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European Rental Housing Framework for the Profitability Calculation of Energetic Ret rofitting Investments

Funded by the European Union

Heat conservation incentives and policies for rental buildings

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1. Why and how heat conservation

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Requirements to heat conservation

1. **Heat conservation should**	2. **Why these requirements?**
a. Be implemented in **the right/optimal amount.**	a. In order to establish an optimization between investments in supply and demand systems. (This is especially relevant in the present strategical change to 100% RE supply systems).
a. Be implemented **in right time.**	b. In order to avoid investments in oversized supply systems in a situation where heat conservations comes “to late”. (This is especially needed in the present situation with a strategical change of the energy supply system).
a. Supports low temperature systems.	c. To make it possible within the existing district heating pipe capacity to supply the needed heat with low temperature systems - and thus avoid new investments in district heating pipes. d. To support a high efficiency/COP of heat pumps powered with mainly wind power.

3. The Danish case

(God and the devil are in the details. Therefore I as a start go in detail with the DK case, where I ”know” the details)

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The energy system benefits of heat conservation

1. Reduced heat losses in the houses have two effects: Firstly that the spared district heat capacity makes it possible to satisfy the heating needs *with a lower water temperature*, secondly that the existing network has capacity to supply an *increased district heating area.*

2. The lower temperature makes it possible to use heat pumps in district heating systems with a high COP factor and thus a lower consumption of kWh electricity for a given amount of heat .

3. The lower supply temperature also results in *reduced losses* in the district heating network.

4. Integrating heat and power, increases the market for wind power and counterweights the ongoing merit order induced fall of wind power prices.This added value caused by integrating heat and electricity markets can be shared between the heat users and the wind power producers, both making heat cheaper, and wind power more profitable.

5. More low temperature heat sources can be used,etc.

The above effects are included in the EnergyPlan calculations and are reasons why the cost per supplied kWh may be reduced concurrently with a reduction of the amount of supplied kWh per m2 meter heating area.

