INTELLIGENT ENERGY EUROPE

SEVENTH FRAMEWORK PROGRAMME

Realistic perspectives for energy renovations in the next decades

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Introduction

- Delft University of Technology – Faculty of Architecture
- OTB Research Institute for the Built Environment
- Housing Quality -
  Energy efficient housing stock

Recent EU Projects

- **Green Solar Cities**: Energy renovation (Concerto)
- **SHELTER**: Cooperation and coordination for energy renovation (IEE)
- **BEEM-UP**: Energy renovation – participation and behaviour of occupants (FP7)
  Ecoheat4cities: Labelling systems for district heating systems (IEE)
- **NEU-Jobs**: Development in the European housing renovation market (FP7)
- **SusLabNWE**: Realisation and pilots with sustainable living labs – Our part: input for measuring systems, organisation and analysis pilots (Interreg)
- **PLEEC:** Planning smart cities (FP7)
- **EPISCOPE:** Data on energy renovation in 17 EU countries (IEE)
- **COHERENO:** Collaboration for NZEB renovation (IEE)
- **IEE 2013**: 3 projects submitted

EU: Energy targets and policies

Energy Performance of Buildings Directive (EPBD)

- 2020 Nearly Zero Energy Buildings
- Renovation > 25%: as newly built

Energy Efficiency Directive (EED)

70% of the housing stock in 2050 already exists

Required: 3% renovation per year at a very high level

IS THIS REALISTIC?

NL: Current policies

- 2020 RES 16%
- 2050 Fossil free energy system.

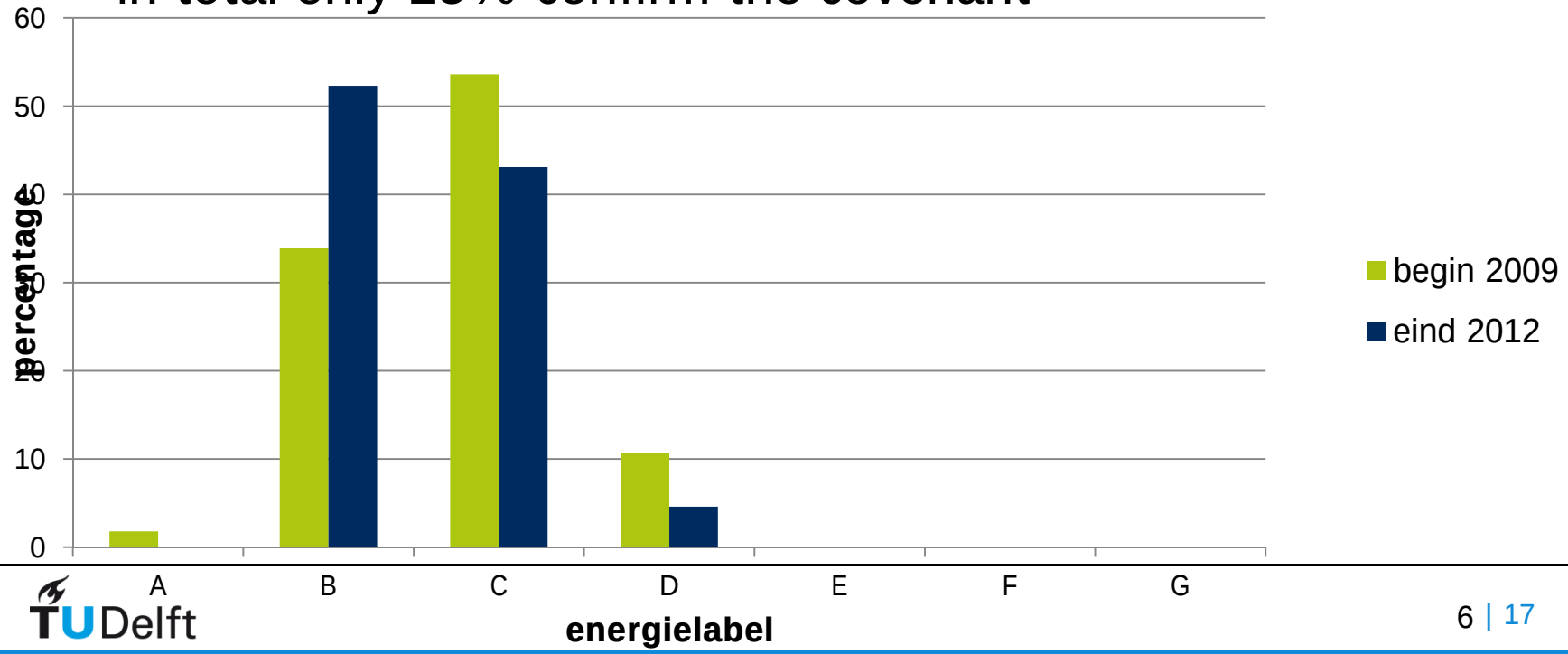
- House prices go down
- Hard to get mortgages
- House building reduced
- Also renovation reduced
- Housing Associations have less money...

