Towards district renovation strategies

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What is a strategy?

- A plan of action designed to achieve a long-term or overall aim
  - Source: https://en.oxforddictionaries.com/definition/strategy
- A method or plan chosen to bring about a desired future, such as achievement of a goal or solution to a problem
  - Source: http://www.businessdictionary.com/definition/strategy.html

➢ Actions to take to achieve some goal

➢ Climate strategies exist for basically every city. How about energy renovation strategies for neighborhoods?

Arguments related to district renovations compared to mere building renovations

Benefits	Challenges
• technological solutions exist • guaranteed increased energy-efficiency and reduced emissions through improvements in the whole energy chain • easier to consider renewable energy solutions due to bigger systems with smaller unit costs • economically more profitable • more extensive business opportunities • more interesting for the private sector through economics of scale • opportunities for new actors • reduced costs due to mass customization and economics of scale • the whole area renewed at once • learning during the process provides better opportunities to consider higher-level targets • possibilities to apply new products	• more stakeholders • no tested business models • more difficult to make decisions • getting finance • needs development of renovation processes • requires more employees since renovations are often labor intensive in any case • new products need field testing before market entry

Building and district-level renovation aims

Strategies for retrofit of apartment buildings and their environmental aims	Strategies for modernization of areas with apartment buildings must have the following key goals
• to cut energy consumption • to cut building maintenance costs • to reduce the effect of polluting factors thus boosting the value of the environment • to improve the condition of buildings and to extend their service (30–40 years) • to improve the indoor comfort • to improve the quality of buildings and to make urban areas more attractive • to increase the market value of buildings • to attract and retain the middle classes	• to improve living standards and the quality of environment • to cut energy consumption and CO_2 emissions • to maintain mixed social structure • to integrate new buildings in the existing environment in a sustainable manner • to develop an urban center of a residential area as a functioning part of the city • democratic planning • close cooperation of partners involved in modernization • lasting retrofit and facilities management

Source: Raslanas et al. Residential areas with apartment houses: analysis of the condition of buildings, planning issues, retrofit strategies and scenarios. International Journal of Strategic Property Management 15 (2) (2011) 158–172. doi: 10.3846/1648715X.2011.586531.

An example of objectives based on investor benefit for energy retrofits

		Investor			
		Owner-occupant	**Absent Owner**	**Leaser**	**External Stakeholder**
Objective	**Economic**	• Investment Cost • Energy Consumption Costs • Maintenance & Replacement Costs • Property Tax • Resale Value	• Investment Cost • Maintenance & Replacement Costs • Property Tax • Resale Value • Rental Value	• Investment Cost • Energy Consumption Costs	• Investment Cost • Property Tax • Environmental Costs • Social Costs
	Environmental	• CO_2 emissions • Environmental Impacts Fossil Fuel Conserving	• CO_2 emissions • Environmental Impacts Fossil Fuel Conserving	• CO_2 emissions • Environmental Impacts Fossil Fuel Conserving	• CO_2 emissions • Environmental Impacts • Fossil Fuel Conserving
	Social	• Community impact • Building impact ○ Health ○ Comfort & Satisfaction ○ Productivity ○ Security ○ Pride & Satisfaction	• Community impact • Building impact ○ Comfort & Satisfaction ○ Security	• Community impact • Building impact ○ Health ○ Comfort & Satisfaction ○ Productivity ○ Security ○ Feeling of proud	• Society impact

