Energy Performance Contracting for Soviet-era Housing in Latvia

Financing housing modernization through energy conservation

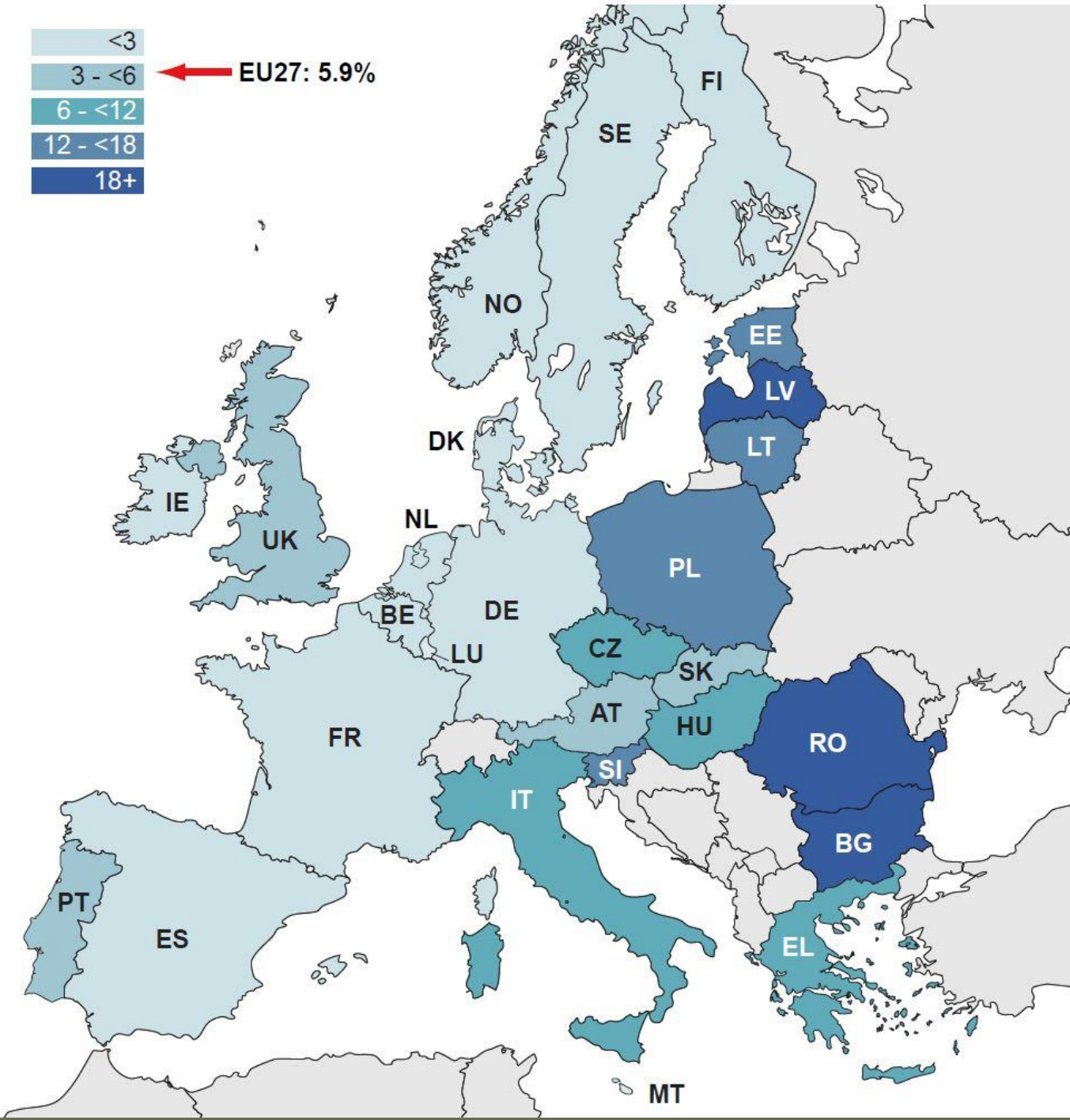
A solution for the post-communist housing legacy

RENESCO

Winner 2011 best
European Energy Service
Provider award

INVESCO

Figure 1:
Severe housing deprivation rate across the EU, 2009



Source:
Own calculations based on EU-SILC 2009 – revision 1 of August 2011.

