Organizational perspectives on adoption of energy efficiency measures in Swedish multi-storey apartment buildings

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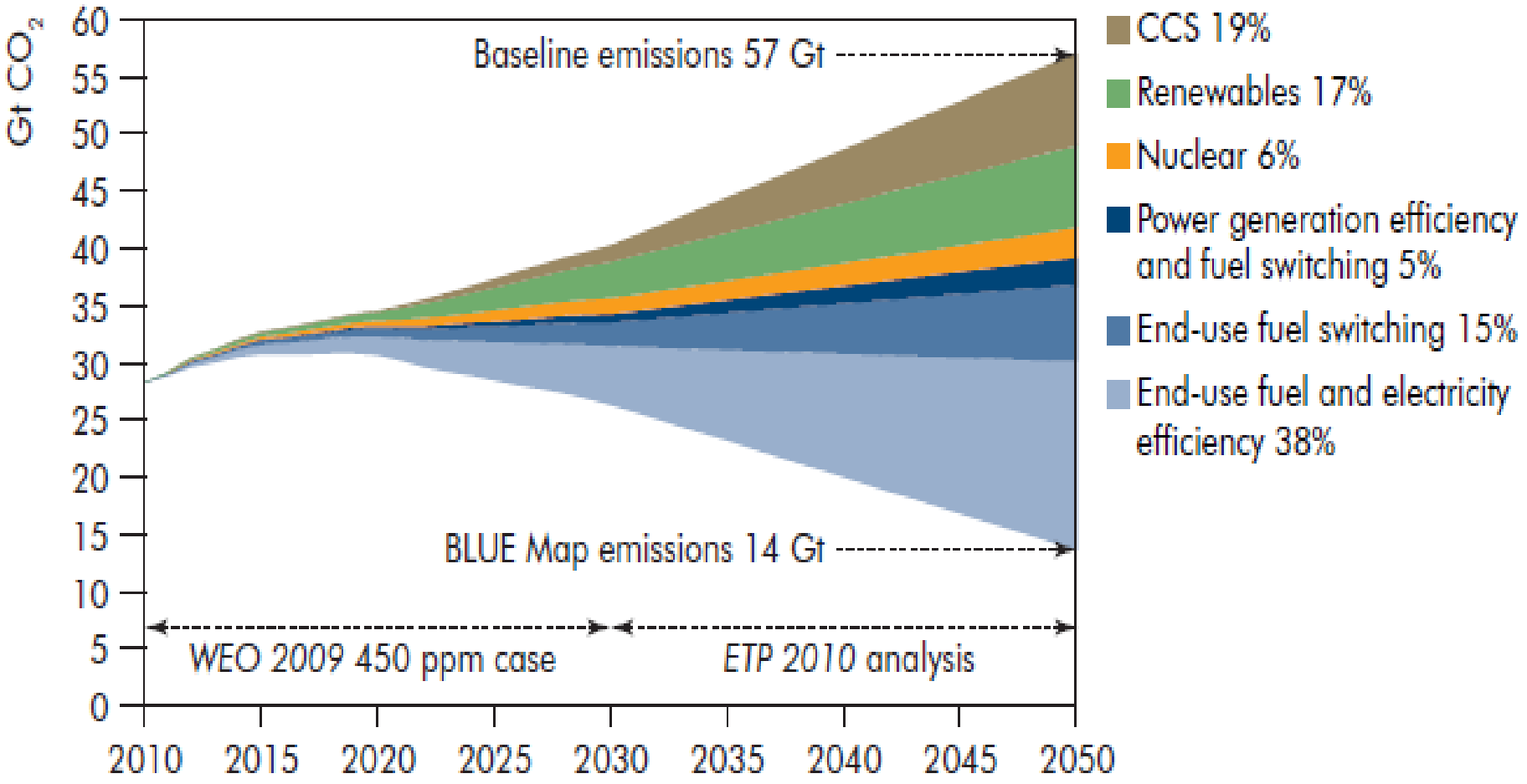
Role of energy efficiency in mitigation of climate change



