



Is management a key driver of energy performance? (preliminary results)

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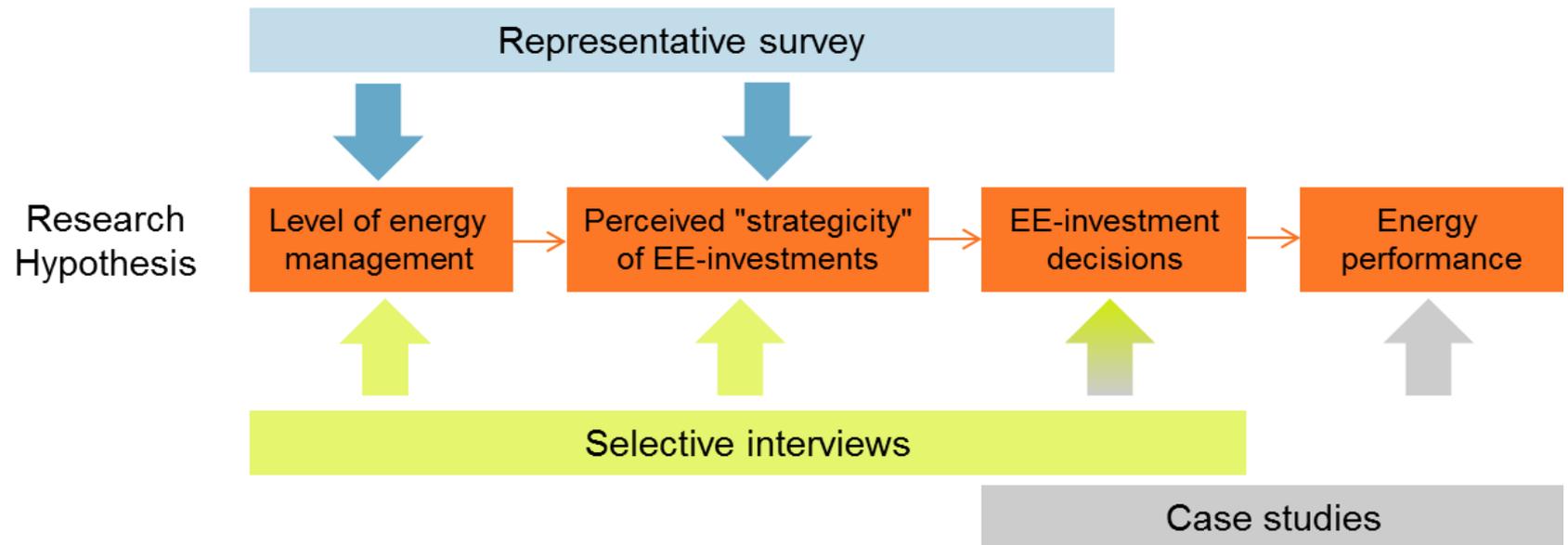
Content

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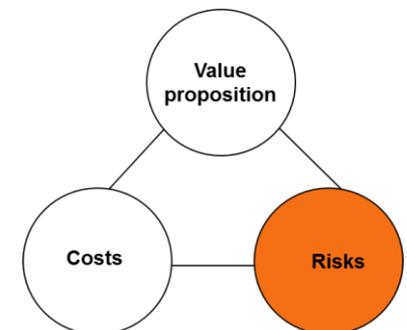
Management as a Key Driver of Energy Performance (M_Key)

- Swiss research project 2015 - 2017
- Part of the National Research Programme "Managing Energy Consumption" (NRP 71) of the Swiss National Science Foundation (SNSF)
- Project partners:
 - 
 - 
UNIVERSITÉ DE
NEUCHÂTEL
Institut de
recherches économiques
 - 
- Target companies:
 - industrial & services sectors
 - > 0.5 GWh/a electricity (large scale consumers)
- Final report with project results will be available by end of November 2017

