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M_KEY – MANAGEMENT AS A KEY DRIVER OF ENERGY PERFORMANCE

ECEEE, Industrial Summer Study
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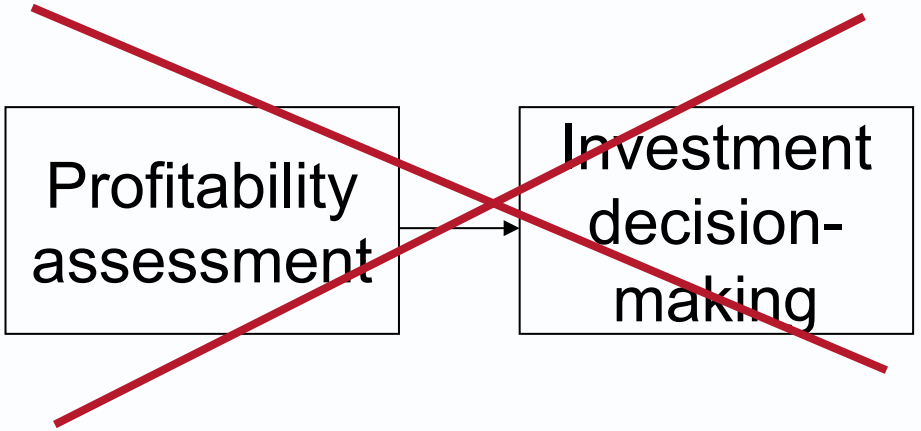
Managing energy consumption
National Research Programme NRP 71

Outline

1. Conceptual framework
2. Empirical research
3. Preliminary results
4. Discussion
5. Conclusion

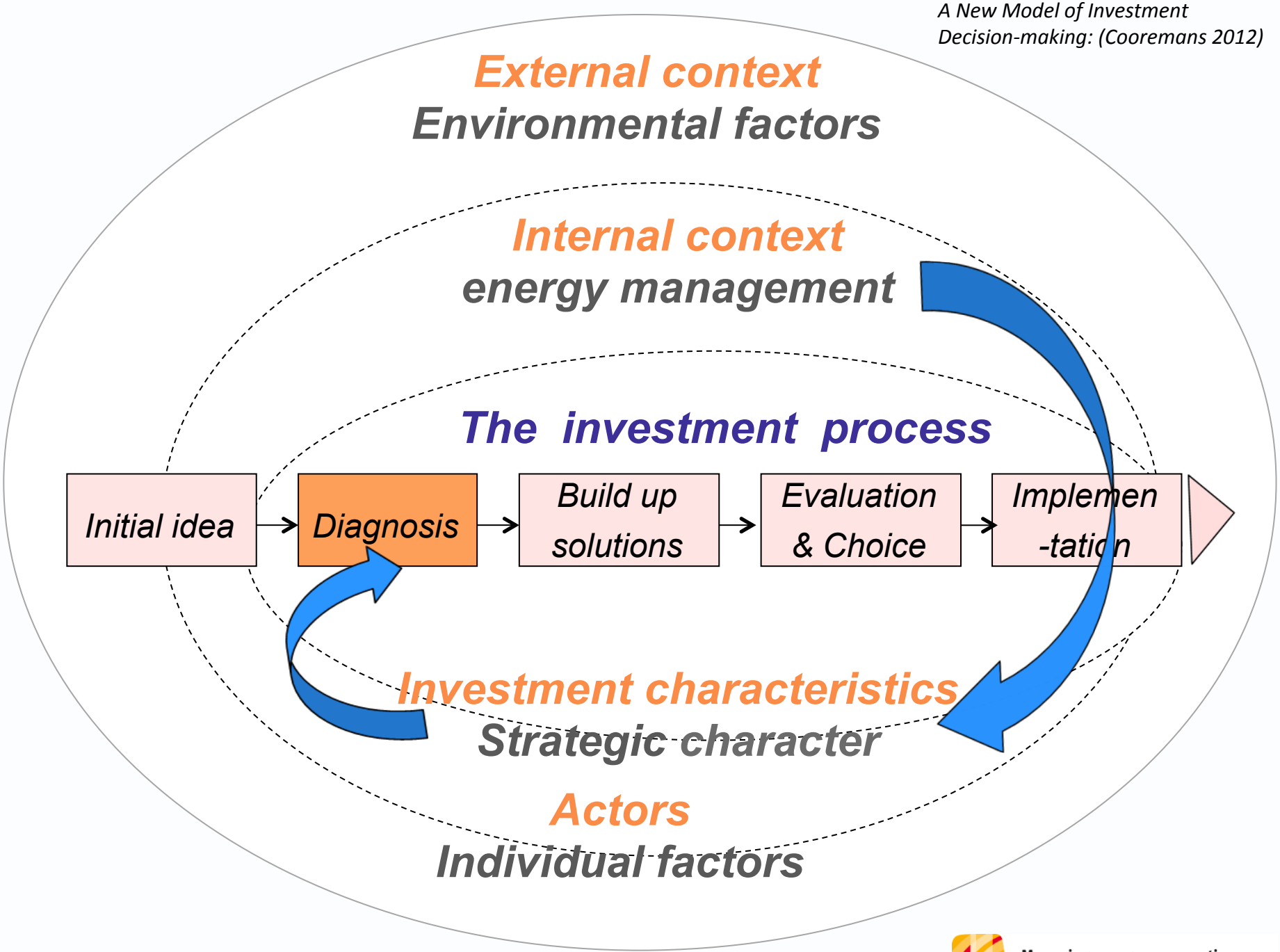
Conceptual framework: Investment decision-making