IEA, 2010

Energy efficiency improvements

- A large number of energy efficiency measures are widely available which provide net benefits (IPCC, 2007)

However

"Nine out of ten technologies that hold potential for energy and CO_2 emissions savings are failing to meet the deployment objectives needed to achieve the necessary transition to a low-carbon future." (IEA, 2012)

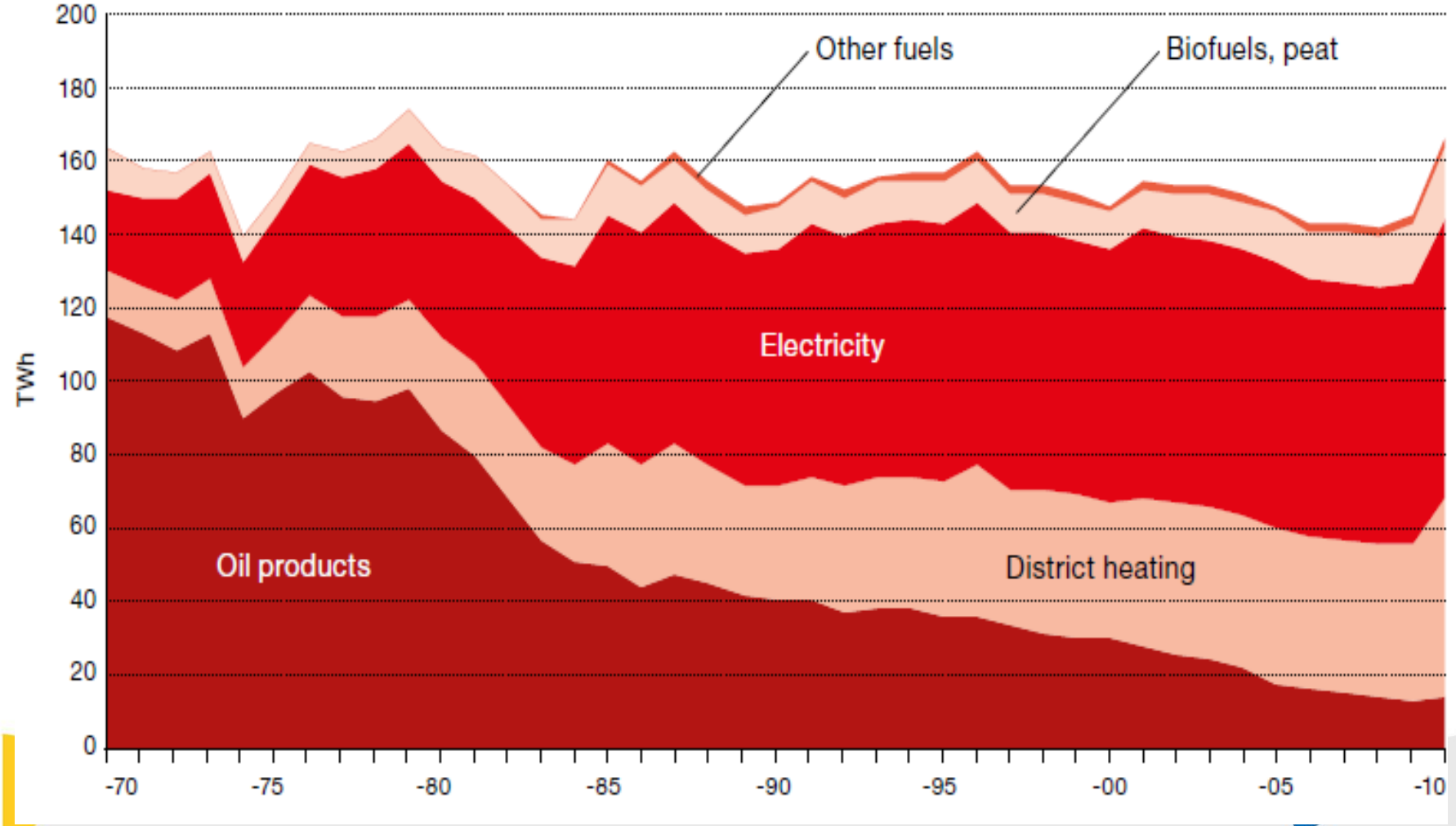
To address the energy efficiency gap....