Progress in energy renovation in NL?

Housing Associations 2,4 mil dwellings
Covenant: in 2020 average Energy label: B

Survey:

- 49% of the HA mention an average label in 2020
- only 52% of them mention Label B:
- in total only 25% confirm the covenant

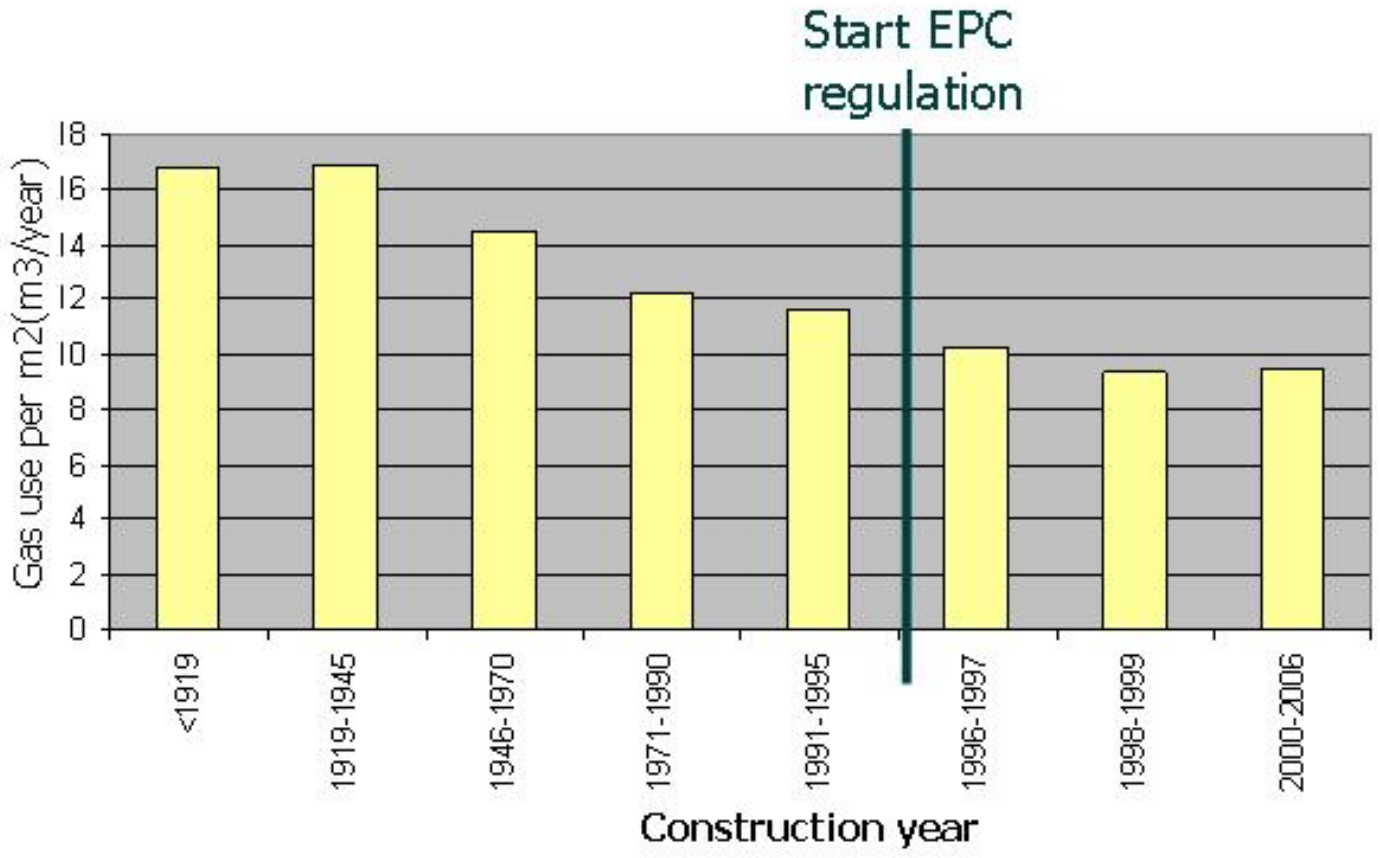


Research 1
Energy performance of New Dwellings in NL

- NL: Energy Performance Regs. Since 1995
- Level: non dimensional digit: (1995) 1.4 – 1.2 – 1.0 – 0.8 – 0.6 (2012)

- Research: Statistical relation between dwellings built under various levels of EPC and final energy use
- 3 data bases

