



Co-funded by the Intelligent Energy Europe
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D9.2 IEE Common Performance Indicators

EMSPI: Energy Management Standardization in Printing Industry

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A. Introduction

Project background

The European Printing Industry generates a turnover of around €106 billion, comprising 134.000 companies employing over 850.000 people. It consists mainly of very small enterprises - around 85% of them employ fewer than 20 people.¹

The experience shows that SMEs Printing Industries, which implement potential energy savings measures to reduce energy consumption, often do not obtain expected results because a non-systematic management leads to a non-controlled situation of energy consumption. Therefore, the systematic approach proposed by this project is needed

Project objective

The “EMSPI- Energy Management Standardization in Printing Industry” project aims to promote actions for increasing the energy efficiency at European small and medium sized enterprises (SMEs) of the Printing Industry.

The main objective of the project is to reap the maximum energy savings in the targeted SMEs by promoting the implementation of Energy Management System based on the global standard ISO 50001.

The EMSPI project has the specific objective of develop an adapted Energy Management System (EnMS) according to the statements of the ISO 50001 standard, and implement this EMS in 100 European SMEs Printing Industries.

Common Performance Indicators (CPIs)

For an energy efficiency project, like this EMSPI, with energy management as its primary field of delivery, no renewable energy generation is expected to result from this project.

The CPIs to be calculated within EMSPI Project are mentioned as follows.

Within the project duration:

- Cumulative investment made by European stakeholders in sustainable energy (Euro)
- Primary energy savings compared to projections (toe/year)
- Reduction of greenhouse gas emissions (t CO₂e/year)

By 2020:

- Cumulative investment made by European stakeholders in sustainable energy (Euro)
- Cumulative Primary energy savings compared to projections (toe)
- Cumulative Reduction of greenhouse gas emissions (t CO₂e)

Methodology

Method 1 (bottom-up method) is the preferred approach if it can be applied. For this project it is possible to build up the CPIs from the project outputs, i.e. the number of Energy Management System implementations can be used to estimate the impacts in terms of energy savings, GHG savings and investment. Therefore Method 1 is chosen.

¹http://ec.europa.eu/enterprise/sectors/wood-paper-printing/printing/statistics/index_en.htm

B. Defining scope and impacts

By the end of the project, the adapted EMS will be implemented in 100 printing industry SMEs in Germany, Denmark, Nederland, Czech Republic and Spain (20 implementations in each country). A ceiling of 25% to the 100 SMEs could not able to implement the full standard, then they will only implement the part of the standard related to Energy Audits, including proposals for investments.

In the longer term, all the tools developed during the EMSPI project (implementation manual, spreadsheets) will be available to be used by every interested company in the printing sector. These companies may implement themselves its own EMS using the EMSPI tools.

Two long-term impact levels have been considered:

- Minimum impact: 500 implementations in European printing industry SMEs by 2020
- Maximum impact: 1500 implementations in European printing industry SMEs by 2020

C. Setting the baseline

This step is not needed for Method 1.

D. Estimation of the short-term impacts

The adapted EMS will be implemented in 100 European printing sector SMEs during the last year of the EMSPI project.

Achievement levels

Three achievement levels have been considered:

- A. Companies that implement the adapted EMS or only made an Energy Audit
- B. Companies that invest in “soft” energy efficiency projects (2 years payback period)
- C. Companies that invest in “hard” energy efficiency projects (5 years payback period)

The energy savings related with an EMS implementation are estimated between 2% and 5% of total energy consumption².

The basic achievement leads to 2% of energy savings. Reaching the B level gives additional 2% of energy savings. Finally, 1% more of energy savings could be fulfilled by the C-level companies.

Achievement level	A	B	C
% Energy Savings	2%	2%	1%

Energy savings calculation

The average energy consumption of a European printing sector company is 9,524.55 GJ / year³. Therefore, the energy savings according to the company achievements are show in the table below:

² Source: European Energy Efficiency Improvement Project (EEEI) in the graphic media industry

³ Source: European Energy Efficiency Improvement Project (EEEI) in the graphic media industry

Energy savings (GJ) / year				
Achievement Level	A	B	C	Total (GJ) / company
A + B + C	190.49	190.49	95.25	476.23
A + B	190.49	190.49	0.00	380.98
A	190.49	0.00	0.00	190.49

GHG emissions savings calculation

GHG savings are calculated from energy savings using the appropriate emissions factors (see next table)

Electricity	0.58 tCO ₂ e / MWh
Natural gas	0.20 tCO ₂ e / MWh

Consequently, the GHG emission savings according to the company achievements are show in the table below:

tCO ₂ emissions reduced / year				
Printing companies	A	B	C	Total tCO ₂ / company
A + B + C	26.67	26.67	13.33	66.67
A + B	26.67	26.67	0.00	53.34
A	26.67	0.00	0.00	26.67

Monetary savings calculation

The energy consumption mix of a European printing sector company is 80% of electricity and 20% of natural gas. The calculations have been done considering the prices of energy shown below.

