of importance to the benefit from the drop down menu (none, Low, medium, high), if selected (please refer to D3.6 for more instructions)
COSTS: choose YES if the selected benefit has an impact on reduction of company's costs
VALUE PROPOSITION: choose YES if the selected benefit has an impact on company's value proposition (see Business Model Canvas)
RISKS: choose YES if the selected benefit has an impact on reduction of company's risks

04. MBs

			QUALITATIVE EVALUATION, WHEN NO QUANTITATIVE EVALUATION IS POSSIBILE				
					Impact of the benefit on:		
DOMAIN	BENEFIT TYPE	INDICATOR	Description	Importance	Costs	Value proposition:	Risks
Value Proposition	1. Improved product/ service efficiency	Energy cost per unit of product/ service	energy cost per piece of producion				
	2. Introduction of new products/ services	N° of new 'green' products/ services			yes		
	3. Development or innovations	Total R&D expenses for 'energy efficiency' initiatives				yes	

Figure 4: Investment analysis tool according to the MB approach: MBs

2.6. MBs quantification

Sheet "05.MB Quantifications" contains in column B information that is automatically filled in taking the information from sheet "03.Economic Analysis" regarding the MBs associated with the analyzed energy efficiency investment cells H84, H96, K854, K96, N84, N96 and leaves room in columns C and D for a short and a more detailed description. An example is reported in Figure 5 below.

05. MBs Quantification

	Shot description	Description
Other	Cooling of un-cooled workplace	Using heat pump lead to the possibility of cooling workplace, now exercised with local unefficient cooling chillers and fans; 40.000 € is the price of actual energy consumption of local machines used
7. Reduced carbon footprint	Electrification	Using electricity, produced by photovoltaic mainly, instead of natural gas lead to a reduced GHG emissions; this lead to a reduced cost for offsetting emissions; 28.000 Smc * 1,93 tCO2*1000Smc * 15 /tCO2

Figure 5: Investment analysis tool according to the MB approach: MBs Quantification

3. The DEESME investments analysis tool to analyse investments according to the Multiple benefits approach- case study analysis of energy efficiency investment for an Italian SME

The paragraphs below illustrate the investment analysis tool completed for the specific case of the installation of an energy efficient heat pump for winter and summer conditioning in an Italian SME that produces and prints flexible, integral and rigid polyurethanes.

The company analyzed is an Italian SME that produces and prints flexible, integral and rigid polyurethanes, with 7 different polyurethane formulations in order to satisfy the needs of each customer. The company operates in the international market selling its products in 60 countries with a market that touches 5 continents and dedicates skills and resources to the creation of the innovation it prefers: as they stated during the interview “the one that has not yet been invented”.

After 65 years in the market, the company is now engaged in the printing of polyurethane products with over 200 employees and a production of approximately 500,000 pieces sold every year.

3.1. Investment analysis according to the MB approach tool: Case Study - cover page

As explained in chapter 2 above the Cover sheet of the xls tool shows the company details and the investment analyzed, in the specific case the installation of an energy efficient heat pump for winter and summer conditioning.

Figure 6, reported below, represents the cover of the spreadsheet completed with the results of the case study analyzed.

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National schemes for energy efficiency in SMEs

Investments analysis according to the Multiple Benefit approach

DEESME

National schemes for energy efficiency in SMEs

Company F.lli Rossetto S.r.l.

Investment Heat Pump for winter&summer conditioning

Main economic results without MBs

Investment	100.000	€
Pay Back time	6	years
IRR	0	%
NPV	20.494	€
NPV/Investment	0,20	-
Cost of Saved Energy	1.980	€/tep

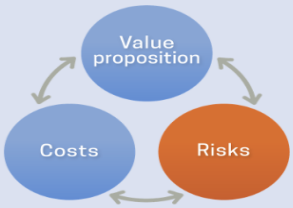
Main economic results with MBs

Investment	100.000	€
Pay Back time	2	years
IRR	1	%
NPV	334.460	€
NPV/Investment	3	-
Cost of Saved Energy	1.792	€/tep

Multiple Benefits (MBs) and expected annual saving

MB1	Other	40.000	€/year
MB2	7. Reduced carbon footpı	660	€/year
MB3	0	0	€/year
MB4	0	0	€/year
MB5	0	0	€/year
MB6	0	0	€/year

