Energy efficiency measures implemented in the Dutch non-profit housing sector

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Introduction

Non-profit rented (social) housing

→ Average energy index 1.25 (Energy Label B) in 2020

- Monitor the energy improvements and their pace through consecutive years
- Using SHAERE database
- Impact on the energy performance coefficient (Energy Index)

Energy Index

$$EI = \frac{Q_{total}}{155 * A_{floor} + 106 * A_{loss} + 9560}$$

Q_{total} yearly primary energy use

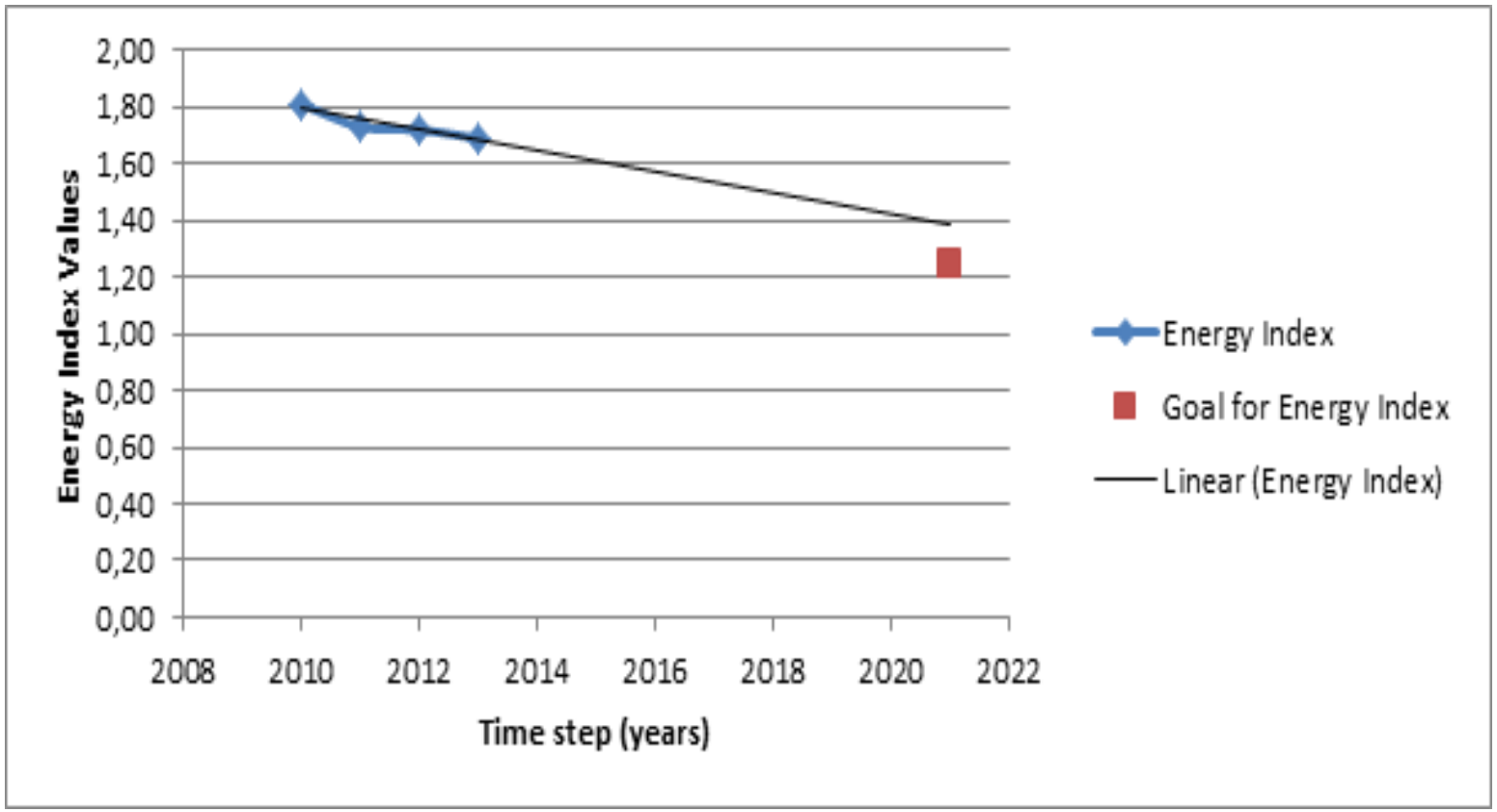
A_{floor} area of the dwelling

A_{loss} areas that are not heated in the dwelling

Energy Label	Energy Index
A (A+, A++)	<1.05
B	1.05 – 1.3
C	1.3 - 1.6
D	1.6 - 2.0
E	2.0 - 2.4
F	2.4 - 2.9
G	> 2.9

Average Energy Index 2010 - 2013

- Results show an average EI of 1.71 and an average energy label of D



SHAERE Database

- SHAERE (Sociale Huursector Audit en Evaluatie van Resultaten Energiebesparing)
- A collective database including data on:
    - Energy consumption , CO_2 emissions , the average EI , registration of energy label etc.
- The variables are categorized per property (home)

Year of reporting	Nr. of dwellings	Percentage of the social stock
2010	1,132,946	47.2%
2011	1,186,067	49.4%
2012	1,438,700	59.9%
2013	1,448,266	60.3%

