# EXPLORING ENERGY MANAGEMENT IN THE SWEDISH PULP AND PAPER INDUSTRY

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# Disposition

- Introduction
- Aim and research design
- Method
- Results
- Conclusions

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# Introduction

- Industrial energy efficiency is one of the most important means of reducing the threat of increased global warming.
- Barriers like split incentives, principal-agent relationsship inbit adoption.
- To overcome barriers, both organisational and behavioural factors are of importance such as the implementation of energy management practices.
- For Swedish industry, significant energy price increases, not the least electricity price increases has taken place the last years.
- The Swedish pulp and paper industry (PPI) accounts for nearly 50 percent of the annual industrial energy use, which is about 2 percent of the EU-25 industrial energy use. The large energy use makes this sector particularly important to study in terms of energy efficiency.

# Introduction continue…

- Previous research has confirmed the existence of an energy efficiency gap in the Swedish PPI
- The largest barriers in the Swedish PPI are:
  - Technical risks such as risk of production disruptions
  - Cost of production disruption/hassle/ inconvenience
  - Technology inappropriate at the mill
  - Lack of time and other priorities
  - Lack of access to capital
  - Slim organisation.
- The largest driving forces in the Swedish PPI are:
  - Cost reductions resulting from lower energy use
  - People with real ambition
  - The existence of a long-term energy strategy.

# Introduction continue…

- Successful industrial energy management demands a strategic approach and also full support from top management. The strategic approaches vary but do have some elements in common such as:
  - An energy audit.
  - Senior management support.
  - The monitoring of energy use.
  - An energy policy.
  - An ongoing and co-coordinated program for energy saving projects.

# Aim

- The aim of this paper is to describe and analyze energy management practices in the Swedish pulp and paper industry.

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# Research Questions

**Based on a literature review, four major research questions were formulated:**

- **How has the mill's priority of the energy issue changed between 1996 and 2007?**
- **How are energy costs allocated at the mill?**
- **Does the mill have an existing long-term energy strategy and if so, what period does it cover?**
- **What payoff criteria are used when investing in energy efficiency measures at the mill?**

# Methods applied

- The study was, inspired by Yin (1994), carried out as a case study using a questionnaire.
- The questionnaire was sent to the energy managers of 59 mills the fall of 2007, resulting in an answering frequency of 68% (40 replies).

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# The priority of the energy issue among Swedish PPIs

- Extensive energy price increases during the studied period, 1996-2007,
- increased environmental concern,
- the adoption of a number of policy instruments, both on a European and on a Swedish level,
- Would plausibly have lead to greater attention being paid to the energy issue in this industry?