Impact of Multiple Benefits on Costs, Value Proposition and Risks



Impacts on costs	Check	Impacts on value proposition	Check	Impacts on risks	Check
1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0
2. Introduction of new products/ services	yes	2. Introduction of new products/ services	0	2. Introduction of new products/ services	0
3. Development or innovations	0	3. Development or innovations	yes	3. Development or innovations	0
4. Increased productivity	0	4. Increased productivity	0	4. Increased productivity	yes
5. Increased utilization	0	5. Increased utilization	0	5. Increased utilization	0
6. Improved maintenance	0	6. Improved maintenance	0	6. Improved maintenance	0
7. Reduced carbon footprint	0	7. Reduced carbon footprint	0	7. Reduced carbon footprint	0
8. Improved quality	0	8. Improved quality	0	8. Improved quality	0
9. Improved Safety	0	9. Improved Safety	0	9. Improved Safety	0
10. reduced energy consumption	0	10. reduced energy consumption	0	10. reduced energy consumption	0
11. Improved raw materials consumption	0	11. Improved raw materials consumption	0	11. Improved raw materials consumption	0
12. Increased recycling	0	12. Increased recycling	0	12. Increased recycling	0
13. Reduced waste	0	13. Reduced waste	0	13. Reduced waste	0
14. Increased employee satisfaction	0	14. Increased employee satisfaction	0	14. Increased employee satisfaction	0
15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0
16. Acquisition of new customers	0	16. Acquisition of new customers	0	16. Acquisition of new customers	0
17. Increased customer satisfaction	0	17. Increased customer satisfaction	0	17. Increased customer satisfaction	0
18. Increased customer loyalty	0	18. Increased customer loyalty	0	18. Increased customer loyalty	0
19. Improved supply chain relationships	0	19. Improved supply chain relationships	0	19. Improved supply chain relationships	0
20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0
21. Reduced litigation risks	0	21. Reduced litigation risks	0	21. Reduced litigation risks	0
22. Increased regulatory compliance	0	22. Increased regulatory compliance	0	22. Increased regulatory compliance	0

Figure 6: Investment analysis tool according to the MB approach: Case Study - Cover

3.2. Investment analysis according to the MB approach tool: Case Study - Introduction

The Introduction sheet part requires the compilation of the company contact details and the details of the person completing the xls tool (auditor), the title of the company representative supporting the completion of the information, the type of investment analyzed and the date of analysis tool compilation. Moreover, the energy efficiency investments incentives details (if available) and the last one leaves room for additional notes if necessary. Figure 7 below reports the completed Case Study Introduction sheet.

Company and investment information	
Company NAME	F.lli Rossetto S.r.l.
Company Address	Via Castellana 64/A - 35010 Trebaseleghe (PD)
Name of the person filling the questionnaire	Roberto Galvanelli
Title of the person filling the questionnaire	Eng. - EGE
Type of energy efficiency investment	Heat Pump for winter&summer conditioning
Date of investment analysis tool compilation	18/02/23

Incentives (if applicable)	
Type	**Amount (in %)**
"Conto Termico"	35% - 35.000 €

Notes

Figure 7: Investment analysis tool according to the MB approach: Case Study - Introduction

3.3. Investment analysis according to the MB approach tool: Case Study - Specifications

The Specifications sheet of the xls tool requires the implementation of the technical data of the energy efficiency investments analyzed, for example the nominal power in the case of the investment in an energy efficient heat pump. Figure 8 below reports the specifications for the Case Study.

Technical data	Value	Notes
Heat Pump nominal power	2x 174 kW	Heating power @45/7°C
Heat Pump nominal power	2x 50 kW	Electrical power
SCOP @55°C	2,83	SCOP

Figure 8: Investment analysis tool according to the MB approach: Case Study - Specifications

3.1. Investment analysis according to the MB approach tool: Case Study – Economic Analysis

The Economic Analysis sheet of the xls tool represents the core of the tool and requires the implementation of data regarding the company production, energy consumption, costs centers involved, investment costs, energy consumption before and after the investment, incentives available (if any), etc...

The sheet is divided in 15 parts, main results of the Case Study are reported in the figures below that report screenshots of the completed case study elaborated for the Italian SME.

As the screenshots were too large to fit one page only part of the results is reported in the figures below. More detailed information can be found in the xls tool.

3.1 **Description of the proposed investment (insert a brief description for the intervention)**

Heat pump for winter conditioning

3.2 **Cost centers (indicate cost centers interested by the intervention)**

☐	Process	☑	Auxiliary services

3.3 **Category (indicate category interested by the intervention)**

☑	Hardware	☐	Software
☐	Maintenance	☐	Procedures / behaviour change

3.4 **Normalization parameters (in order to "normalize" saving to the level of production (t, liters, cm, sqm, etc)/other parameter, insert values for production/other parameters before and after the investmer**

Heat Degrees (HT)

Month	Unit (kg,sqm,l,etc)	Jan	Feb	March	April	May	June
Before	HT	529	384	356	270	136	5
After	HT	529	384	356	270	136	5

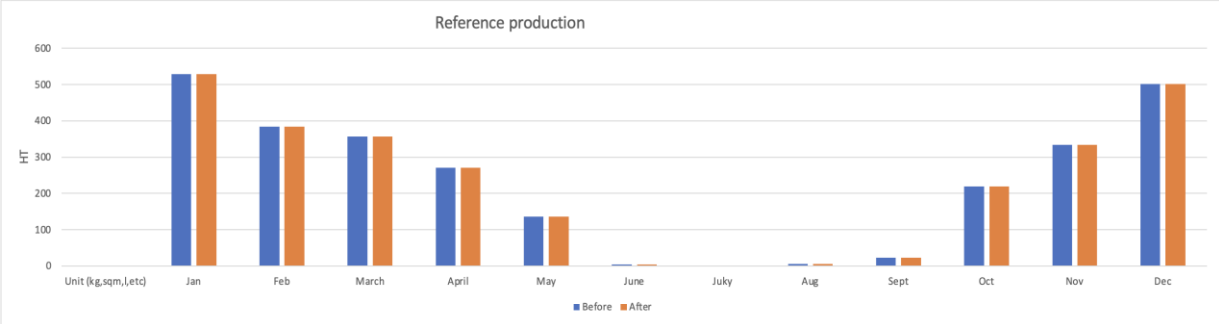


Figure 9: Investment analysis tool according to the MB approach: Economic Analysis part 1-4