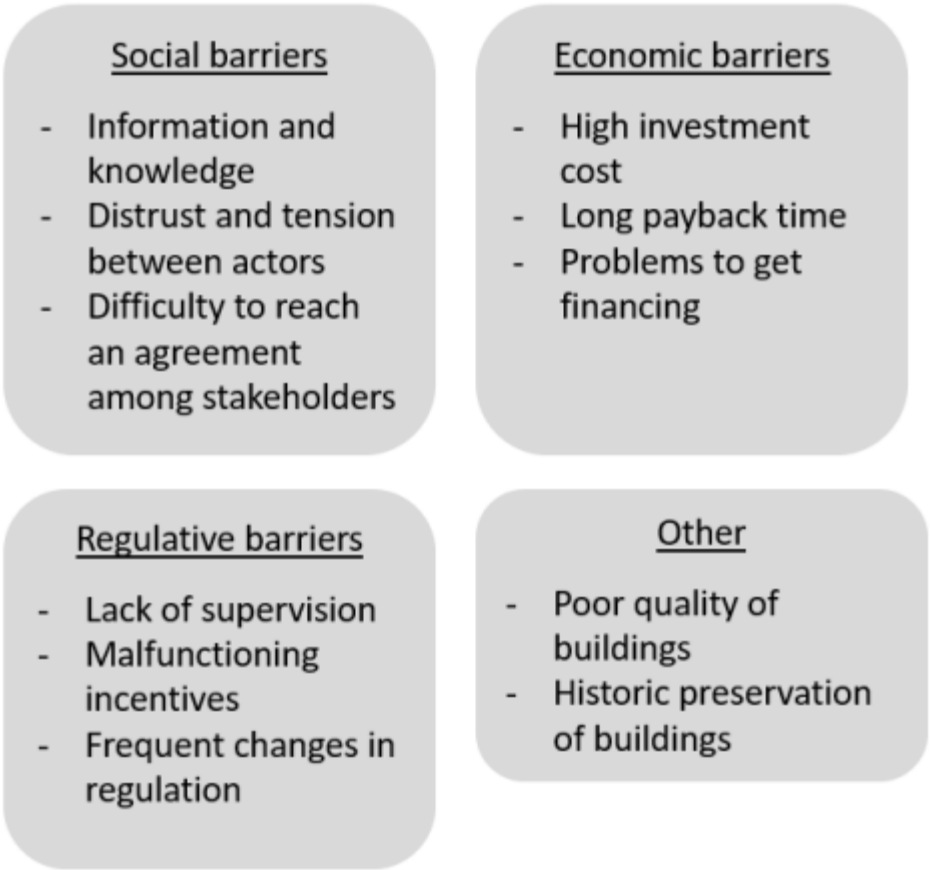
Source: Jafari & Valentin. Selection of optimization objectives for decision-making in building energy retrofits. Building and Environment 130 (2018) 94–103. https://doi.org/10.1016/j.buildenv.2017.12.027

Objectives of housing renovation policies

A. Objective of House Regeneration		B. Whether survey was done by the objectives of house regeneration			
Sub-Class	Class	France	Germany	Denmark	Sweden
• Improvement of housing performance • Better quality of life	Improvement of physical performance	■	■	■	■
• Correspondence to needs of elderly people • Housing adjustment for disabled people	Correspondence to needs of elderly people	■	■	■	■
• Energy conservation • Reduction of GHG emission	Improving energy efficiency	■	■	■	■
• Social cohesion •area revitalization • Utilization of urban infrastructure	Social cohesion ·Area revitalization	■	■	■	
• Generator of employment • Economic revitalization	Economic revitalization			■	■
• Preservation of historic building • Preservation of city landscape	Preservation of houses that carry historic value	■			
•Improvement of hygienic matter •Disaster prevention, safety •Health of nationals	Health of nationals				■

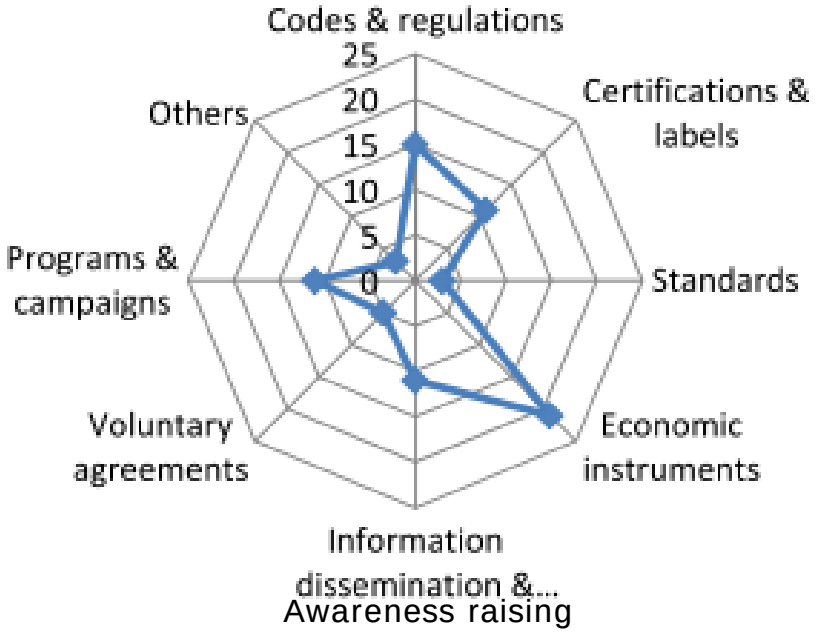
Source: Baek & Park. Changes in renovation policies in the era of sustainability. Energy and Buildings 47 (2012) 485–496. doi:10.1016/j.enbuild.2011.12.028

