

The progress of energy renovations in the housing stock in the Netherlands

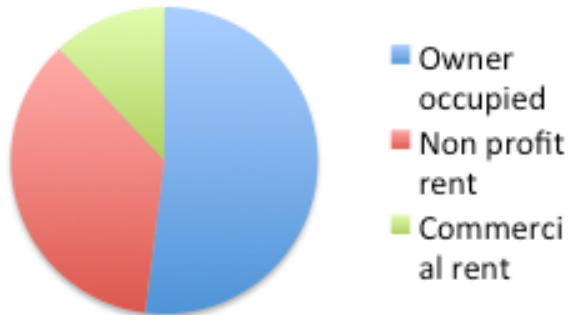
Henk Visscher – Delft University of Technology - the Netherlands



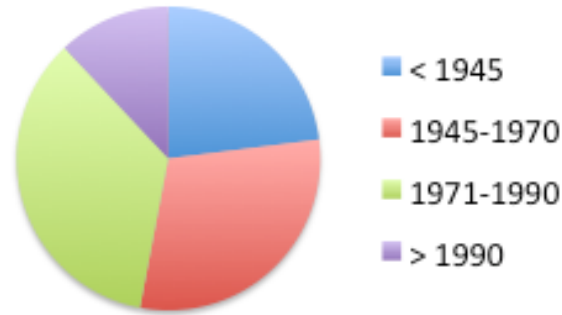
The Dutch Housing Stock

17 million people, 7 million dwellings

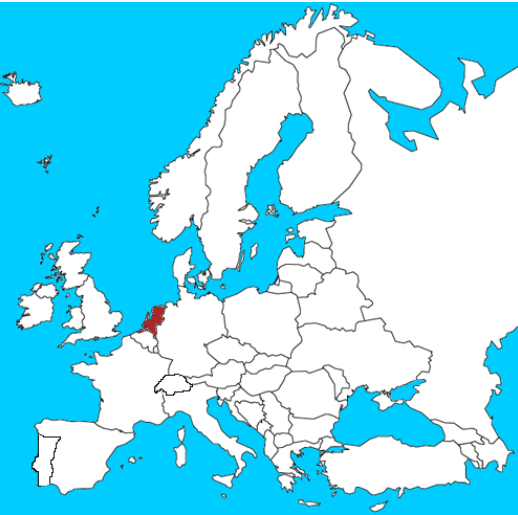
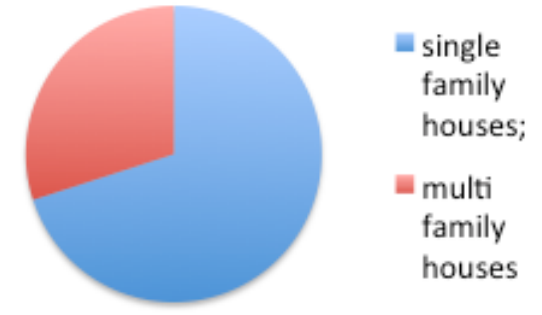
Tenure ship



Year of construction



Type of dwelling



Main regulatory tools

National regulations based on European directives:

EPBD: Energy Performance of Buildings Directive

EED: Energy Efficiency Directive

For **new** buildings:

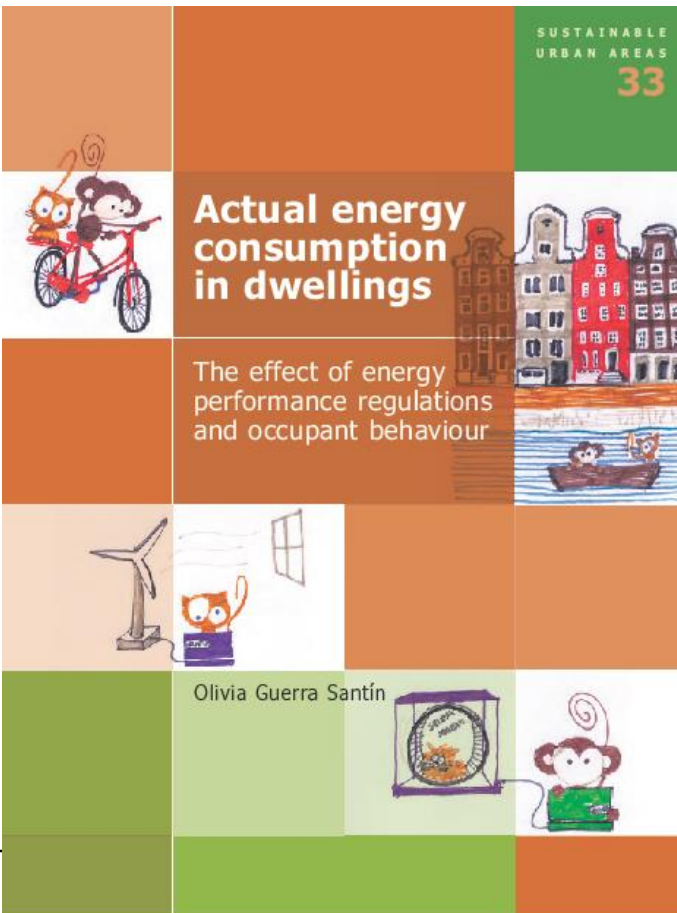
- Energy performance regulations since 1995
- Step by step increase to nearly zero energy by 2021

For **existing** buildings:

- Energy performance certificates (labels)
- Used in incentives policies



Energy performance of New Dwellings

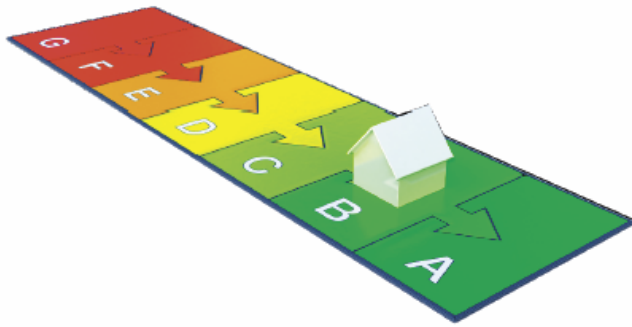


- Energy Performance Regs. Since 1995
- Level: non dimensional digit: (1995) 1.4 – 1.2 – 1.0 – 0.8 – 0.6 (2012)
- PHd Olivia Guerra Santin
- Relation between dwellings built under various levels of EPC and final energy use
- **Increased regulation: no impact on actual energy use**

Energie label woning

Afgegeven conform de Regeling energieprestatie gebouwen.

Veel besparingsmogelijkheden



Weinig besparingsmogelijkheden

Uw woning

Labelklasse maakt vergelijking met woning(en) van het volgende type mogelijk.

Vrijstaande woning

Gebruiksoppervlak

287,2 m²

Opnamedatum

14 december 2011

Energie label geldig tot

14 december 2021

Afmeldnummer

452962250

Adviesbedrijf

BuildingLabel.com BV

Inschrijfnnummer

SKW 21.9500.002-1-2/07

Handtekening



W. de Waard
www.BUILDINGLABEL.COM



Energie label op basis van een ander representatief gebouw of gebouwdeel? nee

Adres representatief gebouw of gebouwdeel:

Standaard energiegebruik voor uw woning

Energiegebruik maakt vergelijking met andere woning(en) mogelijk.

- Het standaard energiegebruik is de jaarlijkse hoeveelheid primaire energie die nodig is voor de verwarming van uw woning, de productie van warm water, ventilatie en verlichting.
- De eventuele opbrengst van een zonnepaneel wordt hiervan afgetrokken.
- Het energiegebruik wordt berekend op basis van de bouwkundige eigenschappen en de installaties van uw woning.
- Bij de berekening wordt uitgegaan van het gemiddelde Nederlandse klimaat, een gemiddeld aantal bewoners en gemiddeld bewonersgedrag.
- Het standaard energiegebruik wordt uitgedrukt in de eenheid 'megajoules', dit is gebaseerd op elektriciteit (kWh), gas (m³) en warmte (GJ).