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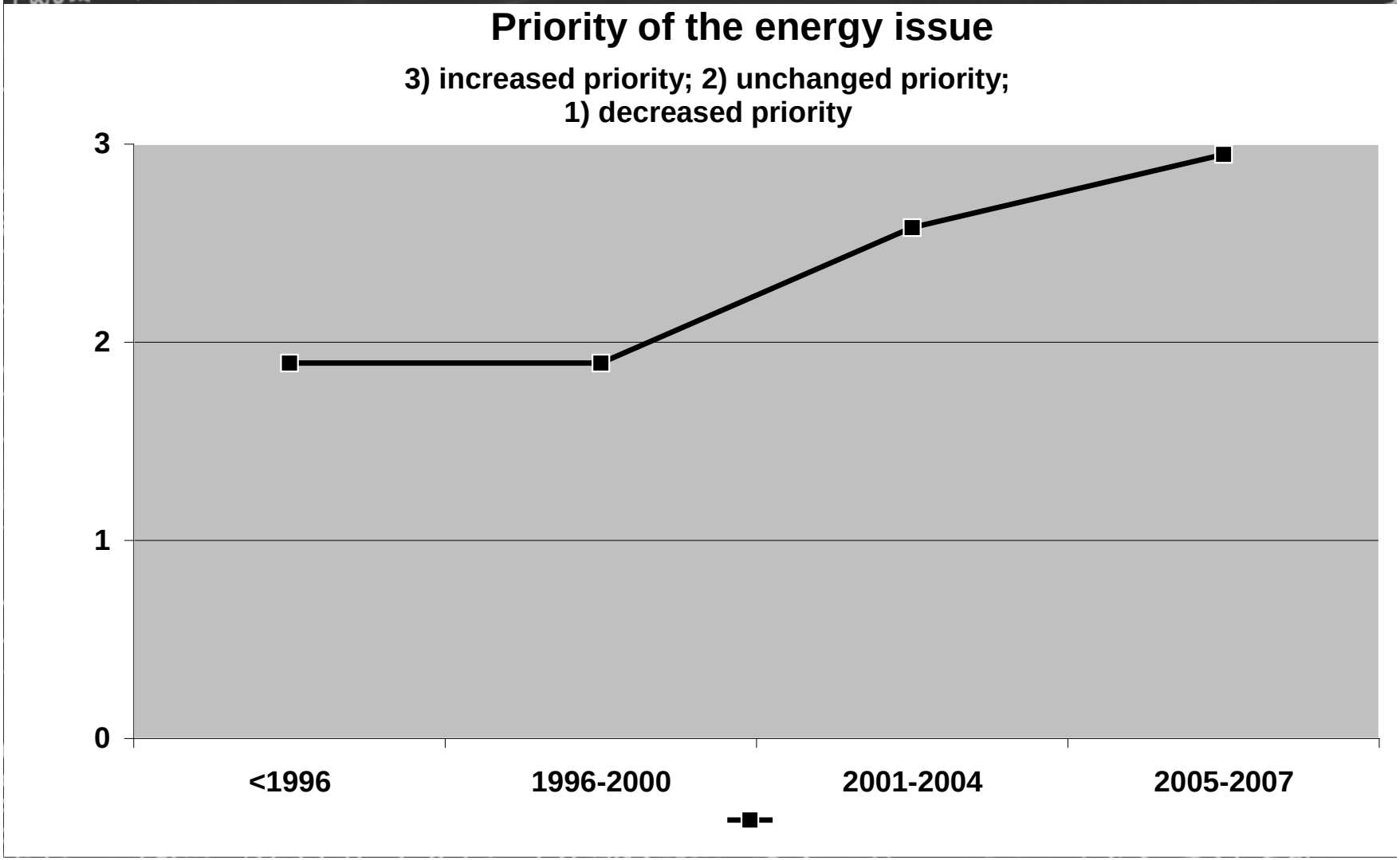
# The priority of the energy issue among Swedish PPIs



# The allocation of energy costs among Swedish PPIs

- Adequate allocation of energy costs may help overcome split incentives
- The split incentive barrier would be assumed to be of lower importance in the Swedish PPI, due to its energy intensity with thorough sub-metering etc.?

