One-stop shop service in Sweden for renovation of detached houses

Krushna Mahapatra
Dept. Of Built Environment & Energy Technology
Linnaeus University, Sweden

Familjen Kamprads stiftelse
The Kamprad Family Foundation for Entrepreneurship, Research & Charity

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innovate

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Large need for renovation of single-family houses

- Single-family houses: 45% of total building stock, 60% of total floor area
- 40% in rural areas, 50% owned by 65+ year old
- 80% of them are more than 30 years old and need renovation, but energy standard is better than other parts of Europe
- Annually ca 1-2% houses implement energy efficiency measures (heating system, insulation, windows)
- Large increase in installation of heat pumps
- Renovation rate must increase to meet the energy and environmental goals

Barriers to holistic energy renovation (1)

- Low energy prices, 3-5% of household income
- High investment cost and lack of proper financing
- Deep renovation may not pay back
- Past subsidies on windows and heating systems
- Tax subsidy on any kind of renovation (30% of labour cost, max 50 kSEK/person/year), aesthetic renovation and fragmented solutions given priority
- Profit tax on house sale (elderly who bought several years back hesitate to sale)
- Biomass based CHP plant, almost no GHG emission from buildings in Växjö
- Information limitations

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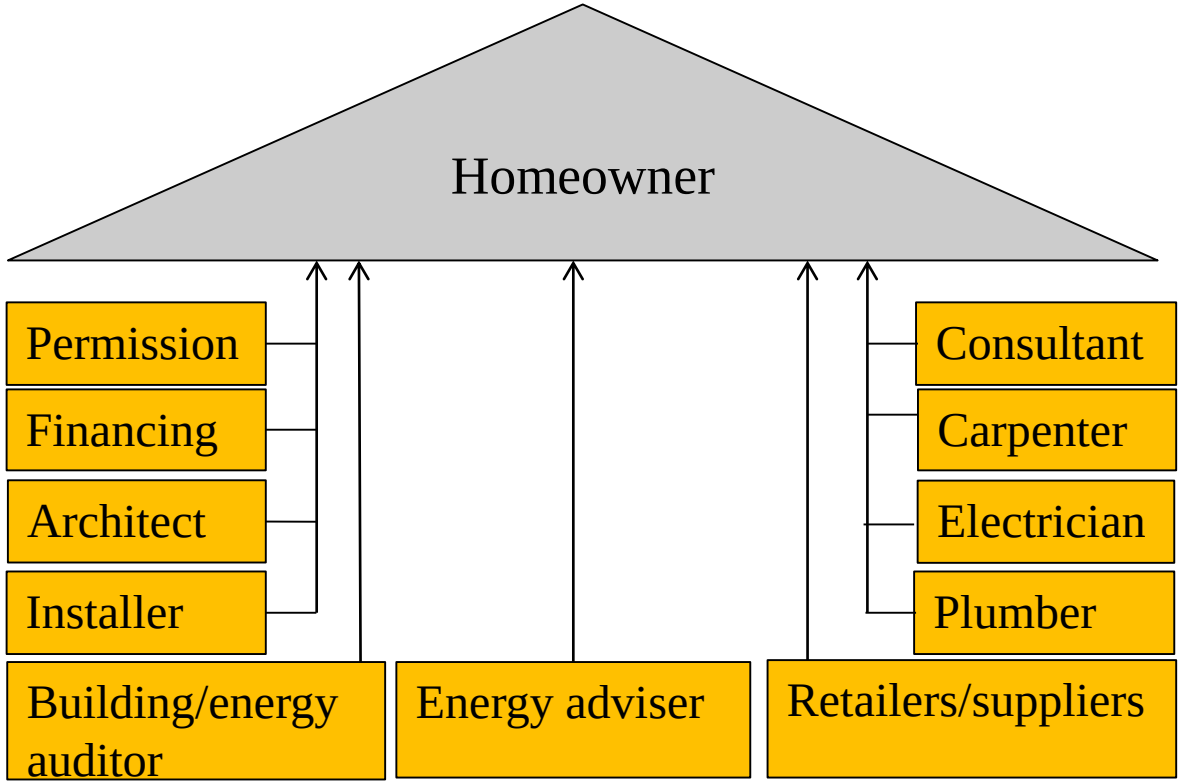
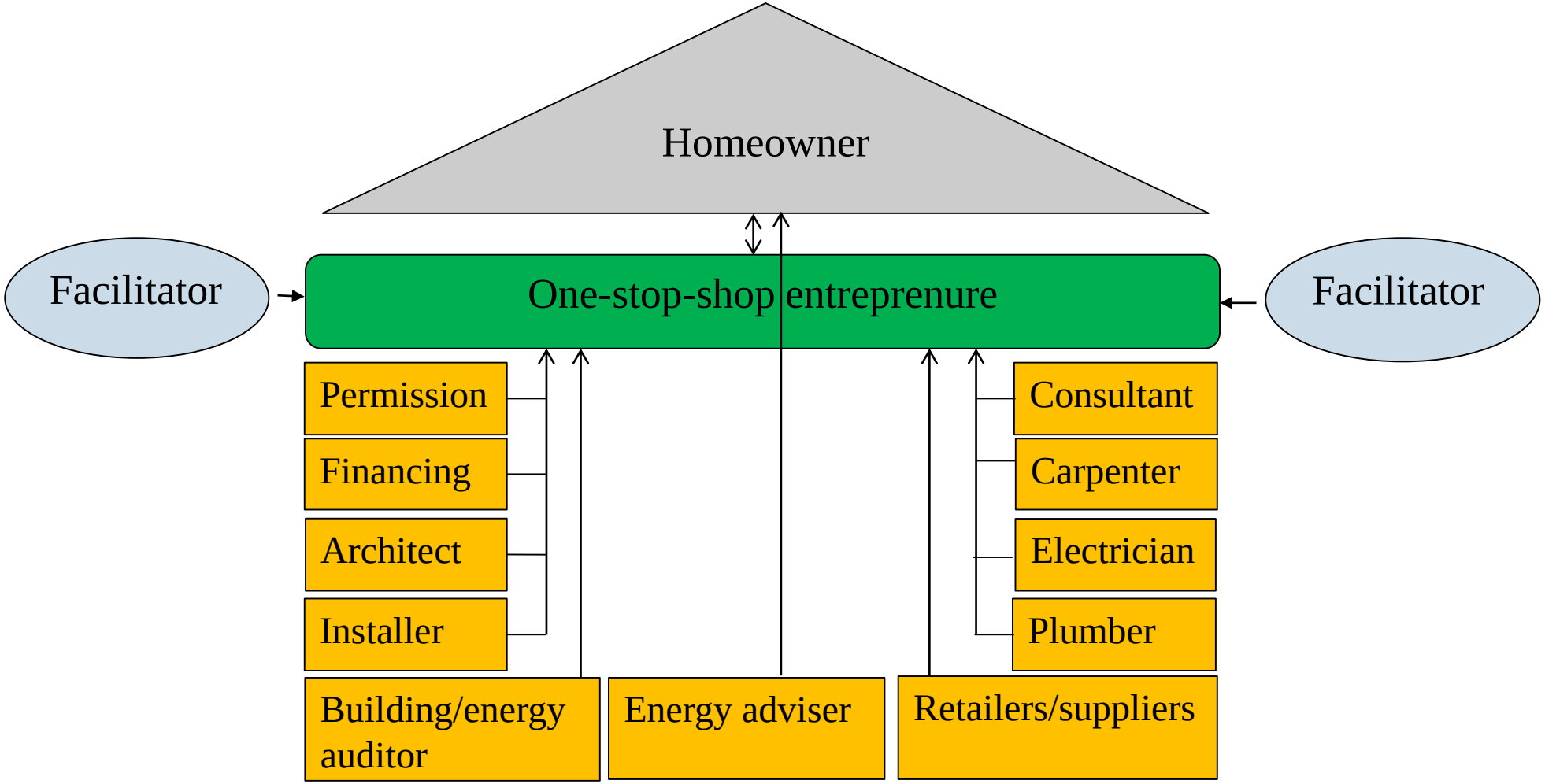
Mahapatra, K., Gustavsson, L., Haavik, T., Aabrekk, S., Svendsen, S., Vanhoutteghem, L., Ala-Juusela, M. and Paiho, S., 2013. Business models for full service energy efficient renovation of single family houses in Nordic countries, Applied Energy, 112: 1558-1565.