B

(zie toelichting in bijlage)



Straat

Kornoelje

Nummer/toevoeging

Postcode

3892 XA

Woonplaats

Zeewolde



200.035 MJ

(megajoules)

3.943 kWh (elektriciteit)

4.653 m³ (gas)

0 GJ (warmte)

Energy Performance Certificate - Actual energy use

PhD Dasa Majcen



#04
2016

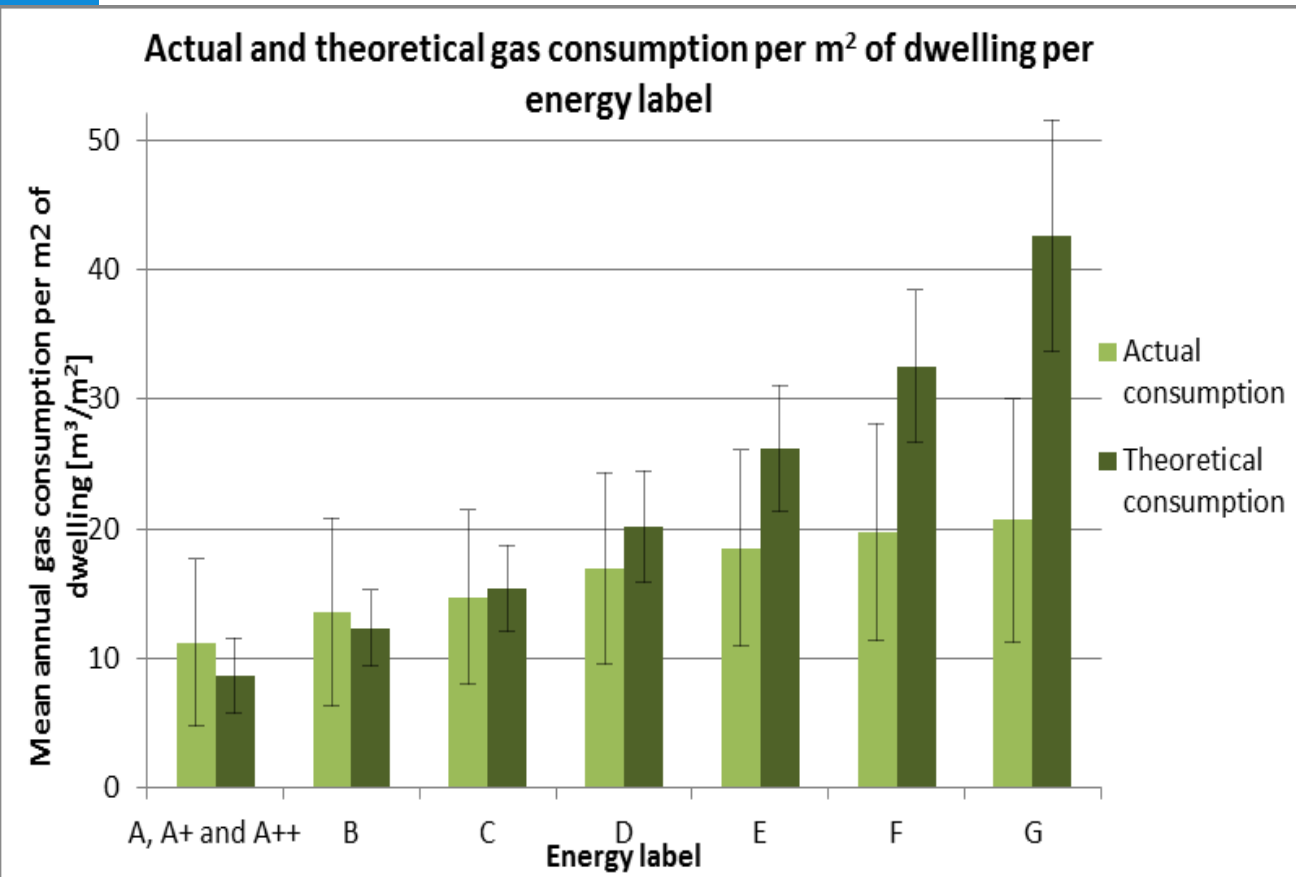
Architecture and the Built environment