DEESME

National schemes for energy efficiency in SMEs

3.5 **Energy carriers and other costs and incentives (indicate current costs of energy vectors, other costs and incentives and their expected annual variation (positive or negative) in percentage)**

Current costs	Electr.	0,35	€/kWh	Gas	1,45	€/Sm3
Annual variation (expected % variation in enery carriers costs)		+3,00%	%		+3,00%	%

3.6 **Energy carriers savings (indicate expected annual consumption before and after the investment for each energy vector - specific consumption is calculated automatically)**

Energy carrier	Electric Energy		Natural gas	
Annual consumption before	0	kWh	22.800	Sm3
Annual consumption after (estimate)	65.000	kWh	0	Sm3
Specific consumption before	0,00	kWh/HT	8,25	Sm3/HT
Specific consumption after	23,52	kWh/HT	0,00	Sm3/HT
Specific consumption Difference	-23,52	kWh/HT	8,25	Sm3/HT
Saving	-65.000	kWh	22.800	Sm3/year
Saving	#DIV/0!	%	100,0%	%
Saving	-12,2	toe/year	18,7	toe/year
Saving	-22.750	€/year	33.060	€/year

3.7 **Multiple Benefits - MB (choose "non-energetic" benefit from the drop-down menu - add a brief description in the next row, if needed)**
Indicate annual expenditure before and after the investment for up to 6 benefits - specific expenditure is calculated automatically

Non energy benefit > select	MB1	**Other**		MB2	**7. Reduced carbon footprint**	
description		Cooling of un-cooled workplace			Electrification	
Annual expenditure before (quantification of MB)		40.000	€		660	€
Annual expenditure after (quantification of MB)		0	€		0	€
MB indicator before		14	€/HT		0	€/HT
MB indicator after		0	€/HT		0	€/HT
MB indicator difference		14	€/HT		0	€/HT
Saving		40.000	€		660	€
Saving		100,0%	%		100,0%	%
Multiple benefit > select	MB4			MB5		
description		0			0	
Annual expenditure before (quantification of MB)			€			€
Annual expenditure after (quantification of MB)			€			€
Specific expenditure before		0	€/HT		0	€/HT
Specific expenditure after		0	€/HT		0	€/HT
Specific expenditure Difference		0	€/HT		0	€/HT
		0	€		0	€

Figure 10: Investment analysis tool according to the MB approach: Economic Analysis part 5-7

3.8 **EXPENDITURE - insert value with negative sign - insert composition of the investment - each row is a specific cost (material, design, etc.) and must be inserted for the number of years it will be supposed to occur**

	YEAR								
Voce	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
2x heat pumps	-€ 60.000								
Distribution	-€ 8.000								
Hydraulic installation	-€ 10.000								
Trasport	-€ 5.000								
Waste disposal	-€ 2.000								
Design	-€ 10.000								
Extra costs	-€ 5.000								
Total	-€ 100.000	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€

Figure 11: Investment analysis tool according to the MB approach: Economic Analysis part 8

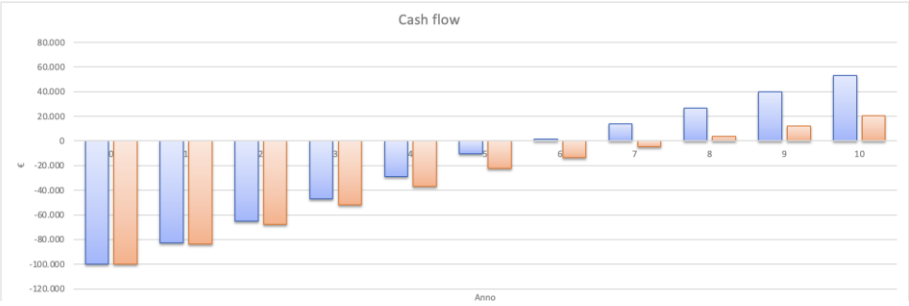
3.9 **Revenues - detailed economic resuts are reported here**

		YEAR								
	Voce	0	1	2	3	4	5	6	7	8
	Electric Energy saving		-€ 22.750	-€ 23.433	-€ 24.135	-€ 24.860	-€ 25.605	-€ 26.373	-€ 27.165	-€
	Natural gas saving		€ 33.060	€ 34.052	€ 35.073	€ 36.126	€ 37.209	€ 38.326	€ 39.475	€
	Other carrier saving		€ -	€ -	€ -	€ -	€ -	€ -	€ -	€
MB1	Cooling of un-cooled workplace		€ 40.000	€ 40.000	€ 40.000	€ 40.000	€ 40.000	€ 40.000	€ 40.000	€
MB2	Electrification		€ 660	€ 660	€ 660	€ 660	€ 660	€ 660	€ 660	€
MB3	0		€ -	€ -	€ -	€ -	€ -	€ -	€ -	€
MB4	0		€ -	€ -	€ -	€ -	€ -	€ -	€ -	€
MB5	0		€ -	€ -	€ -	€ -	€ -	€ -	€ -	€
MB6	0		€ -	€ -	€ -	€ -	€ -	€ -	€ -	€
er revenue 1	"Conto Termico"		€ 7.000	€ 7.000	€ 7.000	€ 7.000	€ 7.000			
er revenue 2										
er revenue 3										
	Total	€ -	€ 57.970	€ 58.279	€ 58.598	€ 58.926	€ 59.264	€ 52.612	€ 52.971	€