According to mainstream, investment decision-making is driven by profitability assessment analysis. Profitability is key.



Conclusion : not observed in real life

A New Model of Investment Decision-making: (Cooremans 2012)



Definitions

- **Energy Management System - EnMS**

  Set of interrelated or interacting elements to establish an energy policy and energy objectives, and processes and procedures to achieve those objectives

  (ISO50001 – Art. 3.9 – Terms and definitions)

- **An investment is strategic**

  if it contributes to create, maintain or develop a sustainable competitive advantage

  (Cooremans, 2011)

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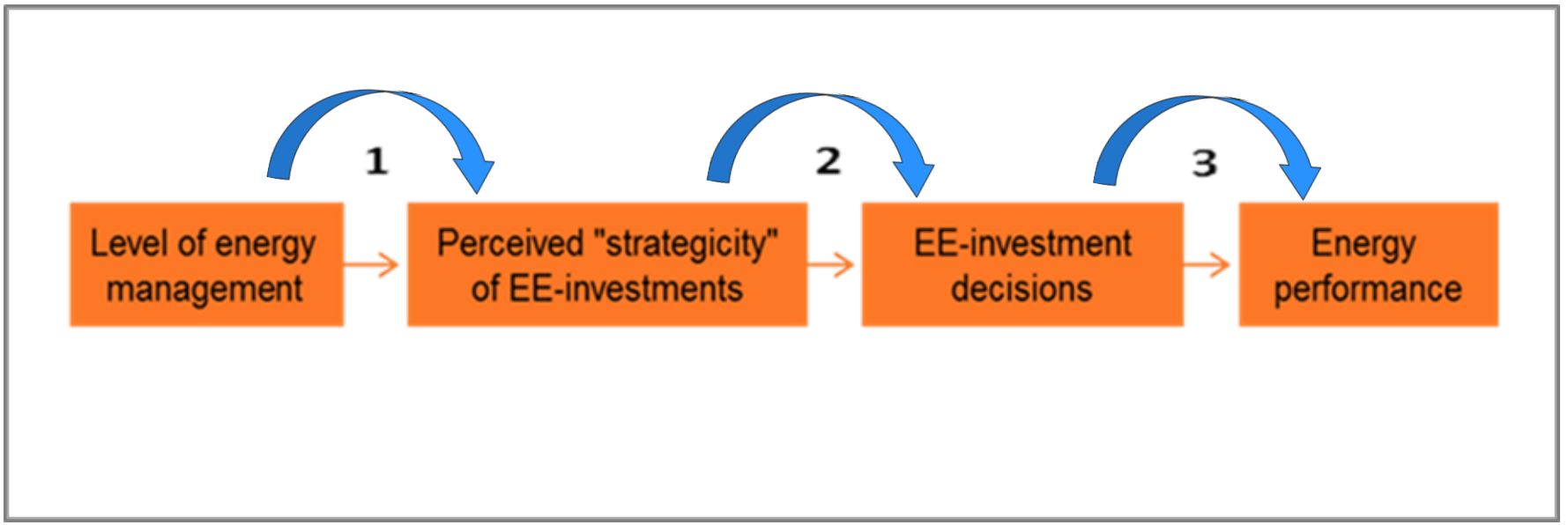
empirical research