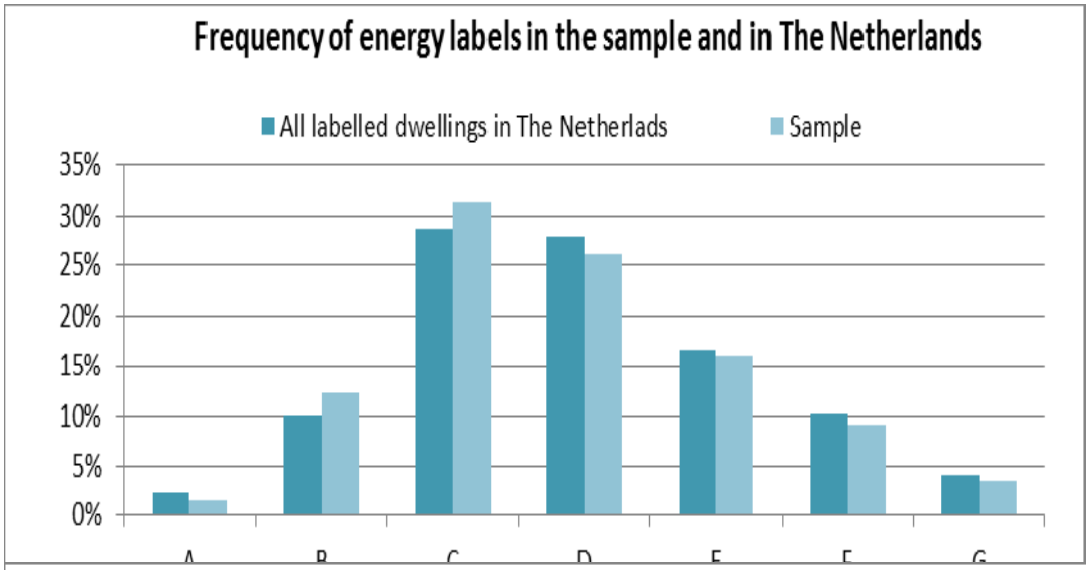
Results – Energy use per m2

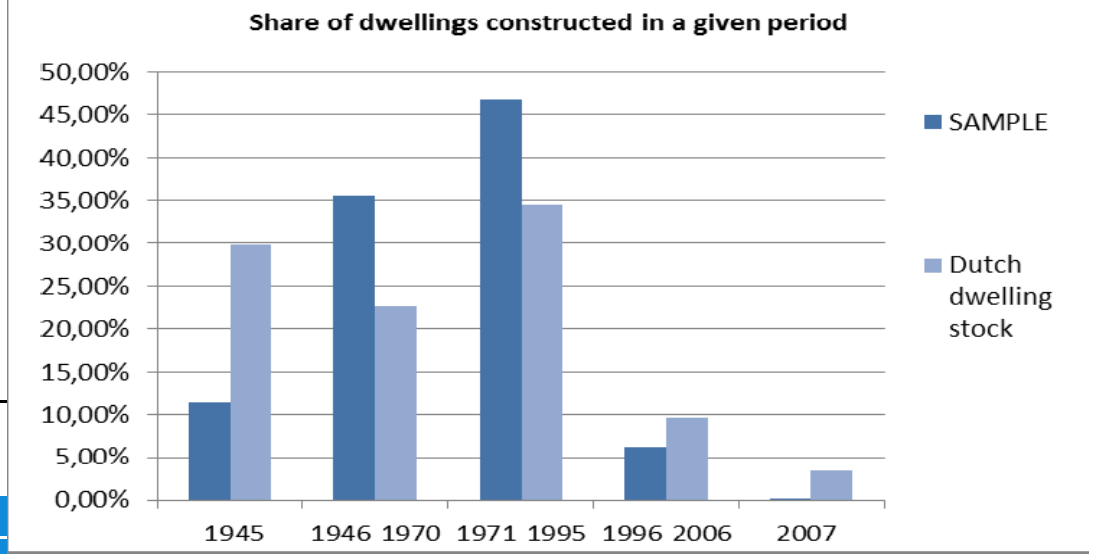


- Actual Energy reduction stagnates
- Rebound effect + under performance of enveloppe and installations

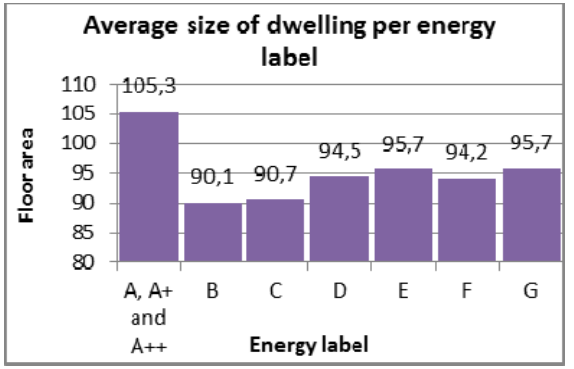
Research 2
Energy use in the existing stock