Barriers to energy renovation (2)

- Deep renovation may mean several regulations to be fulfilled
- Market dominated by individual solutions, conflict of interest among entrepreneurs
- Complex and difficult to handle for homeowners
- Boom in new construction



One-stop-shop renovation model



INNOVATE - Integrated solutio**N**s for ambiti**O**us energy refurbishment of pri**VATE** housing (www.financingbuildingrenovation.eu)

- Horizon 2020 project
- 2017-2020
- Aims to overcome market barriers to deep energy-efficient retrofits of private housing stock and launching ambitious energy retrofit pilot programmes aiming at min. 50% energy savings in 11 target territories
- Coordinator - EnergiCities; Financial Expert - Energies Demain (France)

5 experienced partners will upgrade/enlarge existing energy efficiency services

- Riga Energy Agency (Latvia)
- Frederikshavn municipality (Denmark)
- Brussels Environment (Belgium)
- KAW (Netherland)
- Parity Project (cooperative operating in three London Boroughs)

6 learning partners will develop brand new service packages

- Litoměřice municipality (Czeck republic)
- Aradippou municipality (Cyprus)
- Linnaeus University in cooperation with Växjö municipality (Sweden)
- Mantova municipality (Italy)
- Heerlen municipality (Netherland)
- Extremadura Energy Agency, AGENEX (Spain)

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Kamprad Family Foundation project

- 2016-19
- Objectives:
  - To understand the attitude and interest of different actors towards energy renovation and One-stop-shop concept (OSS)
    - Homeowners
    - SMEs
    - Banks
  - To develop and apply a business model for actual energy renovation of four houses, two in rural area and other two in suburban area of Småland-Blekinge
  - To make an economic and environmental assessment of the renovations

http://ontheworldmap.com/sweden/

Attitude and Interest of **house owners**

- Online survey of 7500 house owners in Kronoberg (14500 house owners all over Sweden, data yet to be analyzed)
- Spring 2017
- 13.5% response rate

Some key findings

- Majority are likely to renovate specific building components and mainly for aesthetic reasons
- Interest on energy effciency measures low, but relatively high interest among younger homeowners
- Ca 6% are very interested (15% interested) in OSS concept, mainly in step-wise renovation
- Customer segment for OSS
  - Young, urban living, and high earning homeowners
- Entrepreneurs may have to come up with a business model for gradual renovation of a house
- Perceived high cost can be a barrier for OSS

Attitude and interest of **companies**

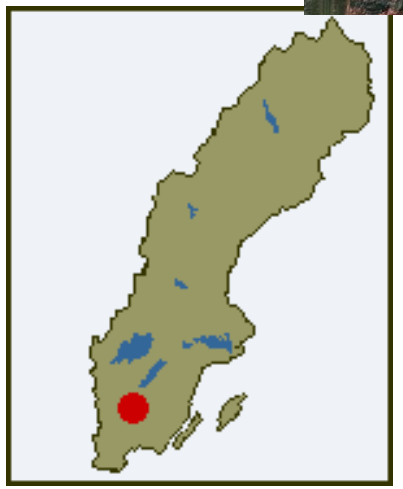
- Interviews with 21 renovation/installation companies; 5 workshops
- Findings
  - Participants considered OSS as a good idea
  - But, lack of interest to adopt OSS due to the complexities of the approach and incompatibility with existing business
    - perceived risks of organizational changes required
    - lack of managerial skills to coordinate the whole process
    - problems in collaboration with other actors (individual specialized knowledge)
  - Proposed a new type of entrepreneur to initiate such a concept on a trial basis
  - Few ”total entrepreneurs”, but they are occupied with small/medium size multifamily constructions

APPLY BUSINESS MODEL

- Several meetings with two potentially interested house owners
- On-site inspection and energy audit of the houses by a company, energy adviser, and researchers
- Energy savings potential 80%-90%
- After more than 6 months of deliberation, house owners were finally not convinced to proceed in renovation
  - One homeowner wanted only to replace the broken air-source heat pump and the other sold the house

Economic assessment of a planned renovation

- Built in 1989
- Heated area: 178 m²
- Energy for space heating, hot water, and ventilation = 110 kWh/m²
- Electric heating (existing air-source heat pump dysfunctional)