M_Key research model:



- 3 relationships of influence
- 4 research questions
- 8 hypotheses

Methodology

- **Survey**:

➢ Population: approx. 10.000 Swiss large-scale energy consumers (for profit) i.e. sites or establishments consuming more than 0.5 GWh/year of electrical energy and/or 5 GWh/year of thermal energy.
= about 35% of the total Swiss electricity consumption.
All types of businesses – Secondary & tertiary sectors.

➢ Sample: 2'040 contacted (11 cantons) - 201 answers

➢ Strict anonymity - help of cantonal energy offices + federal agencies

- **Interviews**: 30
- **Case studies**: 5

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Preliminary results

Energy management level

Energy Management Level	Score	Scale
Energy intensity Which percentage do your energy consumption total costs represent in : - Percentage of your general expenses (%) - Percentage of your turnover (%)	2	2 pts if at least 1 answer
Did your company make a commitment of a continuous reduction of its energy consumption	2	yes = 2 / no = 0
Did your company undertake any of the following tasks in relation with energy use : - Evaluation of energy performance (benchmarking)	1	yes = 1 / no = 0
- Definition of baseline	1	yes = 1 / no = 0
- Definition of key performance indicators	2	yes = 2 / no = 0
- Definition of energy policy	1	yes = 1 / no = 0
- Setting of measurable goals regarding energy consumption reduction	1	yes = 1 / no = 0
- Definition and setting of measures to reach the goals defined	1	yes = 1 / no = 0
- Data collection regarding goals achievement	1	yes = 1 / no = 0
Which ressources have been allocated to energy-efficiency measures implementation : - Human resources (i.e. project team)	1	yes = 1 / no = 0
- Technical resources (i.e. meters)	1	yes = 1 / no = 0
- Electronic resources (i.e. software)	1	yes = 1 / no = 0
Energy manager : - Does the company have an energy manager	2	yes = 2 / no = 0
- Does the energy manager perform other functions in your company	0	yes = -1 / no = 0
- If yes, which one	--	
Does your company establish an internal communication on energy issues	1	yes = 1 / no = 0
Did your company organize the following systems and procedures in relation with its energy policy: - Training system for staff	1	yes = 1 / no = 0
- Reward system	1	yes = 1 / no = 0
- Monitoring system of the results in goals reaching	1	yes = 1 / no = 0
- Revising goals procedure	1	yes = 1 / no = 0
TOTAL	22	Maximum score = 22 pts

Energy management level

- Average score is 10,7 points out of a maximum of 23 points.
- No significant differences between industrial sector (128 firms, including construction) and services sector (73 firms), in terms of average score.
- 50% of the 201 respondent firms have designated an energy manager but all of them (but 10) manage energy issues on a part time basis only.
- Results = similar to those of Cooremans' survey 2006-2007 (Cooremans, 2012)

