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Swiss Energy and Climate Policy regarding the Building sector:

A cost-benefit analysis

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Swiss Energy Strategy 2050: key elements (govt proposal)

1. **No new nuclear power plants**

2. Promotion of **energy efficiency**
   - Reduction of per capita energy consumption by 43% until 2035 vs. 2000 (about 2% p.a.)

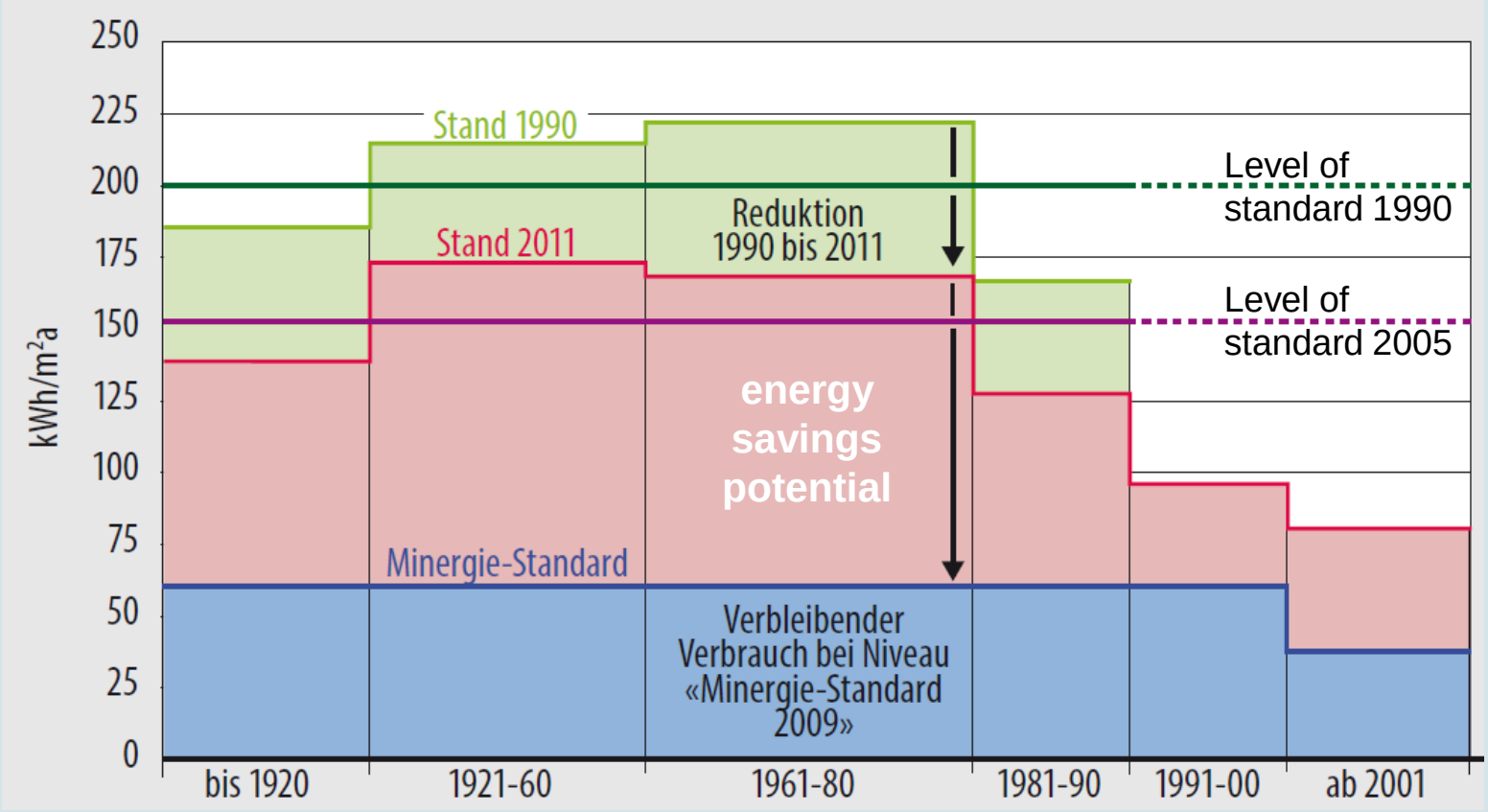
3. Increased use of **renewable energy**
   - New renewable energy: exploitation of sustainably utilisable potentials (24.2 TWh)