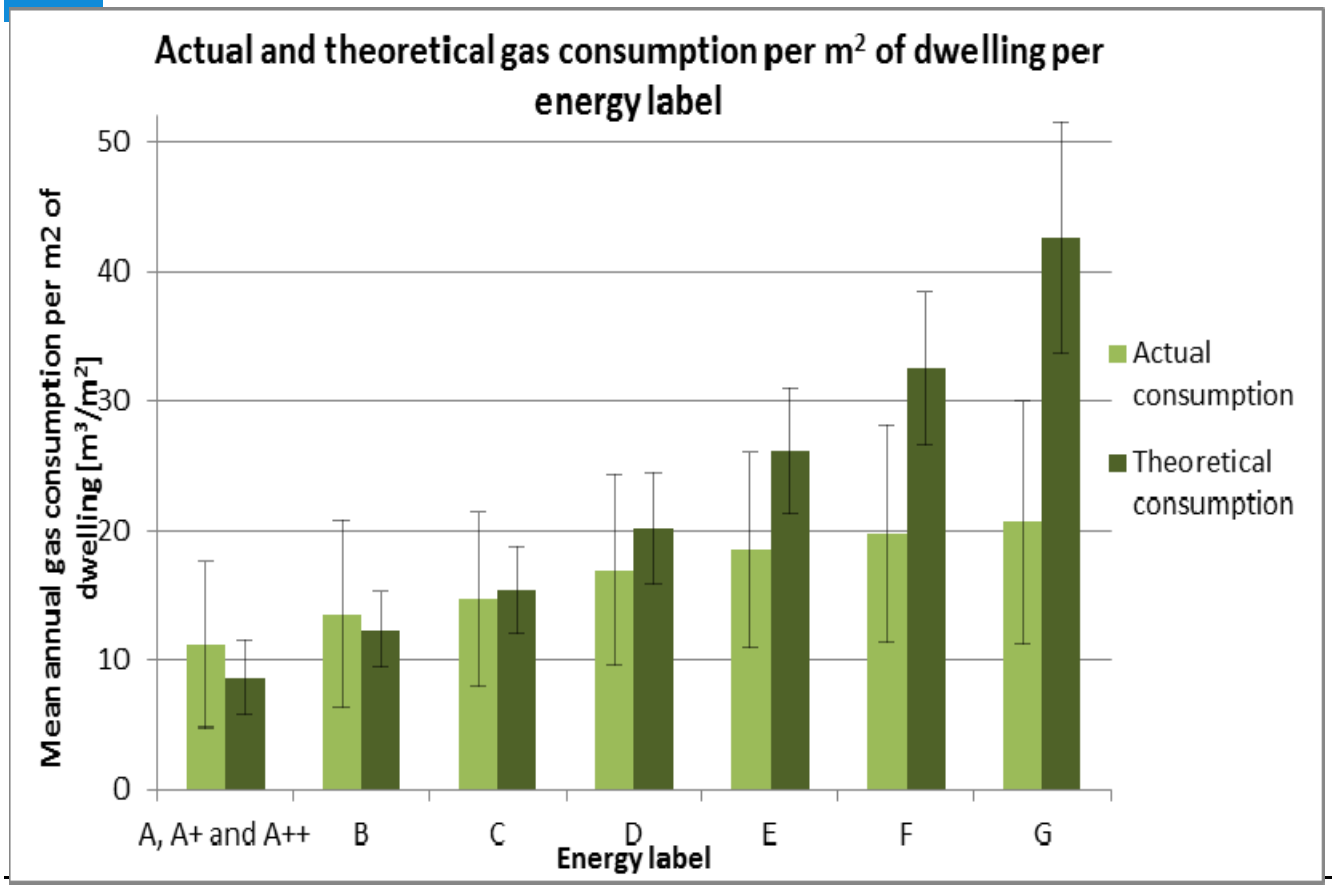
- Energy label data base 2010
- Actual energy use 3 years
- 200.000 cases