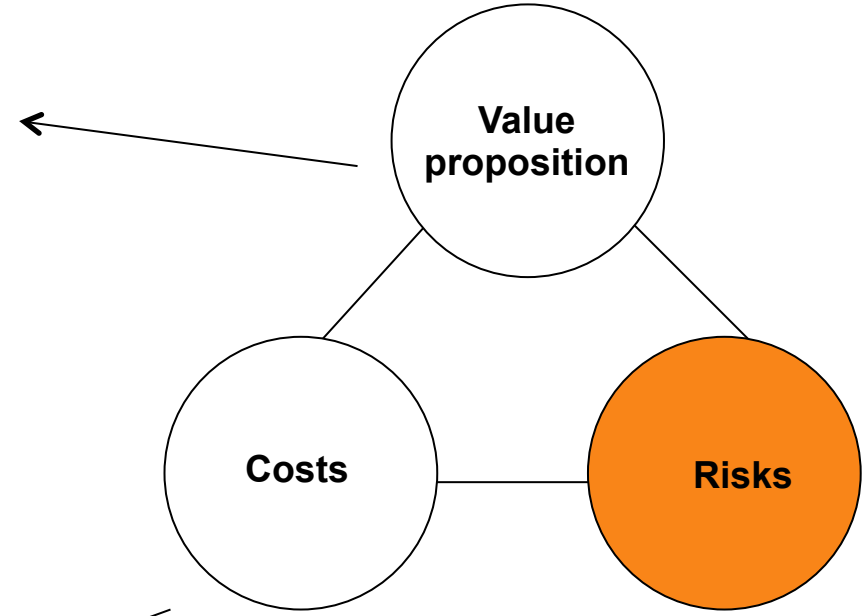
Energy intensity

- Average electricity intensity*: 2,9% (147 answers).
- Average energy intensity*: 4% (110 answers).
- Higher electricity intensity in service sector (3,8% - 45 observations), than in industrial sector (2,5%).