Non-Technical Barriers for Energy Efficient Renovations



Source: Paiho & Ahvenniemi. Non-Technical Barriers to Energy Efficient Renovation of Residential Buildings and Potential Policy Instruments to overcome Them—Evidence from Young Russian Adults. Buildings 2017, 7, 101; doi:10.3390/buildings7040101

Renovation Related Policy Instruments



- A sample of 24 references dealing with renovation related policy instruments

Source: Paiho & Ahvenniemi. Non-Technical Barriers to Energy Efficient Renovation of Residential Buildings and Potential Policy Instruments to overcome Them—Evidence from Young Russian Adults. Buildings 2017, 7, 101; doi:10.3390/buildings7040101

Barriers for energy efficiency and applicable policy instruments in the Russian context

Policy instruments

A. Codes & regulations
B. Certifications & labels
C. Standards
D. Economic insturments
E. Information dissemination & awareness raising
F. Voluntary agreements
G. Programs & campaigns
H. Others

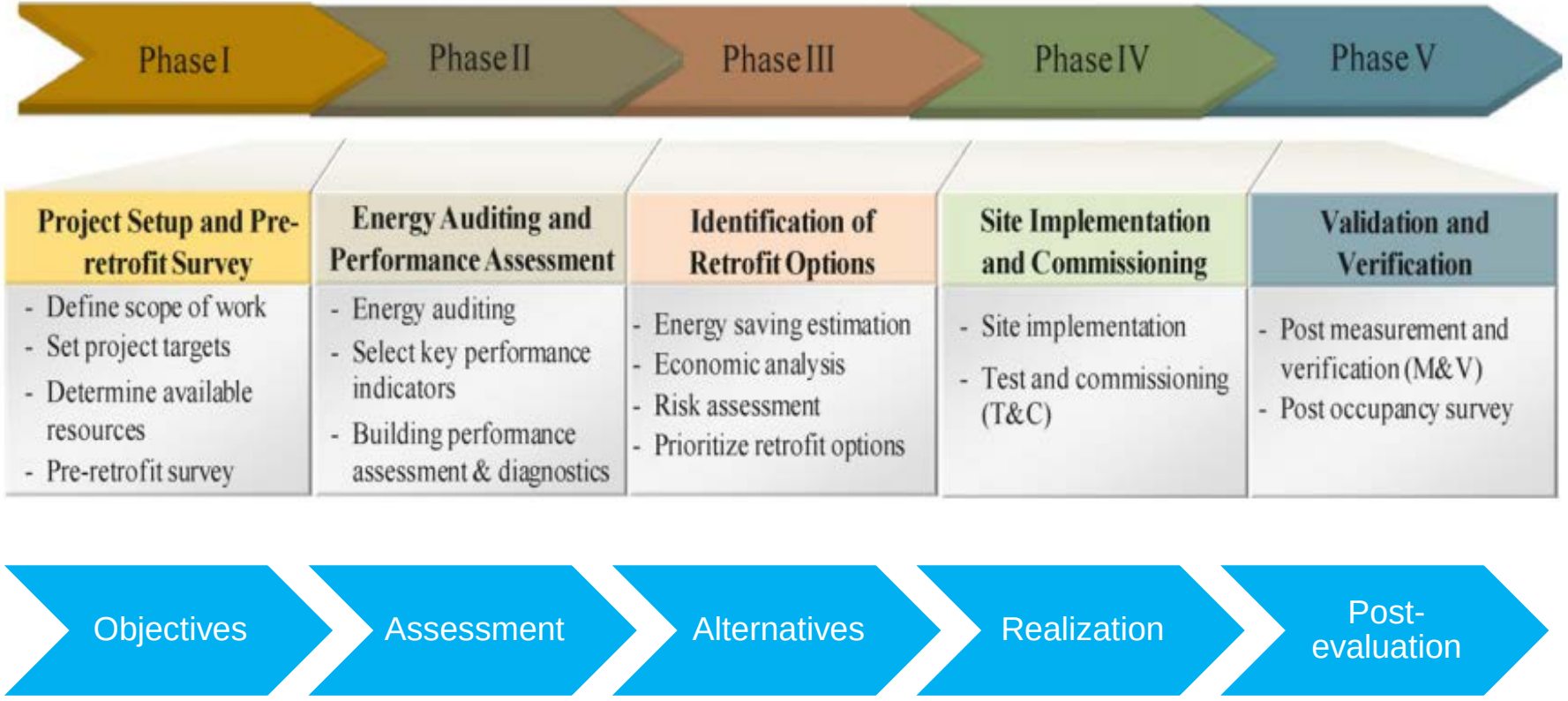
RU = relevant in Russia

Information and knowledge related and social barriers	• Lack of information about the economic (and environmental) benefits, E, G • Lack of information on relevant technologies, E, G (RU)
Economic barriers	• Lack of financial resources, D, G (RU) • Low willingness to invest in energy efficiency D, E, G (RU)
Regulative barriers	• Lack of clarity over who is responsible for change (homeowners or governance), E, F, G • Insufficient regulation, A, B, C (RU)
Other barriers	• Preservation of the historical value of buildings, E, F, H • Poor quality of buildings, E, H (RU)

