Energy-efficiency investments and the concepts of non-energy benefits and investment behaviour

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Background

- Project financed by the Department of Management and Engineering, Linköping University, and the Swedish Energy Agency

- The aim of the project is to make energy-efficiency investments a strategic issue for Swedish industry

Aim

- Categorise and define the benefit concepts related to industrial energy- efficiency investments
- Propose a methodology for categorising the benefits in a way that can meet the need for quantifiability
- Integrate the benefit concept with findings from investment behaviour

Method

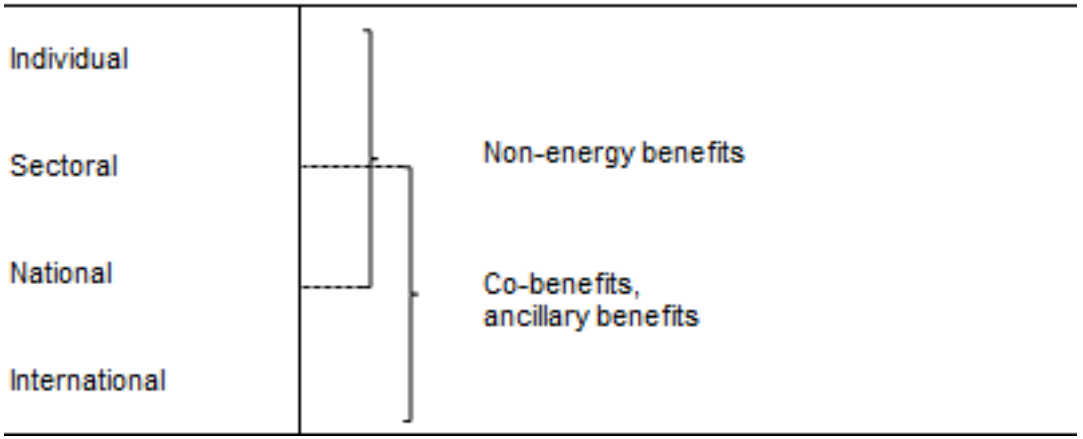
- Literature review on both areas

1. Systematic search on the most common benefit concepts

2. For investment behaviour and the decision-making process; a combination of systematic search and backward searching

Benefit concepts

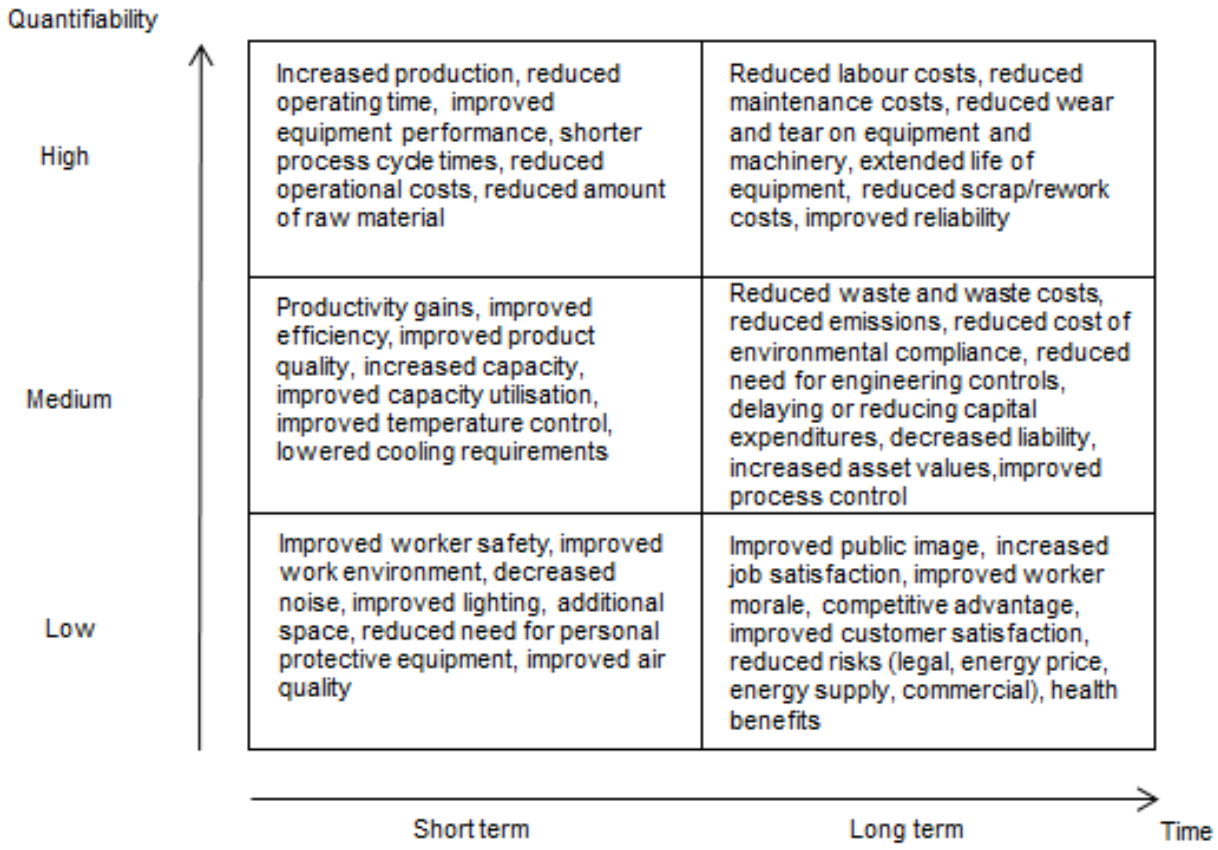
- ***Non-energy benefits***, indirect benefits, ***co-benefits***, multiple benefits, ***ancillary benefits***, productivity benefits…



Previous categorisations of non-energy benefits

- By type
  - Waste, working conditions, production etc.
  - For example Worrell et al. (2003). Productivity benefits of industrial energy efficiency measures. *Energy* 28(11): 1081-1098
- By economic level
  - Individual, sectoral, national, international
  - For example IEA (2012). Spreading the Net: The multiple benefits of energy efficiency improvements. Insight Series 2012. Paris
- By their relation to competitive advantage
  - Cost, value, risk
  - Cooremans (2011). Make it strategic! Financial logic is not enough. *Energy Efficiency* 4(4):473-492

Defining & categorising industrial non-energy benefits to facilitate quantification



Investment behaviour & decision-making