(*Electricity or energy costs as a percentage of turnover).

Investment "strategicity"

Value for customers



Borne to create the value proposition

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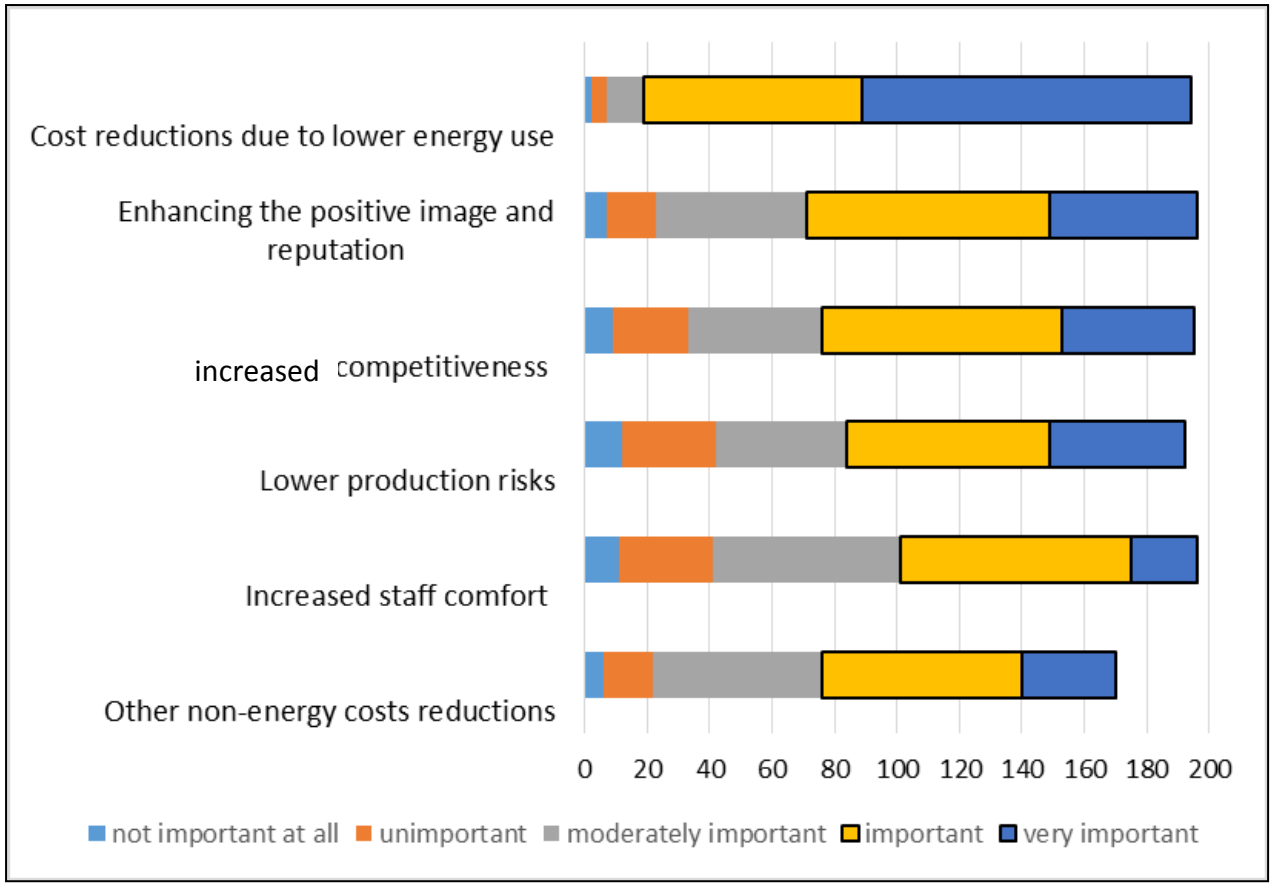
The 3 dimensions of competitive advantage