4. **Remaining demand** to be met through:
   - Fossil-fuelled electricity production (primarily gas and steam)
   - Imports

Outline

1. **Potential and barriers in building sector**
2. Consistent mix of instruments regarding building refurbishment
3. Key instrument: building refurbishment program financed by CO2 levy
4. Conclusions

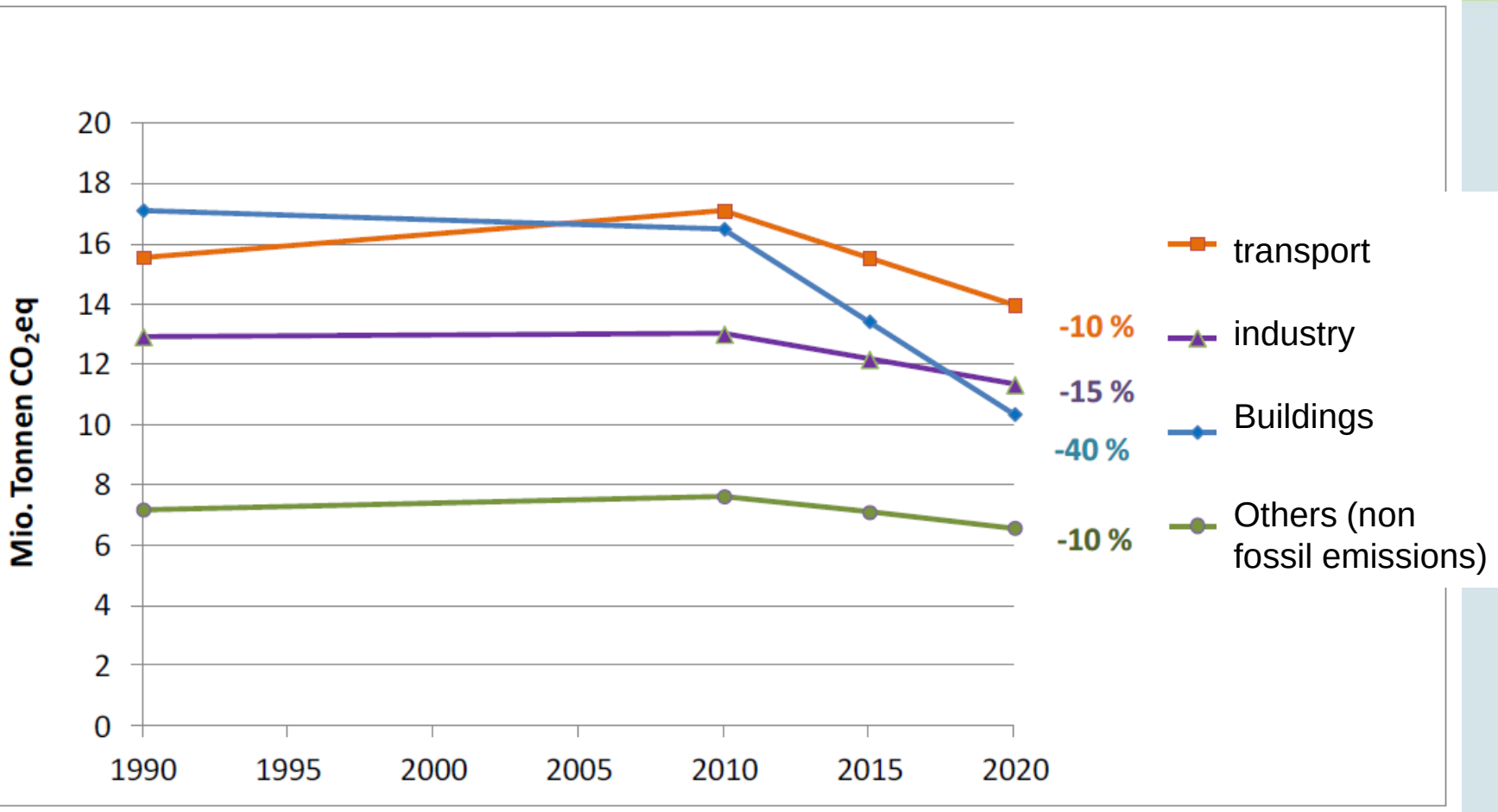
Energy savings potential trough building refurbishment (area in figure corresponds to energy use)