Results

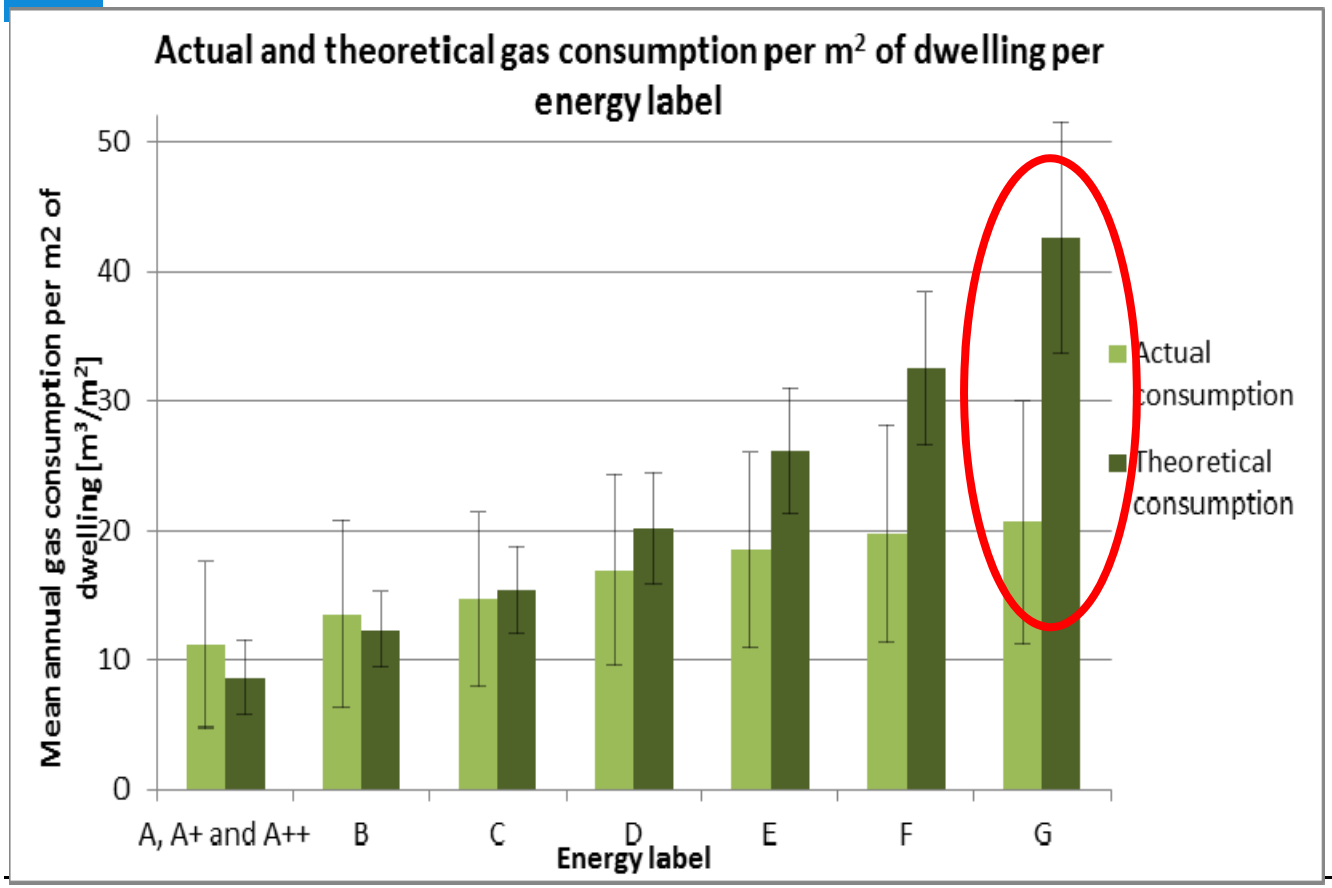




Theory

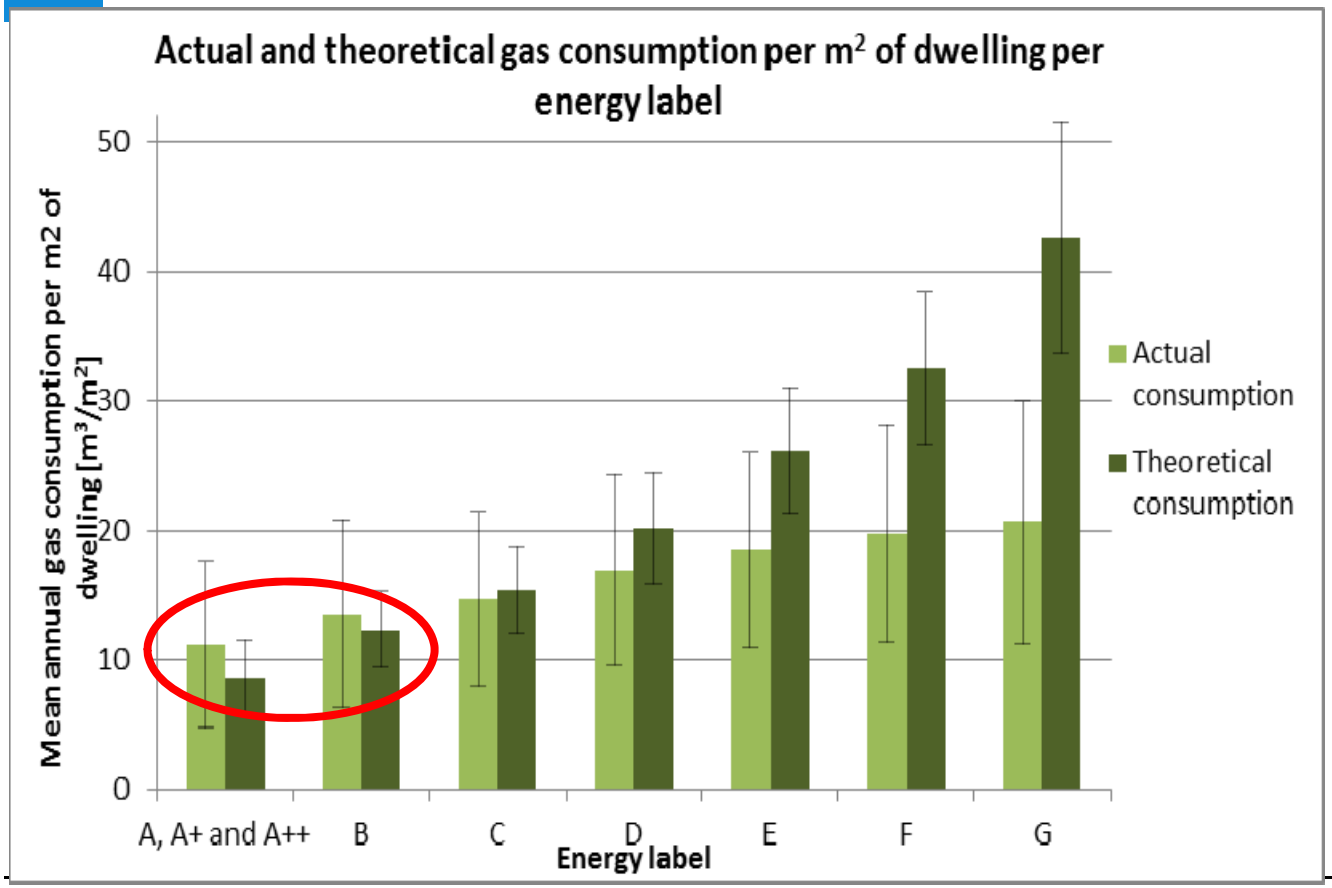