- Firm and investment characteristics
  - Firm size, sector, energy intensity, high risk, low profitability, low strategic value, uncertainty, among others
- Barriers and driving forces
  - Barriers: Low priority level, uncertainty, irreversibility, energy costs not considered important, technical risk
  - Driving forces: Green public image, potential cost savings, improved working conditions
- Phases of the decision-making process
  - Vary between models but always include financial analysis and evaluation

Suggestions

1. Non-energy benefits is the most adequate concept to use in an industrial context and can be defined as the benefits of industrial energy-efficiency investments, beside energy savings, that are quantifiable at a certain level and arise at some point in time

2. Including quantifiable non-energy benefits in the evaluation process can increase the priority level for energy-efficiency investments

3. Non-energy benefits of a low quantifiability level can serve as extra arguments at a later step in the decision-making process to select between similar investment opportunities

4. Including quantifiable non-energy benefits may increase the reward from energy-efficiency investments and increase the value of investing today, overcoming known barriers as well as reinforcing driving forces

Conclusion

- Non-energy benefits is the most adequate benefit concept to use in an industrial context
- By defining and categorising non-energy benefits by their level of quantifiability and time frame, they can be included in the decision-making process and increase the probability for adopting energy-efficiency investments
- The concepts of non-energy benefits and investment behaviour can be integrated and contribute to improved energy efficiency for the industry

Thank you for your attention!

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