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Energy renovation measures

		Renovation measures		Total energy consumption kWh/m²
Initial	0	No energy renovations were performed		110
single energy renovation measures	1	Only improving the u-value of building envelopes	a+b+c	95,4
	2	Adding a heat recovery for ventilation (In Swedish: FTX med värmeväxlare)	FTX	82,5
	3	Only installing a ground source heat pump (GSHP) for supporting space heating demand and domestic hot water	GSHP	21,8
Muyltiple energ renovation measures	4	Improving the u-value of buildings envelopes and adding a heat recovery for ventilation	a+b+c+ FTX	71
	5	Improving the u-value of buildings envelopes and installing a ground source heat pump for supporting space heating and domestic hot water	a+b+c+GSHP	19
	6	Improving the u-value of buildings envelopes, adding a heat recovery for ventilation and installing a ground source heat pump for supporting space heating and domestic hot water	FTX+GSHP	17
	7	Improving the u-value of buildings envelopes, adding a heat recovery for ventilation, installing a ground source heat pump for supporting space heating and domestic hot water	a+b+c+FTX+GSHP	15,7
	8	Improving the u-value of buildings envelopes, adding a heat recovery for ventilation, installing a ground source heat pump for supporting space heating and domestic hot water and adding photovoltice cells for producing electricity	a+b+c+FTX+GSHP+PV	0

		u-value before	u-value after
a	Adding extra insulation in pitch roof construction	2.9	0.35
b	adding extra insulation in external walls' construction	0.12	0.09
c	Changing windows to energy efficient ones with u-value of 0.8	1.5	0.8

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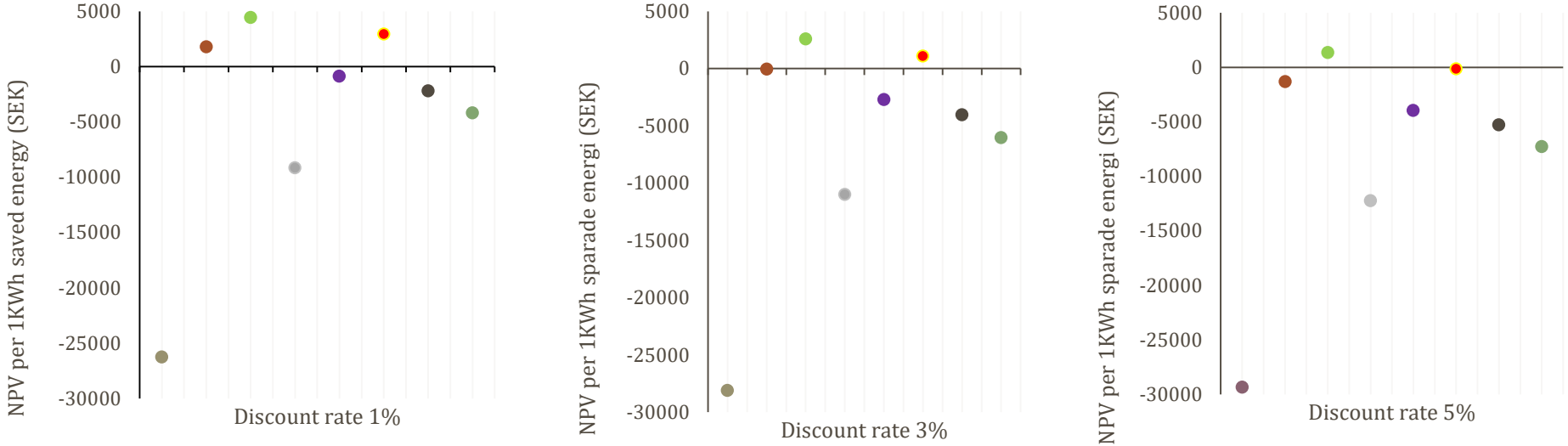
Results (30 year life time)