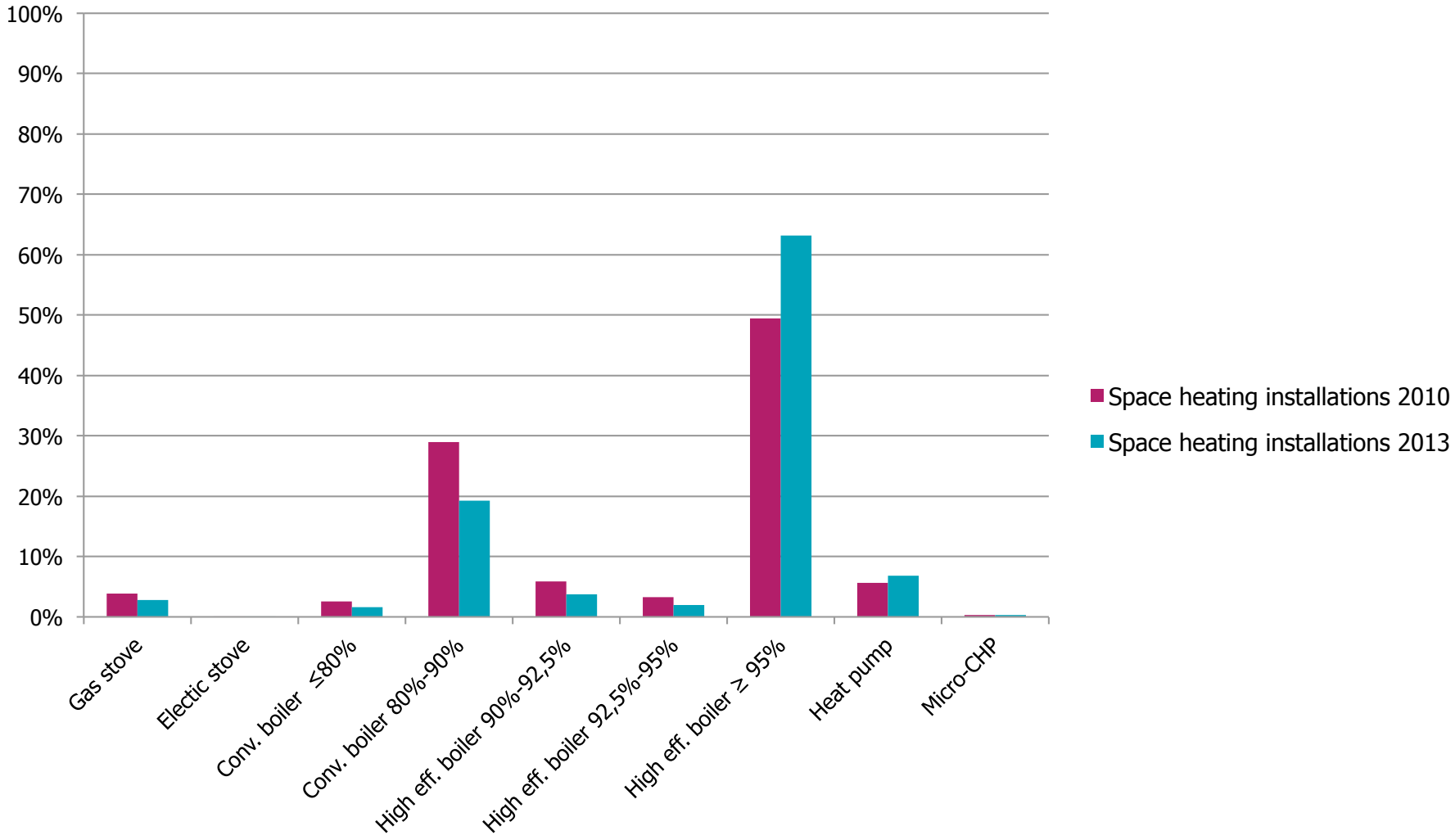
SHAERE Monitoring Database - variables

- Dwelling characteristics (Type, Energy Index, Energy Label, Area, Year of construction etc.)
- Envelope elements (Glazing, Wall U value , Roof U value , Frame U value ,Type of frame and glass etc.)
- Installations (Space heating ,Hot tap water ,Ventilation, Systems' efficiencies etc.)