Actual

Results



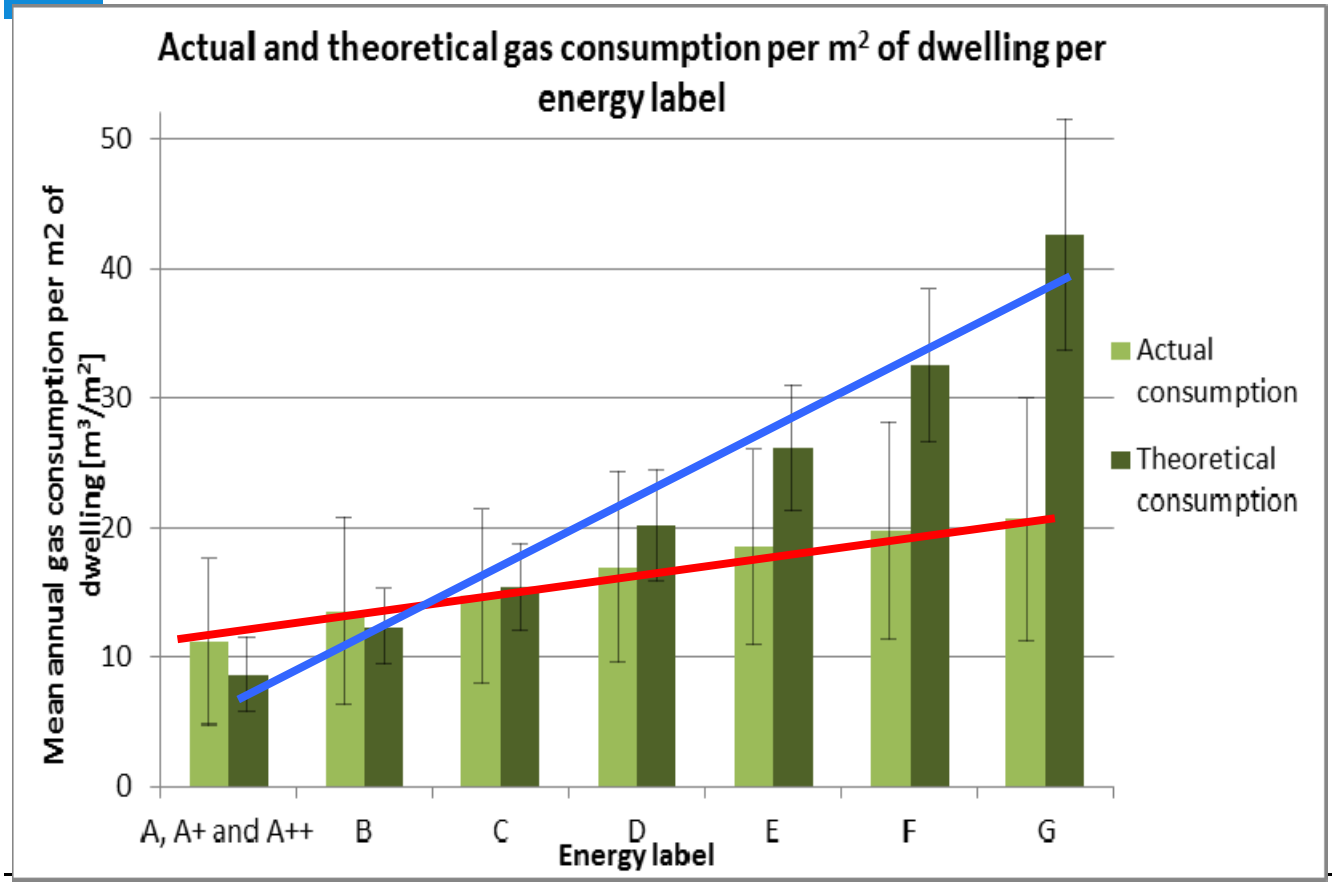
G label:
50% less use than expected