Predicting energy consumption and savings in the housing stock

A performance gap analysis in the Netherlands

Daša Majcen

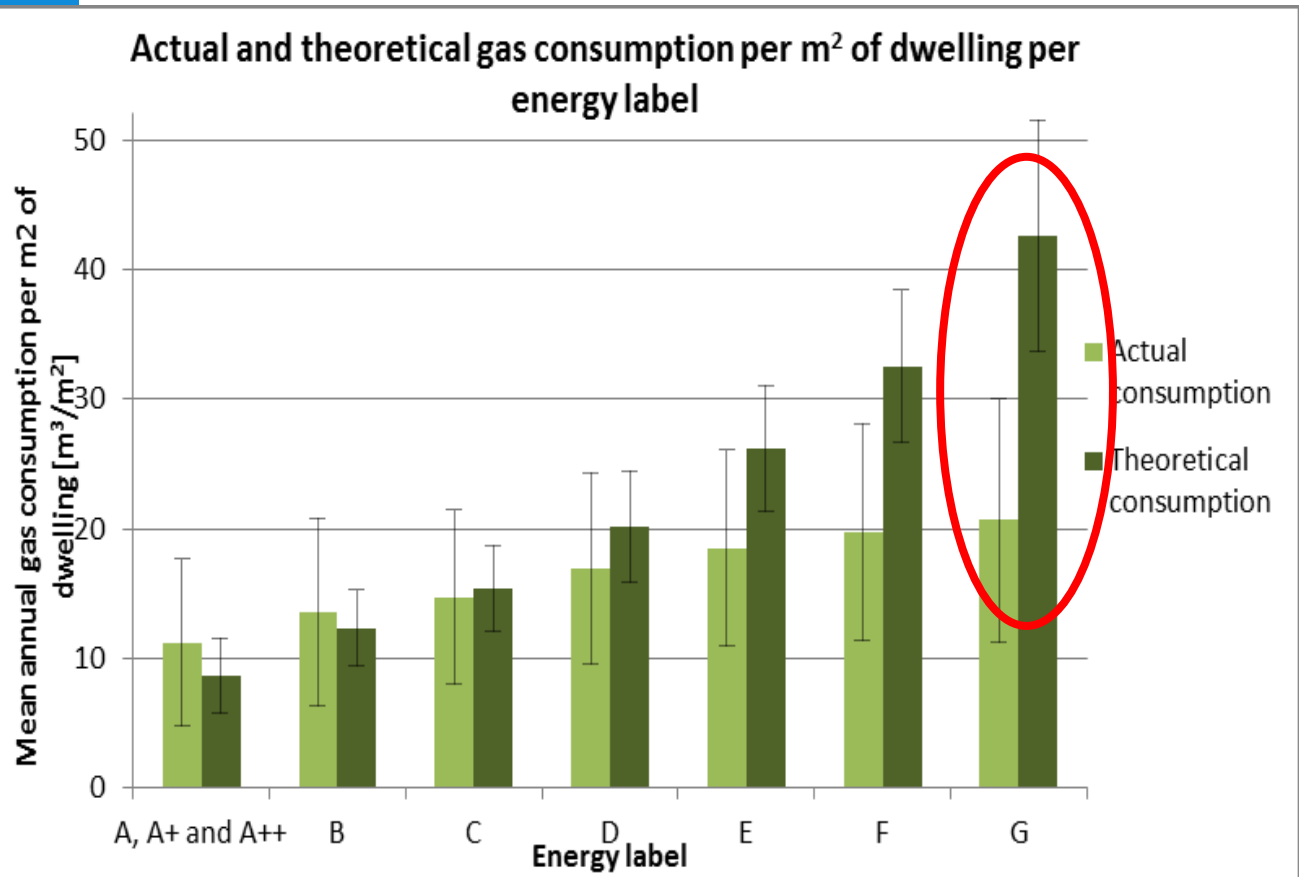
Results



Theory

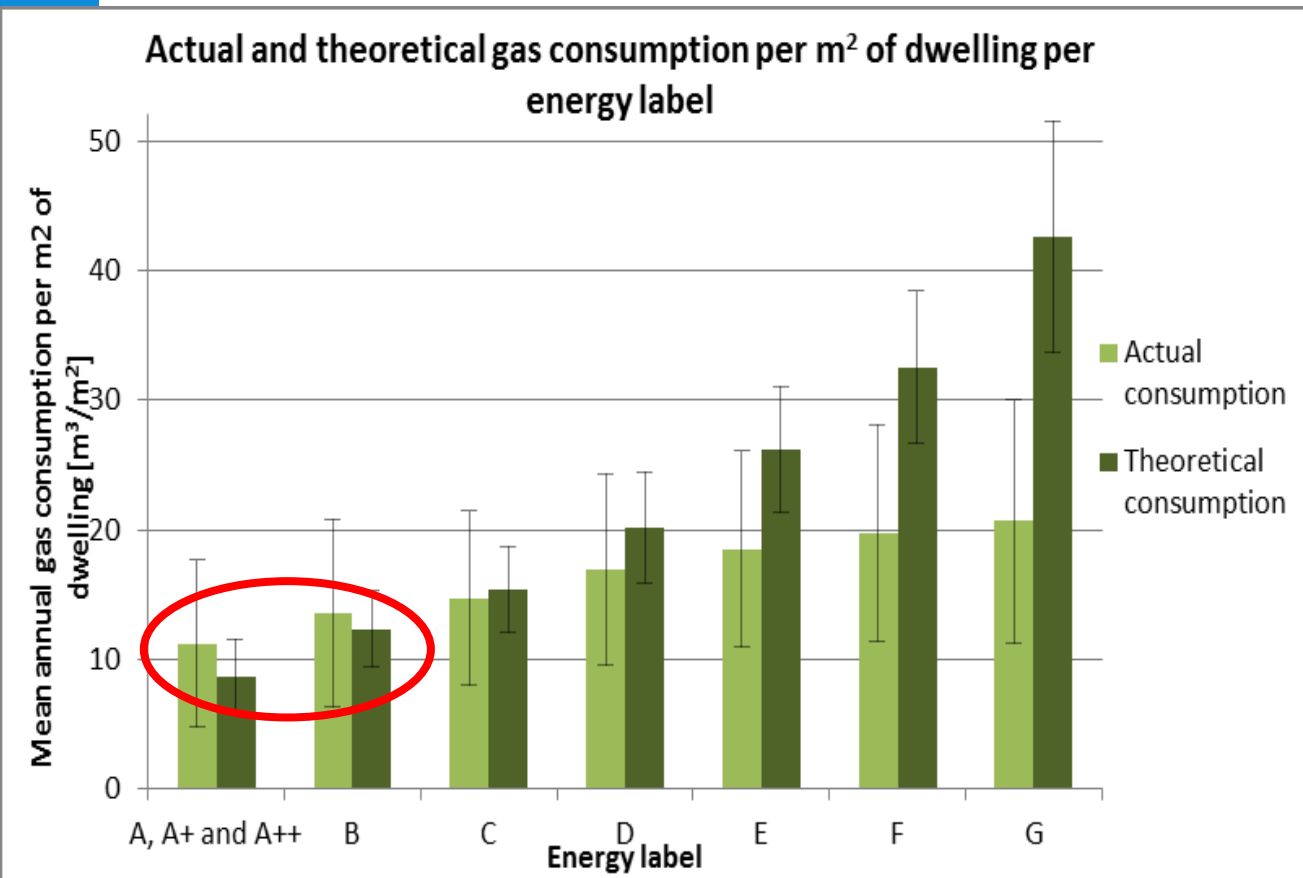
Actual

Results



G label:
50% less use than
expected

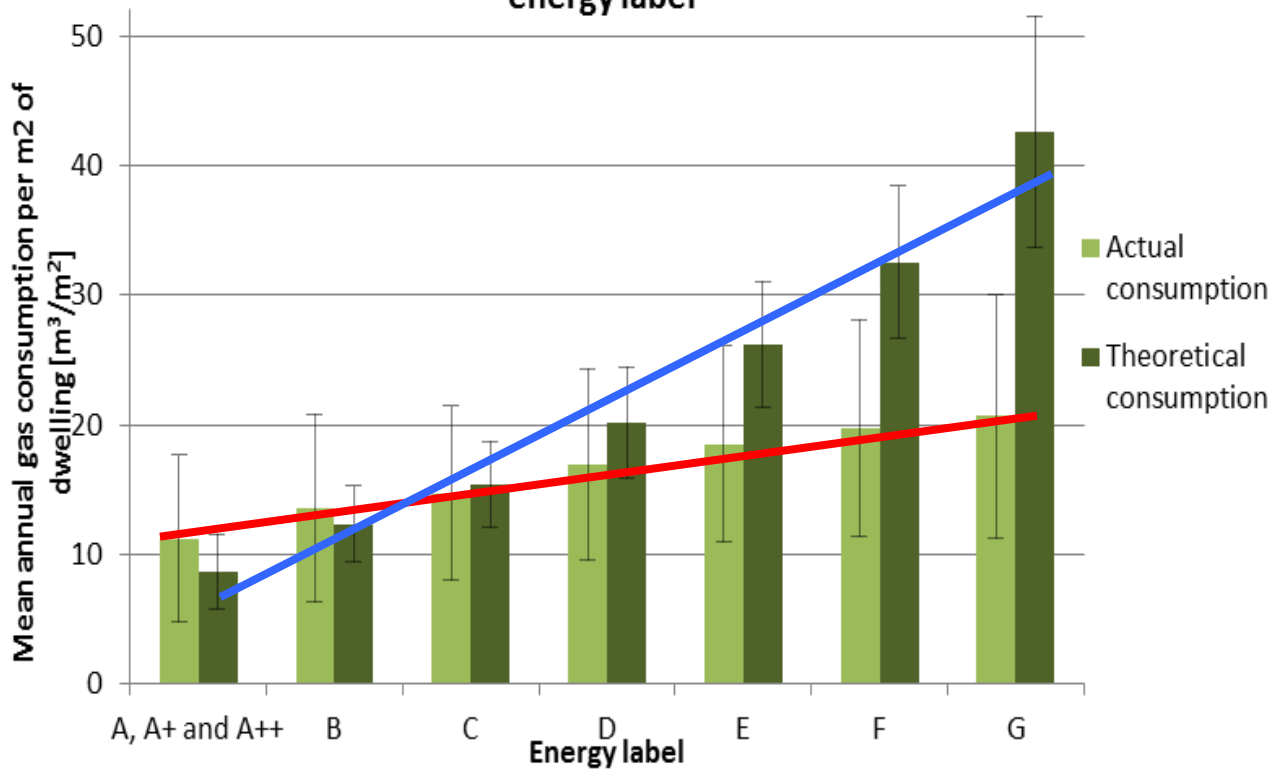
Results



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

Results

Actual and theoretical gas consumption per m² of dwelling per energy label



Very little actual savings !!

Explanations for the Performance gap

For **high label** (A, B) dwellings:

- Underperformance of the buildings and installations
- Rebound effect – higher temps – sometimes due to the heating system

For **low label** (E, F, G) dwellings:

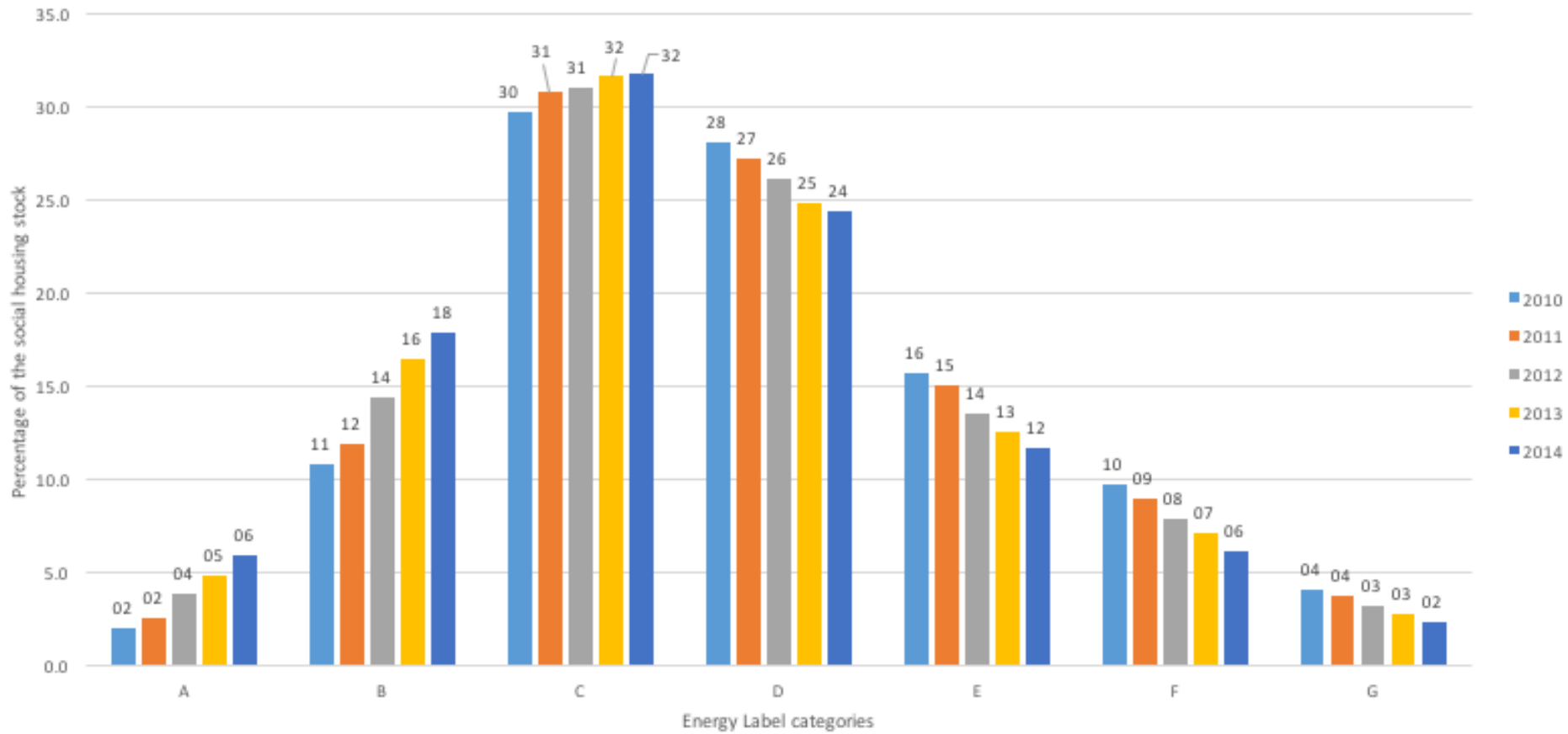
- Better performances of buildings (U-values) and installations
- Lower heating in fewer rooms – sometimes due to the heating system



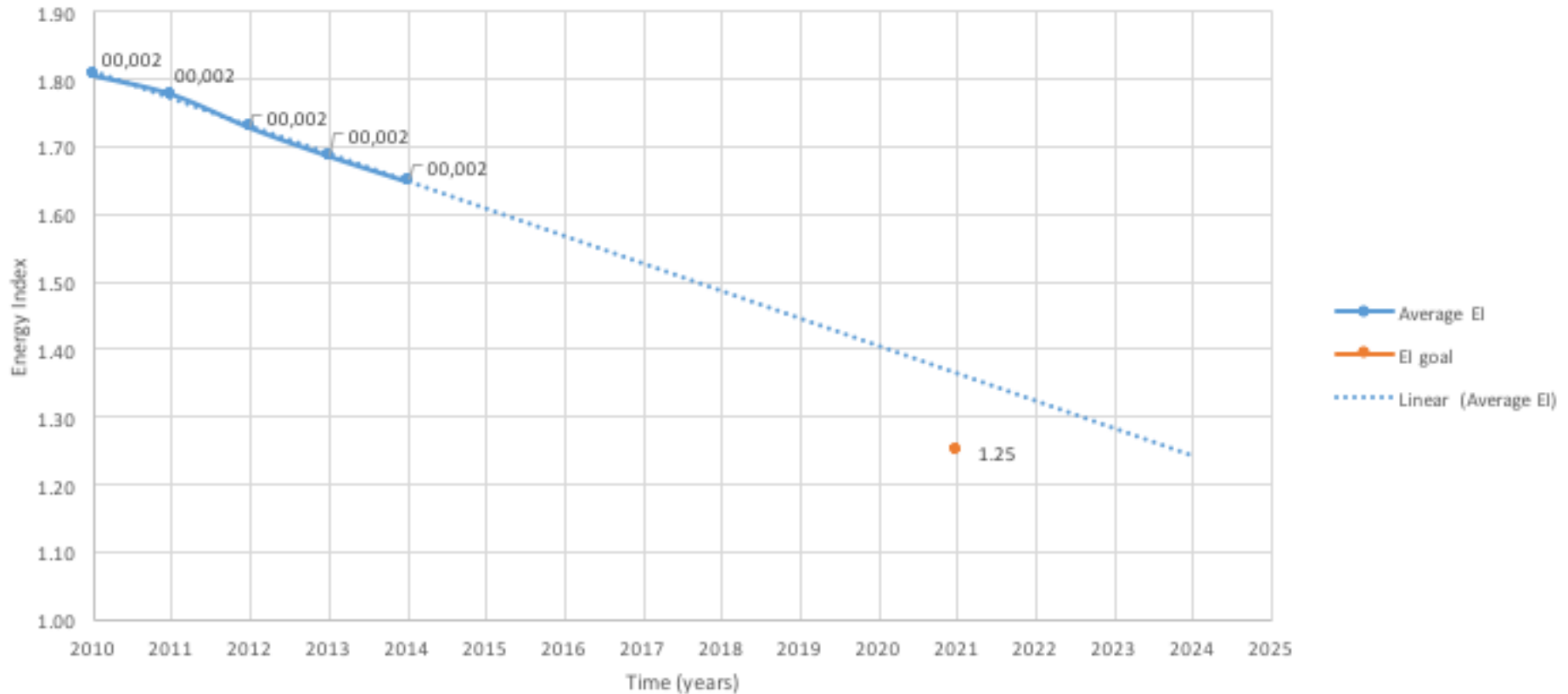
Energy performance certificates as tool for policies

