Energy management: a key driver of energy-efficiency investments?

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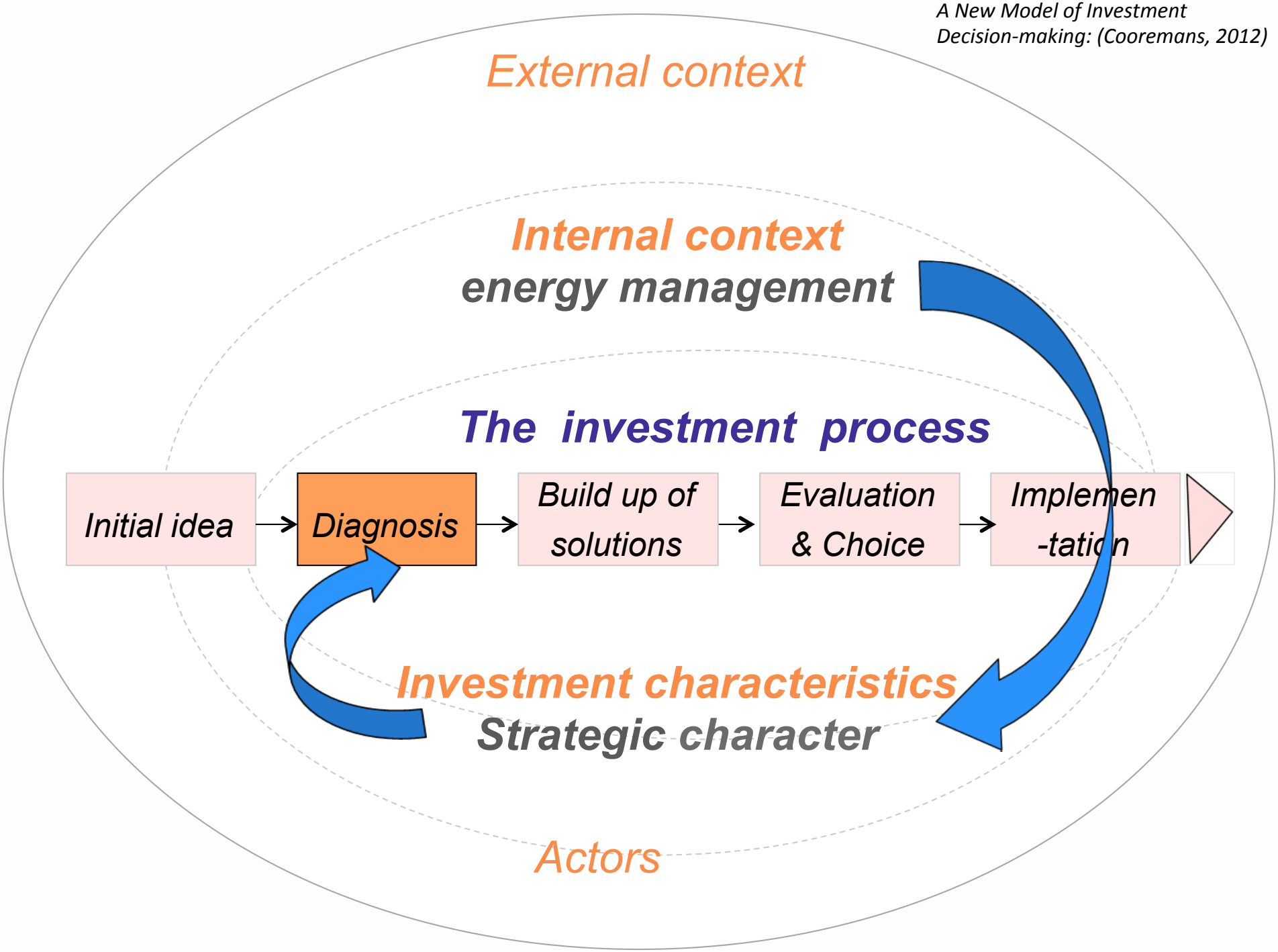
IMPACT ENERGY