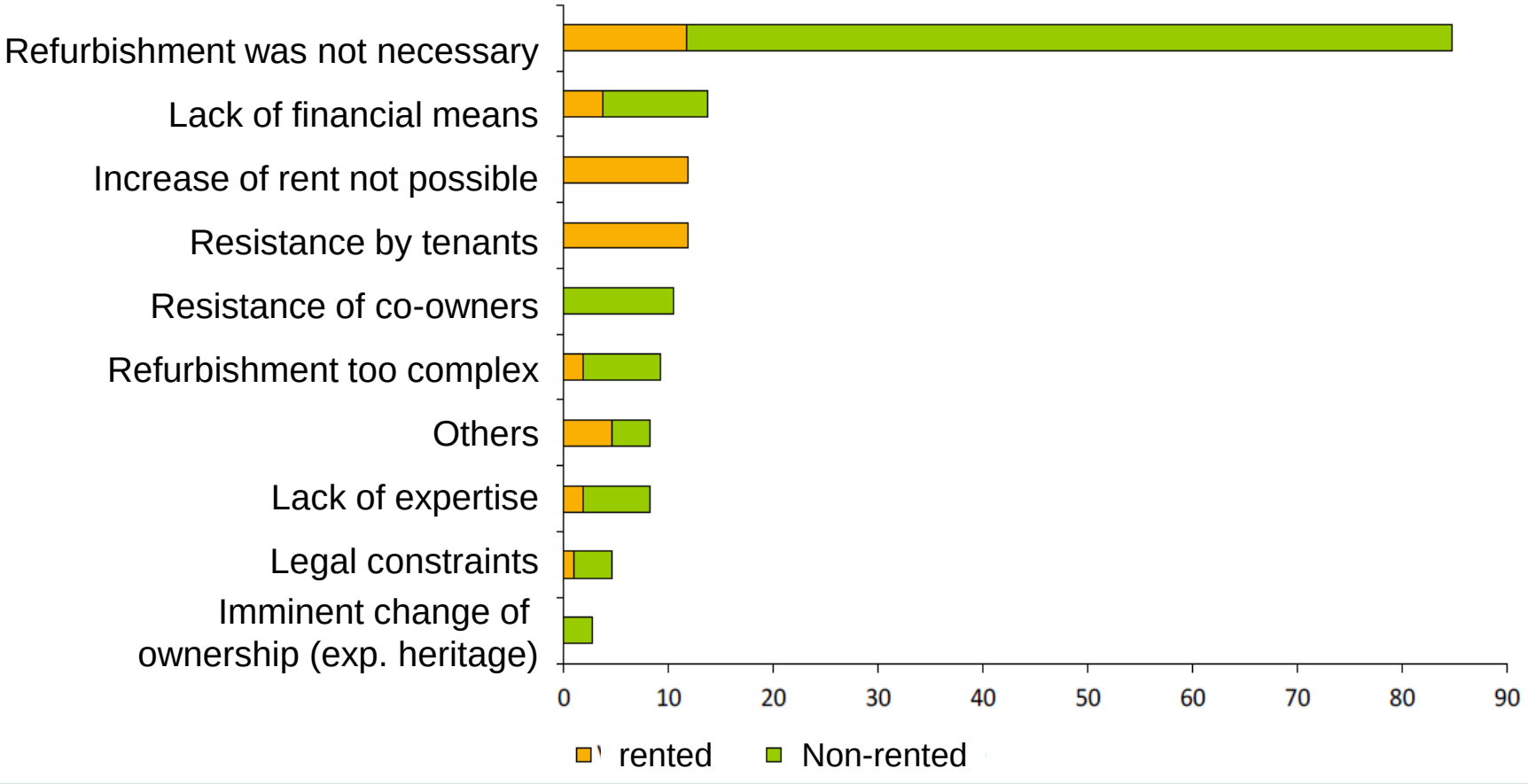
Heated floor area per construction period (in mio sqm)