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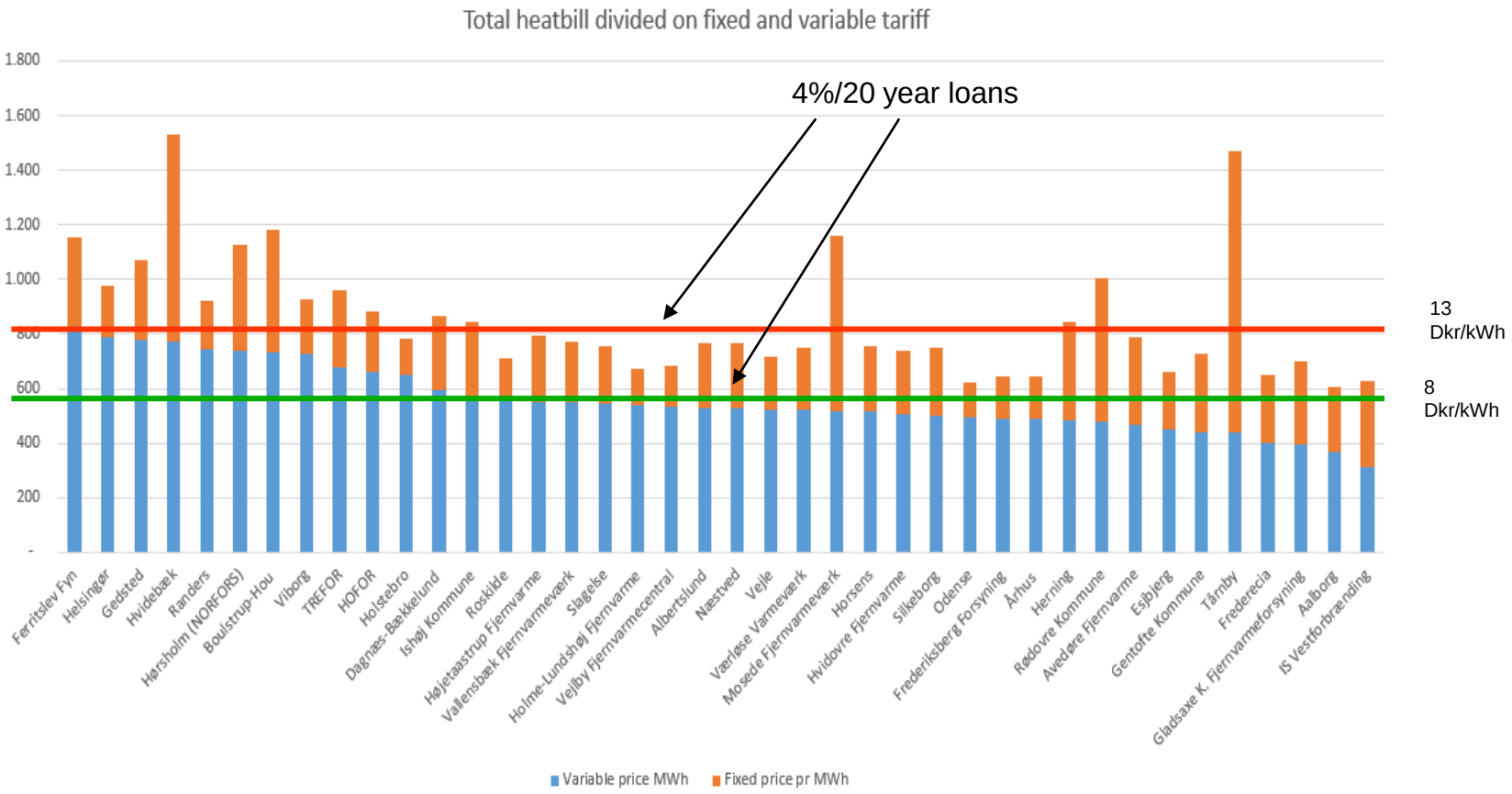
BEFORE REFORM:

Heat supply- and conservation cost in some district heating areas in DKr/MWh.

(75m2 apartment with an annual heat and hot water consumption of 10 MWh)



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Does it pay for a landowner of apartment buildings to invest in heat conservation?

a. The **"Total economy neutrality"** situation. First of all any landlord has the right increase the rent in any rented house equivalent to the reduction in the energy bill caused by a given investment in energy conservation. As shown before, at the present incentive structure it does not pay to invest in energy conservation.

b. The **free rent** situation: In houses build after 1991 the rent is set in a free process between landlord and the tenant. Here the landlord is free to set the rent, but may lose competitiveness due to the present bad energy conservation incentive structure.

Conclusion: it does not pay for the landlord to invest in heat conservation.

Does subsidies change the incentive situation?

As we have seen in former slides, the investment costs are between 8 Dkr and 15 Dkr for an investment that annually saves 1 kWh in the technical lifetime of the investment. It is possible to sell the energy conservation right of this investment to the large energy companies for a price of 0,3-0,6 Dkr/kWh

0,3-0,6 Dkr/kWh is a subsidy of between 2% and 5% of these investment costs, from which furthermore should be subtracted the consultancy or transaction costs of getting the subsidy. In subsidy per kWh it amounts to between 1 and 2 øre/kWh.

This subsidy element is insignificant and does not change the incentive situation.

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Does technical building renovation codes influence the heat conservation incentive?

It can be claimed that the economic incentives at the house owner and tenant level are not that important, as ambitious building renovation codes could assure that over time all parts in the house will be replaced with parts of a high energy quality.

But it is possible to repair instead of renovate buildings. And if a landowner repairs a roof, windows etc., the repair does not have to live up to building codes. And if a landowner make a renovation that does not pay, he/she will have to pay the present value deficit. So it may pay to repair instead of renovate and thus prolong the lifetime of an investment considerable. This may mean too late and too low reduction in energy consumption.