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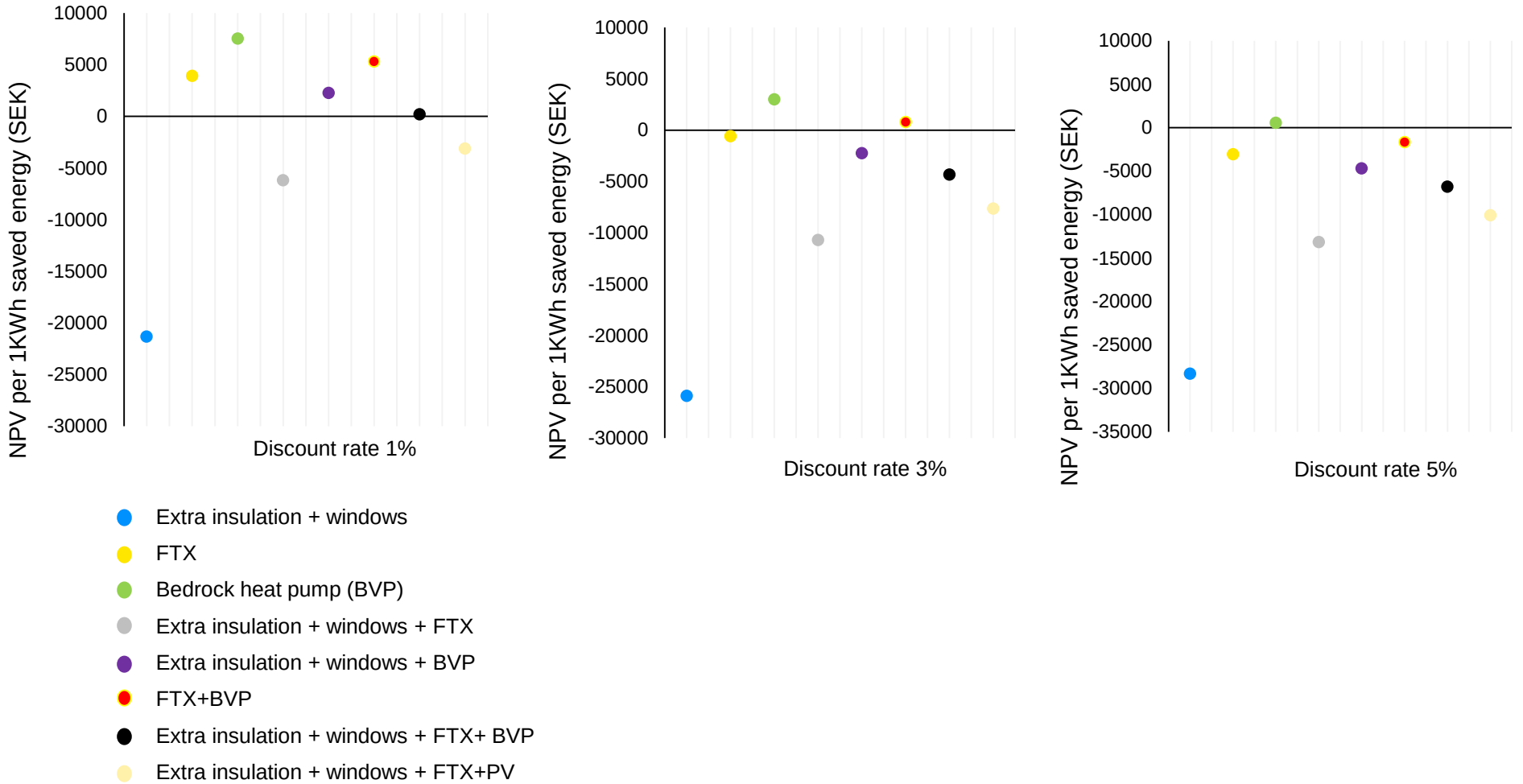
Results (50 year life time)



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One-stop-shop in Växjö/Sweden – Reflection of Växjö municipality

- A tool to reach the Energy Efficiency Directive
- A tool to reach Växjö Environmental Goals

- Close to or beyond the limits?
  - Legal?
  - Conflict with private entrepreneurs?
  - Uneven conditions?

- Possible business or just catalyst?

Växjö kommun
Europas grönaste stad

Source: Jan Johansson, Energy Manager, Växjö municipality

One-stop-shop in Växjö – Reflection of Växjö municipality

- Linnaeus University in Växjö created a base
- Energy Agency Southeast seeks a process that can work in a Swedish municipality in general and in Växjö in particular.
- Inventory of available entrepreneurs
- Find events where the entrepreneurs already participate
- Find demo cases and entrepreneurs for a pilot

Source: Jan Johansson, Energy Manager, Växjö municipality

Växjö kommun
Europas grönaste stad

CONCLUSION

- OSS renovation service yet to establish in Sweden
- Interest exists among homeowners for step-wise renovation
- Difficulty to find OSS entrepreneur, but we seems to find one
- Project management oriented training needs for SMEs to be OSS entrepreneurs
- Swedish municipalities may not offer OSS service, but can only facilitate
- Policy measures are needed to promote energy renovation

THANK YOU FOR THE ATTENTION