Outline

1. Conceptual framework
2. Empirical research
3. Results
4. Discussion
5. Conclusions and policy recommendations

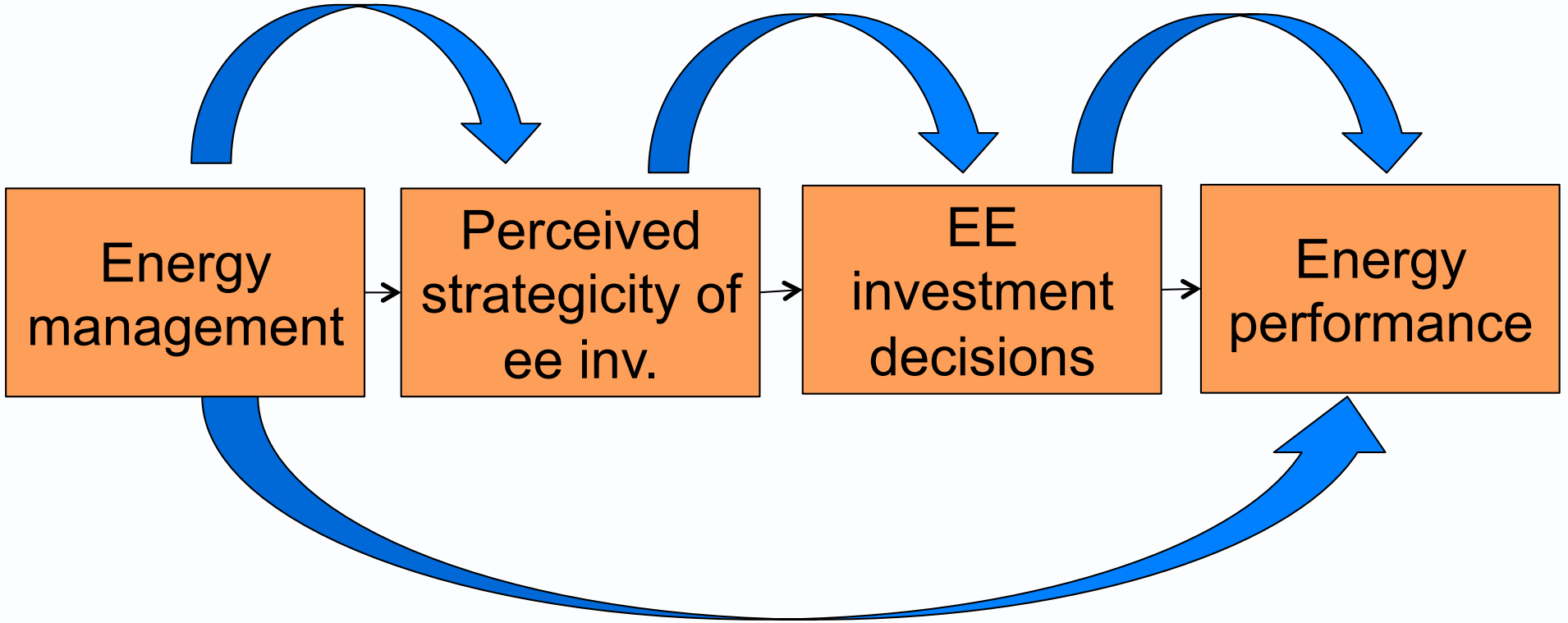
Conceptual framework: Investment decision-making

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



M_Key
empirical research

M_Key research model:



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

A set of interacting elements
to establish an energy policy and energy objectives, and processes and procedures to achieve those objectives
(ISO50001 – Art. 3.9)