3.10 **Cash Flow - detailed economic results WITHOUT MBs are shown here**

	Year								
Voce	0	1	2	3	4	5	6	7	8
Total revenues	€ -	€ 17.310	€ 17.619	€ 17.938	€ 18.266	€ 18.604	€ 11.952	€ 12.311	€
Total expenditure	-€ 100.000	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€
Cash flow	-€ 100.000	€ 17.310	€ 17.619	€ 17.938	€ 18.266	€ 18.604	€ 11.952	€ 12.311	€
Cumulative cash flow	-€ 100.000	-€ 82.690	-€ 65.071	-€ 47.133	-€ 28.867	-€ 10.263	€ 1.689	€ 14.000	€
Discounted cash flow	-€ 100.000	€ 16.486	€ 15.981	€ 15.495	€ 15.027	€ 14.577	€ 8.919	€ 8.749	€
Discounted cumulative cash flow	-€ 100.000	-€ 83.514	-€ 67.533	-€ 52.038	-€ 37.010	-€ 22.433	-€ 13.515	-€ 4.766	€

Interest rate	5,00%		
Investment cost	€ 100.000,00	**IRR**	9%
Payback Period	5,9	**NPV**	€ 20.494,05
Discounted Payback Period	8,3	**NPV/I**	0,205



3.11 **Economic analysis results - summarized economic results WITHOUT MBs are reported here**

Investment	100.000	€
Pay Back time	5,86	years
IRR	9%	%
NPV	20.494	€
NPV/Investment	0,205	-
Cost of Saved Energy	1.980	€/tep

3.12 **Cash Flow - detailed economic results WITH MBs are shown here**

	Year								
Voce	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Total revenues	€ -	€ 57.970	€ 58.279	€ 58.598	€ 58.926	€ 59.264	€ 52.612	€ 52.971	€
Total expenditure	-€ 100.000	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€
Cash flow	-€ 100.000	€ 57.970	€ 58.279	€ 58.598	€ 58.926	€ 59.264	€ 52.612	€ 52.971	€
Cumulative cash flow	-€ 100.000	-€ 42.030	€ 16.249	€ 74.847	€ 133.773	€ 193.037	€ 245.650	€ 298.620	€
Discounted cash flow	-€ 100.000	€ 55.210	€ 52.861	€ 50.619	€ 48.479	€ 46.435	€ 39.260	€ 37.645	€
Discounted cumulative cash flow	-€ 100.000	-€ 44.790	€ 8.071	€ 58.690	€ 107.168	€ 153.603	€ 192.863	€ 230.509	€

Interest rate	3,00%		
Investment cost	€ 100.000,00	**IRR**	57%
Payback Period	1,7	**NPV**	€ 334.460,26
Discounted Payback Period	2,3	**NPV/I**	3,345

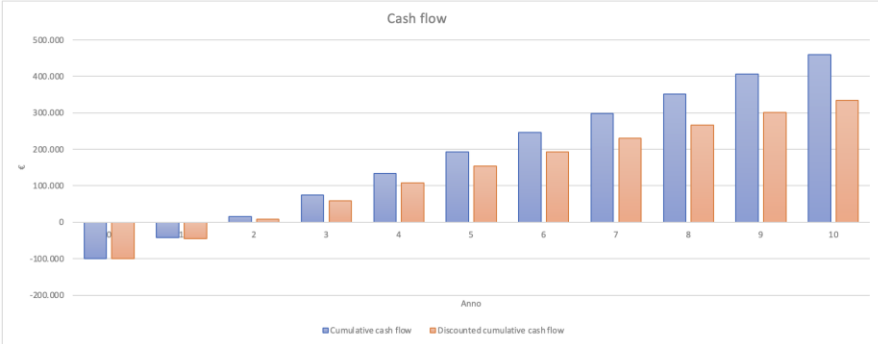


Figure 12: Investment analysis tool according to the MB approach: Economic Analysis part 10-12

3.13 **Economic analysis results - summarized economic results WITH MBs are reported here**

Investment	100.000	€
Pay Back time	1,72	years
IRR	57%	%
NPV	334.460	€
NPV/Investment	3,345	-
Cost of Saved Energy	1.792	€/tep
Investment life	10	Years

3.14 **MB indicators**

Benefit	Indicator	Indicator before		Indicator after		Delta		
Improved product/service efficiency	Energetic cost / product	1,17	€/pc	1,156	€/pc	-0,014	€/pc	-1,2%
Reduced carbon footprint	tep/ product	1,529	tep/1.000pcs	1,516	tep/1.000pcs	-0,013	tep/1.000pcs	-0,9%
Reduced energy consumption	kWh / product	5,104	kWh/pc	5,117	kWh/pc	0,013	kWh/pc	0,3%
Reduced energy consumption	Smc / product	0,651	Smc/pc	0,646	Smc/pc	-0,005	Smc/pc	-0,8%
Increased employee satisfaction	Confort level	6	1 to 10	8	1 to 10	2	1 to 10	33,3%

3.15 **Additional information**

Additional benefits (indicate additional qualitative/non energy benefits, if any)

Notes

Critical issues

Related Annexes

Planned monitoring plan

Figure 13: Investment analysis tool according to the MB approach: Economic Analysis part 13-15

3.2. Investment analysis according to the MB approach tool: Case Study - Multiple Benefits

An example of the information required in the sheet "MB" is reported in Figure 14 below which is part of the whole table which can be found in the xls spreadsheet.

