

# Low energy buildings and the role of economic instruments the case of DENMARK



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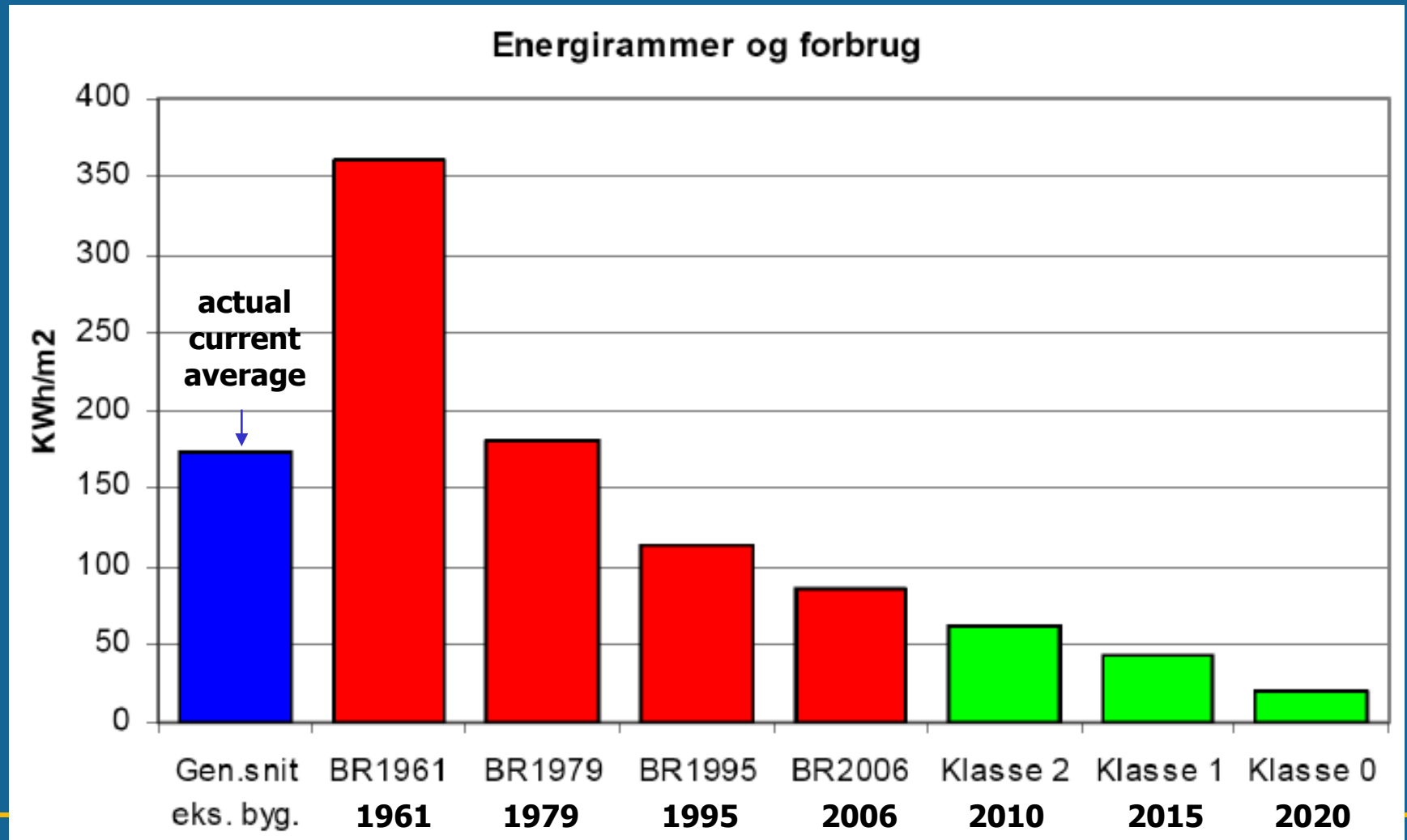
# EEA: European Environment Agency

