



Energy management and training for industrial energy optimization

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Management as a key driver of energy performance (M_Key)

In many companies there is considerable potential to reduce energy consumption, but investments in energy efficiency often remain undecided, even though they may be highly profitable.

The Swiss research project "Management as a Key driver of energy performance" (M_Key) is investigating through a detailed analysis of large Swiss companies whether energy management significantly increases companies' perception of the strategic character of energy-efficiency investments and ultimately increases their energy performance.

M_Key runs between 2015 and 2017 in three phases:

1. A survey among 2 000 large scale consumers, i.e. companies in the industrial and service sectors that consumer more than 0.5 GWh of electric energy per year, led by the University of Neuchâtel
2. Interviews with 26 companies, led by INFRAS
3. Case studies with 5 companies, led by Impact Energy.

Survey preliminary results

Currently, preliminary results from the survey are available with responses from around 200 companies. The level of energy management of these companies was assessed based on their answers to the survey questionnaire on a scale from 1 to 23 possible points. The average score of respondents was at 10.7 points. 50% of the respondent firms have designated an energy manager but all of them (except 10) manage energy issues on a part time basis only. Figure 1 shows the most important drivers and barriers for investing into energy efficiency.

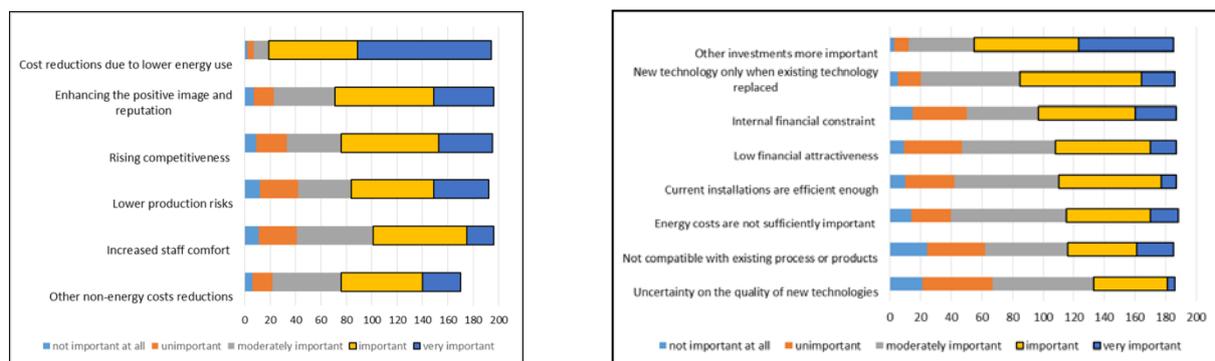


Figure 1, Drivers (left) and barriers (right) of energy efficiency investments (Source: M_Key, 2016)

M_Key is led by INFRAS, a Swiss consulting company, project partners are the University of Neuchâtel and Impact Energy. M_Key is part of the National Research Programme "Managing Energy Consumption" (NRP 71) of the Swiss National Science Foundation (SNSF). Further information on the National Research Programme can be found at www.nrp71.ch.

For an effective energy management and the implementation of energy efficiency investments, qualified people are necessary within the industrial factories. The experience of Impact Energy working with industrial plants in Switzerland has demonstrated the lack of addressing electric energy efficiency and competence in particular concerning the improvement of motor systems that consume over 80% of the electricity. This coupled with the fact that so far Swiss training programs have focused on renewable energy and thermal energy has led to the idea of launching a new training program.

Training on Industrial Energy Optimization

After a feasibility study in 2014 in cooperation with the University of Geneva, Impact Energy has built up a new Swiss training program for Industrial Energy optimization (IEO), supported by the Swiss Federal Office of Energy and SwissEnergy. IEO aims to empower technical staff in industrial plants to:

1. Establish a long-term, continuous improvement process for motor systems within the factory
2. Lead and implement motor systems optimization projects
3. Convince upper management to invest into motor systems optimization regularly.

The training is 6 days long and is held on three weekends (Friday/Saturday), during a period of six weeks. The training is built up of four main blocks: 1) Introduction, 2) Energy management, 3) Energy technology, focusing on motor systems, 4) Test (last day). There are two Swiss training sites:

- Lucerne University of Applied Sciences and Arts (HSLU) near Lucerne, in German
- Haute École d'Ingénierie et de Gestion du Canton de Vaud (HEIG-VD) near Yverdon, in French.

IEO		1		2		3		4		5		6							
D2-2017		FR		SA		FR		SA		FR		SA							
V2																			
09:15	10:00	Introduction		Module 1: Motors (Theory & measurements in groups)		Module 2: Converters (Theory & measurements in groups)		Energy management and communication		Module 4: Pumps (Theory & measurements in groups)		Test							
10:15	11:00	Standard Test Report										Lunch		Lunch		Presentation individual assignments			
11:15	12:00																		
12:15	13:00			Individual assignment		Individual assignment													
13:15	14:00	Lunch								Lunch									
14:15	15:00	Preparation Individual assignment		Motor-Systems-Check		Module 3: Fans (Theory & measurements in groups)		Group work		Module 5: Compressors (Theory & measurements in groups)		Presentation individual assignments							
15:15	16:00																		
16:15	17:00																		
17:15	18:00	Q&A		Q&A				Q&A				Apéro							

Modules 1 to 5 are held in the lab or on site

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Figure 2, Training overview (Source: Impact Energy, 2016)

The practical part of the training is taking part in the motor labs of the schools, where also demonstrators for pumps and fans are used. Participants are required to work on individual practical assignments, analyzing the energy performance of one machine and making recommendations for optimizing it which they are required to present at the end of the training.

The first training was held at the HSLU in German during June/July 2016. The 7 training participants were energy consultants. They acknowledged the importance of the training topic and appraised the training structure and duration. They required more practical work with examples and less time for theoretical background and energy management. The exchange among the participants was highly appreciated. The next trainings are planned for 2017 in German and French at the two training sites.

- [1] Catherine Cooremans, Rita Werle: M_Key Management as a key driver of energy performance, eceee Industrial Summer Study 2016, Berlin
- [2] Rita Werle, Conrad U. Brunner, Rolf Tieben: Tackling the efficiency gap with capacity building in industrial energy optimization, eceee Industrial Summer Study 2016, Berlin
- [3] Rolf Tieben, Rita Werle, Conrad U. Brunner: EASY- Lessons learned from four years of the Swiss EASY audit and incentive program, Energy Efficiency in Motor Driven Systems EEMODS 2015, Helsinki