Source: Canton of Zurich

Sectorial targets 2020 according to CO2 Law



Barriers to landlords for refurbishment decision (percentage shares, multiple answers possible)



Source: Interface study

Analysis of Investment Decisions for Energy-Efficient Renovation of Multi-Family Buildings (Banfi et al. 2012)

Conclusion 1:

Construction companies and other specialists such as architects and planning experts seem to have a **key role in renovation decisions**, because they are usually consulted by multi-family building owners as their primary source of information. Therefore, it is important that these experts are well informed on the advantages of energy-saving technologies, including prefab types. This could be implemented by organizing **training programs** and by offering **consultancy on specific renovation projects**.

Analysis of Investment Decisions for Energy-Efficient Renovation of Multi-Family Buildings (Banfi et al. 2012)

Conclusion 2:

Energy-saving renovations are generally considered as **risky investments** by the owners. Risk factors could be particularly important because renovation decisions are often irreversible. Moreover, other things being equal, the owners generally **prefer simple overhaul and maintenance measures** over energy-efficient retrofits. Therefore, **targeted policy instruments** such as specific subsidy programs, reduced interest rate can be effective ways of promoting such investments by decreasing the costs. However, all these instruments should **be related to ambitious energy efficiency criteria**, for instance through certificates or labels such as Minergie. Indiscriminate subsidies and tax deductions could be counter-productive because they might relatively favor non-energy saving renovations.

Outline

1. The Swiss Energy Strategy after Fukushima: energy efficiency
2. Potential and barriers in building sector
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5. Conclusions

Regulations influencing the refurbishment market

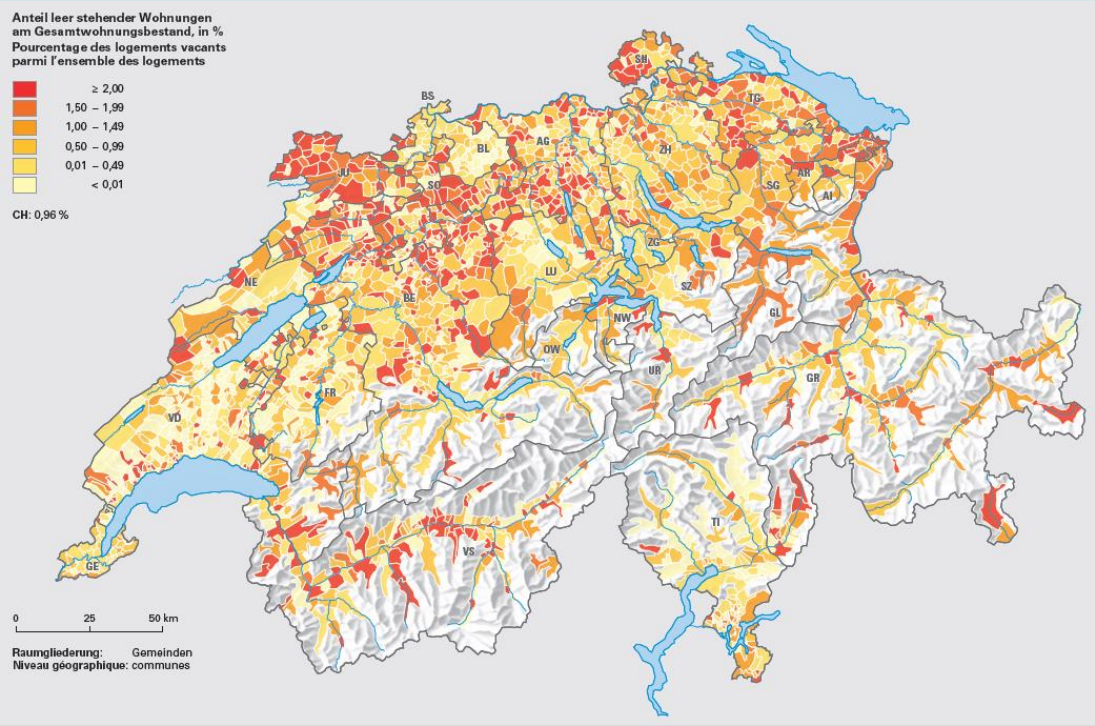
- Tenants law: 50 to 70% of energetic investments can be transferred to the tenant by the building owner.
  ⇒ no obstacle for refurbishment