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- ... through the provision of timely, targeted, relevant and reliable information to policy making agents and the public”
- EEA is an independent EU institution with 32 member countries incl. Turkey, Switzerland and Norway
- 200 staff in Copenhagen headquarters - and 6 Topic Centres with wide network throughout Europe



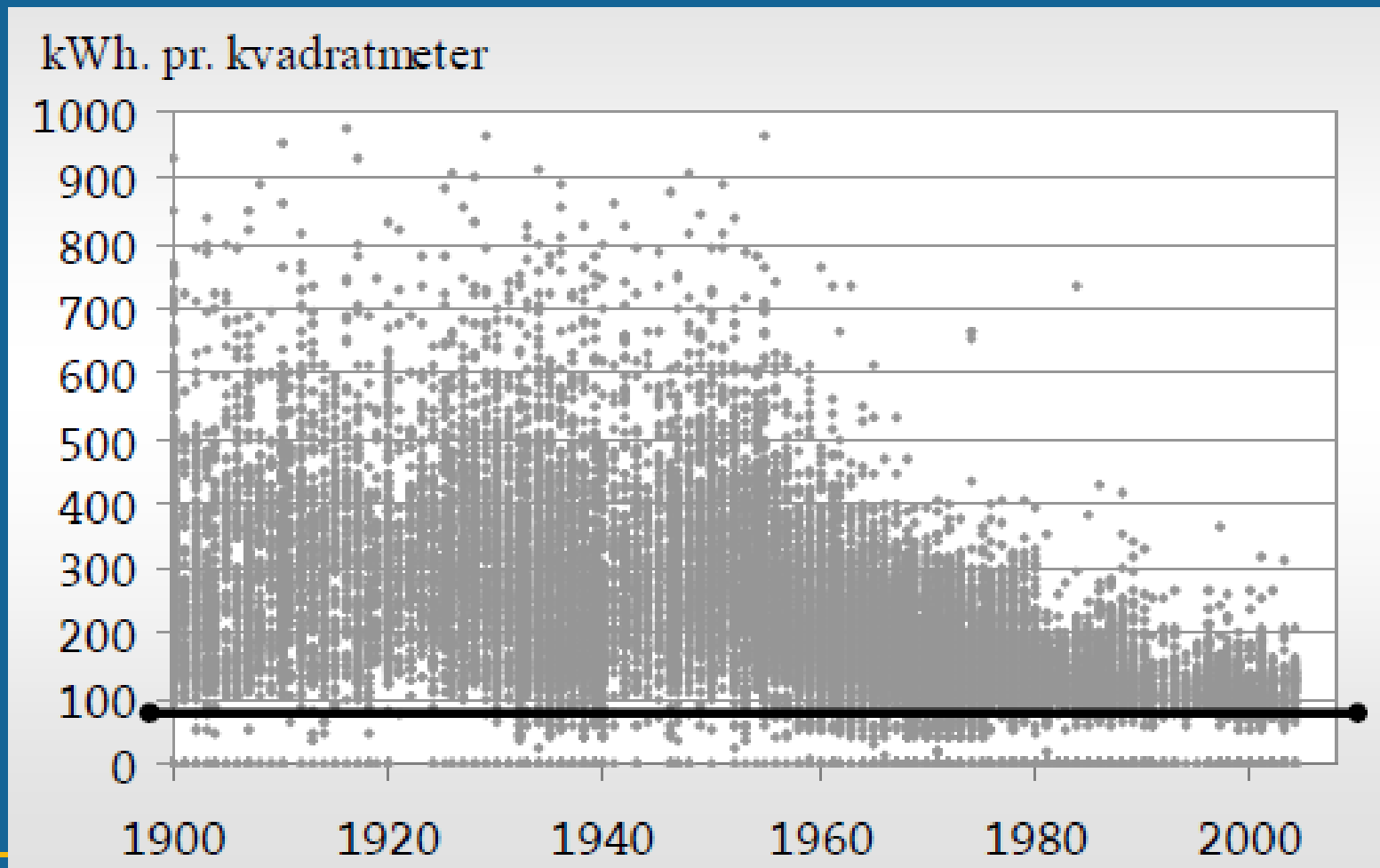
# Building codes: evolution in kWh/m<sup>2</sup>