			QUALITATIVE EVALUATION, WHEN NO QUANTITATIVE EVALUATION IS POSSIBILE				
					Impact of the benefit on:		
DOMAIN	BENEFIT TYPE	INDICATOR	Description	Importance	Costs	Value proposition:	Risks
Value Proposition	1. Improved product/ service efficiency	Energy cost per unit of product/ service	energy cost per piece of producion				
	2. Introduction of new products/ services	Nº of new 'green' products/ services			yes		
	3. Development or innovations	Total R&D expenses for 'energy efficiency' initiatives				yes	
Activities	4. Increased productivity	Value of output items/ Value of input items					yes
	5. Increased utilization	Capacity utilization					
	6. Improved maintenance	Maintenance Unit Cost					
	7. Reduced carbon footprint	Total GHG emissions per year					
	8. Improved quality	Right First Time					

Figure 14: Investment analysis tool according to the MB approach: MB

3.3. Investment analysis according to the MB approach tool: Case Study - MBs Quantification

The MB quantification sheet contains a simple description of the Multiple Benefits of the analyzed investments. The sheet reports the MB analyzed in the sheet "Economic Analysis" and requires to report a brief description. An example is reported in Figure 15 below.

	Shot description	Description
7. Reduced carbon footprint	Cooling of un-cooled workplace	Using heat pump lead to the possibility of cooling workplace, now exercised with local unefficient cooling chillers and fans; 40.000 € is the price of actual energy consumption of local machines used
17. Increased customer satisfaction	Electrification	Using electricity, produced by photovoltaic mainly, instead of natural gas lead to a reduced GHG emissions; this lead to a reduced cost for offsetting emissions; 28.000 Smc * 1,93 tCO2*1000Smc * 15 /tCO2
0		
0		
0		
0		

Figure 15: Investment analysis tool according to the MB approach: MBs Quantification

4. Conclusions

The calculation tool developed in the framework of DEESME WP3, and illustrated in this document allows to analyze Energy efficiency investments including the associated Multiple Benefits (MBs). This is an important tool as normally MBs are not included in investment evaluations, due to a general lack of data, methodology and skills.

The tool, which consists in an xls file containing a cover sheet and 5 input sheets, allows to give a good feedback to companies on the economic return of their energy efficiency investments and the associated MBs.

It is important to underline that the calculation tool allows to give a quantitative value to some MBs. Other are only described in a qualitative way.

One of the main purposes of this tool is to increase the uptake of energy efficiency investment.

The Multiple Benefits approach calculation tool implementation is well aligned with the needs of working with indicators and benchmarks.

It is important to underline that some of the MBs are relevant for other company purposes like the calculation of the carbon footprint or other information needed to complete economic social and environmental sustainability assessments that are increasingly requested to comply with new EU regulations.

Annex 1: Investments analysis according to the MB approach: examples in pilot countries

The figures below report the cover page of the xls tool developed for energy efficiency investments analysis according to the MB approach showing a few examples of the results of the investments analysis carried out by PPs in the 4 pilot countries Italy, Bulgaria, Germany, and Poland. (The information for Poland will be updated.)

Investment analysis examples according to the MB approach tool – Italy

Investments analysis according to the Multiple Benefit approach

Company F.lli Rossetto S.r.l.
Investment Heat Pump for winter&summer conditioning

Main economic results without MBs

Investment	100.000	€
Pay Back time	6	years
IRR	0	%
NPV	20.494	€
NPV/Investment	0,20	-
Cost of Saved Energy	1.980	€/tep

Main economic results with MBs

Investment	100.000	€
Pay Back time	2	years
IRR	1	%
NPV	334.460	€
NPV/Investment	3	-
Cost of Saved Energy	1.792	€/tep

Multiple Benefits (MBs) and expected annual saving

MB1	Other	40.000	€/year
MB2	7. Reduced carbon footpr	660	€/year
MB3	0	0	€/year
MB4	0	0	€/year
MB5	0	0	€/year
MB6	0	0	€/year