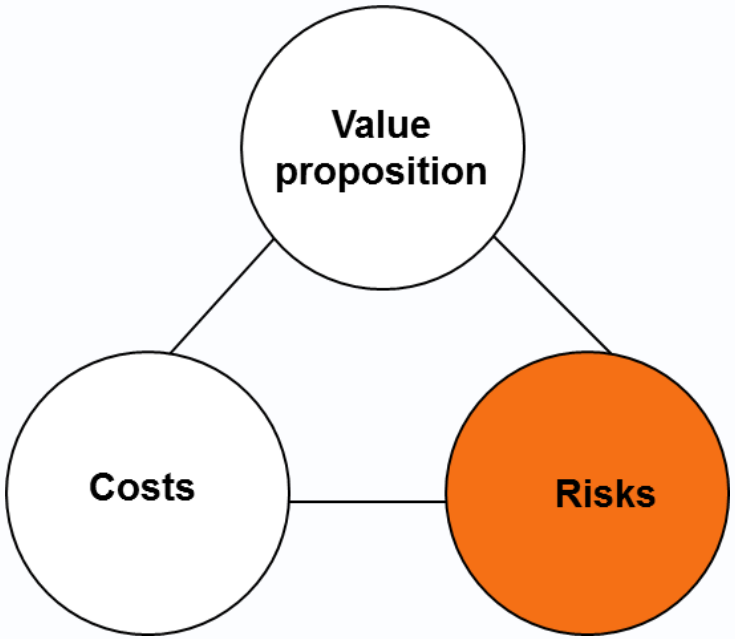
Energy management level:

23 points max.

20 questions

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

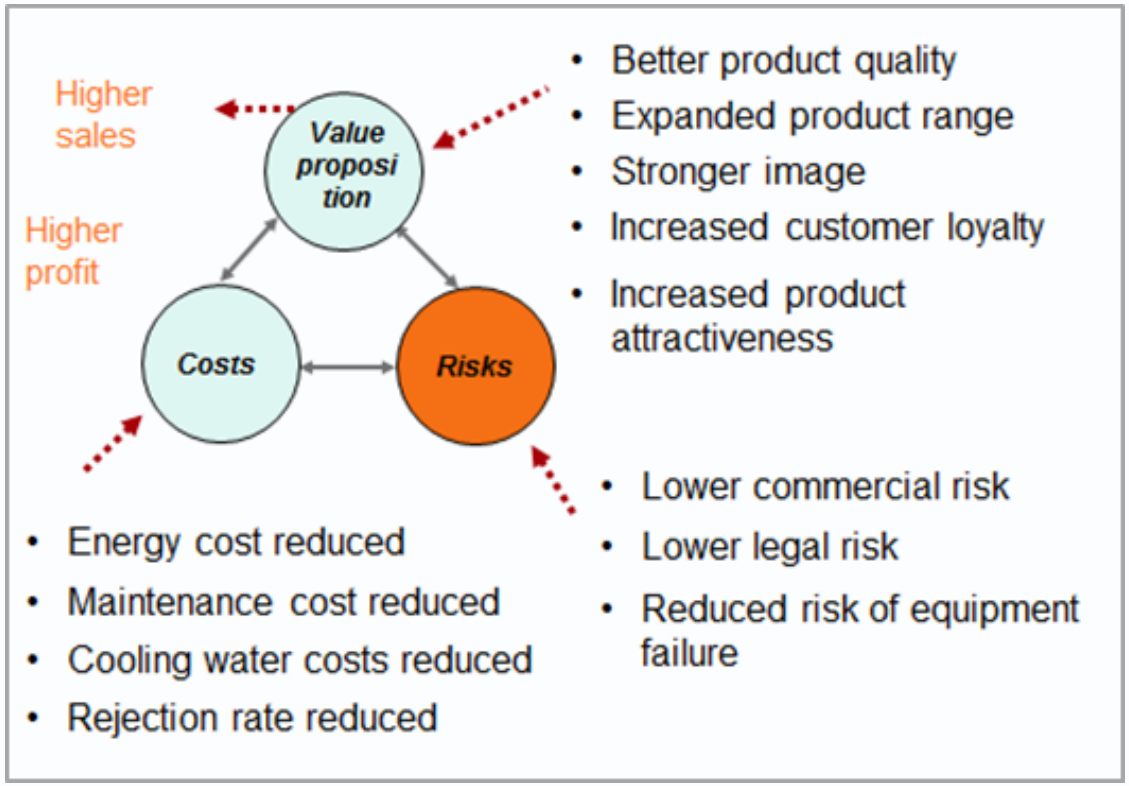
An investment is strategic if it contributes to create, maintain or develop a sustainable competitive advantage (Cooremans, 2011)



The 3 dimensions of competitive advantage

Example of a Swiss SME active in surface treatment of metal objects (electronic galvanizing)

EE action: rectifiers replacement



Source: energy audit program canton of Vaud – Greenwatt auditor

Strategicity level:

40 points max.