Results



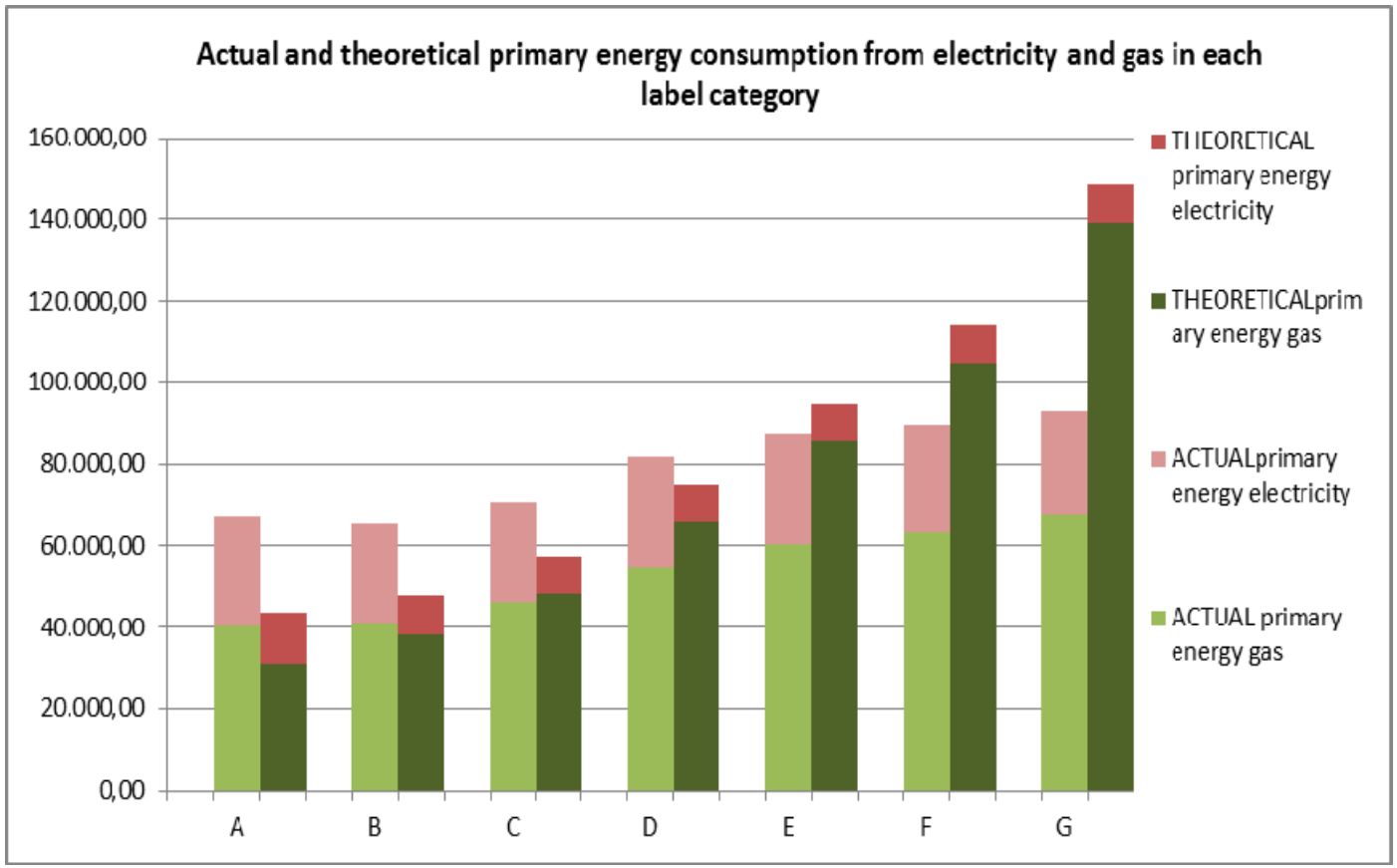
A and B label:
10-20% more use than expected