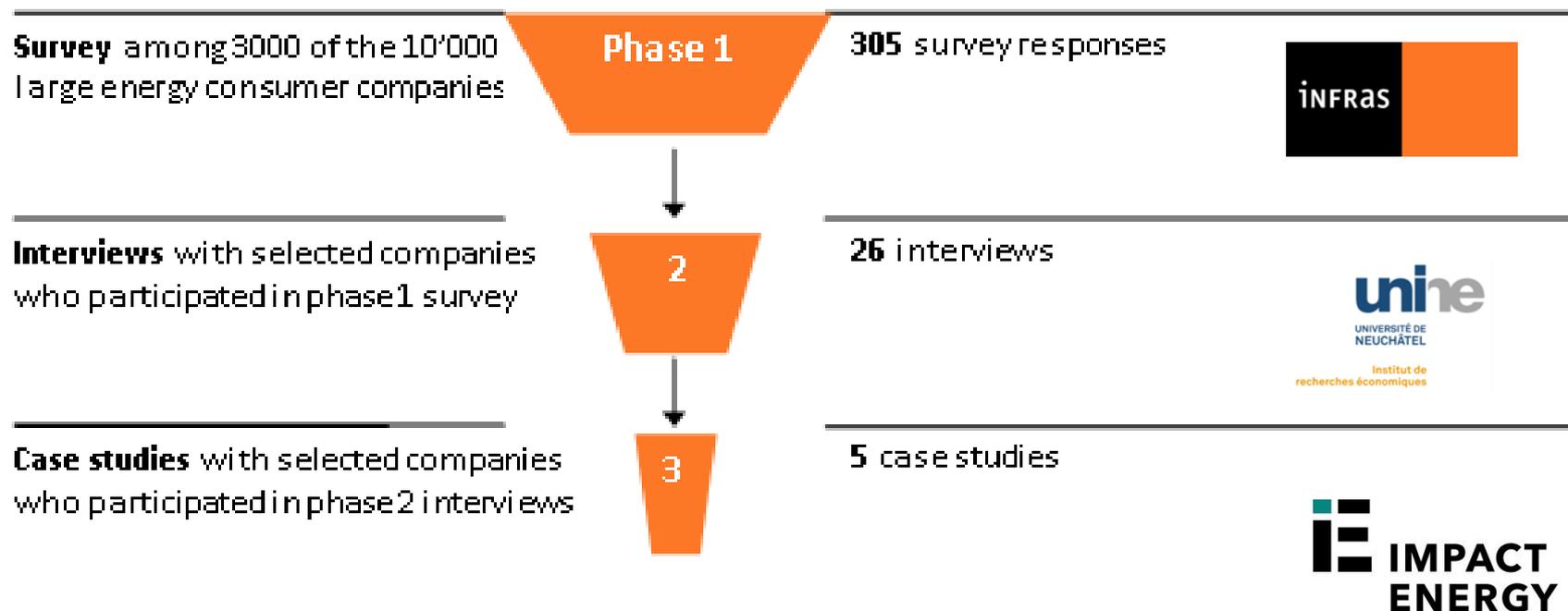
Research model*



*based on A Model of Investment Decision-making (Cooremans 2012)



Methodology

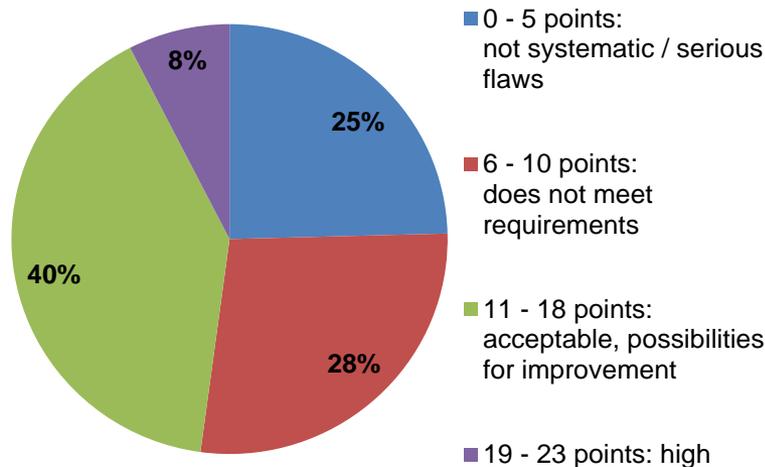


Preliminary results

Phase I: survey

Level of energy management

Level & quality of energy management system (0 to 23 points)