- “An improved understanding of the human dimensions of energy consumption, particularly in the residential and commercial sectors... will help policy makers to catalyse technology-based energy savings” (IEA, 2012)

Energy use in Swedish residential sector

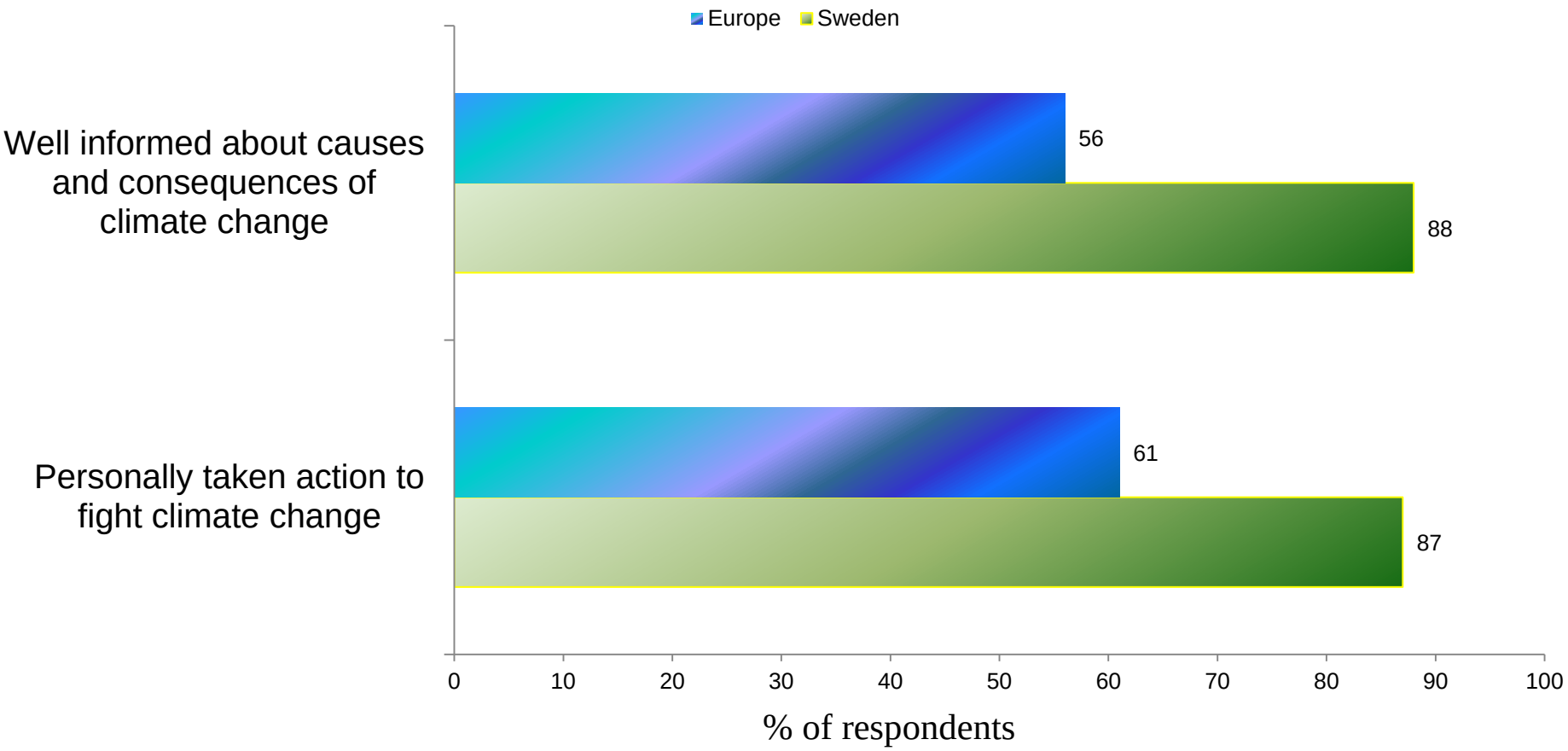
- The final energy use for residential and service sectors in 2010 was 166 TWh (40% of the national final energy use)
- Approximately 60% of the sector's energy use is for heating and hot water
- Addition of new houses to the existing stock happens slowly
- Government target: to reduce energy use/heated floor area by 50% from 1995 to 2050
- Various policy instruments are used to encourage building owners to adopt energy efficiency (EE) measures