Results

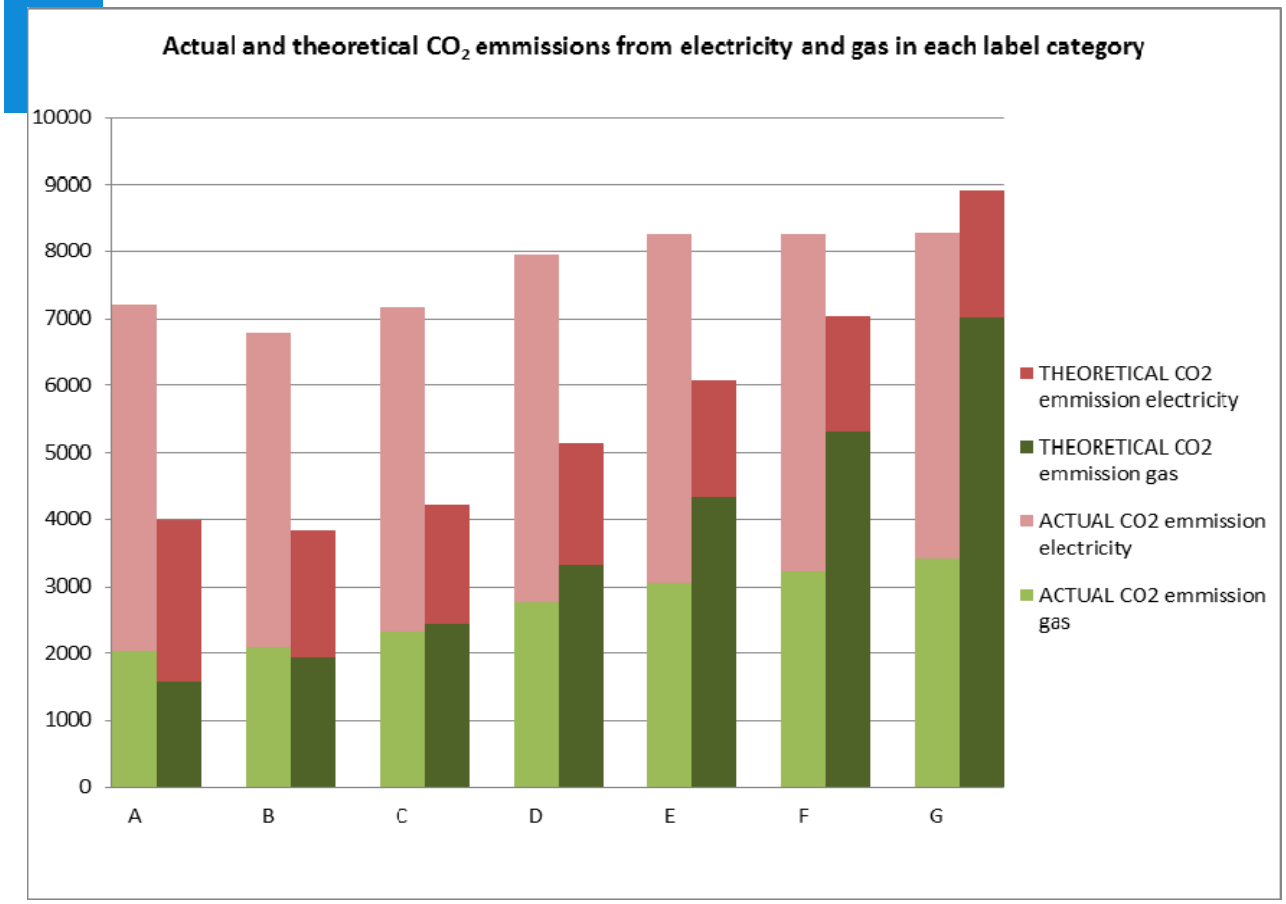


Very little actual savings

Total primary energy use



Total CO_2 emissions



- Total CO2 emissions can hardly be reduced by reducing the heating demand
- Covering the domestic electricity use with PV is very effective in NL!

Conclusions

- Large scale renovations on nZEB levels will be very hard to achieve: requires hugh investments
- When renovating poor performing dwellings to higher levels, a large share of potential savings are used to increase comfort => the average temperature in the dwelling increases
- Renovation programmes should be set up with the aim to increase the total quality and increase the expected life span and value of the dwellings
- Quality assurance essential to achieve potential performances of nZEB
- Use of RES (PV) large contribution to reduce CO_2