- Covenant rental housing sector
- Housing associations, tenants union, government
- 2020: average label B

Division over label categories from 2010 to 2014



Development of Energy Index 2010 to 2014



Conclusions

- Actual energy savings by reducing the energy demand by renovations are lower than expected
- Pay-back times do not work
- What are useful investments?

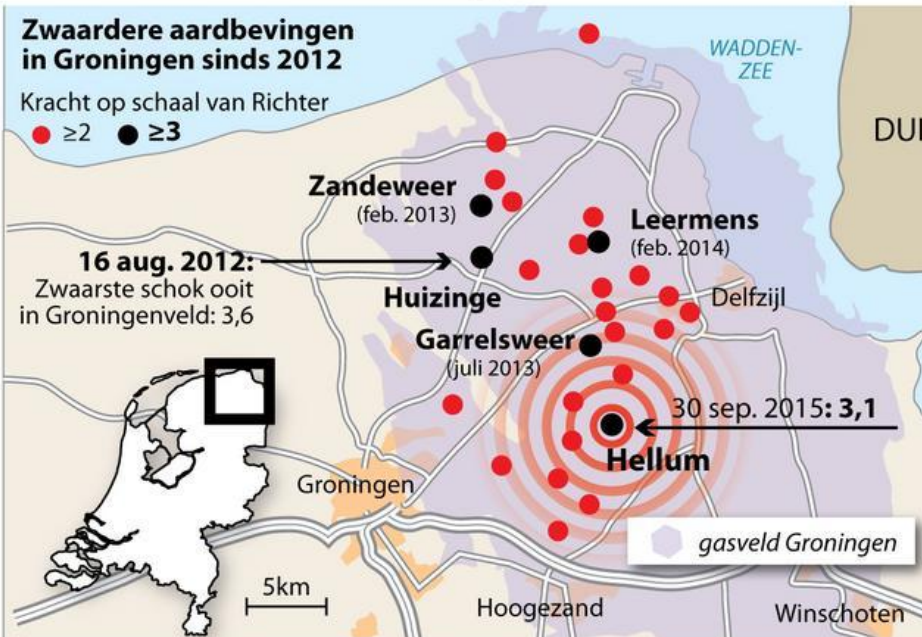


Game changer in NL

Earthquakes due to gas extraction
Gas basic energy source for heating



Weer aardschok in Groningen



bron: knmi

ANP

2030 Gas free residential areas?

2018 New Energy agreement

- 2050 CO₂-zero / energy-zero built environment / houses ??
- Closing coal powerplants 2020

Houses:

- Question: what is the effective, efficient and feasible balance between reducing energy demand and use of external generated renewable energy

