



# Non-energy benefits in energy audit and energy efficiency network policy programs for industrial SMEs

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eccee 2019 Summer Study on energy efficiency 3-8 June

Presqu'île de Giens, France, 2019-06-06



# Introduction

- Energy audit is the first step towards adoption of energy management practices in a company.
- Factors needed to successfully realise the full energy efficiency potential: a long-term energy strategy, concrete goals and someone at the site being responsible for the issue.
- In addition to energy audit, industrial energy efficiency networks can give the SMEs the help and support needed to implement the success factors.

Backlund, Thollander, Palm, & Ottosson, 2012

# Introduction

## Non-energy benefits (NEBs)

- NEBs: benefits in addition to energy cost savings
- NEBs at **company level**: increased production and enhanced competitiveness
- NEBs at **national/international level**: new jobs, improved energy security and reduced environmental impact.
- Difficult to quantify, but could **cut payback time by a factor of two** when including NEBs

# Introduction

## Non-energy benefits (NEBs)

Production	Operation & management	Working environment	Waste & emissions	Other
Increased production rate	Maintenance reduction	Improved worker safety	Reduction of waste water	Improved corporate image
Improved quality of products	Lower cooling demand	Reduction of noise	Reduction of hazardous waste	Improved morale of workers
Increased production reliability	Reduced labour demand	Improved quality of air	Reduction of waste fuel, heat, gas	Increased level of sales
Shorter cycle time of process	Reduced need for engineering control	Improvement of lighting	Reduced emissions	

Nehler et al., 2014

# Introduction

## Aim



- Identify NEBs from two key energy efficiency policies
  - The Swedish Energy Audit Program
  - Energy efficiency network program (ENERGIG)





# Introduction

## Swedish Energy Audit Program (SEAP)

- Provided financial support for energy audits in SMEs between 2010 and 2014
- A one-time-only support for companies covering half of the price for an energy audit
- The audit had to cover
  - An overview of annual energy end-use
  - Price for each energy carrier
  - Suggested measures
- No requirements on auditor certification

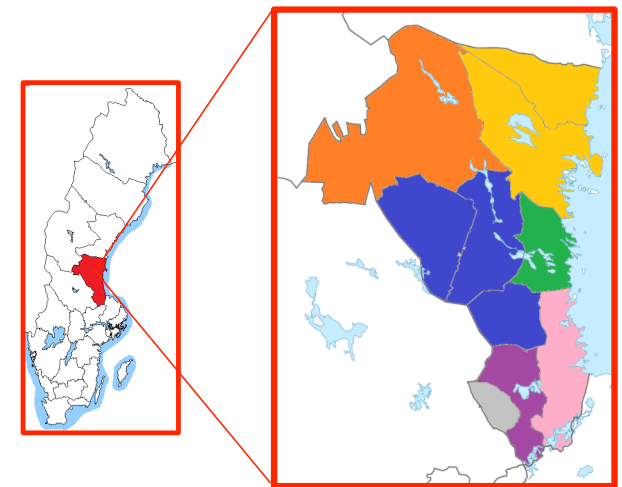


# Introduction

## Energy efficiency network ENERGIG



- Regional research project, lasted from 2015 to 2018
- Targetting industrial SMEs in Gävleborg, Sweden
- The project included:
  - regular meetings at the company sites
  - lectures given by energy experts
  - a free energy audit by an experienced auditor
  - database covering energy efficiency measures





# Method

- Semi-structured interviews
- Six respondents from the regional energy efficiency network program
- Four respondents from the Swedish Energy Audit Program
- Mentioned NEBs were categorized into:
  - *Production, Operation and maintenance, Working environment, Waste and emissions, and Other*





# Results

## Production



- Most commonly mentioned NEB: **increased lifetime of equipment**
  - Often mentioned as a result of new installation of LED lights
- **More reliable production** due to improved knowledge from energy audits and network participation
- Network participants perceived NEBs also related to measures related to energy management practices, i.e. not only technical installations





# Results

## Operation and management

- Network participants mentioned NEBs in this category more frequent than respondents from SEAP did
- **Reduced maintenance costs** most commonly mentioned
- Lectures in the network project and knowledge obtained from those were mentioned as reasons to reduced maintenance





# Results

## Working environment

- Both groups mentioned NEBs related to **working environment**
- Mainly due to **improved quality of light** after LED installations
- **Reduction of noise, improved quality of air and improved temperature control** was also noted by the network participants





# Results

## Waste and emissions

- Only a few NEBs mentioned related to waste and emissions
- They do not measure external emissions and can only roughly estimate how these were affected
- Utilization of waste heat and reduced waste from installation of LED lights were mentioned



# Results

## Other



- Major difference between the two groups in this category
- Improved work ethic and improved company image
  - Mentioned by the respondents from EEN, while not from respondents from SEAP
- EEN companies also mentioned new contacts
  - Professional contacts and less formal contacts



# Conclusions

- Participants from the energy audit program related NEBs mainly to **technical installations**, while network participants also saw these types of NEBs from **energy management practices**
- The NEBs mentioned are similar to the commonly seen examples of NEBs except the additional NEBs mentioned by network participants related to the **established contacts** with other companies
- EENs deliver a higher degree of **improved energy efficiency** and **knowledge about energy management practices**, compared to energy audits alone



# Conclusions

- The two groups of companies differ in **degree of awareness** of energy efficiency and energy management in general
- As a company evolves into higher maturity levels of energy management practices, **NEBs increases in importance**





# Thank you!

## Questions?

## References

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