(Denmark)

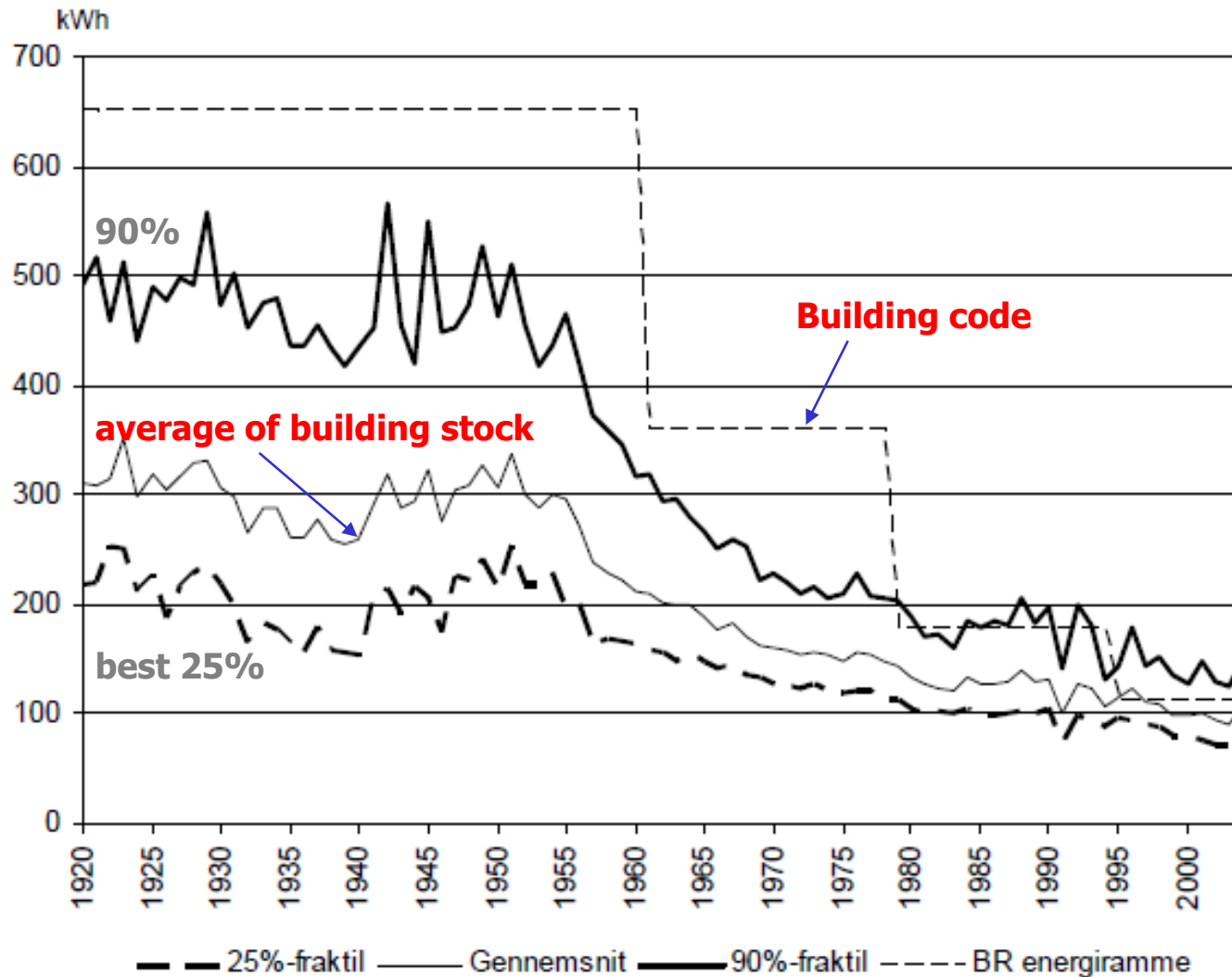


# State of the art : kWh per