Important or very important **drivers** of energy-efficiency investment



- Energy-cost reductions: 90%
- Non-energy cost reductions: 55%

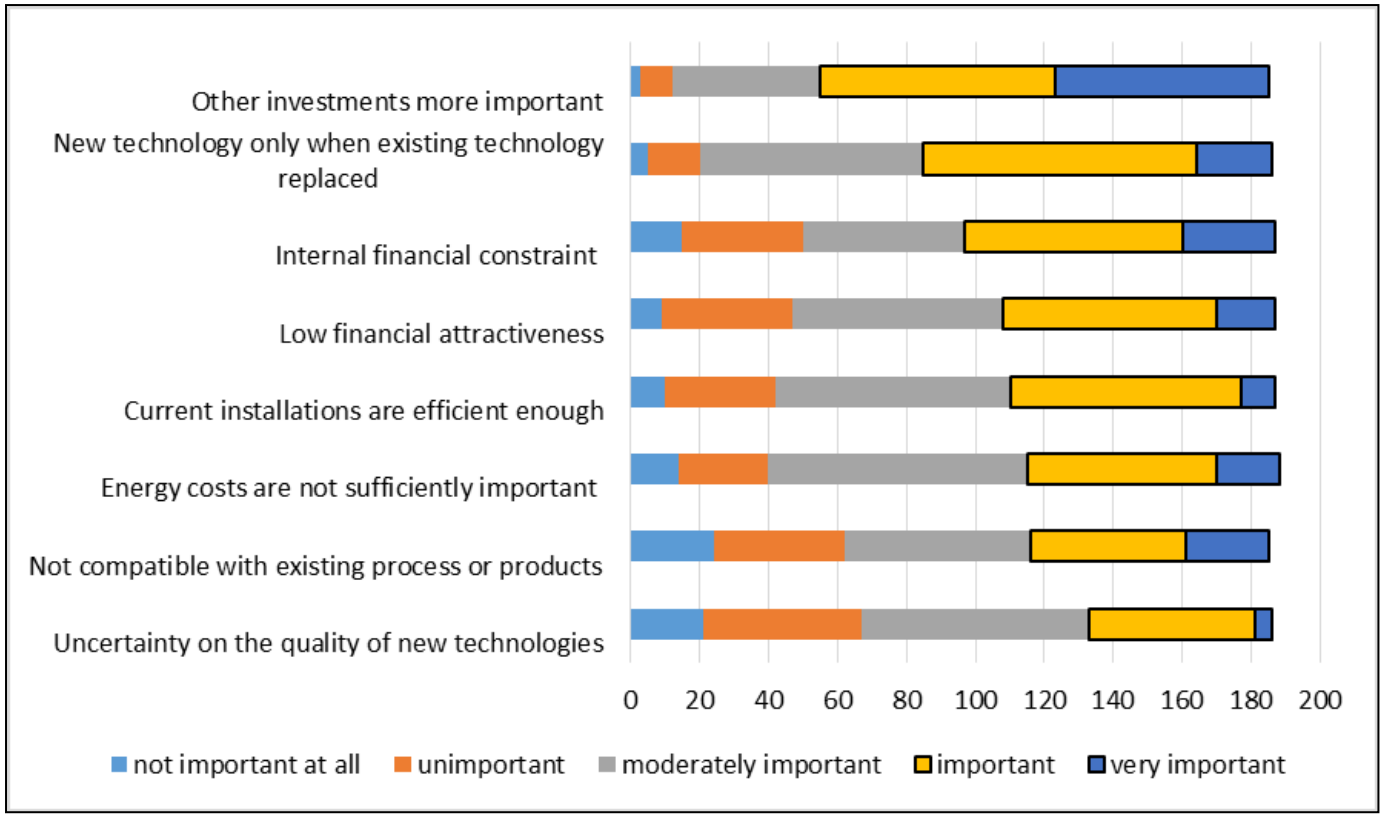
“Strategicity” of energy-efficiency investment