Impact of Multiple Benefits on Costs, Value Proposition and Risks

Impacts on costs	Check	Impacts on value proposition	Check	Impacts on risks	Check
1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0
2. Introduction of new products/ services	yes	2. Introduction of new products/ services	0	2. Introduction of new products/ services	0
3. Development or innovations	0	3. Development or innovations	yes	3. Development or innovations	0
4. Increased productivity	0	4. Increased productivity	0	4. Increased productivity	yes
5. Increased utilization	0	5. Increased utilization	0	5. Increased utilization	0
6. Improved maintenance	0	6. Improved maintenance	0	6. Improved maintenance	0
7. Reduced carbon footprint	0	7. Reduced carbon footprint	0	7. Reduced carbon footprint	0
8. Improved quality	0	8. Improved quality	0	8. Improved quality	0
9. Improved Safety	0	9. Improved Safety	0	9. Improved Safety	0
10. reduced energy consumption	0	10. reduced energy consumption	0	10. reduced energy consumption	0
11. Improved raw materials consumption	0	11. Improved raw materials consumption	0	11. Improved raw materials consumption	0
12. Increased recycling	0	12. Increased recycling	0	12. Increased recycling	0
13. Reduced waste	0	13. Reduced waste	0	13. Reduced waste	0
14. Increased employee satisfaction	0	14. Increased employee satisfaction	0	14. Increased employee satisfaction	0
15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0
16. Acquisition of new customers	0	16. Acquisition of new customers	0	16. Acquisition of new customers	0
17. Increased customer satisfaction	0	17. Increased customer satisfaction	0	17. Increased customer satisfaction	0
18. Increased customer loyalty	0	18. Increased customer loyalty	0	18. Increased customer loyalty	0
19. Improved supply chain relationships	0	19. Improved supply chain relationships	0	19. Improved supply chain relationships	0
20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0
21. Reduced litigation risks	0	21. Reduced litigation risks	0	21. Reduced litigation risks	0
22. Increased regulatory compliance	0	22. Increased regulatory compliance	0	22. Increased regulatory compliance	0

DEESME
National schemes for energy efficiency in SMEs

Investments analysis according to the Multiple Benefit approach

DEESME
National schemes for energy efficiency in SMEs

Company Conceria La Veneta
Investment Thermal plant revamping

Main economic results without MBs

Investment	510.000	€
Pay Back time	5	years
IRR	0	%
NPV	440.224	€
NPV/Investment	0,86	-
Cost of Saved Energy	277	€/tep

Main economic results with MBs

Investment	510.000	€
Pay Back time	2	years
IRR	0	%
NPV	1.480.908	€
NPV/Investment	3	-
Cost of Saved Energy	277	€/tep

Multiple Benefits (MBs) and expected annual saving

MB1	6. Improved maintenanc	15.000	€/year
MB2	11. Improved raw materia	6.000	€/year
MB3	11. Improved raw materia	1.000	€/year
MB4	7. Reduced carbon footp	100.000	€/year
MB5	0	0	€/year
MB6	0	0	€/year

Impact of Multiple Benefits on Costs, Value Proposition and Risks

Impacts on costs	Check	Impacts on value proposition	Check	Impacts on risks	Check
1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0
2. Introduction of new products/ services	0	2. Introduction of new products/ services	0	2. Introduction of new products/ services	0
3. Development or innovations	0	3. Development or innovations	0	3. Development or innovations	0
4. Increased productivity	0	4. Increased productivity	0	4. Increased productivity	0
5. Increased utilization	0	5. Increased utilization	0	5. Increased utilization	0
6. Improved maintenance	0	6. Improved maintenance	0	6. Improved maintenance	0
7. Reduced carbon footprint	0	7. Reduced carbon footprint	0	7. Reduced carbon footprint	0
8. Improved quality	0	8. Improved quality	0	8. Improved quality	0
9. Improved Safety	0	9. Improved Safety	0	9. Improved Safety	0
10. reduced energy consumption	0	10. reduced energy consumption	0	10. reduced energy consumption	0
11. Improved raw materials consumption	0	11. Improved raw materials consumption	0	11. Improved raw materials consumption	0
12. Increased recycling	0	12. Increased recycling	0	12. Increased recycling	0
13. Reduced waste	0	13. Reduced waste	0	13. Reduced waste	0
14. Increased employee satisfaction	0	14. Increased employee satisfaction	0	14. Increased employee satisfaction	0
15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0
16. Acquisition of new customers	0	16. Acquisition of new customers	0	16. Acquisition of new customers	0
17. Increased customer satisfaction	0	17. Increased customer satisfaction	0	17. Increased customer satisfaction	0
18. Increased customer loyalty	0	18. Increased customer loyalty	0	18. Increased customer loyalty	0
19. Improved supply chain relationships	0	19. Improved supply chain relationships	0	19. Improved supply chain relationships	0
20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0
21. Reduced litigation risks	0	21. Reduced litigation risks	0	21. Reduced litigation risks	0
22. Increased regulatory compliance	0	22. Increased regulatory compliance	0	22. Increased regulatory compliance	0

Investment analysis examples according to the MB approach tool - Bulgaria

DEESME

National schemes for energy efficiency in SMEs

Investments analysis according to the Multiple Benefit approach

DEESME

National schemes for energy efficiency in SMEs

Company A Ltd.

Investment Replacement of an old system of 3 old cutting machines with a new cutting line from a new high-tech plating system with a robot for cutting

Main economic results without MBs

Investment	205.011	€
Pay Back time	> 10	years
IRR	0	%
NPV	-144.571	€
NPV/Investment	-0,71	-
Cost of Saved Energy	6.193	€/tep

Main economic results with MBs

Investment	205.011	€
Pay Back time	1	years
IRR	1	%
NPV	1.256.085	€
NPV/Investment	6	-
Cost of Saved Energy	6.193	€/tep

Multile Benefits (MBs) and expected annual saving

NEB1	6. Improved maintenan	164.200	€/year
NEB2	4. Increased productivit	0	€/year
NEB3	0	0	€/year
NEB4	0	0	€/year
NEB5	0	0	€/year
NEB6	0	0	€/year

Impact of Multiple Benefits on Costs, Value Proposition and Risks

Impacts on costs	Check
1. Improved product/service efficiency	yes
2. Introduction of new products/services	0
3. Development or innovations	0
4. Increased productivity	yes
5. Increased utilization	yes

Impacts on value proposition	Check
1. Improved product/service efficiency	yes
2. Introduction of new products/services	0
3. Development or innovations	0
4. Increased productivity	yes
5. Increased utilization	yes

Impacts on risks	Check
1. Improved product/service efficiency	yes
2. Introduction of new products/services	0
3. Development or innovations	0
4. Increased productivity	yes
5. Increased utilization	yes

DEESME

National schemes for energy efficiency in SMEs

Investments analysis according to the Multiple Benefit approach

DEESME

National schemes for energy efficiency in SMEs

Company K. Ltd.