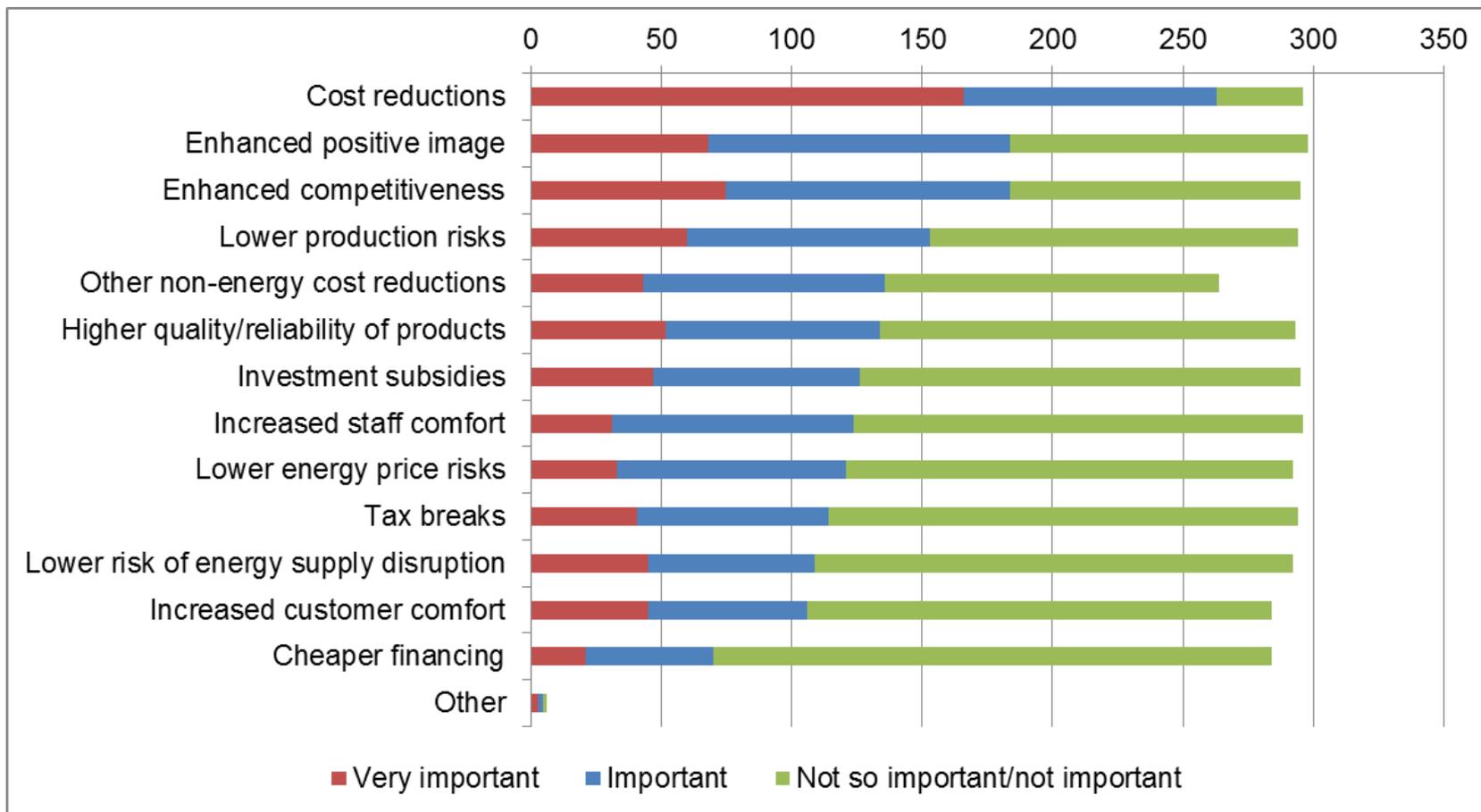
n = 305

- Average score: 10.3 points
- 50% have person to look after energy, full time only 14