Final energy use in residential and service sector – 1970-2010 (TWh)



Source: Swedish Energy Agency, 2011

Attitude towards climate change



Source: Europeans' attitudes towards climate change; Eurobarometer, 2008

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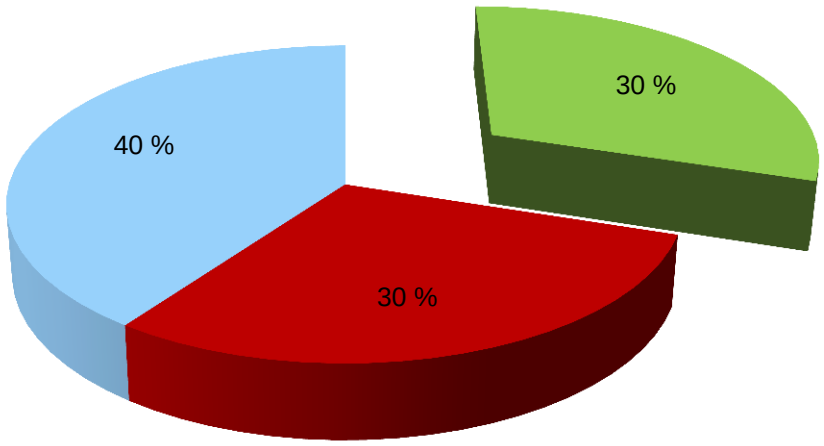
Multi-family apartments

- Sweden has about 2.5 million multi-family apartments
- Heated floor space in 2010 was about 180 million m^2
  - 85% apartments are heated by district heating system
- Owenership of multi-family apartment apartment buildings



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Co-operative housing associations in Sweden

- Tenant-Ownership
- Approximately 26500 co-operative housing associations
- Executive board headed by chairperson makes decision
- Chairperson and board members are elected from apartment owners

Objective and Methodology

Overall Objective

- To better undersand the co-operative housing associations adoption practices of energy efficiency measures in their buildings