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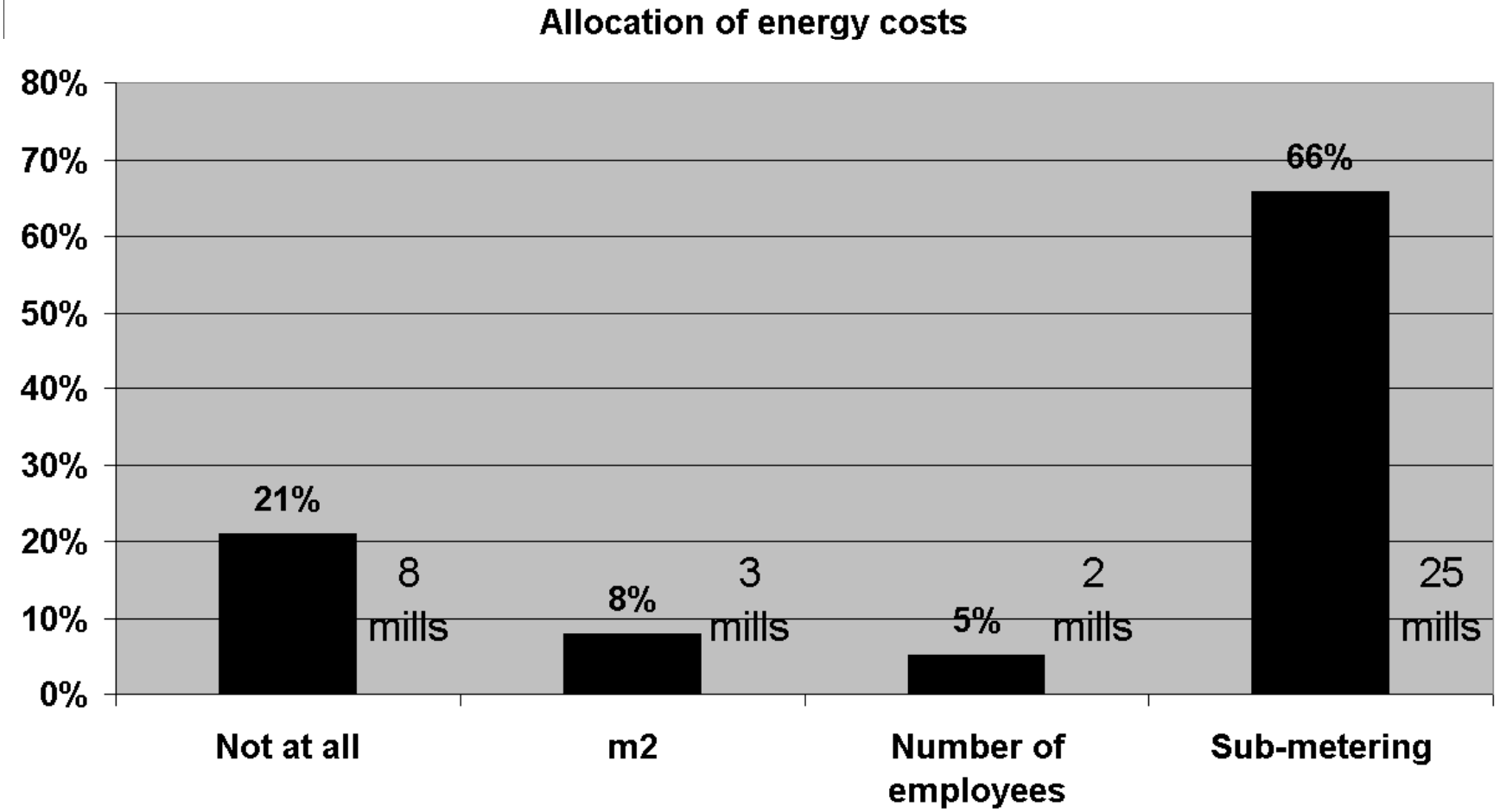