- Increased competitiveness = a driver for 61%
- Energy cost reduction = the 1st driver
  of energy-efficiency investment decision-making (175 out of 194 firms consider cost savings as an “important or very important” driver).

BUT:

- Investment subsidies = a driver only for 42.5% and tax breaks only for 39%.

Important or very important barriers to energy-efficiency investment



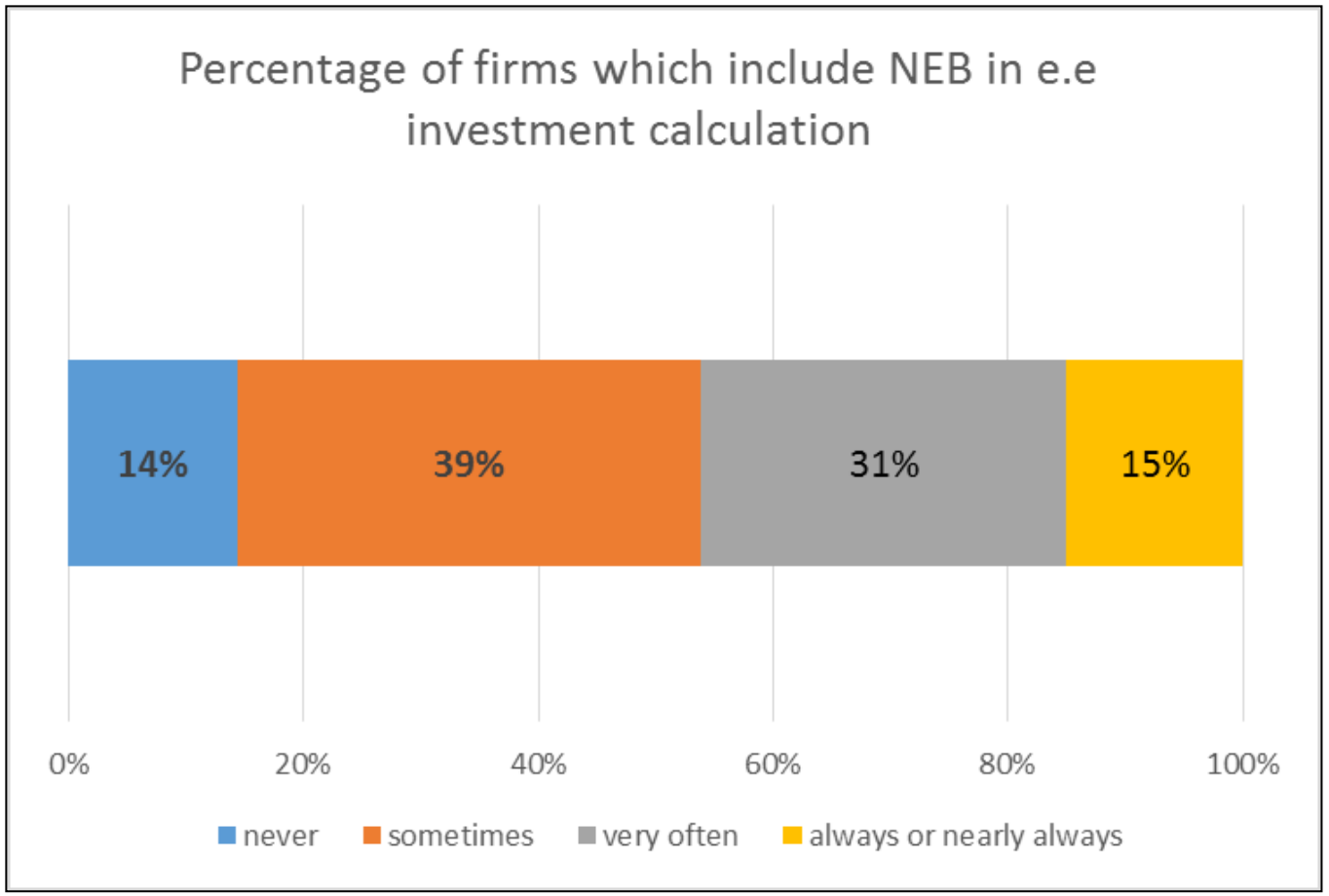
- Other investment more important: 70%
- Financial constraints - internal: 48% - external: 18.5%
- Low financial attractiveness: 42%
- Energy costs not important enough: 39%

Financial practices

	yes	no	total
Simple payback (payback period)	144	20	164
Net present value NPV	25	99	124
Internal rate of return (IRR)	34	94	128