The conclusion on our preliminary analysis is that the building code implementation linked to renovation, due to lack of economic incentives, will have low impact, as renovation may be replaced by repair. The effects on energy conservation of the building code requirements therefore may come too late and be far below 20-30% of heat and hot water conservation. (This has to be analysed and discussed in dept!)

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Conclusion regarding present heat conservation incentives in Denmark.

Will the energy conservation measures be *implemented* *in right time, in the right way and in the right amount?*

The answers to these 3 questions are from the preceeding analysis:

no, no and no, unless new policy measures are implemented.

In the following we will just mention three policy reforms that could improve the incentive situation, and start turning the answers on the above 3 questions to a yes, yes and yes.

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Three policy suggestions

1. Establish a situation with 100% variable tariffs, and

2. Give public guarantee making 30 year 2% loans possible for renovation purposes.

3. Combine this with a certified energy consultancy program as the basis for public guaranty and long time low interest loans.

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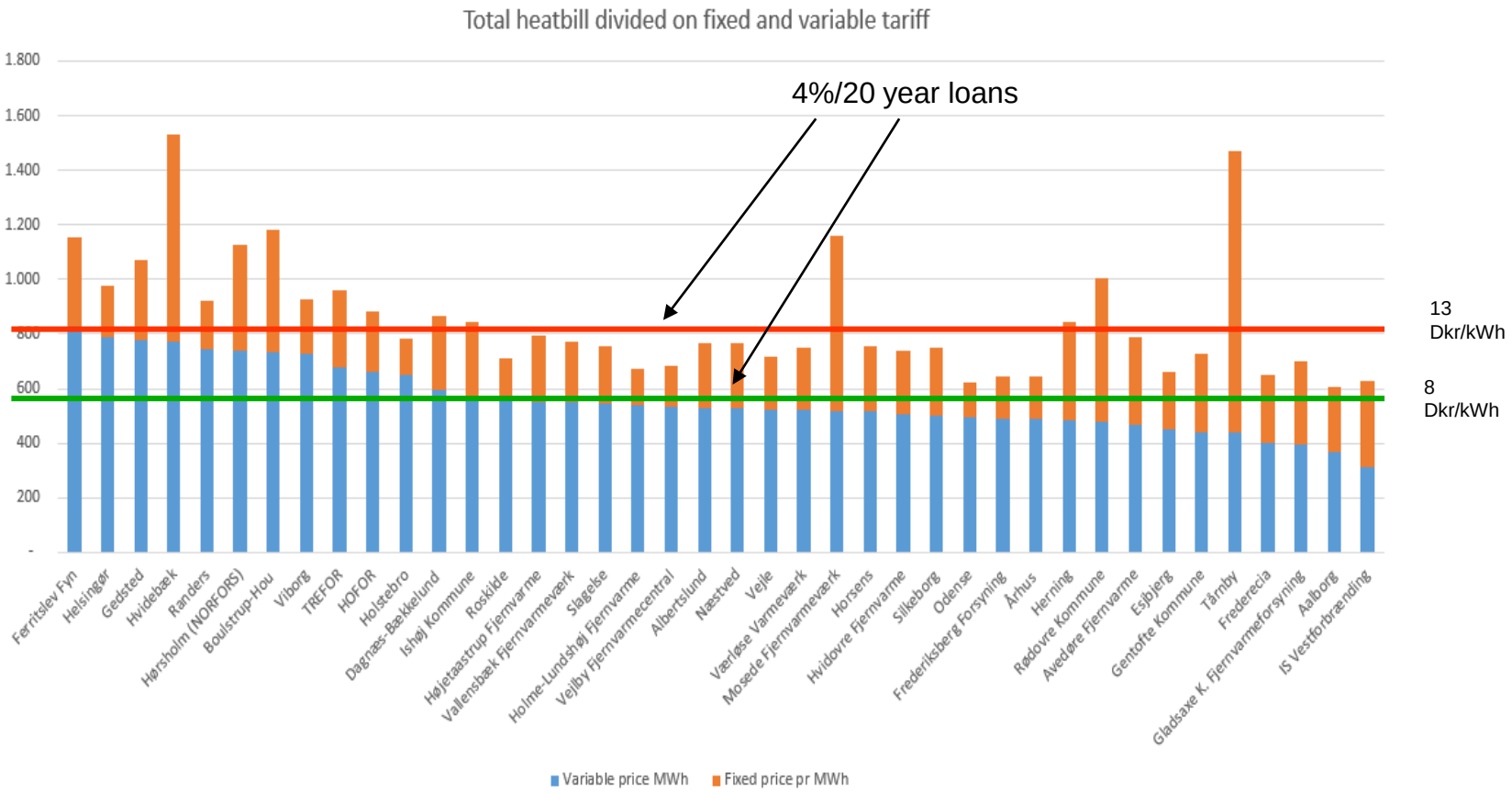