Energy Management Level	Score	Scale
Energy intensity Which percentage do your energy consumption total costs represent in :		
- Percentage of your general expenses (%)		2 pts if at least 1 answer
- Percentage of your turnover (%)	2	
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 resources 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

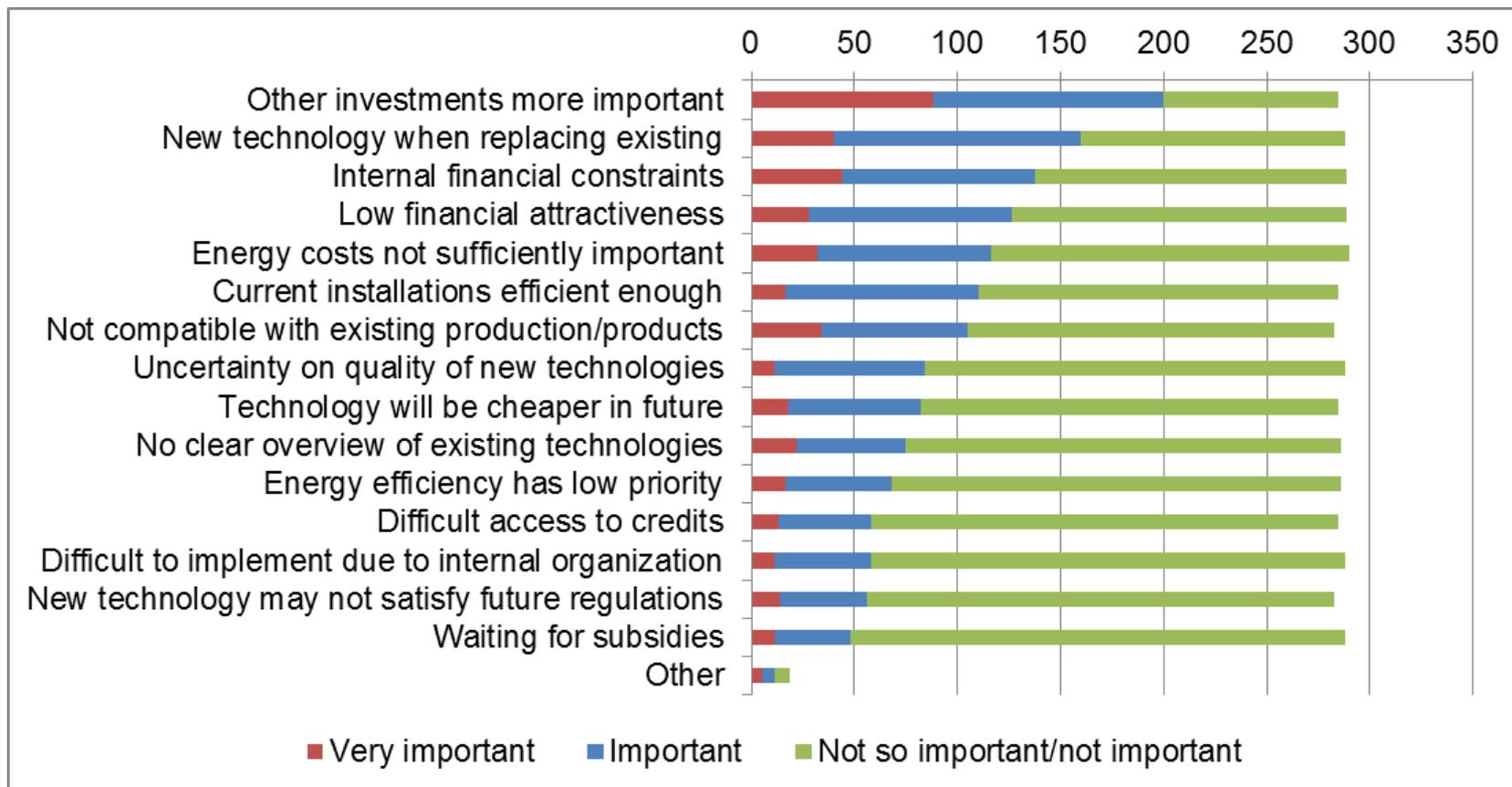
Phase I: survey

Drivers of energy efficiency investments



Phase I: survey

Barriers of energy efficiency investments



Phase II: interviews

Characteristics of 26 companies

Criteria		German part	French part	Total
Level of Energy Management*	"high" (19-23 points)	3	3	6
	"upper medium" (11-18 points)	9	0	9
	"lower medium" (6-10 points)	6	2	8
	"low" (0-5 points)	0	3	3
Size	> 10 GWh _{el} /a	5	4	9
	3-10 GWh _{el} /a	7	2	9
	0.5-3 GWh _{el} /a	6	2	8
Sector	Industry	11	6	17
	Services	7	2	9
Total		18	8	26

Phase II: interviews

Most mentioned reasons for EM* development



Font size indicates the number of mentions by companies

*EM: energy management

Phase II: interviews

Conclusions

Reasons for energy management development	Policy instruments / financial incentives	Sustainability policies / Corporate social responsibility (also SMEs)	People (motivation and collaboration, involvement of top management)
Role of energy management in the decision-making process	A tool for: data collection / potential analysis / project ideas	Fact based argumentation for project proposals	Monitoring of energy-efficiency projects' impact
Investment decision-making criteria	Profitability / Cost reductions	Priority of core business investments	Additional non-energy benefits
What determines the strategicity of energy-efficiency investments?	Core business defines strategic relevance of investments	Sustainability policies and market demand (customer expectations, investors) can make energy-efficiency more strategic	Finances are strategic relevant for companies. Low energy prices prevent energy-efficiency measures from becoming more strategic