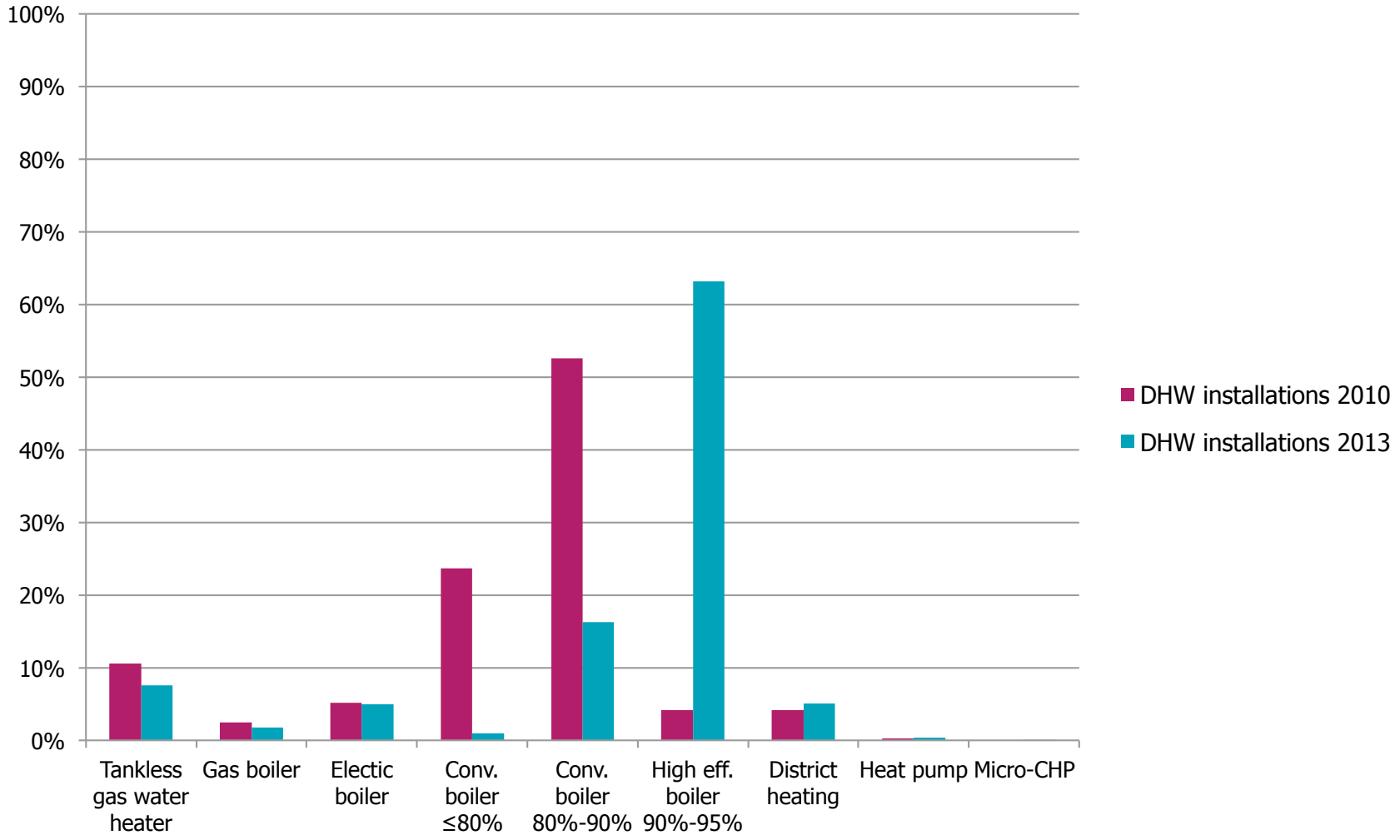
Energy Improvement Measures – heating system
n=757 614

2013 \ 2010		Gas/oil stove	Electric stove	"Conventional" boiler (η<0.80)	Improved non-condensing boiler (η= 0.80-0.90)	Condensing boiler (η=0.90-0.925)	Condensing boiler (η=0.925-0.95)	Condensing boiler (η≥ 0.95)	Heat pump	micro-CHP	Total
	Gas/oil stove	72,5							0,0	0,0	21055
	Electric stove	0,0	96,6						0,0	0,0	257
	"Conventional" boiler (η<0.80)	1,2	0,8	55,4							11044
	Improved non-condensing boiler (η= 0.80-0.90)	2,0	0,0	8,9	61,3					6,4	136827
	Condensing boiler (η=0.90-0.925)	0,3	0,0	1,2	0,9	61,5			0,2	0,2	29758
	Condensing boiler (η=0.925-0.95)	0,1	0,0	0,1	0,3	0,8	64,1		0,0	7,5	17309
	Condensing boiler (η≥0.95)	23,7	2,7	33,1	35,6	34,9	34,0	99,3	0,4	3,1	487801
	Heat pump	0,1	0,0	1,3	1,8	2,7	1,9	0,5	99,4		50548
	micro-CHP	0,0	0,0	0,0	0,1	0,1	0,0	0,2	0,0	82,7	3015
	Total	29025	262	19283	219210	44644	25092	374553	43038	2507	757614
	Percentage change	27,5	3,4	44,6	38,7	38,5	35,9	0,7	0,6	17,3	**17,26**