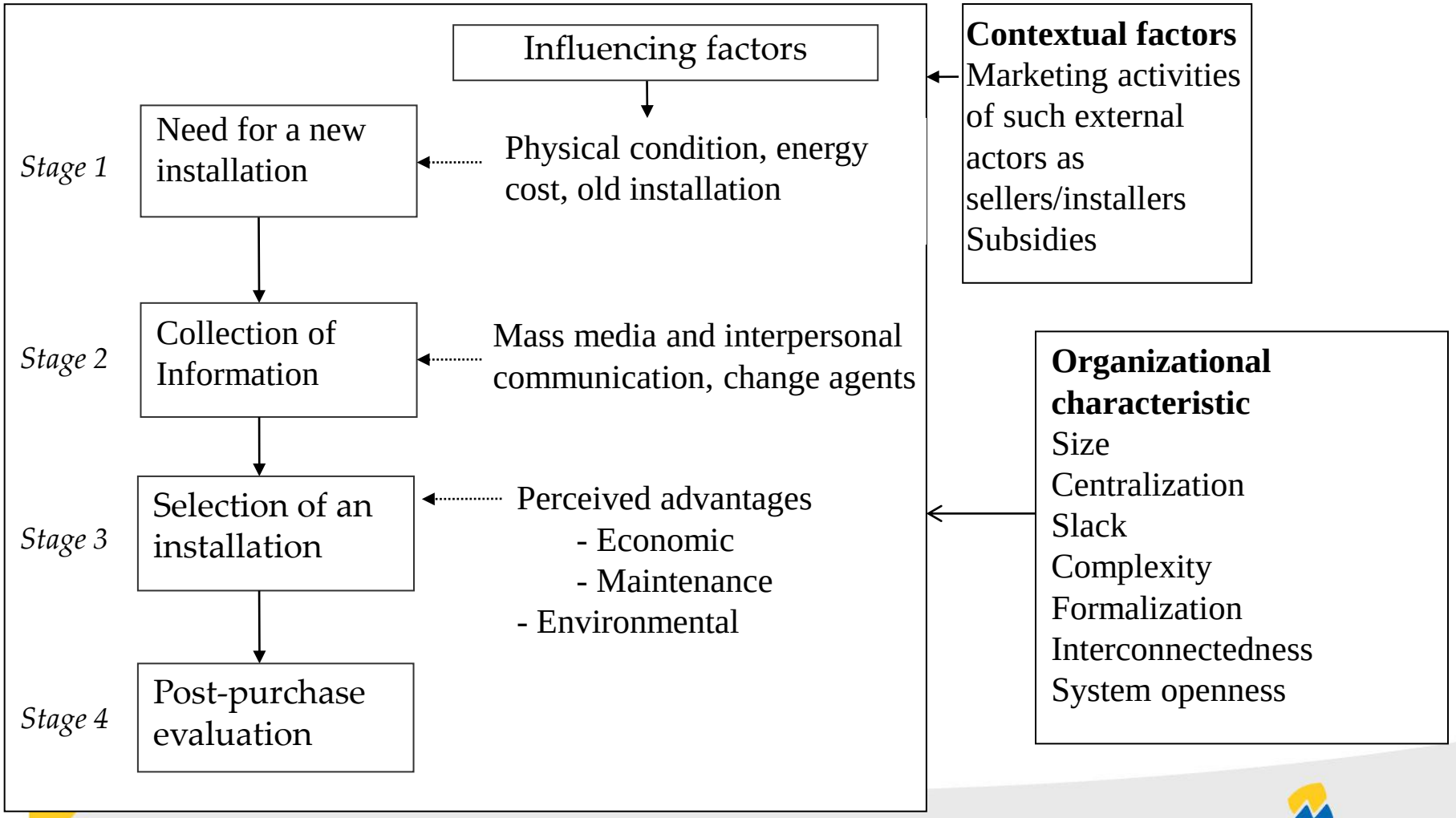
Methodology

- 2800 questionnaire were sent during June-October 2010
- Address were selected randomly from Bolagsverket
- Response rate – 24%

Respondent category

- About 40% buildings were more than 40 years old
- Heating system – 50% district heating, 14% electricity heated, and the rest other heating system

Stages in adoption of an end-use energy efficiency measure



Adapted from Rogers, 2003

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Perception towards energy efficiency (EE) improvement

- % of respondents who believed their annual heating and electricity cost as high was 15% and 6% , respectively

- Still, for 55% and 38% of respondents, it was important to reduce heating and electricity use, respectively

However

- 76% of associations did not have any plan for energy efficiency improvements in their buildings