m<sup>2</sup>

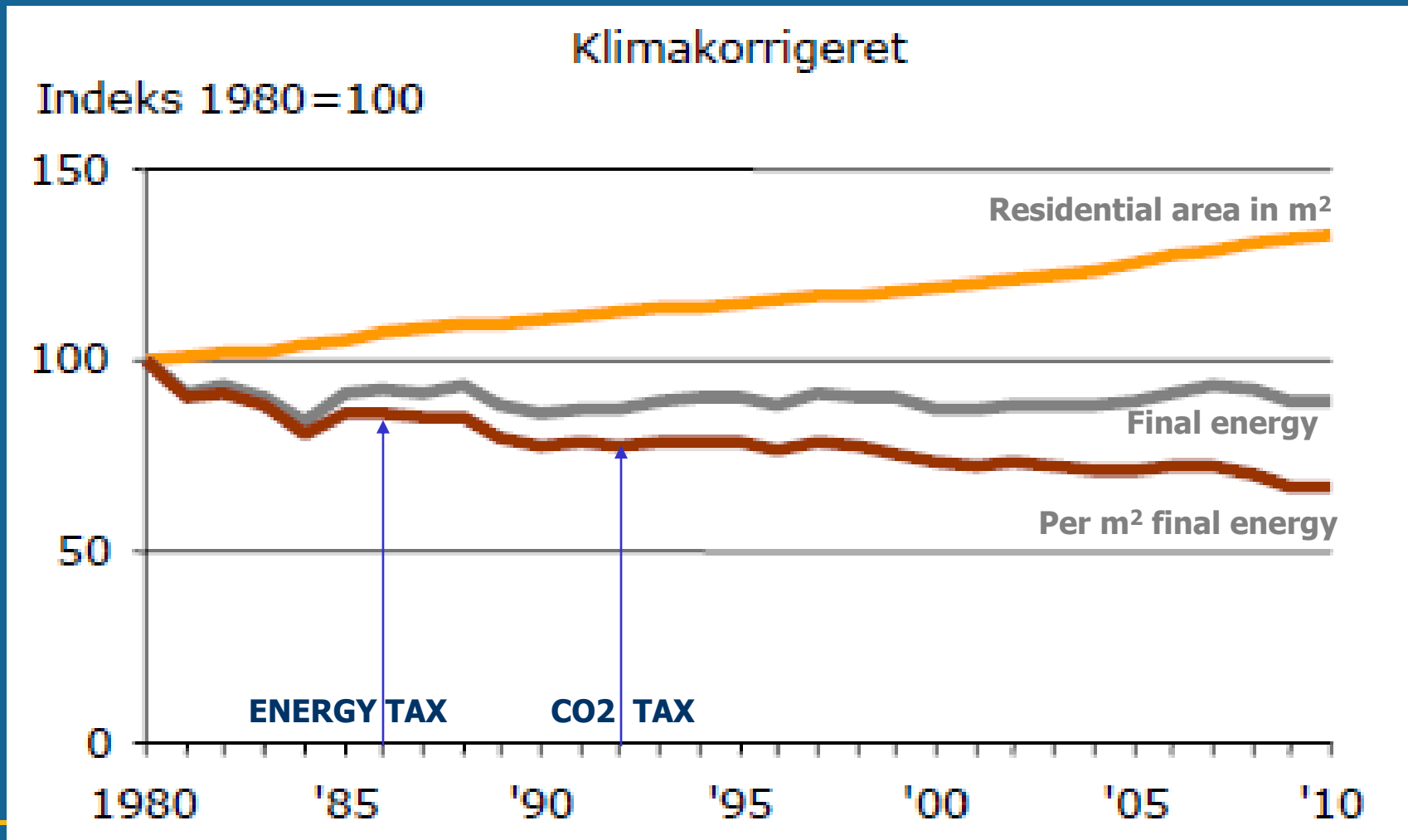
(from the 2004 energy labelling)