Phase III: case studies

Methodology: on-site visit

Before

- Case study guide with questions
- Request for information:
 - Energy cost & consumption
 - List of implemented measures
 - Savings commitments, financial incentives

During

- Discussion based on case study guide
- Followed by factory visit with two efficiency experts

After

- Minutes of discussion
- Technical report with experts observations

Phase III: case studies

Characteristics of companies

General data	A	B	C	D	E
Level of energy management	4 low	9 lower medium	15 upper medium	19 high	19 high
Sector	services	industry	industry	industry	industry
Region	German	German	German	French	German
Size	medium	small	small	large	large
Product	photos, books, calendars, phone cases	cosmetics	yeast	aluminum sheet metal	pharmaceutical, chemical
Degree of competition in the sector	not so high	not so high	not so high	not so high	very high
Energy intensity (Energy cost/turnover)*	2-3%	1%	1.1%	10%	7-12% **
Energy cost (million USD/a)	0.5	0.2	0.2	12.9	57 to 78 **
Energy consumption GWh/a (thermal/fossil)	Gas 1	oil 0.4 wood 0.7 total 1.1	gas 2.8	gas 184	gas 466 steam (waste) 86 total 552
Energy consumption GWh/a (electric)	3.3	0.7	2.3	77	492 +48 own production total 540
Energy manager	1 part-time	1 part-time	1 part-time	1 energy manager (part-time) plus team	1 energy manager (part-time) and team of 6 people
Contact person(s)	1	1	1	3	4

*The definition of "energy intensity" is not used in the same way by the five companies: energy cost is compared to either total cost, turnover i.e. sales volume or gross value added. These data (total cost, turnover, gross value added) are kept confidential in most companies. Therefore the energy intensity values shown give an indication, however, the values are not directly comparable.