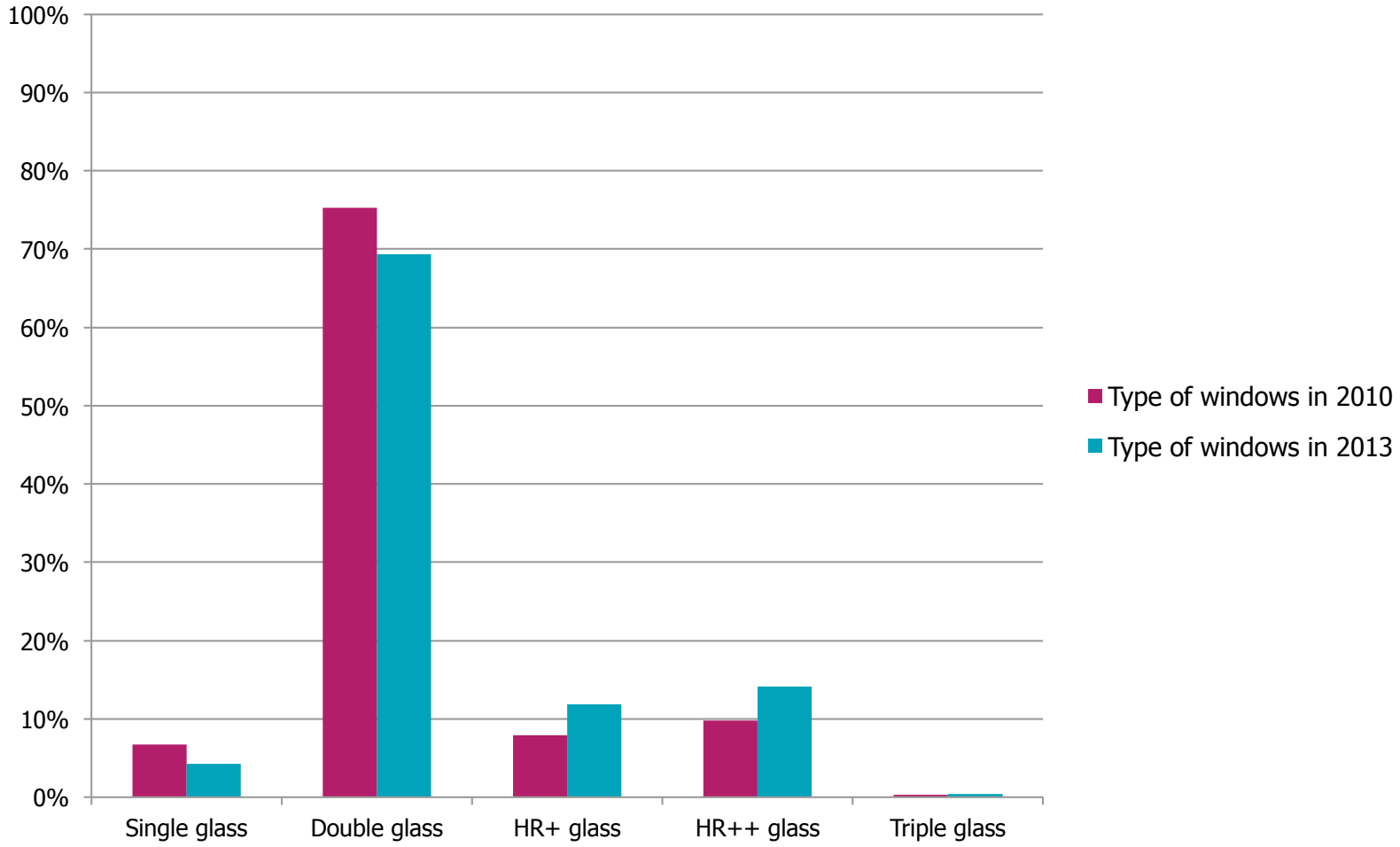
Energy Improvement Measures – heating system 17,26% change



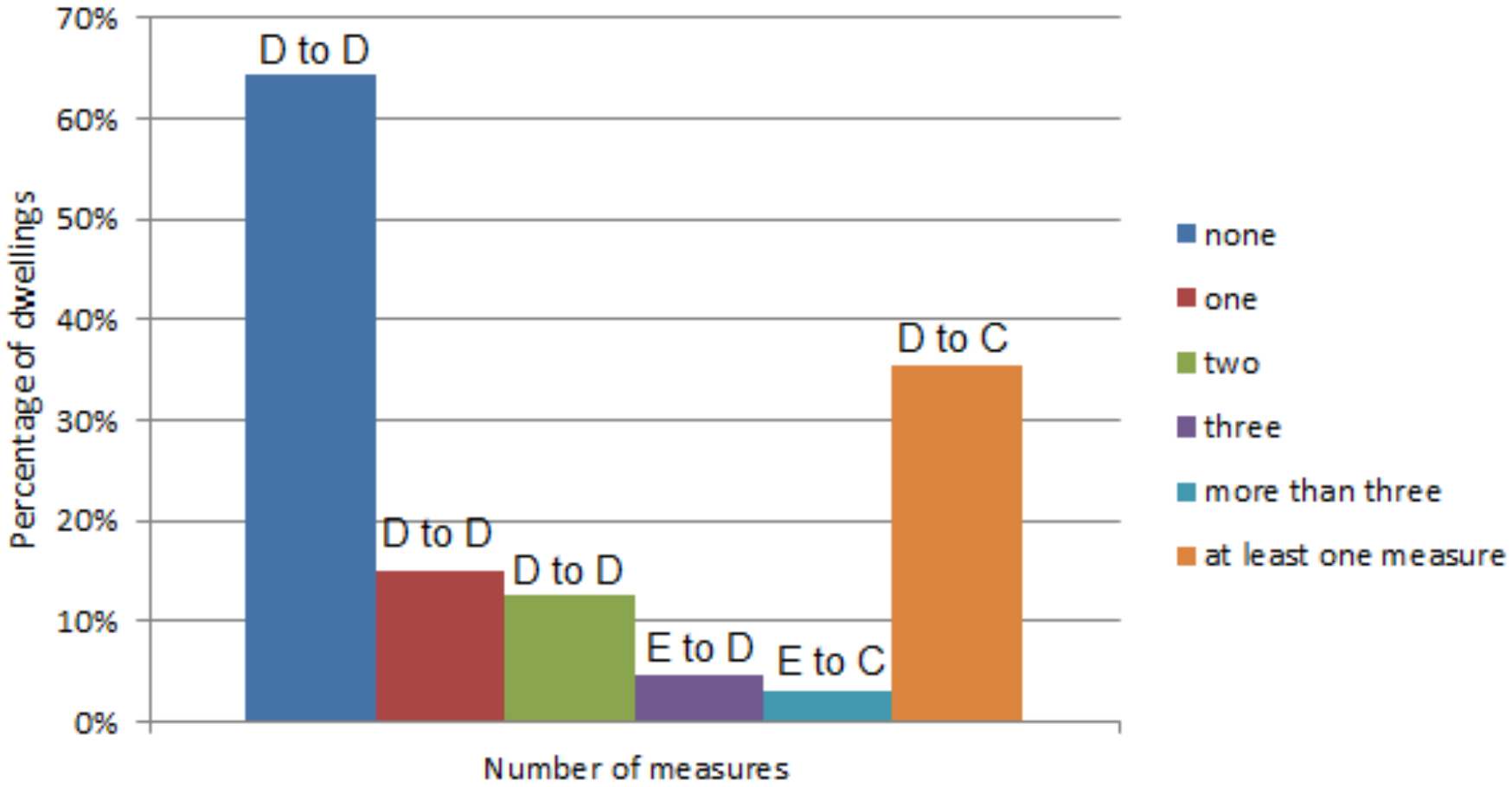
Energy Improvement Measures – hot tap water 15,5% change