- Tax regime for private building owners (covering 80% of buildings): energetic investments can be fully deducted from income tax.
  ⇒ no obstacle for refurbishment

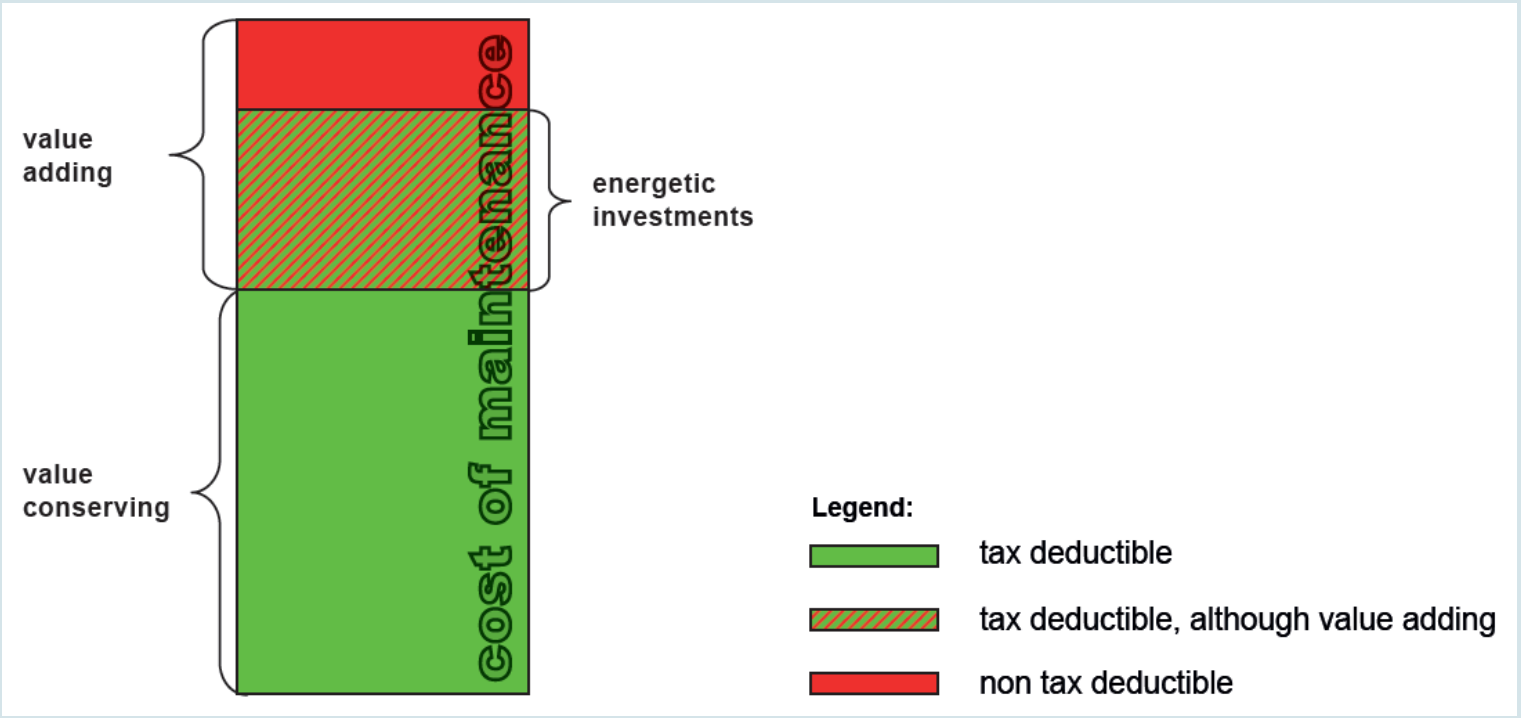
- Carbon tax on heating fuels: cost can be fully transferred to tenants.
  ⇒ no incentive for refurbishment => need for refurbishment support scheme