**Range in the last five years.

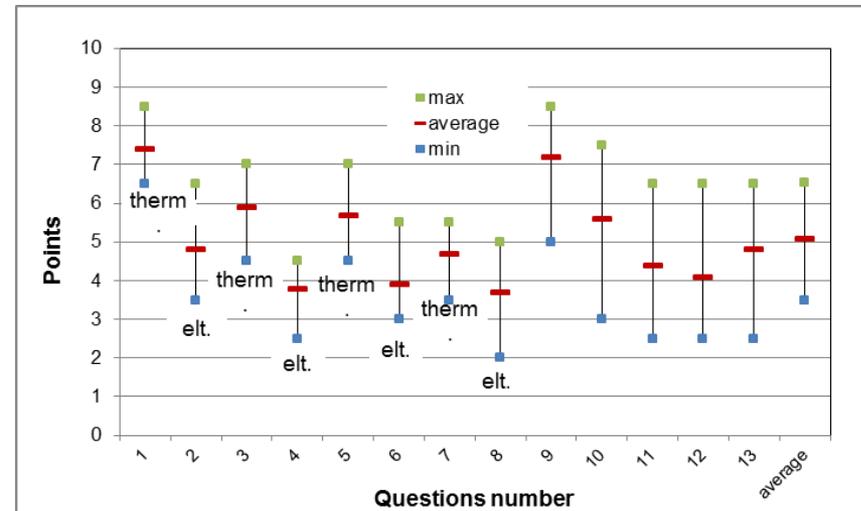
Phase III: case studies

Level of energy performance

Rating

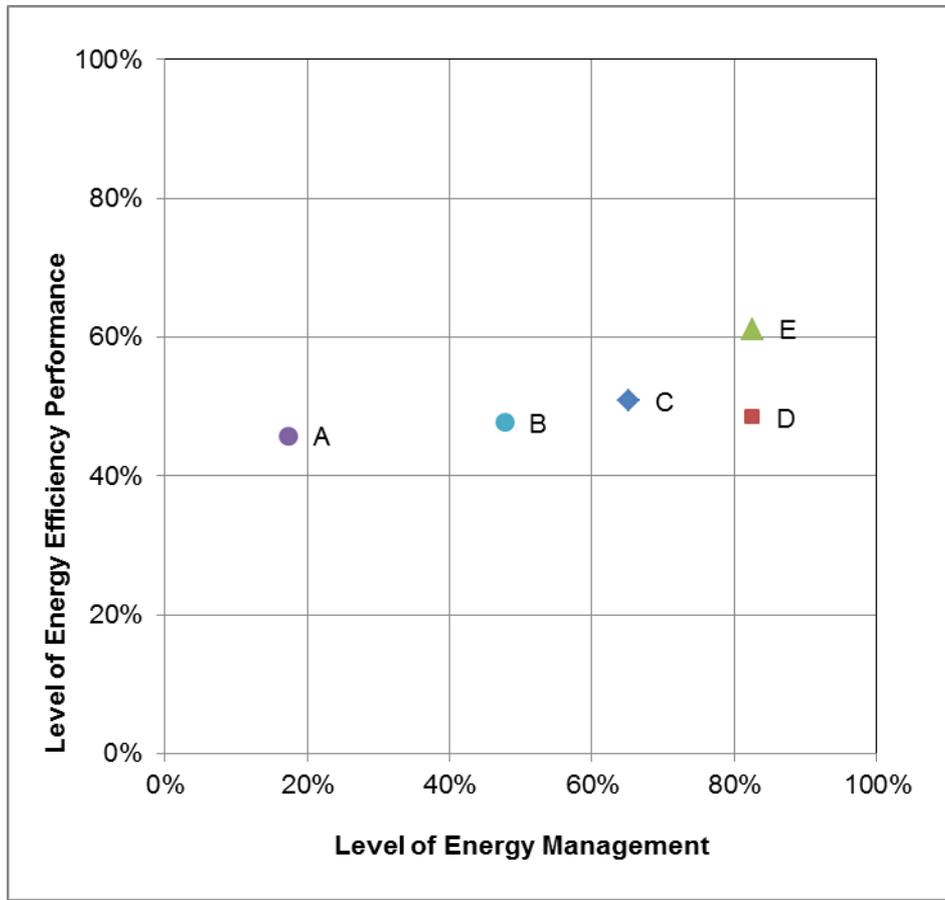
Level of energy efficiency performance							all		
Nr	Question	A average	B average	C average	D average	E average	min	median	max
1	Are all thermal processes and their energy efficiency potential analyzed?	6.5	6.5	8.5	7.0	8.5	6.5	7.0	8.5
2	Are all electric processes and their energy efficiency potential analyzed?	5.0	5.0	4.0	3.5	6.5	3.5	5.0	6.5
3	Is the implementation of the cost effective thermal efficiency measures planned systematically?	6.0	5.0	7.0	4.5	7.0	4.5	6.0	7.0
4	Is the implementation of the cost effective electric efficiency measures planned systematically?	4.5	4.0	2.5	3.5	4.5	2.5	4.0	4.5
5	Fraction of thermal measures implemented?	5.0	5.0	7.0	4.5	7.0	4.5	5.0	7.0
6	Fraction of electric measures implemented?	3.0	4.0	3.0	4.0	5.5	3.0	4.0	5.5
7	Do they have a good plan* for fossil measures for the next 5 years?	4.5	3.5	5.0	5.5	5.0	3.5	5.0	5.5
8	Do they have a good plan* for electric measures for the next 5 years?	3.5	3.5	2.0	4.5	5.0	2.0	3.5	5.0
9	Does the energy manager give the impression of being competent?	5.0	7.5	8.5	7.0	8.0	5.0	7.5	8.5
10	Did the company use external experts?	7.0	7.5	6.5	4.0	3.0	3.0	6.5	7.5
11	Did the company take individual measurements before a machine was changed?	3.0	2.5	5.0	5.0	6.5	2.5	5.0	6.5
12	Did the company take individual measurements after a machine was changed and compared with the outset?	2.5	2.5	4.5	4.5	6.5	2.5	4.5	6.5
13	Are the calculations for the effect of the energy efficiency measures shown in their plan plausible?	4.0	5.5	2.5	5.5	6.5	2.5	5.5	6.5
average		4.6	4.8	5.1	4.8	6.1	3.5	5.3	6.5
percentage		46%	48%	51%	48%	61%	35%	53%	65%