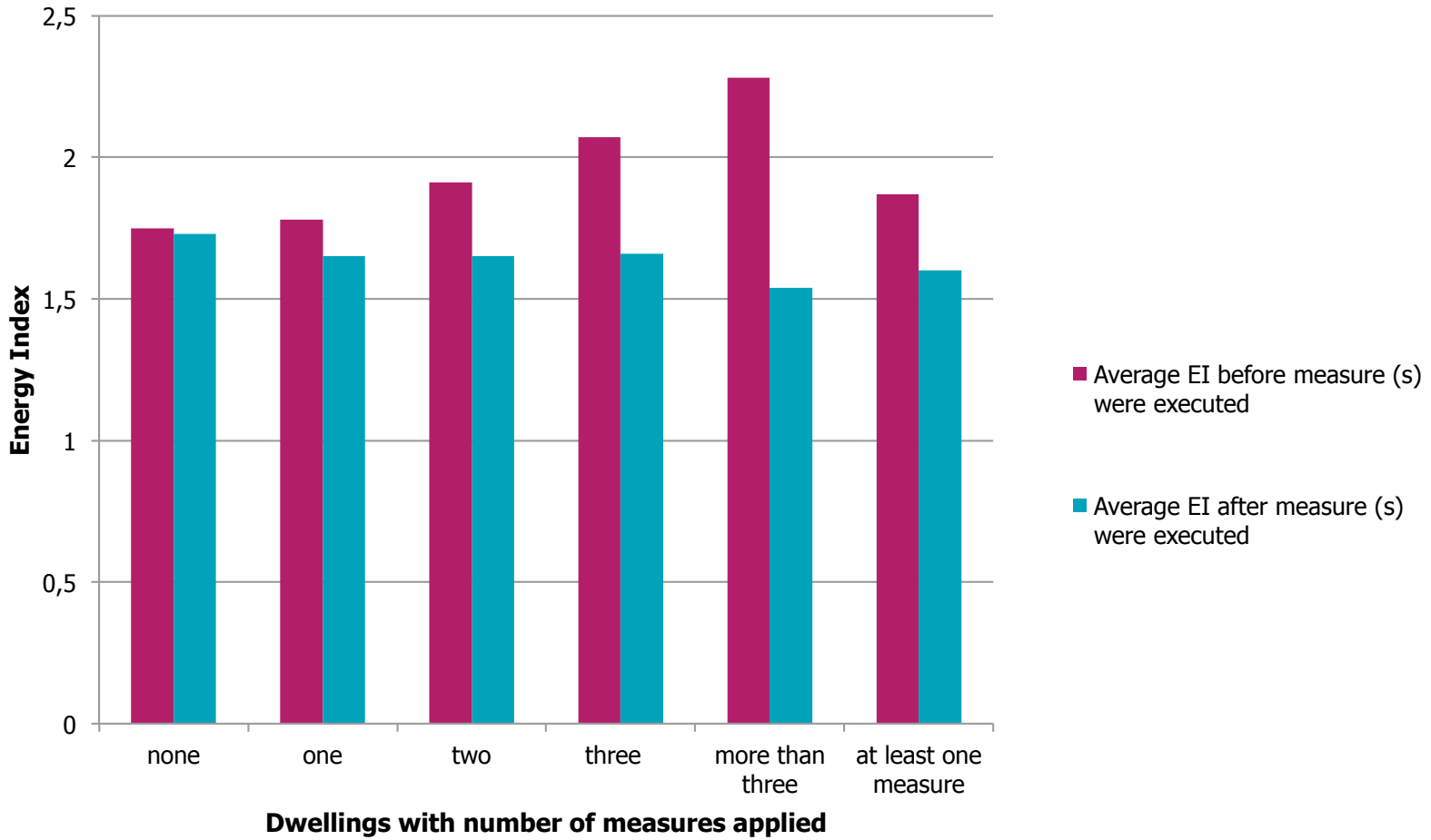
Energy Improvement Measures – glazing (based on U value) 9,89% change



Number of measures applied and their impact on the energy performance



Number of measures applied and their impact on the Energy Index

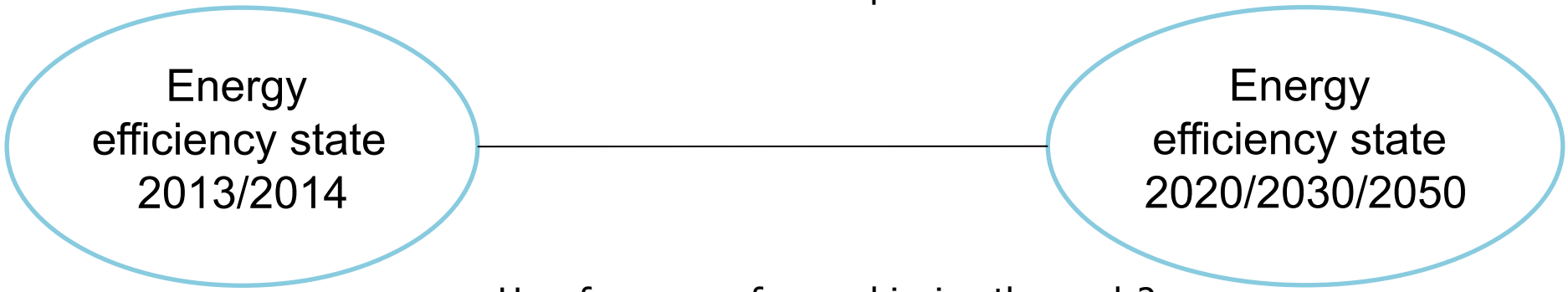


Conclusions

- There is a bias towards conventional solutions / measures applied
- For 2010 to 2013 small changes of the energy efficiency of the dwellings
- Major or deep renovations hardly took place (nZEB level)
    - Dwellings with major improvements are 3% of the dwellings

Points for discussion

Which are the energy improvement measures that need to take place?