8 questions

Lykert scale (1 (totally unimportant – 5 extremely important)

drivers of investment decision	**Lykert scale**
Cost reductions resulting from lower energy use	1-5
Enhancing positive image and reputation	1-5
Lower production risks	1-5
Other non-energy costs reductions	1-5
Higher quality/reliability of products and/or production process	1-5
Lower energy price risks (instability)	1-5
Lower risk of disruption in energy supply	1-5
Increased customers comfort (e.g. commercial surface)	1-5
Total	8 - 40

Methodology

- 10.000 Swiss for-profit large-scale energy consumers
- “Gros consommateurs” = 0.5 GWh of electricity and/or 5 GWh of thermal energy per year
- 35% of total Swiss electricity consumption.
- All types of businesses
- Secondary and tertiary sectors

3 Levels of empirical research:

- Survey: 305 companies (out of 3’070 contacted in 11 cantons) – 38 questions
- Interviews: 26 companies
- Case studies: 5 companies (on-going)

Respondent: energy “manager”

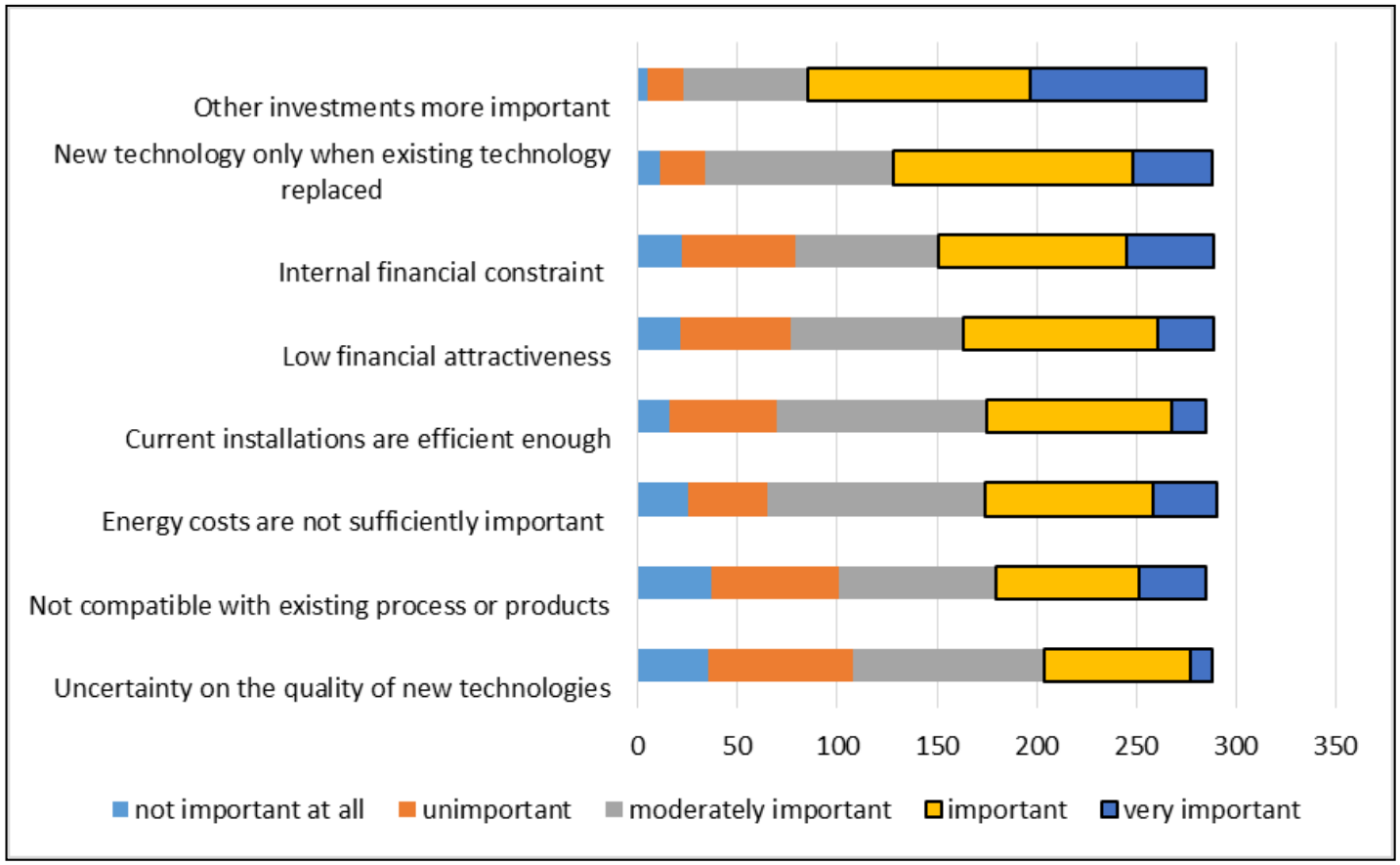
M_Key
results

Energy intensity

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

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

Barriers to energy-efficiency investment



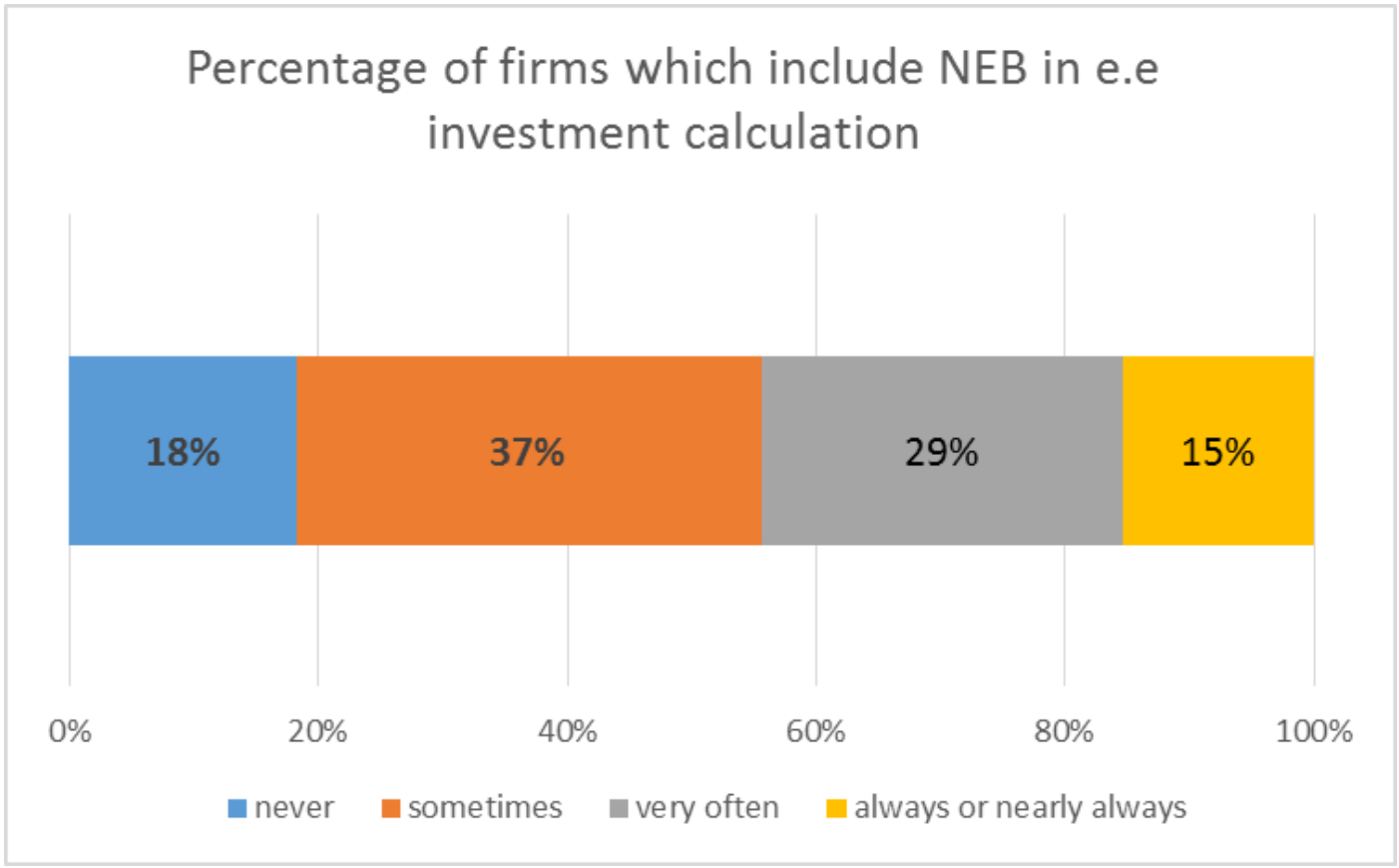
- Other investment more important: 70%
- Financial constraints - internal: 48% - external: 18.5%
- Low financial attractiveness: 44%
- Energy costs not important enough: 40%