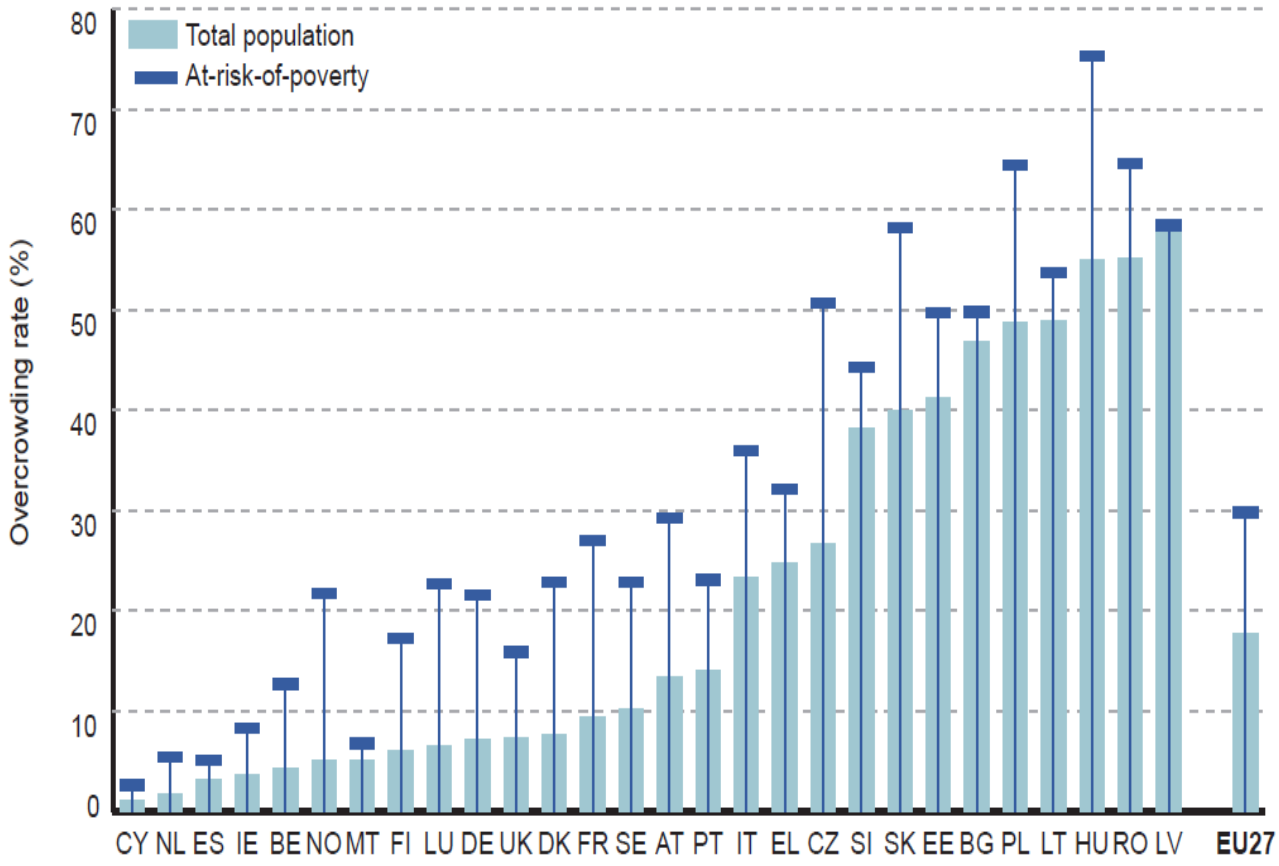
Notes:
Severe housing deprivation refers to the percentage of the population in a dwelling which is considered as overcrowded and exposed to at least one of the following three housing deprivation measures: (1) a leaking roof or damp walls, floors, foundations or rot in window frames or floor; (2) neither a bath, nor a shower, nor an indoor flushing; or (3) too dark.

Figure 4:

Overcrowding rate, comparing total population and those at-risk-of-poverty, 2009

Source:
Own calculations based on EU-SILC 2009 – revision 1 of August 2011.

Notes:
A person is considered as living in an overcrowded dwelling if the household does not have at its disposal a minimum number of rooms equal to: one room for the household; one room per couple in the household; one room for each single person aged 18 or older; one room per pair of single people of the same gender between 12 and 17 years of age; one room for each single person between 12 and 17 years of age and not included in the previous category; one room per pair of children under 12 years of age.
EU27: population-weighted average of national indicators.



Housing market situation

Facts

- In 2005 Latvians 15.3m^2 per person living space (after recent mass emigration ±17.5$m^{2)}$. Estonians had 24.0 m^2, Germans 41.3 m^2 and Danes 53 m^2 (source: STATINFO). Only Romanians had less, 14.1 m^2.
- Almost no new housing stock for low and average income households (85% of population) has been built in the last 25 years
- Current housing stock is too little and of too poor quality
- Existing housing stock has very poor protection against weather and is deteriorating rapidly
- Insulating buildings protects them against moisture and temperature swings, stops corrosion and very significantly prolongs their lifespan.