Are refurbishment investments cost effective? (BWO study 2014)

- In most cases, building refurbishments lead to a **net increase of rents**, even when taking into account reduced heating costs.
- From the **landlords** view point, the refurbishment is **cost-effective** since the investment cost can be transferred to tenants.
- However, **rents can not be increased at all locations**, since people move out (market rent is generally 30% higher than rents for long term tenants):



Tax deductions for building refurbishment (direct federal tax): consistency of tax and rent law



The Swiss federal department of finance estimates that CHF 185 to 285 million lost tax income result from these deduction due to approx. **80% free riders**.
A tax deduction scheme based on minimal performance standards could reduce these negative effects.

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Building refurbishment program financed by earmarked CO2 levy

Since 2008, a CO2 levy has been charged on heating fuels (oil, gas, coal) and redistributed to the general public and business community independently of consumption.

Since January 2014, the levy is at CHF 60 per ton of CO2 or CHF 0.16 per liter of heating oil, roughly 20% of retail price.

4 million flats in Switzerland, most of them are rented.

Heating bill is paid by tenant, not by landlord.

CO2-levy is included in heating bill => no incentive for landlord to refurbish.

A maximum of one-third of the levy (CHF 200 million per year) is allocated to the buildings refurbishment program.

Possible effects of the refurbishment program:

- *Trigger:* the subsidies are triggering the investment decision.
- *Advanced refurbishment:* individuals advance investments originally planned for a later moment.
- *Extended refurbishment:* individuals extend the investment to other building parts (roof, envelope, window).
- *Refurbishment at higher quality:* due to the subsidies, more insulation material is used or window glazing is improved.

Assessment of quantitative energy savings

The Swiss federal and cantonal buildings program began in 2010. In its fourth reporting period covering the year 2013, CHF 210 Millions of refurbishment investments were funded leading to 121'000 tons of avoided CO2 emissions or 31 ktoe (1.6 PJ) on an annual basis. This amounts to 3.2 Mio. tons over the life time (25 years) of the building refurbishment investment.

This effects are calculated based on standardizes measures:

One square meter of improved building envelope leads to x tons of avoided CO2 emissions (modeled effects).

Evolution of energy use for space heating private households (in PJ)

2000	2007	2008	2009	2010	2011	2012	2013
186.6	183.7	183.0	181.9	180.5	178.8	177.0	175.8

Climate corrected values

Conclusions: replicability for other markets possible!

Possible preconditions:

- Carbon tax: earmarking and stable financing conditions; avoiding “stop and go”.
- Consistency and transparency between rental law, tax deductions and subsidy scheme.
- Continuous evaluation and “fine tuning” of program in order to minimize “free rider” effects as well in subsidy program as in tax deduction schemes.
- Reporting to Parliament/stake holders regarding the effectiveness of the program (in Switzerland foreseen by law).

Recommendation: apply minimal performance standards for both subsidy programs as well as tax deductions in order to minimize free rider effects.

Thank you for your kind attention!

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Building refurbishment pays!

Roof and building envelope: **55% savings**

- Subsidies cover 15% of investment cost
- Additional 40% cost savings trough reduced heating cost

Windows: **energy savings 30%**

- Subsidies cover 5% of investment cost
- Additional 25% cost savings trough reduced heating cost

Assumptions:

- oil price at 65 Euros per 100 liter
- Pay back time of 25 years.