Investment Replacement of old production machines with new more energy efficient machines

Main economic results without MBs

Investment	600.000	€
Pay Back time	9	years
IRR	0	%
NPV	-59.692	€
NPV/Investment	-0,10	-
Cost of Saved Energy	2.028	€/tep

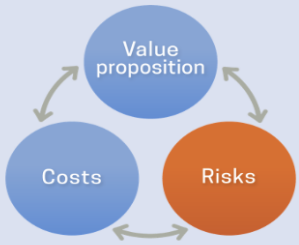
Main economic results with MBs

Investment	600.000	€
Pay Back time	3	years
IRR	0	%
NPV	1.099.459	€
NPV/Investment	2	-
Cost of Saved Energy	2.028	€/tep

Multiple Benefits (MB) and expected annual saving

NEB1	6. Improved maintenance	135.888	€/year
NEB2	4. Increased productivity	0	€/year
NEB3	0	0	€/year
NEB4	0	0	€/year
NEB5	0	0	€/year
NEB6	0	0	€/year

Impact of Multiple Benefits on Costs, Value Proposition and Risks



Impacts on costs	Check	Impacts on value proposition	Check	Impacts on risks	Check
1. Improved product/ service efficiency	yes	1. Improved product/ service efficiency	yes	1. Improved product/ service efficiency	yes
2. Introduction of new products/ services	yes	2. Introduction of new products/ services	yes	2. Introduction of new products/ services	yes
3. Development or innovations	0	3. Development or innovations	0	3. Development or innovations	0
4. Increased productivity	yes	4. Increased productivity	yes	4. Increased productivity	yes
5. Increased utilization	yes	5. Increased utilization	yes	5. Increased utilization	yes
6. Improved maintenance	yes	6. Improved maintenance	yes	6. Improved maintenance	yes
7. Reduced carbon footprint	no	7. Reduced carbon footprint	no	7. Reduced carbon footprint	yes
8. Improved quality	yes	8. Improved quality	yes	8. Improved quality	yes
9. Improved Safety	yes	9. Improved Safety	no	9. Improved Safety	yes
10. reduced energy consumption	yes	10. reduced energy consumption	no	10. reduced energy consumption	yes
11. Improved raw materials consumption	yes	11. Improved raw materials consumption	yes	11. Improved raw materials consumption	yes
12. Increased recycling	0	12. Increased recycling	0	12. Increased recycling	0
13. Reduced waste	yes	13. Reduced waste	no	13. Reduced waste	yes
14. Increased employee satisfaction	0	14. Increased employee satisfaction	0	14. Increased employee satisfaction	0
15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0
16. Acquisition of new customers	yes	16. Acquisition of new customers	yes	16. Acquisition of new customers	yes
17. Increased customer satisfaction	yes	17. Increased customer satisfaction	yes	17. Increased customer satisfaction	yes
18. Increased customer loyalty	0	18. Increased customer loyalty	0	18. Increased customer loyalty	0
19. Improved supply chain relationships	yes	19. Improved supply chain relationships	yes	19. Improved supply chain relationships	yes
20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0
21. Reduced litigation risks	0	21. Reduced litigation risks	0	21. Reduced litigation risks	0
22. Increased regulatory compliance	0	22. Increased regulatory compliance	0	22. Increased regulatory compliance	0

DEESME
National schemes for energy efficiency in SMEs

Investments analysis according to the Multiple Benefit approach

DEESME
National schemes for energy efficiency in SMEs

Company D Ltd.

Investment Replacement of the old "conventional" modular line for spectacle lenses with the new FF modular line

Main economic results without MBs

Investment	569.215	€
Pay Back time	> 10	years
IRR	0	%
NPV	-327.888	€
NPV/Investment	-0,58	-
Cost of Saved Energy	4.307	€/tep

Main economic results with MBs

Investment	569.215	€
Pay Back time	2	years
IRR	1	%
NPV	2.265.503	€
NPV/Investment	4	-
Cost of Saved Energy	4.307	€/tep

Multiple Benefits (MB) and expected annual saving

NEB1	6. Improved maintenanc	304.024	€/year
NEB2	4. Increased productivity	0	€/year
NEB3	0	0	€/year
NEB4	0	0	€/year
NEB5	0	0	€/year
NEB6	0	0	€/year