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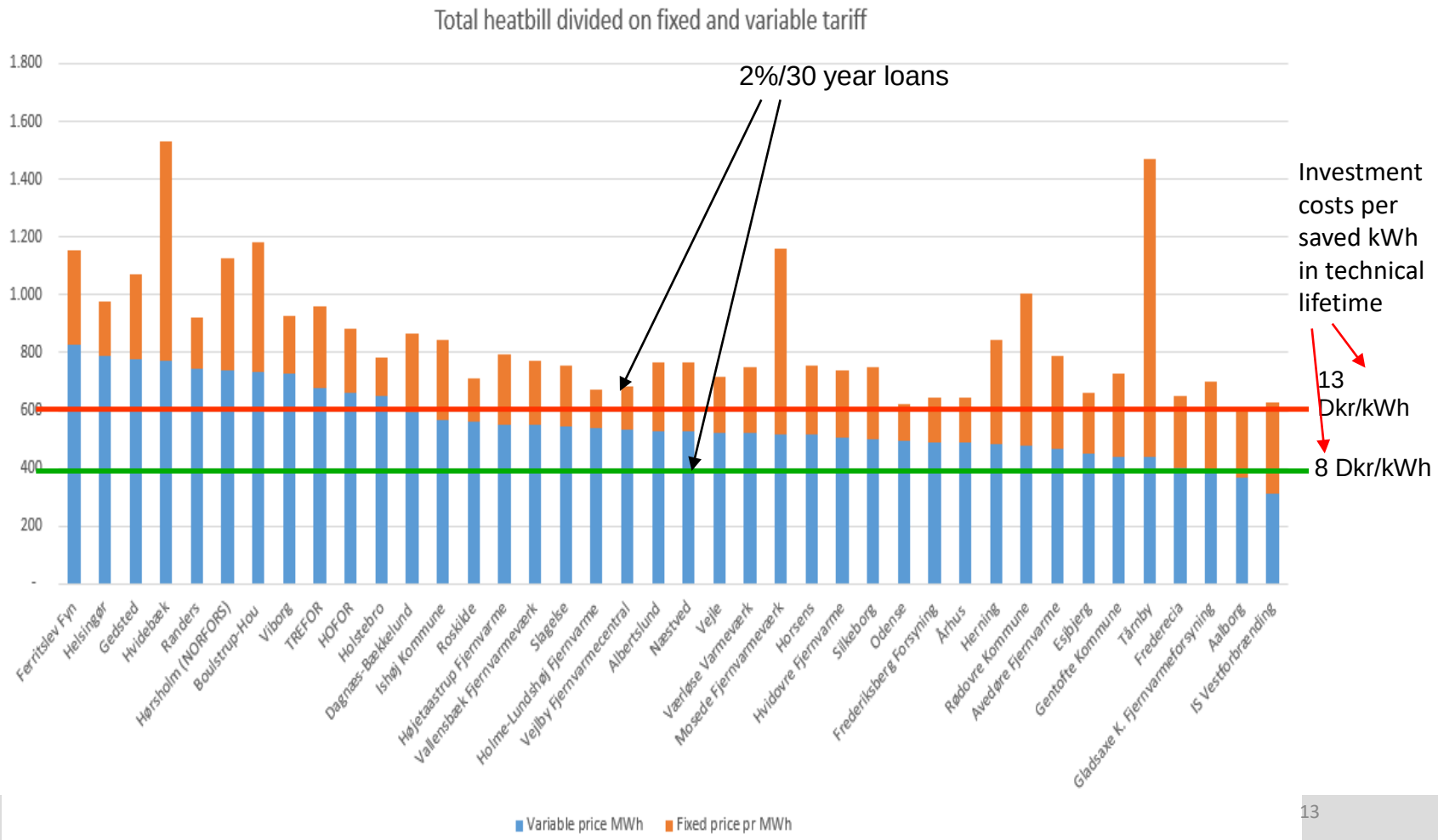