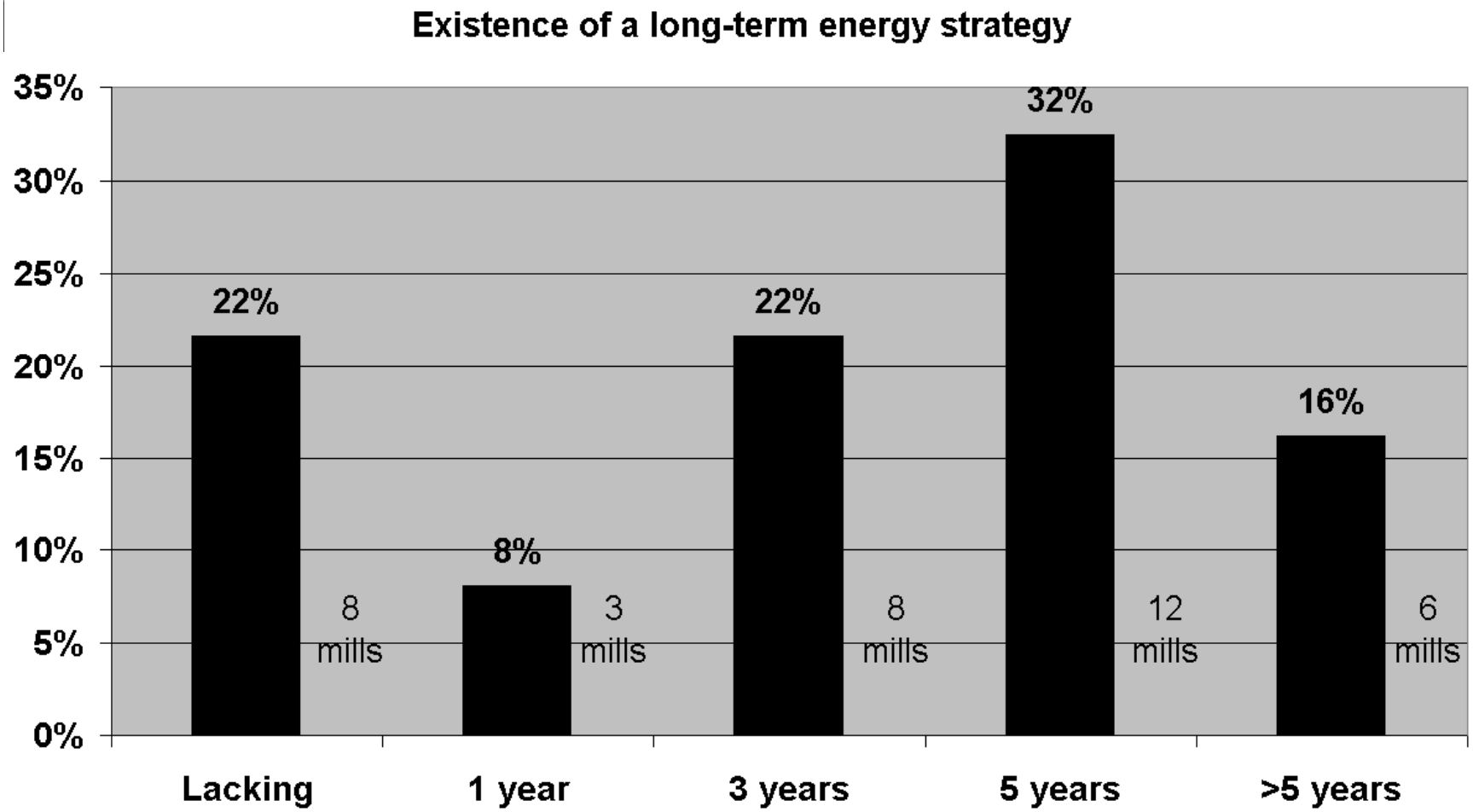
# The allocation of energy costs among Swedish PPIs