Impact of Multiple Benefits on Costs, Value Proposition and Risks

Impacts on costs	Check	Impacts on value proposition	Check	Impacts on risks	Check
1. Improved product/ service efficiency	yes	1. Improved product/ service efficiency	yes	1. Improved product/ service efficiency	yes
2. Introduction of new products/ services	0	2. Introduction of new products/ services	0	2. Introduction of new products/ services	0
3. Development or innovations	0	3. Development or innovations	0	3. Development or innovations	0
4. Increased productivity	yes	4. Increased productivity	yes	4. Increased productivity	yes
5. Increased utilization	yes	5. Increased utilization	yes	5. Increased utilization	yes
6. Improved maintenance	yes	6. Improved maintenance	yes	6. Improved maintenance	yes
7. Reduced carbon footprint	no	7. Reduced carbon footprint	no	7. Reduced carbon footprint	yes
8. Improved quality	yes	8. Improved quality	yes	8. Improved quality	0
9. Improved Safety	yes	9. Improved Safety	yes	9. Improved Safety	yes
10. reduced energy consumption	yes	10. reduced energy consumption	yes	10. reduced energy consumption	yes
11. Improved raw materials consumption	yes	11. Improved raw materials consumption	yes	11. Improved raw materials consumption	yes
12. Increased recycling	yes	12. Increased recycling	no	12. Increased recycling	yes
13. Reduced waste	yes	13. Reduced waste	yes	13. Reduced waste	yes
14. Increased employee satisfaction	0	14. Increased employee satisfaction	0	14. Increased employee satisfaction	0
15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0
16. Acquisition of new customers	yes	16. Acquisition of new customers	yes	16. Acquisition of new customers	yes
17. Increased customer satisfaction	yes	17. Increased customer satisfaction	yes	17. Increased customer satisfaction	yes
18. Increased customer loyalty	0	18. Increased customer loyalty	0	18. Increased customer loyalty	0
19. Improved supply chain relationships	yes	19. Improved supply chain relationships	yes	19. Improved supply chain relationships	yes
20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0
21. Reduced litigation risks	0	21. Reduced litigation risks	0	21. Reduced litigation risks	0
22. Increased regulatory compliance	0	22. Increased regulatory compliance	0	22. Increased regulatory compliance	0

Investment analysis examples according to the MB approach tool - Germany

DEESME

National schemes for energy efficiency in SMEs

Investments analysis according to the Multiple Benefit approach

DEESME

National schemes for energy efficiency in SMEs

Company Airportsquash

Investment Improvement of CHP

Main economic results without MBs

Investment	50.000	€
Pay Back time	> 10	years
IRR	0	%
NPV	-25.950	€
NPV/Investment	-0,52	-
Cost of Saved Energy	#DIV/0!	€/tep

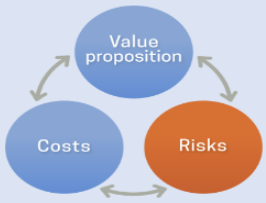
Main economic results with MBs

Investment	50.000	€
Pay Back time	2	years
IRR	0	%
NPV	128.485	€
NPV/Investment	3	-
Cost of Saved Energy	#DIV/0!	€/tep

Non Energy Benefits (MB) and expected annual saving

NEB1	7. Reduced carbon footpri	0	€/year
NEB2	17. Increased customer sa	20.000	€/year
NEB3	0	0	€/year
NEB4	0	0	€/year
NEB5	0	0	€/year
NEB6	0	0	€/year

Impact of Multiple Benefits on Costs, Value Proposition and Risks



Impacts on costs	Check	Impacts on value proposition	Check	Impacts on risks	Check
1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0	1. Improved product/ service efficiency	0
2. Introduction of new products/ services	yes	2. Introduction of new products/ services	0	2. Introduction of new products/ services	0
3. Development or innovations	0	3. Development or innovations	yes	3. Development or innovations	0
4. Increased productivity	0	4. Increased productivity	0	4. Increased productivity	yes
5. Increased utilization	0	5. Increased utilization	0	5. Increased utilization	0
6. Improved maintenance	0	6. Improved maintenance	0	6. Improved maintenance	0
7. Reduced carbon footprint	0	7. Reduced carbon footprint	0	7. Reduced carbon footprint	0
8. Improved quality	0	8. Improved quality	0	8. Improved quality	0
9. Improved Safety	0	9. Improved Safety	0	9. Improved Safety	0
10. reduced energy consumption	0	10. reduced energy consumption	0	10. reduced energy consumption	0
11. Improved raw materials consumption	0	11. Improved raw materials consumption	0	11. Improved raw materials consumption	0
12. Increased recycling	0	12. Increased recycling	0	12. Increased recycling	0
13. Reduced waste	0	13. Reduced waste	0	13. Reduced waste	0
14. Increased employee satisfaction	0	14. Increased employee satisfaction	0	14. Increased employee satisfaction	0
15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0	15. Acquisition of 'green' customers	0
16. Acquisition of new customers	0	16. Acquisition of new customers	0	16. Acquisition of new customers	0
17. Increased customer satisfaction	0	17. Increased customer satisfaction	0	17. Increased customer satisfaction	0
18. Increased customer loyalty	0	18. Increased customer loyalty	0	18. Increased customer loyalty	0
19. Improved supply chain relationships	0	19. Improved supply chain relationships	0	19. Improved supply chain relationships	0
20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0	20. Improved stakeholder relationships	0
21. Reduced litigation risks	0	21. Reduced litigation risks	0	21. Reduced litigation risks	0
22. Increased regulatory compliance	0	22. Increased regulatory compliance	0	22. Increased regulatory compliance	0