Electricity	0.093 € / kWh
Natural gas	8.99 € / GJ

Hence, the monetary savings according to the company achievements are show in the table below:

Monetary savings (€) / year				
Achievement Level	A	B	C	Total (€) / company
A + B + C	4,275.46	4,275.46	2,137.73	10,688.66
A + B	4,275.46	4,275.46	0.00	8,550.93
A	4,275.46	0.00	0.00	4,275.46

Investment calculation

The investment amount has been calculated considering that:

- A-Level investment is 0
- B-Level investment have 2 years payback period
- C-Level investment have 5 years payback period

Total investment (€)				
Achievement Level	A	B	C	Total (€) / company
A + B + C	0.00	8,550.93	10,688.66	19,239.59
A + B	0.00	8,550.93	0.00	8,550.93
A	0.00	0.00	0.00	0.00

Considering the implementation mix as shown below:

Achievement level	A	B	C
Implementations	10	45	45

The summary of the project short-term impacts CPIs is shown in the table below (1 toe = 11,63 MWh):

Energy savings (toe) / year	Monetary savings (€) / year	Investment (€)	GHG emissions reduced (tCO ₂ e) / year
966.83	908,536.24	1,250,573.42	5,667.11

E. Estimation of the long-term impacts

According to the long-term criteria exposed, a minimum of 500 and a maximum of 1500 EnMS will be implemented by 2020.

Considering the implementation mix as shown below:

	Minimum (Implementations)	Maximum (Implementations)
A + B + C	225	675
A + B	225	675
A	50	150

The summary of the project long-term impacts CPIs is shown in the table below (1 toe = 11,63 MWh):

Implementations	Energy savings (toe) / year	Monetary savings (€) / year	Investment (€)	GHG emissions reduced (tCO ₂ e) / year
1,500	4,834.16	4,542,681.21	6,252,867.08	28,335.54
500	14,502.49	13,628,043.63	18,758,601.23	85,006.61

F. Cumulative impacts

Considering that after the project finalization, every year are implemented 25% of the target, the results are shown in the tables below:

MINIMUM HYPOTHESIS				
Year	Energy savings (toe)	Monetary savings (€)	Investment (€)	GHG emissions reduced (tCO₂e)
2016	966.83	908,536.24	1,250,573.42	5,667.11
2017	3,142.21	2,952,742.79	2,813,790.18	18,418.10
2018	6,526.12	6,132,619.63	4,377,006.95	38,252.97
2019	11,118.57	10,448,166.78	5,940,223.72	65,171.73
2020	16,919.57	15,899,384.23	7,503,440.49	99,174.38

MAXIMUM HYPOTHESIS				
Year	Energy savings (toe)	Monetary savings (€)	Investment (€)	GHG emissions reduced (tCO₂e)
2016	966.83	908,536.24	1,250,573.42	5,667.11
2017	5,559.29	5,224,083.39	5,940,223.72	32,585.87
2018	13,777.36	12,946,641.44	10,629,874.03	80,756.28
2019	25,621.06	24,076,210.40	15,319,524.33	150,178.34
2020	41,090.38	38,612,790.27	20,009,174.64	240,852.06

G. Impacts checking

Impact	Scope (implementations)	Energy savings (toe)	Monetary savings (€)	Investment (€)	GHG emissions reduced (tCO ₂ e)
Short-term	100	966.83	908,536.24	1,250,573.42	5,667.11
Minimum long-term	500	16,919.57	15,899,384.23	7,503,440.49	99,174.38
Maximum long-term	1,500	41,090.38	38,612,790.27	20,009,174.64	240,852.06

Ratio	Scope	Energy savings	Monetary savings	Investment	GHG emissions reduced
Max. / Short	15.00	42.50	42.50	16.00	42.50
Min. / Short	5.00	17.50	17.50	6.00	17.50
Max. / Min.	3.00	2.43	2.43	2.67	2.43

- Scope ratio and Investment ratio should be similar
- On account of cumulative effect, long-term savings ratios should be about 3 times greater than scope ratio
- Savings ratios (Max. / Short, Min. / Short, Max. / Min) are very similar

H. Conclusions

According to the data obtained, the target of EMSPI Project in terms of IEE Common performance indicators is the next;

Target within the action duration:	Target by 2020:
1,250,573.42 € Cumulative investment made by European stakeholders in sustainable energy	7.5 – 20.0 M€ Cumulative investment made by European stakeholders in sustainable energy
966.83 toe / year Primary energy savings compared to projections	16,919 – 41,090 toe Cumulative Primary energy savings compared to projections
5,667.11 t CO₂e / year Reduction of greenhouse gas emissions	99,174 – 240,852 t CO₂e Cumulative Reduction of greenhouse gas emissions

Some discrepancies has been found with the data initially calculated in the Technical Form due to the update of hypothesis and accumulation calculus and use of proper units and conversion factors.