Conclusions:

- Any affordable, decent quality housing apartment are, and will be, in low supply for many years to come and therefore much sought after
- As non-protected buildings deteriorate further the renovated housing stock will become even more desirable

Our question is not
how to save energy!

It is; How to save Eastern Europe's housing stock?

Energy saving is the answer.

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completed projects 2010/2011

- Valmiera, Gaujas 13

- Cēsis, Kovārņu 31

5 projects completed in 2012

Renovētā ēka Cēsīs, Vilku ielā 5

RENESCO's pipeline

2013 **7** more buildings are in process of renovations (5 nearly completed)

2014 **9** renovations to start in the spring

Initiate projects with potential partners in other countries in North-Eastern Europe

investment per apartment

± € 7,000 for renovation (currently 50% subsidy)

± € 1,500 for geo-thermal heat supply (no subsidy)

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Until recently all renovation costs have been 100% bank financed by Renesco based on the value of future energy savings

Flat owners do not assume any risk, or contribute in any form, except by agreeing that the energy savings will go to Renesco during the EPC period (20 years).

RENESCO financial partners

Dutch International Guarantee for Housing foundation

BNG Netherlands Municipal Bank

ASN Sustainable Bank

Citadele bank

European Regional Development Fund

2014 EBRD?

Benefits for residents

- Conservation and modernization of their apartment
- No financial or technical risks
- More comfortable and nicer looking house to live in (currently many apartments are severely under-heated).
- Flat owners receive 25% profit share of Renesco's net result
- 20 year guaranty on all construction works and therefor less worries and cost for maintenance during the contract period
- The sales' value of their apartment increases by at least 20% after renovation
- After 20 years apartment owners get all the benefits from nergy savings (40% guaranteed, 60-80% expected).

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External parts are corroding due to the effects of weather

Crushed panel joints

Collapsing structures

Internal parts are poorly designed and rotting away

Damaged roofs

Obsolete engineering networks

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Building renovation

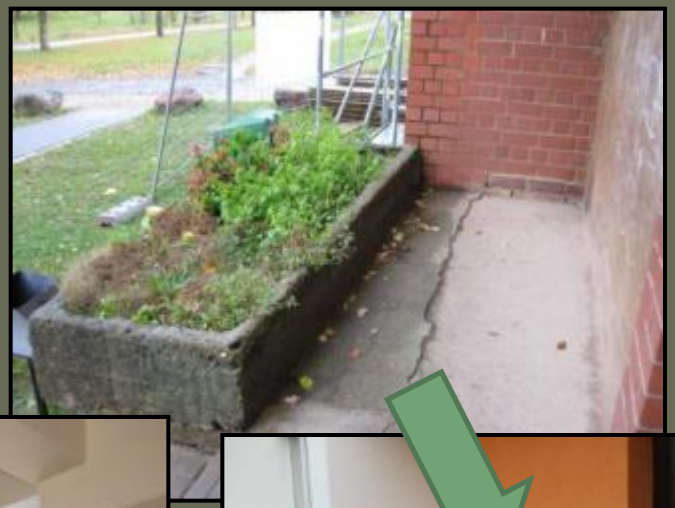
Technical measures

Outside (envelope)