- How about in Sweden?
- How about in single-family houses?

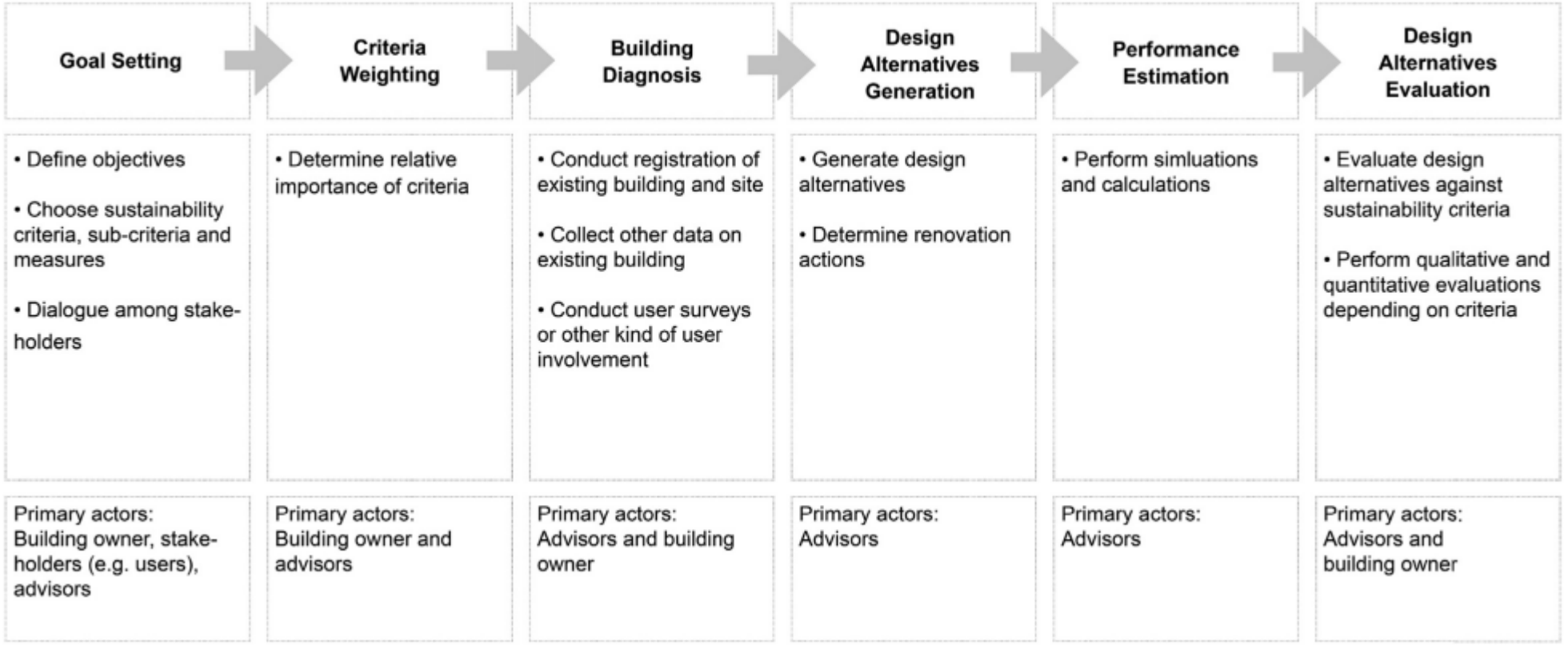
Source: Paiho & Ahvenniemi. Non-Technical Barriers to Energy Efficient Renovation of Residential Buildings and Potential Policy Instruments to overcome Them—Evidence from Young Russian Adults. Buildings 2017, 7, 101; doi:10.3390/buildings7040101

Key phases in a sustainable building retrofit program



Source: Ma et al. Existing building retrofits: Methodology and state-of-the-art. Energy and Buildings 55 (2012) 889–902. http://dx.doi.org/10.1016/j.enbuild.2012.08.018