# The existence and length of a long-term energy strategy among Swedish PPIs

- A long-term energy strategy is one of the crucial elements in successful energy management practices
- A study among Swedish PPIs found that a long-term energy strategy was one of highest ranked factors promoting energy efficiency
- A long-term energy strategy is not the same as an EMS, which is adopted on a more operational level lower down in the organization. Energy management should have top management support and adopting a long-term energy strategy is an important means of emphasizing this.
- Long-term energy strategies would be assumed to be widely adopted in the sector?

# The existence and length of a long-term energy strategy among Swedish PPIs



# Investment criteria among Swedish PPIs

- The principal-agent relationship may lead to the inclusion of strict investment criteria.
- One common method used in industry is the pay-off method. Even though this method does not include an interest rate it gives some indication of the studied companies' investment criteria for energy efficiency investments.

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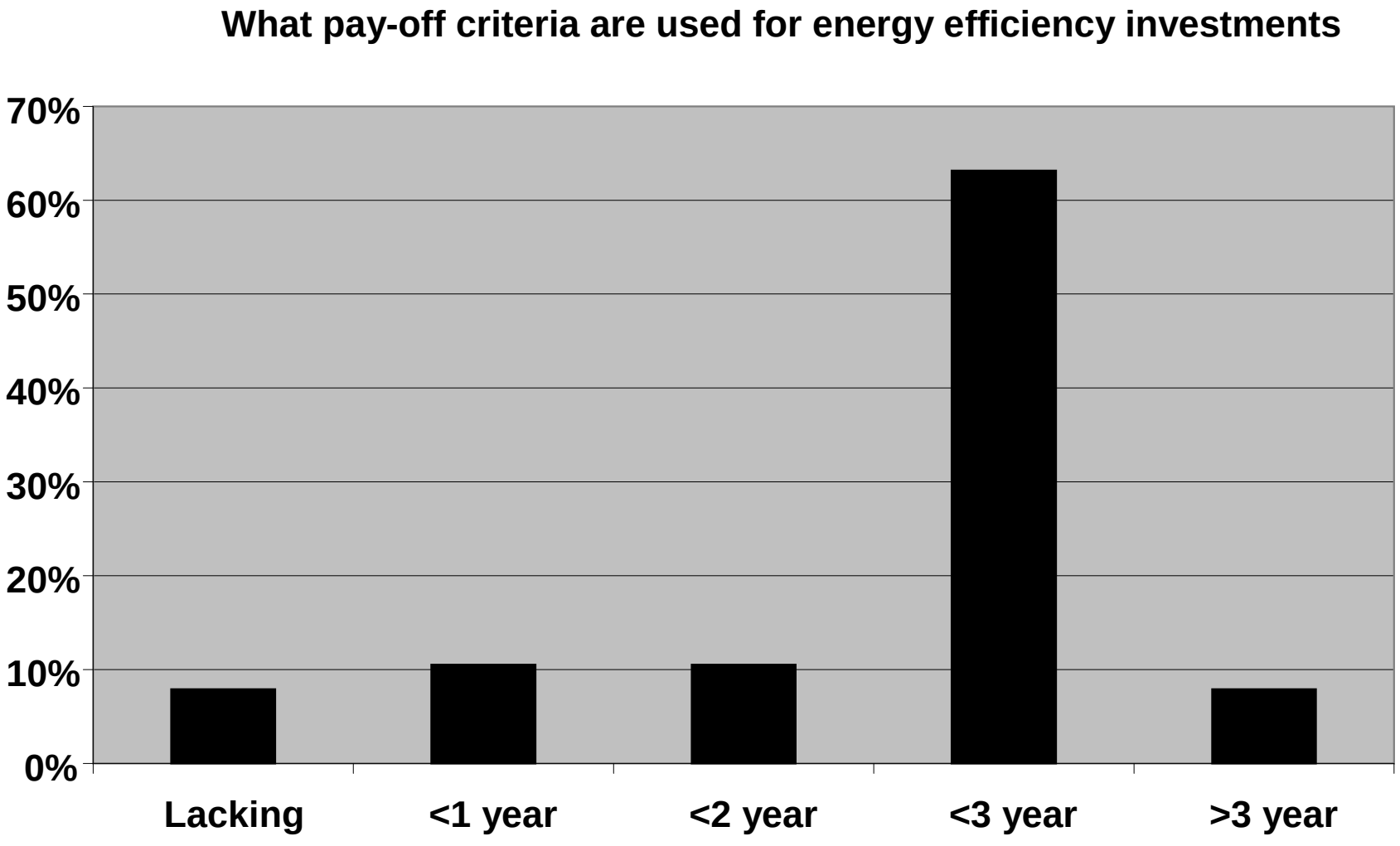
# Investment criteria among Swedish PPIs



# Conclusion

- As regards the studied mill's pay-off criteria, the majority of the mills applying periods of 3 years. In conclusion, the principal-agent relationship barrier thus seems to be of lower importance in the studied industry.
- One third of the studied mills does not allocate energy costs by means of sub-metering, most likely contributing to reinforce for example the split incentive barriers.
- One fifth of the studied mills lack a long-term energy strategy, and less than half of the studied mills have an energy strategy of at least five years.
- In one of the most energy intensive industries in the world, energy management seems not to be a highly prioritized issue for a considerable part of the sector. In conclusion, a potential thus seem to exists to improve energy management in the sector.

# Conclusion continue

- LTAs and EMSs are very fruitful approaches to increased energy efficiency in industry but results from this study nevertheless indicate further improvement potential in the formulation of these instruments, such as increased promotion of various energy management elements.
- The improvement potential for energy management practices in the highly energy-intensive sector studied indicate that there is plausibly an even greater potential for energy management improvements in other, less energy-intensive sectors, which adopted could lower the environmental impact from the industrial sector.

# Thanks for your attention!

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# Questions to be addressed?

- Could and should an LTA (or and an EMS standard) include mandatory components such as the formulation and adoption of a long-term energy strategy and allocation on energy costs based on sub-metering?
- Or are such components deviating too far from mainstream energy policies focusing on solely reducing market imperfections?