Facade

Roof

Staircase and entrance repair



Windows and Doors

Repair of balconies & loggias

Building renovation 2

Inside

Hot water, Ventilation, Heat source,
Heat Distribution, Heat Production

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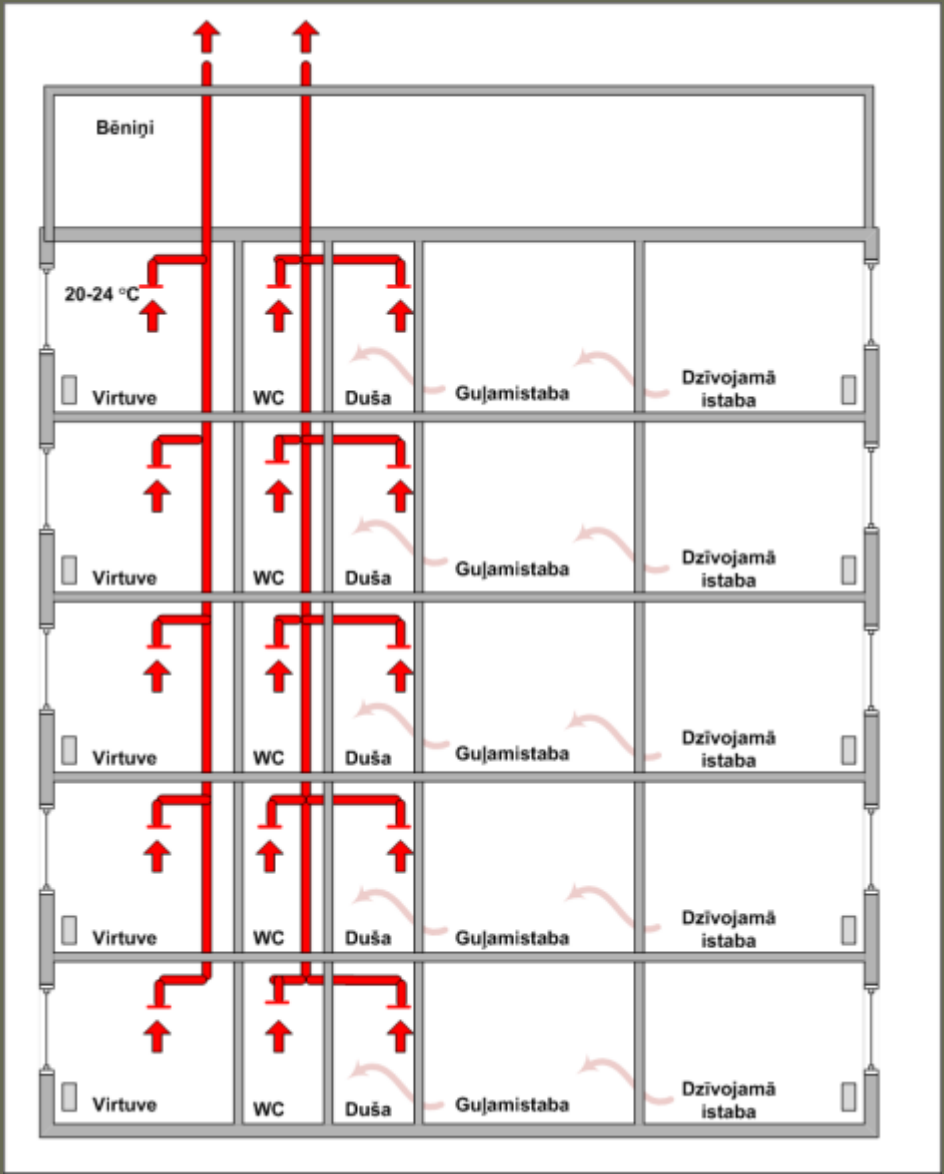
New hot water network and heat substation

Attic and basement ceiling

Loose mineral wool in the attic covering new hot water and heating pipes

New networks placed inside ceiling insulation

Old ventilation system….



‘natural’ ventilation

- To little ventilation with poor indoor climate (fungus problems)
- Ventilates not enough in mild weather conditions, too much in severe weather conditions
- High heat losses (ventilation losses account for 30-50% of all heat losses in standard renovated buildings)

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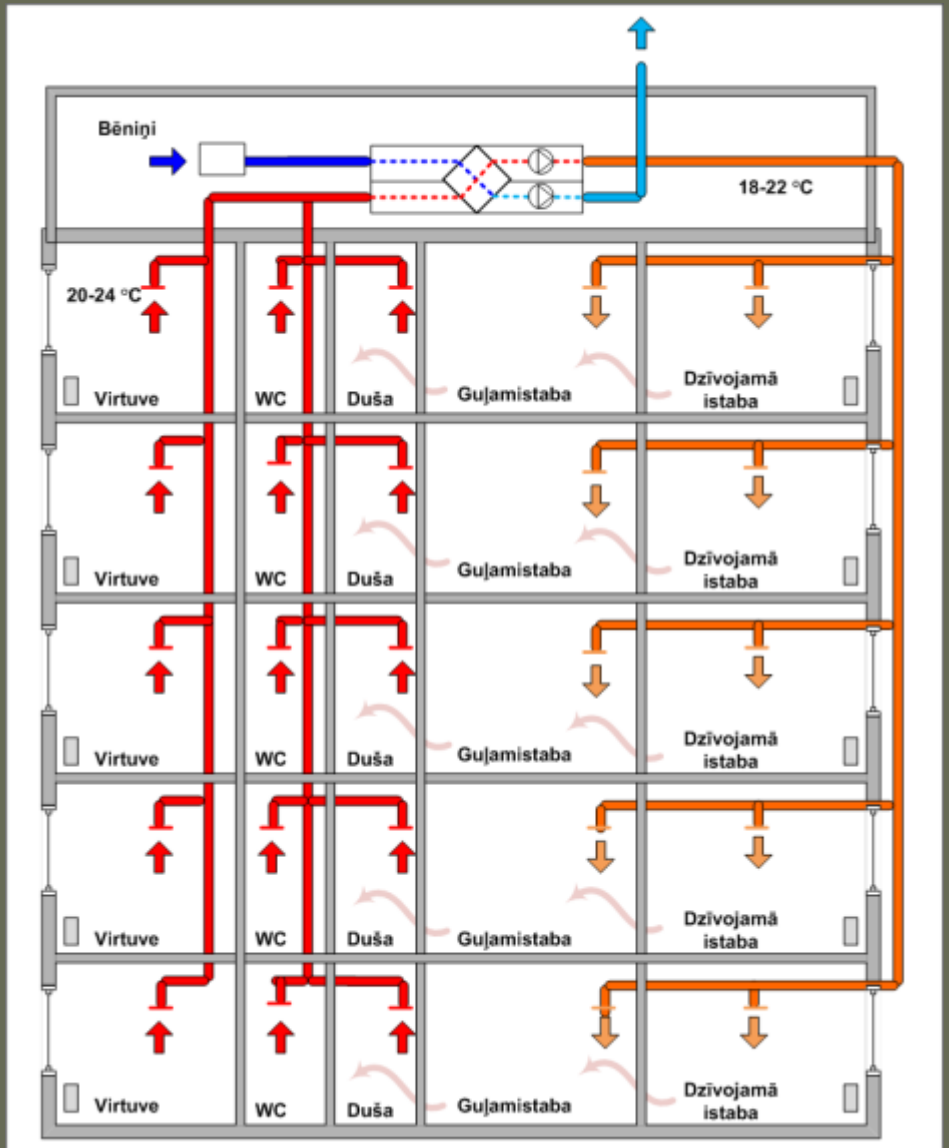
…..new ventilation system