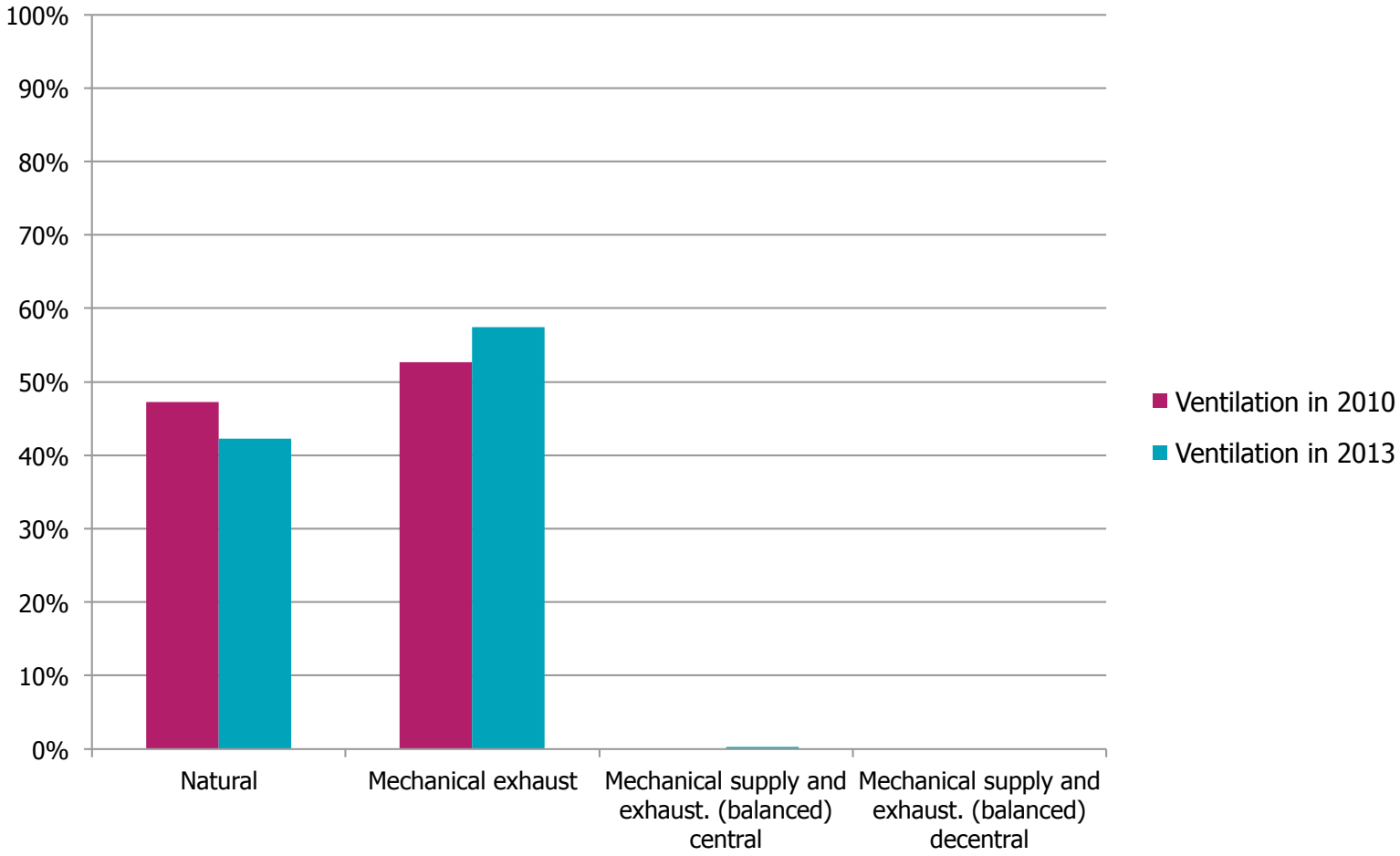
How far are we from achieving the goals?

What is the impact on the actual energy consumption?