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

DRIVERS	Percentage of "important and very important driver" for responding firms	Number of respondents
Cost reductions due to lower energy use	88.0%	299
Rising competitiveness	62.4%	295
Enhancing the positive image and reputation	61.7%	298
Lower production risks	52.0%	294
Other non-energy costs reductions	51.5%	264
Higher quality and reliability of products and processes	45.7%	293

- Energy-cost reductions: 88%
- Impacts on other costs, risks, and quality and reliability assessed : 62-46%

Non-energy benefits



55% of companies rarely or never include NEBs in their investment calculations

Financial practices

	yes	no	total
Simple payback (payback period)	224	31	255
Net present value (NPV)	42	146	188
Internal rate of return (IRR)	52	141	193
Total	318	318	

22-26% companies only apply NPV and/or IRR to assess energy-efficiency investments, which is different from their financial practices regarding "general investment" evaluation.

Energy management level

- Average score is 10,2 points
- Same average score in industry and services.
- 50% of the respondent firms have designated an energy manager but all of them (but 14) manage energy issues on a part time basis only.
- Results = similar to those of Cooremans' survey 2006-2007 (Cooremans, 2012)

“Strategicity” of energy-efficiency investment

- Increased competitiveness = a driver for 62%
- Energy-efficiency investments perceived as moderately strategic
- Contribution of ee investments to quality and reliability of processes: a driver for 46%
- MBs not taken into account in investment evaluations
- Lack of figures regarding MBs

Impact of energy-efficiency investments on companies' economic performance

- 20% evaluate a positive impact
- 40% see no impact of ee investments on their firm's economic performance.
- 35% are not able to evaluate the impact.