# Performance against building code (kWh/m<sup>2</sup>)



# Residential heating per m<sup>2</sup>: down 33%



# Economic instruments applied - past

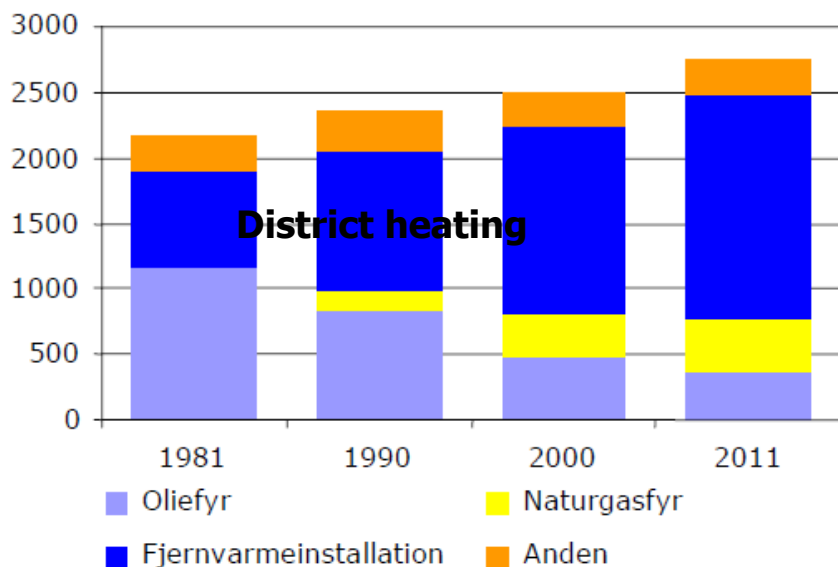
- Subsidies for double-glassed windows, awarding first-movers (1980's)
- Subsidies for insulation of buildings
- Promotion of CHP and district heating
- Tax on electricity and taxes on fuels, with reduced burden for heating



# More district heating; less furnaces and reduced heating losses

## Varmeinstallationer i boliger

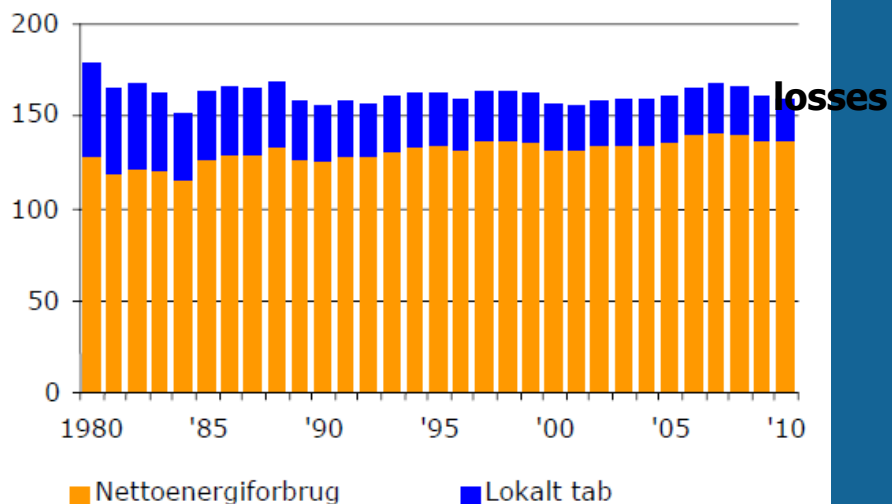
1000 stk.