mechanized ventilation

- Fixed hourly air refresh independent of season or weather
- Healthy indoor climate in all seasons and all parts of the apartments
- Recovery of up to 90% of ventilated heat energy
- If geothermal heat pump is installed > free cooling in summer

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Geothermal heat pumps; The end of city (co-generation) heating?

In order to get 1 MWh of heat into a building we need;		
	District heating	Geothermal heat pump
Energy required	1.2 MWh thermal Includes 20% or more distribution losses	0.25 MWh electricity no distribution losses and at least COP of 4.0 (400% efficiency)
Cost	**~ 65 Euro per MWh** average cogeneration city heating tariff in Latvia ex VAT	**~ 22 Euro per MWh** Based on average purchase price of electricity from the Nordpool electricity market using day/night tariff)
Environment	Large quantities of mainly fossil fuels	Small quantity of mainly non-fossil fuels (hydro and wind)

Latvian apartment owners

Most flat owners are financially, technically and organizationally not equipped to fully bear the responsibility of collective ownership;

- They cannot prepare proper renovation and maintenance plans
- They have great difficulty to organize decision-making process in their buildings
- They mistrust and misunderstand financial and technical risks and opportunities
- They are afraid of bank loans
- Many who have tried to renovate have ended up receiving poor quality works for inflated prices
- Collectively residents are conservative and very risk averse

A residential ESCO like RENESCO can place ALL RISKS with one party which understands and accepts all financial and technical responsibilities and consequences of the renovation and energy saving process

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So how do we finance renovations though energy savings?

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For an ESCO the solution is to sell comfort instead of energy

ESCO principle

Before

600 MW h/a

ESCO

After

600 MW h/a

50 % = 300 MWh/a

+

50 % = 300 MWh/a

= 600 MWh/a

How are residents payments calculated?

1st step – average pre-renovation heat consumption is calculated:

	2007	2008	2009	2010	**Average**
Heat + hot water + circulation losses MWh /year	620	598	578	636	**608 MWh/ year**

How residents payments are calculated(2)

2nd step – adjustment according to price / temperature changes:

$$ET_{A,S} = ET_B \times \frac{(TO_S - TI_S)}{(TO_B - TI_B)} \times \frac{SA_S}{SA_B}$$

Calculated payment to RENESCO

=

pre-renovation heat consumption (608 MWh)