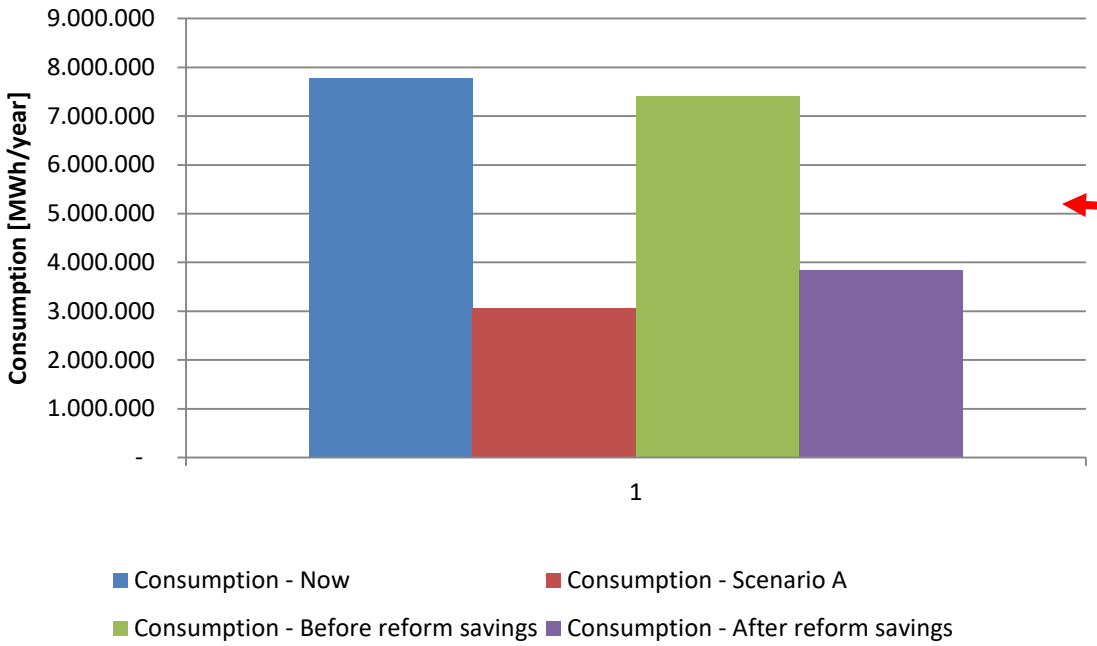
AFTER REFORM:

Heat supply- and conservation cost in some district heating areas in DKr/ MWh.

(75m2 apartment with an annual heat and hot water consumption of 10 MWh)



Energy consumption for heating and hot water before and after reform. (Under the assumption that heat conservation is implemented, when the present value is positive, and not implemented if the present value is negative)



Consumption if only investments with positive present value are implemented. The savings are higher when the renovation building codes are included. How much is difficult to say.

2. Energy conservation incentives and the RentalCal case

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Conclusion on incentives and heat conservation in rental buildings

1. Existing heat conservation incentives are far from sufficient in Germany, Spain, UK and Denmark.
2. There are incentive problems in Polen especially linked to heat conservation in area with historical buildings.
3. In the Chech Republic large conservation potentials still remains unexploited.

In summary the heat conservation incentive structures in the above countries are far from sufficient.

New policies must be implemented!!!

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Thank you!

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Policy suggestions

(Some policy examples out of many suggestions)

1. Long term low interest loans (Loan guarantee – Public G.?-Heat company G?).
2. Abolish fixed tariffs .
3. No tax on renewable energy for heat.
4. Tax deduction of a part of the heat conservation investment costs.
5. Free energy consultancy built into a heat conservation program.
6. Improve the landlords incentive for investments (increase rent more than investment costs??)
7. Grants and subsidies for investments in heat conservation.
8. Establish special programs for villages and smart business projects.
9. Assist cities and regions in energy management.
10. Etc,etc,etc!!! See the draft report.

3.Employment analysis

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Purposes of employment analysis

- Employment effects may constitute a positive SOCIAL EXTERNAL EFFECT, that should be INTERNALIZED in the heat conservation feasibility studies. This is especially interesting in countries with a high level of unemployment, and countries with “hidden unemployment”, manifested in a high share of working poor employees.

- The public budget effects of increasing the number of taxpayers due to increased employment.

- Employment effects at a detailed level could represent the base for analyzing the needs for further educating the labor force.

- An estimation of potential innovative solutions as returns on the increased level of heat conservation activities.

The aim here is to establish some very preliminary calculation of the employment needs/effects of investing in energy conservation in rental buildings in the different countries.

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Information from RentalCal participants

Table 6 Heat conservation levels and costs of heat conservation.

Country	a. Present heat consumption in kWh/m2	b. Heated area in m2	c. Future heat consumption goals in kWh/m2 (old buildings)	d. Investment cost of heat conservation in € per annually saved KWh
1.Germany	138	1.539.000.000	70	5.3 (Seems high ?)
2.Poland	174	1.047.000.000	90	0.6
3.Chech Republic	169	71.157.414	90	0.3-0.6
4.Spain	72	221.385.124	50	1.5 (?)
5.Denmark	133	77.723.000	70	1.5
6.UK	No data	No data	No data	No data
7.Netherlands	No data	No data	No data	No data
8.France	No data	No data	No data	No data

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A rough estimation of the employment needs/effects in 8 European countries.

Denmarks population is 5.7 million, and the population of France, The Netherlands and UK is 149 mio., or 26 times Denmark.

If we assume the same heat conservation potential in these three countries, and the same investment costs per save kWh, the employment needs/effects will be around 235.000 persons annually.

If we furthermore assume that the German investment costs per kWh are “only” 2 € per kWh, then the total annual employment needs/effects of reducing energy for heat in the rental sector down to the in table 3 mentioned levels will be around 750.000 persons/year (In these 8 EU countries (332 mill. Or 63% of EUs 520 mill.)

It is worthwhile to underline that the rental building stock only amounts to a minor part of the heat consumption in the EU.

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Further studies

1. There are many analysis of the technical potentials and possibilities of heat and hot water conservation. But there is crying need for very systematic analyses of the heat conservation incentive structures in the EU countries.
2. This analysis should be POLICY ADEQUATE instead of/and not only JOURNAL ADEQUATE. These two lewels works against each other!!! A structural desease in the university system.
3. There is a need for a systematic paradigmatic change from heat conservation to energy system optimization. (an optimization of heat conservation and energy supply technologies).
4. There is a need for an internalization of the employment effects in socio-economic analysis of heat conservation projects.
5. But we already know a lot: Long term low interest loans , free energy consultancy, no tax on renewable energy for heat, no fixed tariffs, energy conservation investment subsidies instead of energy (heat) subsides to user bills, etc.

There is a need for European collaboration on these subjects.

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Thank you!