## Nettoenergiforbrug og tab ved opvarmning i boliger

PJ

Klimakorrigeret





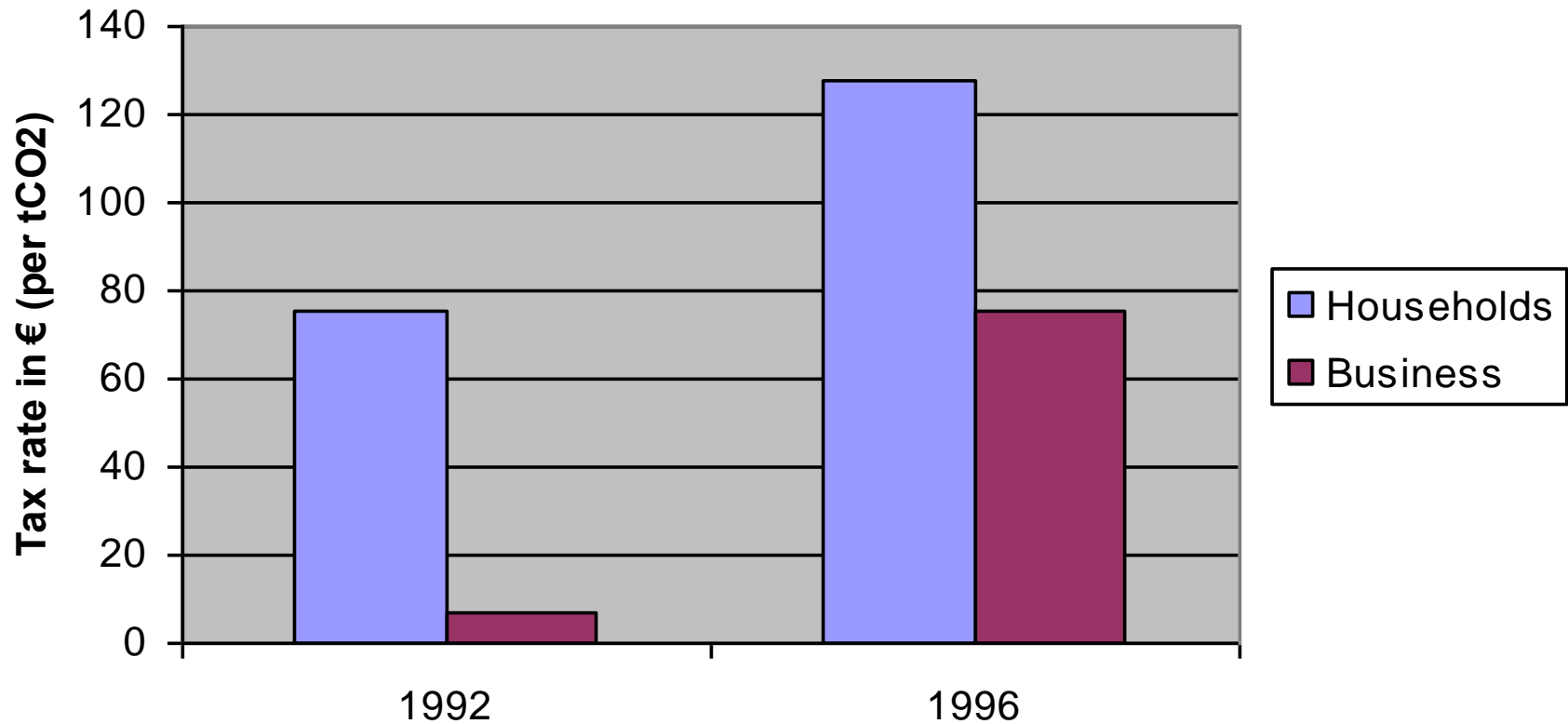
# Energy tax for households in Denmark

- 1979: Second oil crisis; price hike
- 1986: Drop in oilprices
- 1986: Energy tax introduced to maintain high energy price for households ! ( $\sim 6\text{€}/\text{GJ}$ )
  - to support expansion of natural gas grid
- 1992: CO<sub>2</sub> tax (phased in;  $12\text{€}/\text{tCO}_2$ )
- 1996: Energy-CO<sub>2</sub> tax also for business