×

monthly average temperature

×

60-80 Euro/ MWh

local district heating tariff

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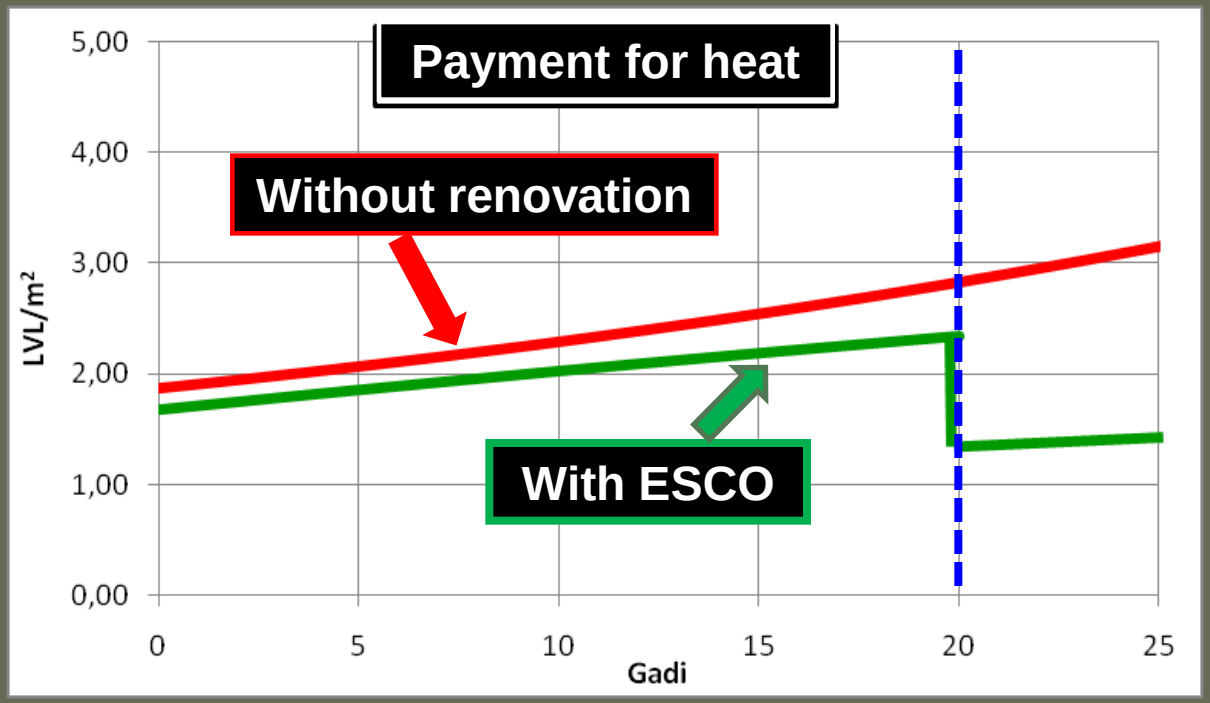
Financial benefits

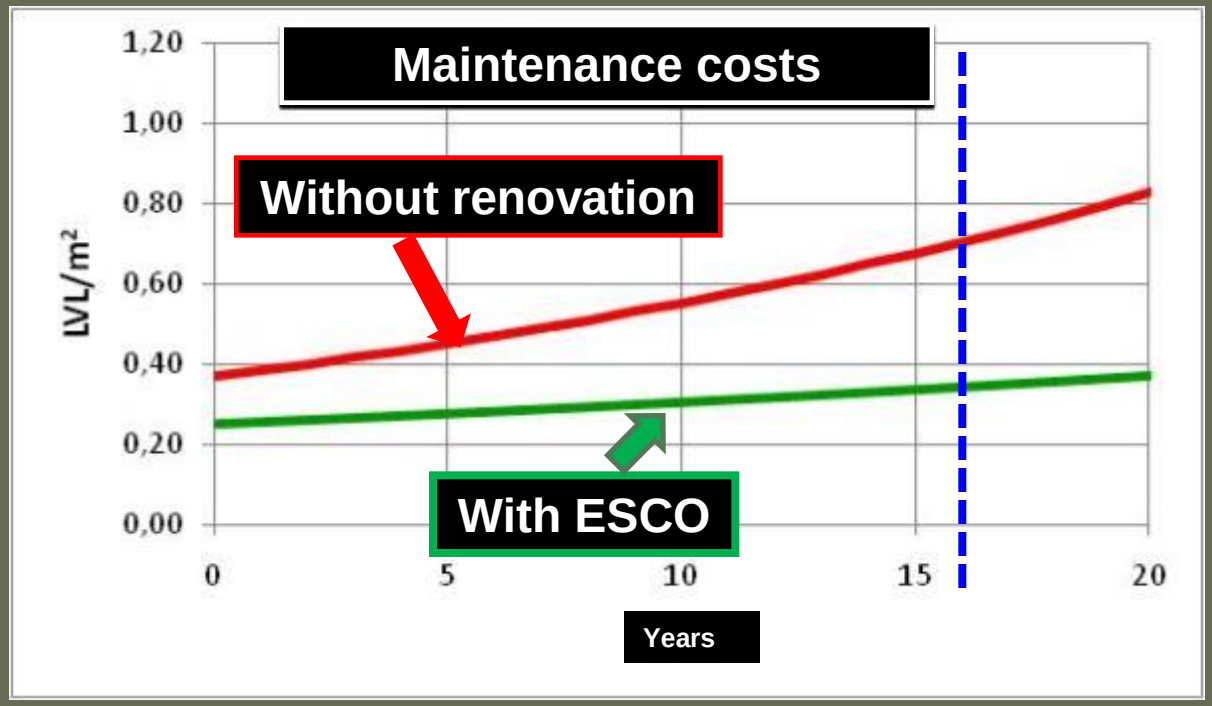
- Residents receive profit share of 25% of RENESCO net profits from their building. Residents heating bills are reduced by;