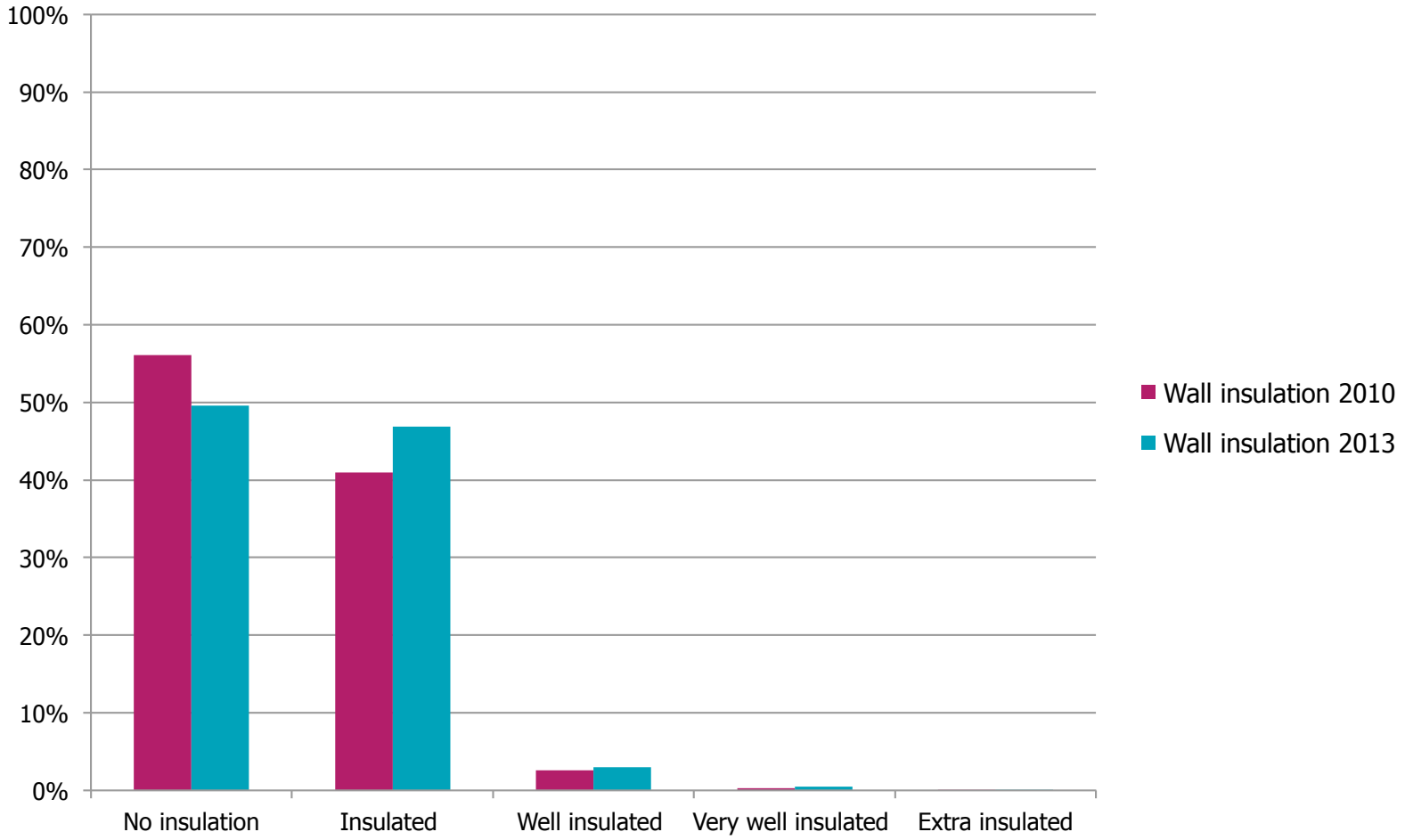
Thank you!

Questions?

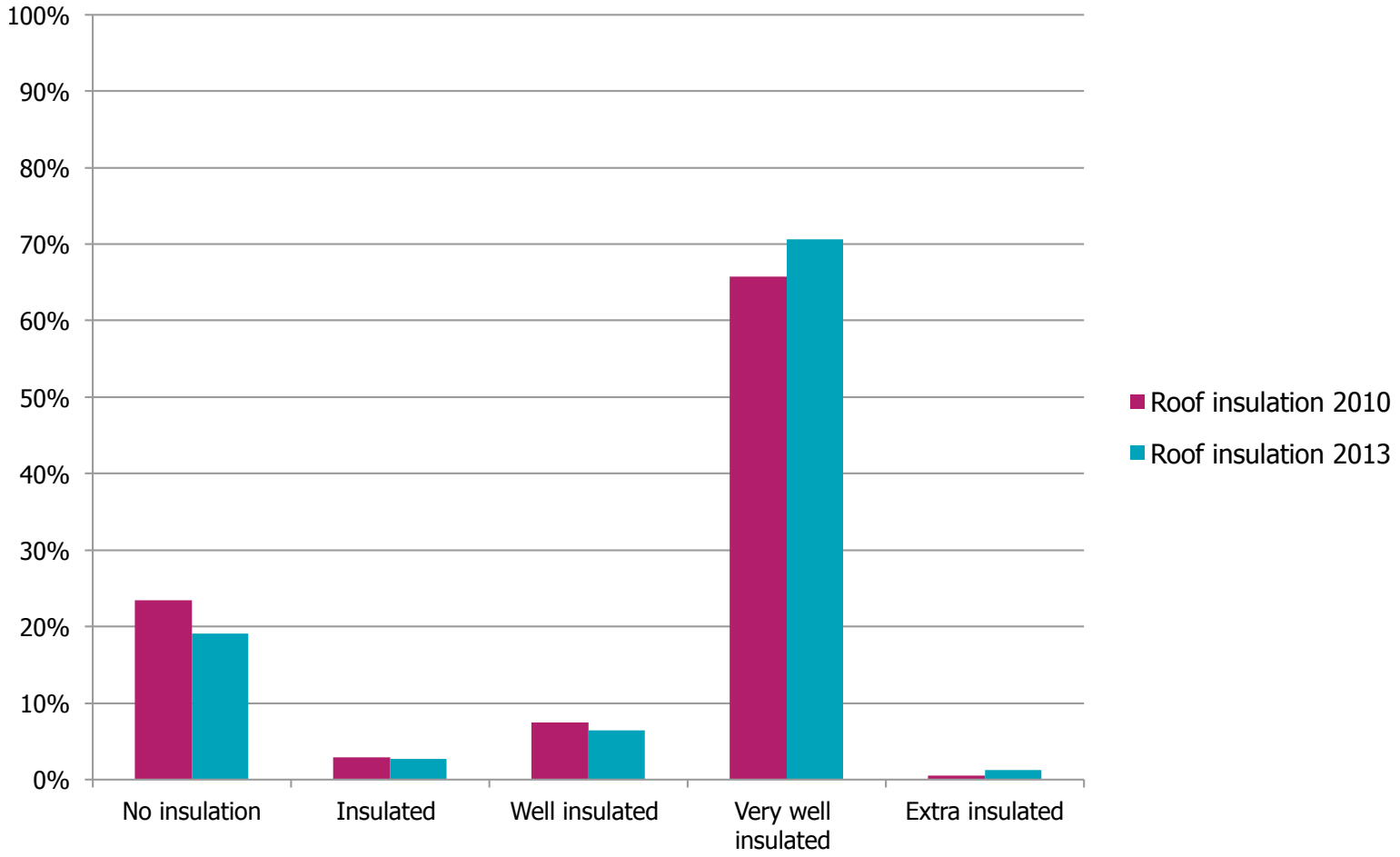
Energy Improvement Measures – ventilation 8,7% change