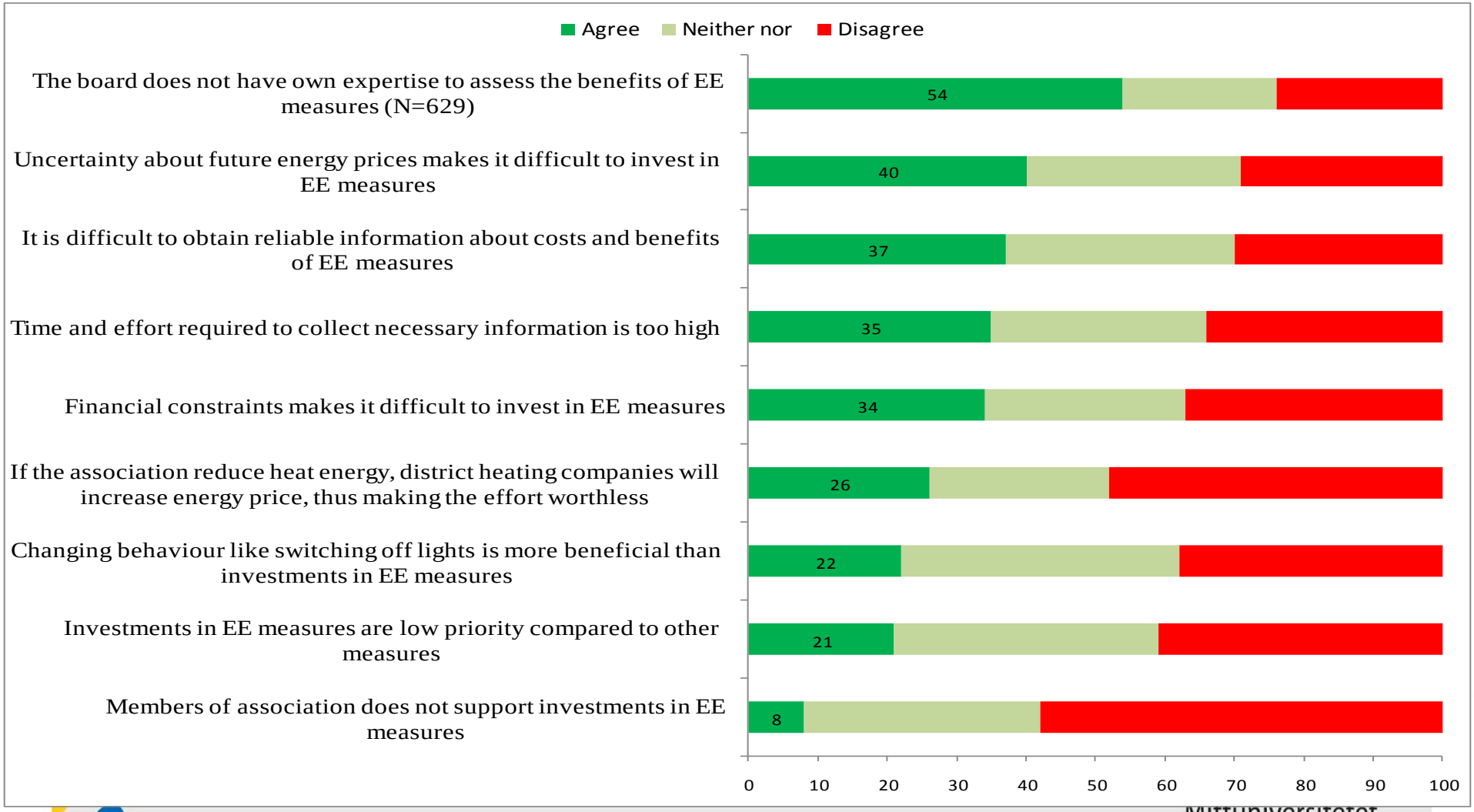
Plan to replace building envelope components

Building envelope components	% of respondents		
	No	Yes, within 3 years	Yes, in 3-10 years
Windows (N=578)	79	8	13
Attic insulation (N=555)	84	8	8
Basement insulation (N=534)	94	2	4
External wall insulation (N=548)	94	3	3

Association's goals

Goals	% of respondents		
	Agree	Neither nor	Disagree
To keep monthly *rent* to its members as low as possible	79	17	4
To provide good indoor environment	86	13	7
To be an environmentally friendly association	67	24	9
To become an highly energy efficient association	65	27	8