1. at the beginning of contract period: ±3-7%
2. At the end of contract period more than 50%



Financial benefits (2)

- After renovation the housing maintenance costs decrease by 30 - 40%



Esco from a financier perspective

From an economic point of few RenEsco should be seen as a utility company with customers which:

a)Are locked in for 20 years

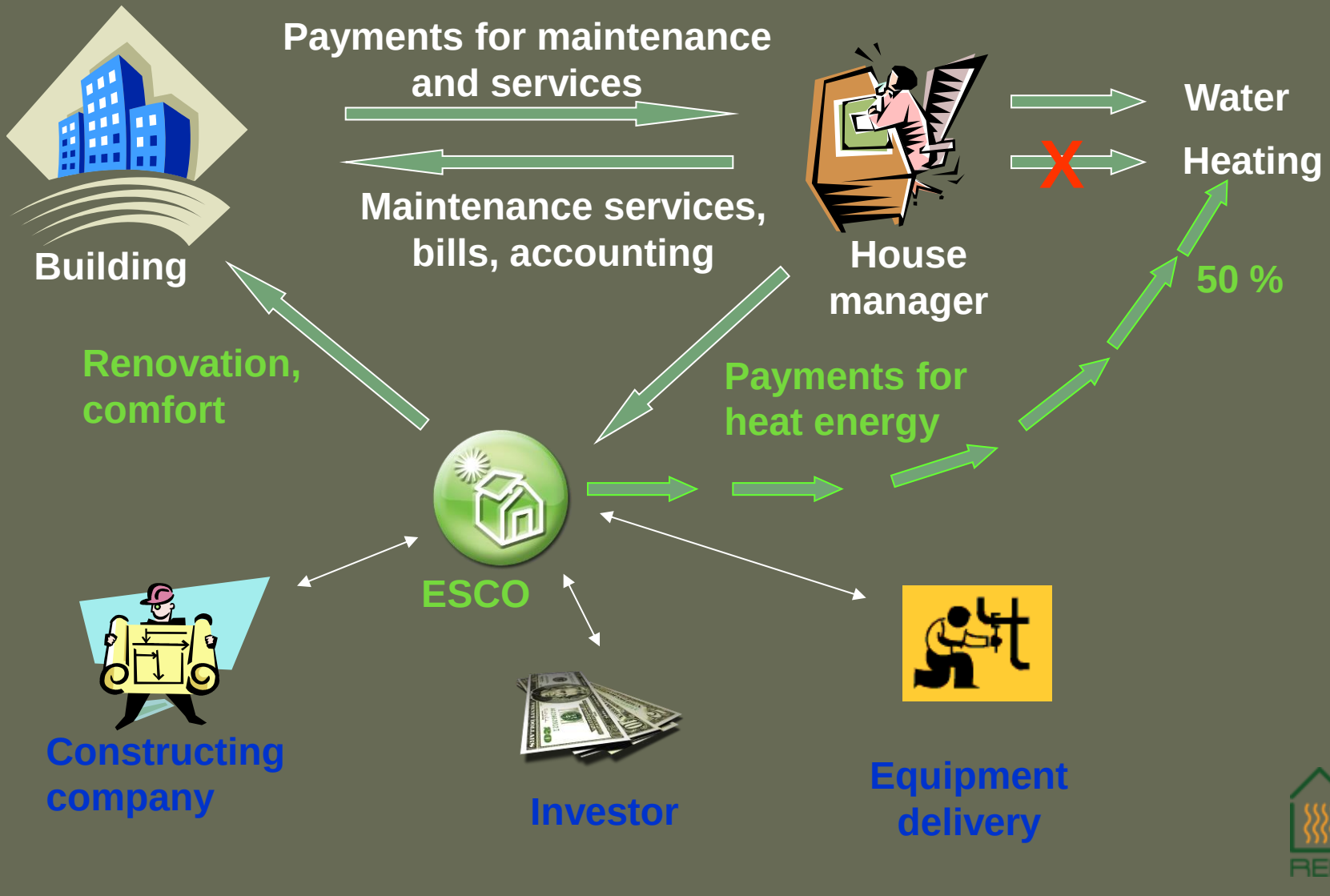
b)Will consume and pay for a guaranteed quantity of energy for 20 years

c)Have provided a minimum price guarantee for that energy which exceeds operational costs and debt obligations

The price the ESCO has paid to get these customers is the deep renovation of their building and a 20 guarantee on comfort and construction.