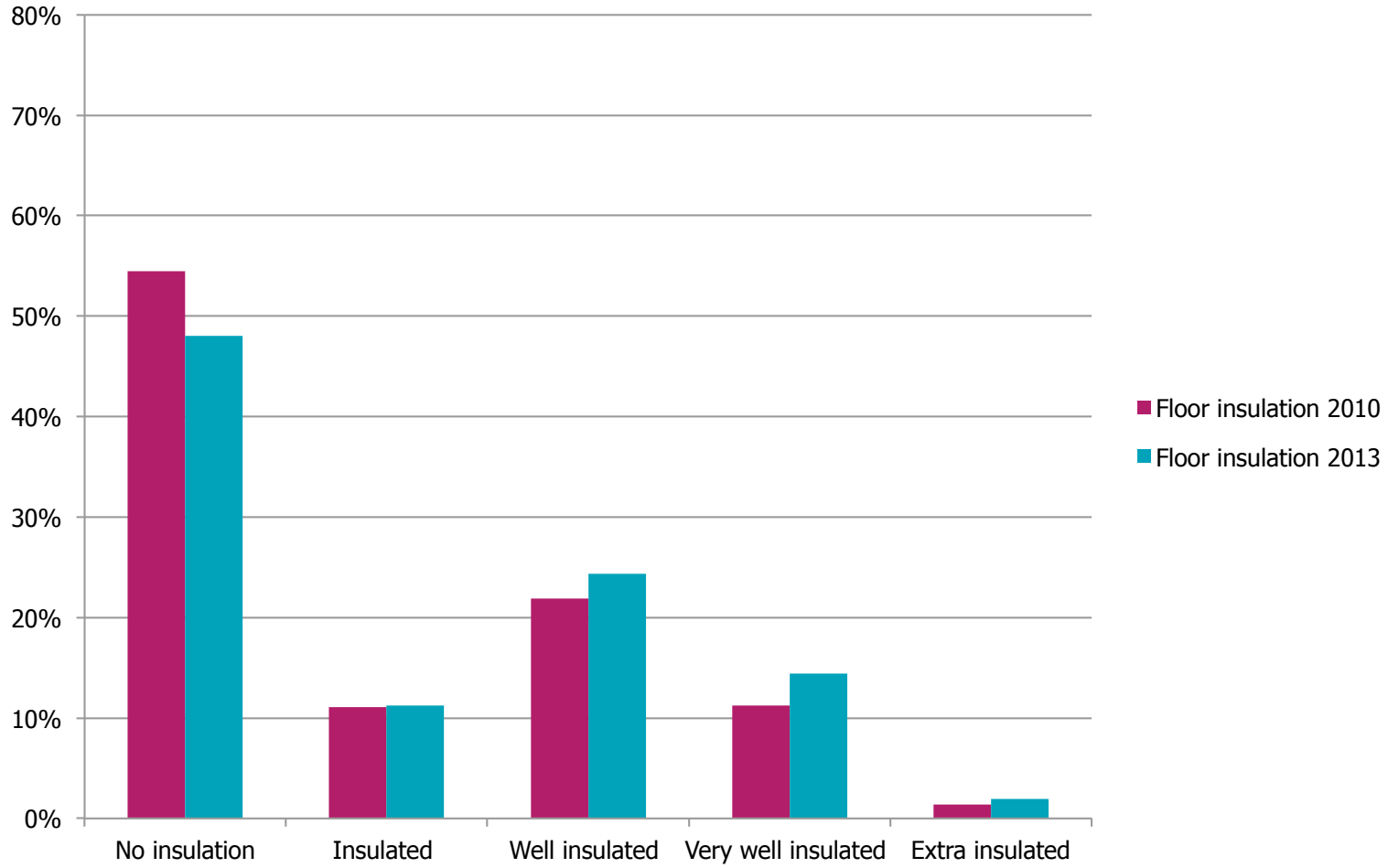
Energy Improvement Measures – wall insulation (based on Rc value) 7,06% change



Energy Improvement Measures – roof insulation (based on Rc value) 6,64% change



Energy Improvement Measures – floor insulation (based on Rc value) 9,42% change



Distribution of the energy labels of the non-profit rented housing sector in SHAERE database 2010-2013