Issues regarding investment intensive EE measures in apartment buildings



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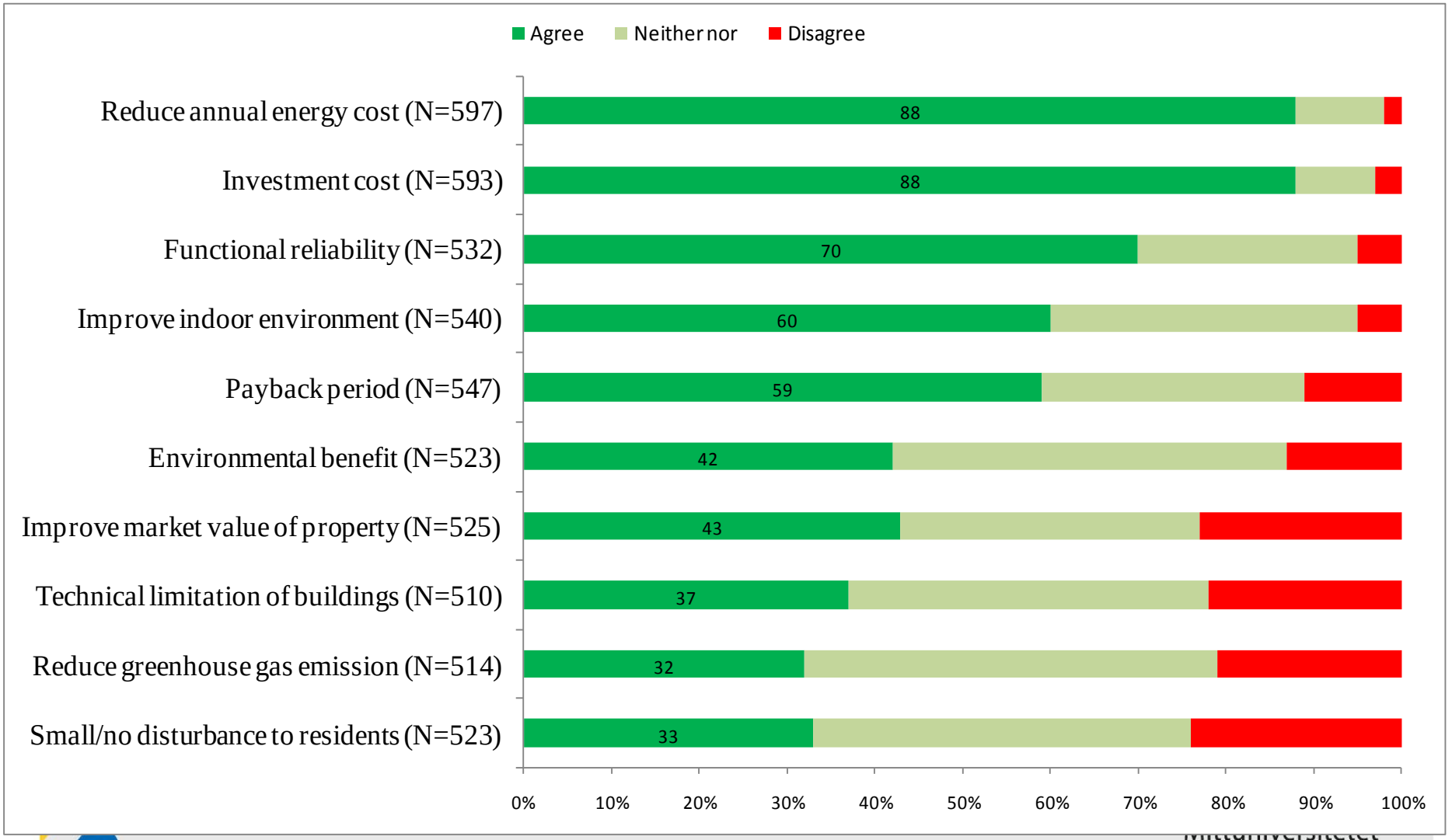
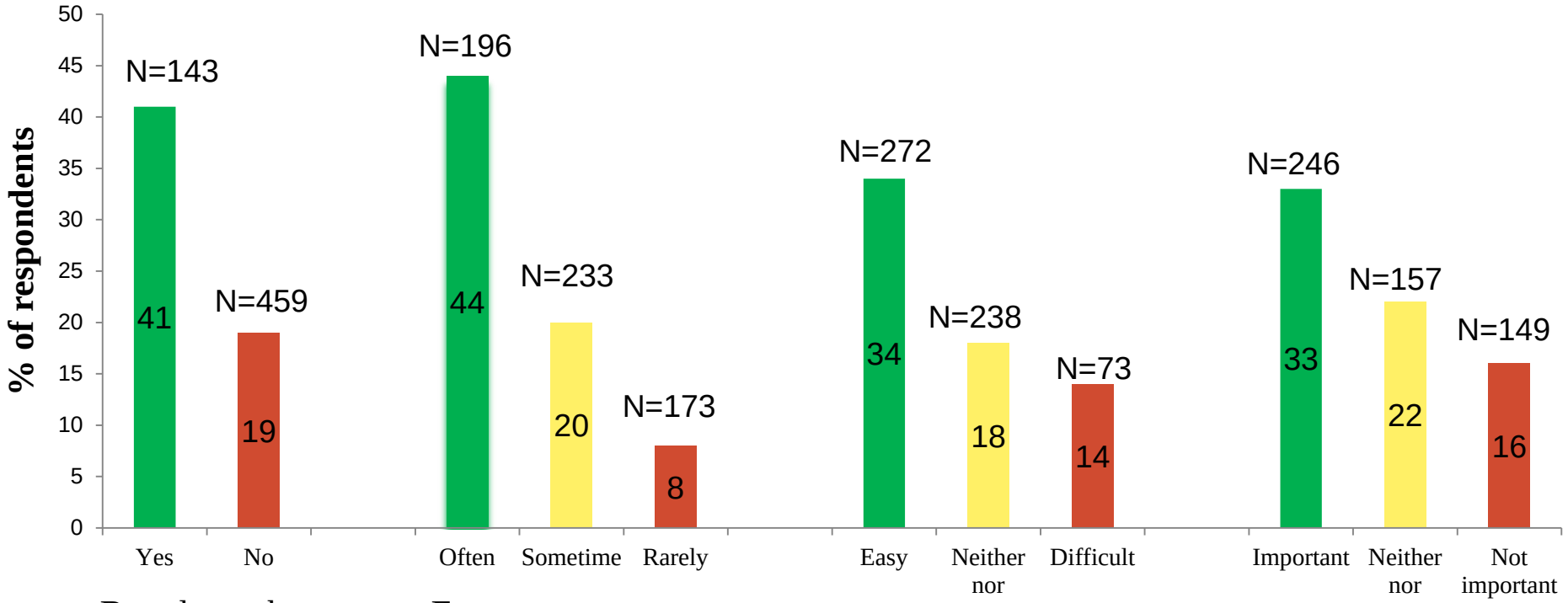
Importance of various factors in respondents' EE investment decisions



Plan for energy efficiency improvements



Board members responsible for energy issues

Frequency: energy issues discussed in board meeting

Board's approval on energy efficiency investments

Energy efficiency and association's image

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Factors that were not found to significantly influence association's plan for EE

- Financial position
  - 77% respondents reported that the financial position of their association is good
- Number of members in the board
  - Surrogate indicator of the size of the organization
- Chairperson's educational qualification and tenure duration

Conclusions

- More than 75% of associations do not have any plan to improve the energy efficiency of their buildings
- Economic factors were important in influencing the decisions
- Only a small percentage of respondents consider their energy cost burden as high
- A large number of respondents consider it important to reduce energy use
- Majority of respondents reported that they did not have expertise to assess the benefits of EE investment measures

Thank you for your attention!