If the country continuous to be governed by rule of law, there is no legal scenario under which the ESCO could end up with a negative cash flow

Housing renovation with ESCO and maintenance company



Risks?

Investors (banks, funds etc.)

€

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Payment for guaranteed comfort

Bank requirements from RENESCO:

- Guaranties of company owners
- Commercial pledge
- Rights to receive cash flows from the people's payment for heat

Building or residents do not provide collateral or guarantees

If the company goes bankrupt

Bank requirements to company:
- ~~Guaranties of company owners~~
- ~~Rights to company's capital~~
- Rights to receive cash flows from the people's payment for heat

Building, nor residents, provide collateral of guarantees

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Monitoring system

- We control the heating of the building and we can therefore take on full financial responsibility for the loans and cash flows
- http://monitoring.itworks.lv/en/energy_consumption

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european energy service award

eesi european energy service initiative

European Energy Service Award 2011

Award Winners 2011

Best Provider: RENESCO

The prize was organized by the **Berlin Energy Agency**.

The jury consisted of the

- **European Commission**
- **European Investment Bank**
- **European Bank for Reconstruction and Development**
- **European Federation of Regional Energy and Environment Agencies**
- **German Federal Environment Agency**

Link: http://www.european-energy-service-initiative.net/eu/european-energy-service-award.html

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Let’s talk housing policy!

- Majority of East Europeans live in substandard apartments that are getting worse every day
- Virtually no new affordable housing has been build for decades
- In developed countries people spend 20-30% of household income on capital costs for housing. In the Baltics low and medium income households spend less then 5%. Instead they spend >15% of income on purchasing hot air (mainly from Russia).

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Living in low quality housing is costly;

- Higher health costs
- Higher energy costs
- High maintenance costs
- Low self esteem of population
- Young families and professionals leave for better cities and countries
- Greater chance of people falling into poverty
- Lack of credit and banking facilities for occupants
- Low labor mobility due to low housing mobility
- Bad investment climate in such neighborhoods
- Etc, etc.

- For decades countries like Lithuania have suffered from a huge lack of institutional capacity to deal with mass housing (both public and private sectors). As a result the nations' housing stock needs to be redeveloped on many levels.
- Creating affordable mass housing requires equity and organizational capacity which many end-users cannot provide at some stage of their life (young families, pensioners, lower working class).
- Affordable housing requires very long term financing (30-40 years) and the benefits exceed the life span of individual human beings.
- In developed countries it is the role of national authorities to create conditions for the private and public sectors to solve these dilemmas.
- Since acquiring independence 22 years ago, most post communist countries have not defined their role regarding their nations' housing needs. If that continues, their governments will fail their citizens in providing the most basic necessities of life.

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Current policy barriers preventing the speedy modernization of existing residential housing

1. Decision-making rules for apartments buildings encourage keeping things as they are and make it unreasonably difficult to agree on any actions.
   - Passivity of owners should not lead to obstruction of renovations. Only count votes of people who vote. If owners don't vote their vote should count as neutral, not as an against vote. Abandon the need for a quorum (in second voting round).

2. Decision-making by controlling institutions can ad huge cost and uncertainty to a already very complex process
   - Overbearing bureaucracy leads to high process costs (20% at Renesco, double what was planned)
   - Delay in implementation (6-24 months extra)
   - Many cancelations (50% or more)
   - Unpredictable financial planning and results.

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Current policy barriers preventing the speedy modernization of existing residential housing (2)

3. Availability and Cost of Financing
   - First aim at providing low cost loans and only after that plug market gaps and social and technical issues with targeted subsidies (on a 20-year repayment schedule 1% lowering of interest rates = 9% investment subsidy).
   - Providing cheaper loans through the use of state guarantees is the cheapest and most common way to finance housing for low/medium income households in developed countries. However, ensure that time implementing parties are fully at risk and cannot simply walk away from overpriced and underperformed projects
   - Equity requirements of the contracting party needs to be solved (either forfeiting of cash flows, or near 100% debt financing of projects).

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Current policy barriers preventing the speedy modernization of existing residential housing (3)

4. No separate rules and programs for different types of agreements or implementing organizations.
   - The housing problem is so big that it needs the efforts of all potential entities who are willing to stick out their neck (home owners associations, cooperatives, house managers, ESCO's).
   - The buildings have the same financial and technical challenges for everybody, no need to put any party at an advantage or disadvantage.
   - Stimulate anybody willing to do this difficult work and let the market and residents decide who offers the best solutions.
   - Don't block any entity from using the support tools you plan to create. Only demand that they offer a transparent package and that any building receiving support will be comprehensively renovated with sufficient guarantees from the contractor.

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РИНОК

National Renovation Cost-Benefit Calculation

link

Renovation cash flows

graphs

Thank you for attention!

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