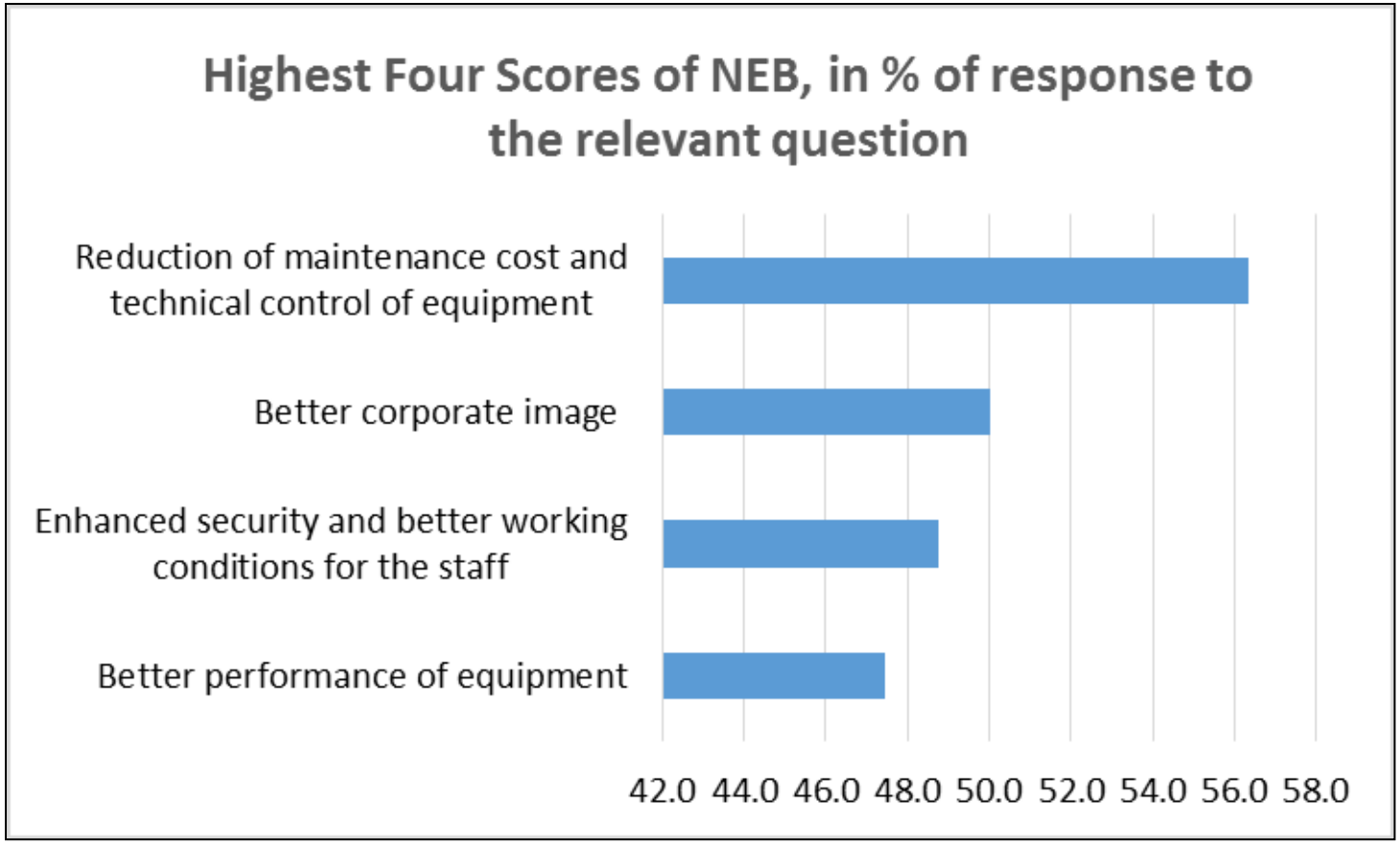
20-25% companies only apply NPV and/or IRR to assess energy-efficiency investments, which is different from their financial practices regarding “general investment” evaluation.

Non-energy benefits



53% of companies rarely or never include NEBs in their investment calculations

Non-energy benefits



Discussion

Discussion I

- Energy cost reduction is described as the first driver of ee investments (as usual) but energy costs are not high enough to be a powerful driver, and resources (capex) are allocated to *more important* investments.
- Subsidies and tax rebates are not perceived as important: why?
- Restrictive financial methods and criteria (PB) probably illustrate the low strategic character of ee investments and a lack of financial competences of engineers in charge of framing investment projects.
- Non-energy cost reduction is generally not taken into account in financial calculations.

Discussion II

- EE investments' contribution to core business and competitiveness perceived as drivers moderately important or important for 45-60% of companies.

  But NEBS (which significantly raise ee investment contribution to value-costs-risks competitiveness) are rarely or not taken into account in investment asessment (qualitative / quantitative) by 53%.
- Energy management level is very moderately correlated with strategicity level and investment level.
- 35-40% of the respondents see no impact on competitiveness or profitability of ee investments. 30% are not able to evaluate the impact.

Conclusions

- Huge diversity between companies.
- Relationship of influence not observed yet and few hypotheses confirmed.
- However results enable comparison with previous studies and give the first extensive picture of Swiss large-scale energy consumers and of their ee investment practices.
- More answers to the questionnaire are needed (2nd wave of sending now).
- More analysis is needed.

Thank you!

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