Areas where formal decision-making methods can contribute in renovation projects



Source: Nielsen et al. Early stage decision support for sustainable building renovation – A review. Building and Environment 103 (2016) 165 – 181. http://dx.doi.org/10.1016/j.buildenv.2016.04.009

Suggested modules in decision support tools for sustainable renovation of one or multiple buildings

- A **Goal Setting Module** containing the aspects of setting sustainability goals, choosing and weighting criteria. The criteria can be adapted from existing sustainability assessment methods or based on project-specific criteria.
- A **Registration Module** providing a method and a platform for registration of the existing building(s). Existing databases are used to make the registration less time-consuming and ensure a sufficient level of information.
- If dealing with multiple buildings, it is suggested to include a **Ranking Module** where the buildings are ranked in relation to their renovation need.
- A **Recommendation Module** providing recommendations for renovation actions based on the sustainability criteria and registration information defined in the Goal Setting Module and the Registration Module.
- An **Evaluation Module** providing the option of evaluating the design during the design process or assess the finished design in relation to the sustainability goals.

Source: Nielsen et al. Early stage decision support for sustainable building renovation – A review. Building and Environment 103 (2016) 165 – 181. http://dx.doi.org/10.1016/j.buildenv.2016.04.009

An example of means (GGP = guided group purchases)

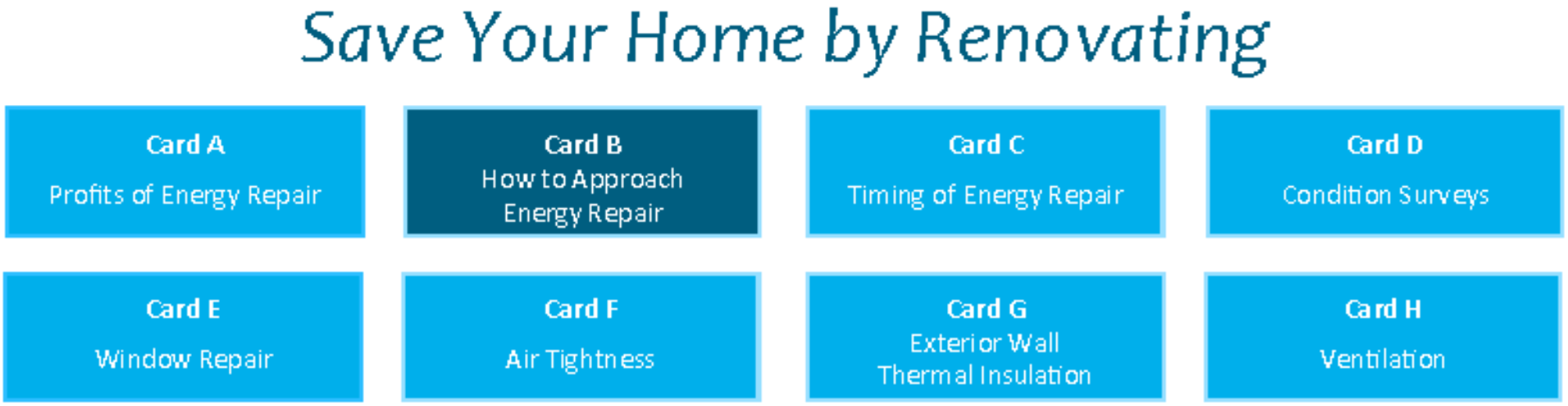
- An approach combining support, guidance and group purchasing of energy renovation services and works in Belgium

	Expression of interests (by 74 owners)	Effective interventions (by 50 owners)	Percentage of effective interventions for each GGP
Energy audit[a]	44	30	68 %
Insulation/greening of flat roof	35	3	9 %
Insulation of inclined roof	6	5	83 %
Insulation of cellar floor	16	13	81 %
Insulation of indoor floor	27	2	7 %
Insulation of attic floor	3	3	100 %
Insulation of walls	34	5	15 %
Window replacement	38	18	47 %
Total	203	79	39 %

Source: Ruelle & .Teller. Guided group purchases of energy renovation services and works in deprived urban neighbourhoods. Energy Efficiency (2016) 9:861 – 874. DOI 10.1007/s12053-015-9401-z

Case Oulu

- Oulu Building Supervision Office provides unbiased information about renovations to homeowners
  - http://www.energiakorjaus.info/in-english/
- The goal is to produce simple and clear instructions to achieve successful energy renovations




TECHNOLOGY FOR BUSINESS