Thermal vs. electric



Phase III: case studies

Level of energy performance vs.
level of energy management



Phase III: case studies

Observations (1)

- High energy-intensity: motivation for keeping energy costs low
- Energy efficiency is considered in investments, but not a priority
- Investment category «energy efficiency» in 2 of 5 companies
- SMEs depend on external know-how, large companies not
- Low electricity & energy prices create disincentive
- Focus on fossil energy
- Goal setting of target agreements useful
- No revision of planned measures during target agreement period

Phase III: case studies

Observations (2)

Monitoring & verification

- Companies claim: results as expected – how do they check?
- Challenge: influencing factors (production & weather changes)
- No Key Performance Indicators comparable over time

Financial incentives

- Keep admin costs at minimum
- Free rider effect?
- SMEs not aware

Overall conclusions & Policy recommendations (preliminary)

Phases I to III

Overall conclusions

■ Energy management

- The higher the perceived strategicity of energy, the higher the level of energy management
- Instrument for identification and implementation of energy-efficiency investments
- Driver in large companies: top down (through sustainability strategy)
- Driver in SMEs: bottom up through (energy manager)

■ Laws & regulations

- Trigger companies' investments into energy efficiency
- Particularly effective to gain top management support

Phases I to III

Policy recommendations

1. Energy managers
 - Training
 - Better define position, including tasks and duties
2. Qualified external know how and support for:
 - Initial analysis
 - Identification of potentials
 - Implementation of energy efficiency improvements
 - Follow-up (systematic and improved monitoring of energy savings)
3. Information and tools
 - Raise top management support
 - Non-energy benefits*
 - Financial incentives
4. Financial support to promote establishment of energy management
5. Improved/new policy instruments
 - Mandatory regular audits
 - Increase prices for conventional energy sources through taxes

*e.g. improved product quality, increased productivity, reduced production time/losses, reduced maintenance cost, increased workplace comfort/safety, reduced GHG emissions.

Thanks for your attention!

Questions?

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