Discussion

Discussion I: the financial dimension

- Energy cost reduction is described as the first driver of ee investments

BUT

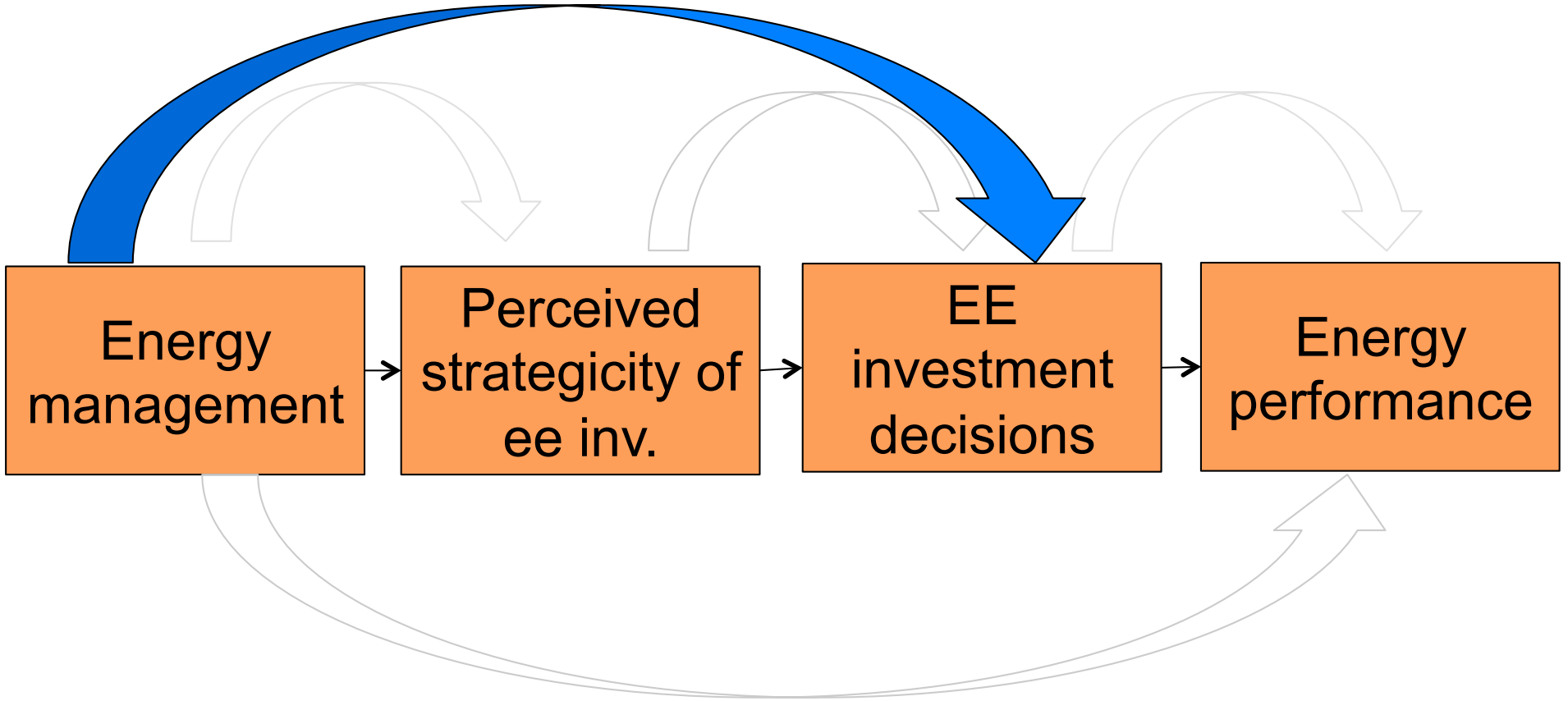
- Subsidies and tax rebates not perceived as important: why?
- Financial constraints not a major barrier
- Lack of investment profitability not a major barrier.
- Non-energy cost reduction is generally not taken into account in financial calculations.

Discussion II – The strategic dimension

- Other investments more important 1st barrier
- EE investments' contribution to core business and competitiveness moderately important or important to 45-60% of companies.
- But MBs are rarely or not taken into account
- Restrictive financial methods and criteria (PB) probably: low strategic character of ee investments and a lack of financial competences of engineers in charge of framing investment projects.

Discussion III – Energy management

- rather low on average
- Companies' size matters
- Does not increase strategicity of investment
- A tool to better inform decision-makers
- But lack of monitoring tools


Energy management
Perceived strategicity of ee inv.
EE investment decisions
Energy performance

Conclusions
and
policy recommendations

"The energy manager is responsible for the project design and he has to find all the possible levers [to sell the project to the top management].

We have to get out of the technical aspects because they do not understand them. The project must be related to the company's strategic objectives (for example, a perfect product quality is a strategic objective. Thus it must be emphasized that if chilled water production is changed, there will be no quality problem in the future).

The energy manager must put "a nice knot around the project". However, we can put forward only indisputable arguments, with a solid basis so that "[management] people cannot challenge it".

- Huge diversity between companies.
- The first extensive picture of Swiss large-scale energy consumers and of their energy-efficiency investment practices.
- More analysis and research is needed.

Policy recommendations

- Increased transparency and reduced complexity of supporting and regulatory schemes
- Promote improvement of monitoring systems
- Promote MBs in projects evaluations

Thank you!

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