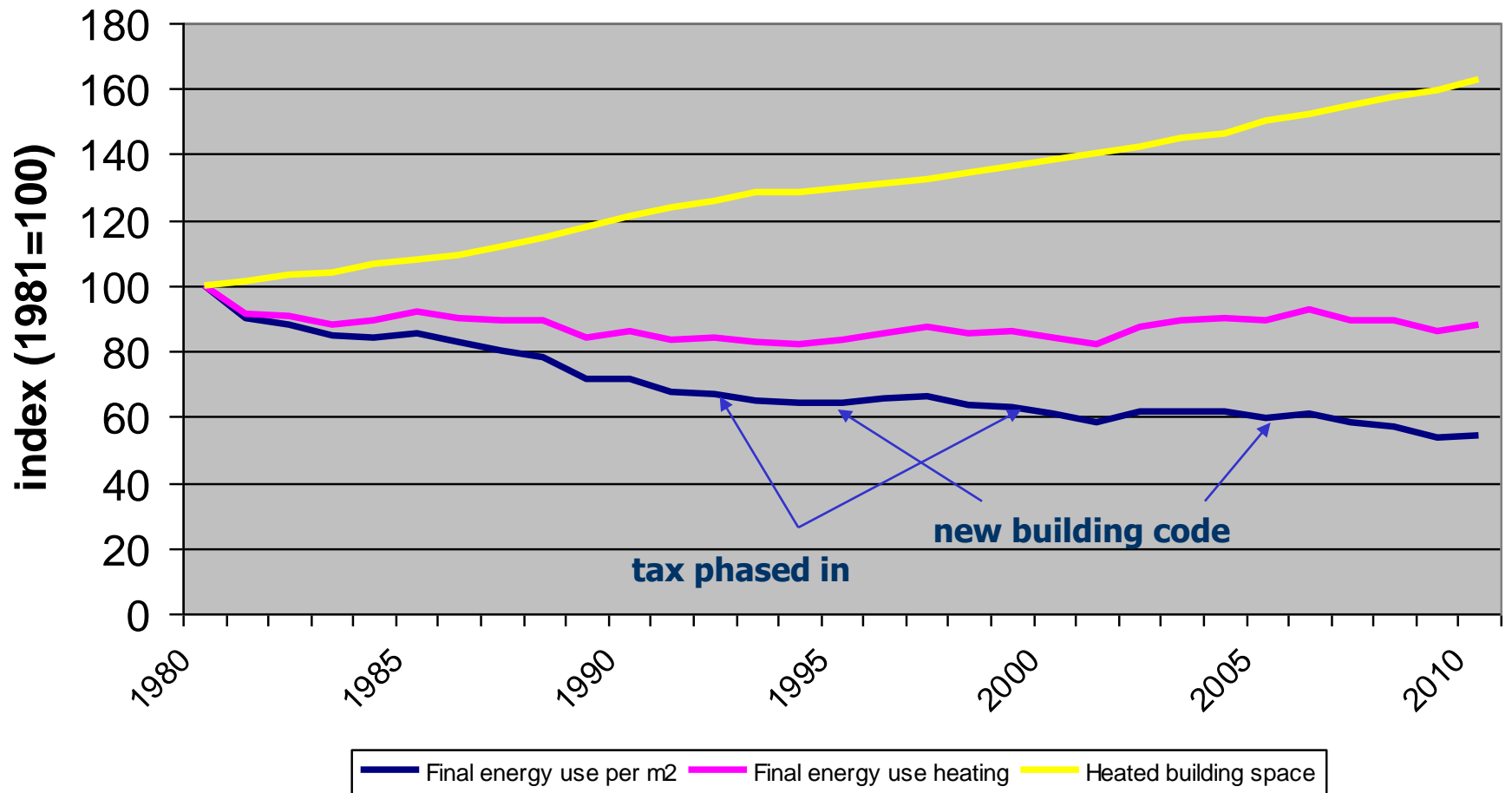


# Energy-CO<sub>2</sub>-tax for business

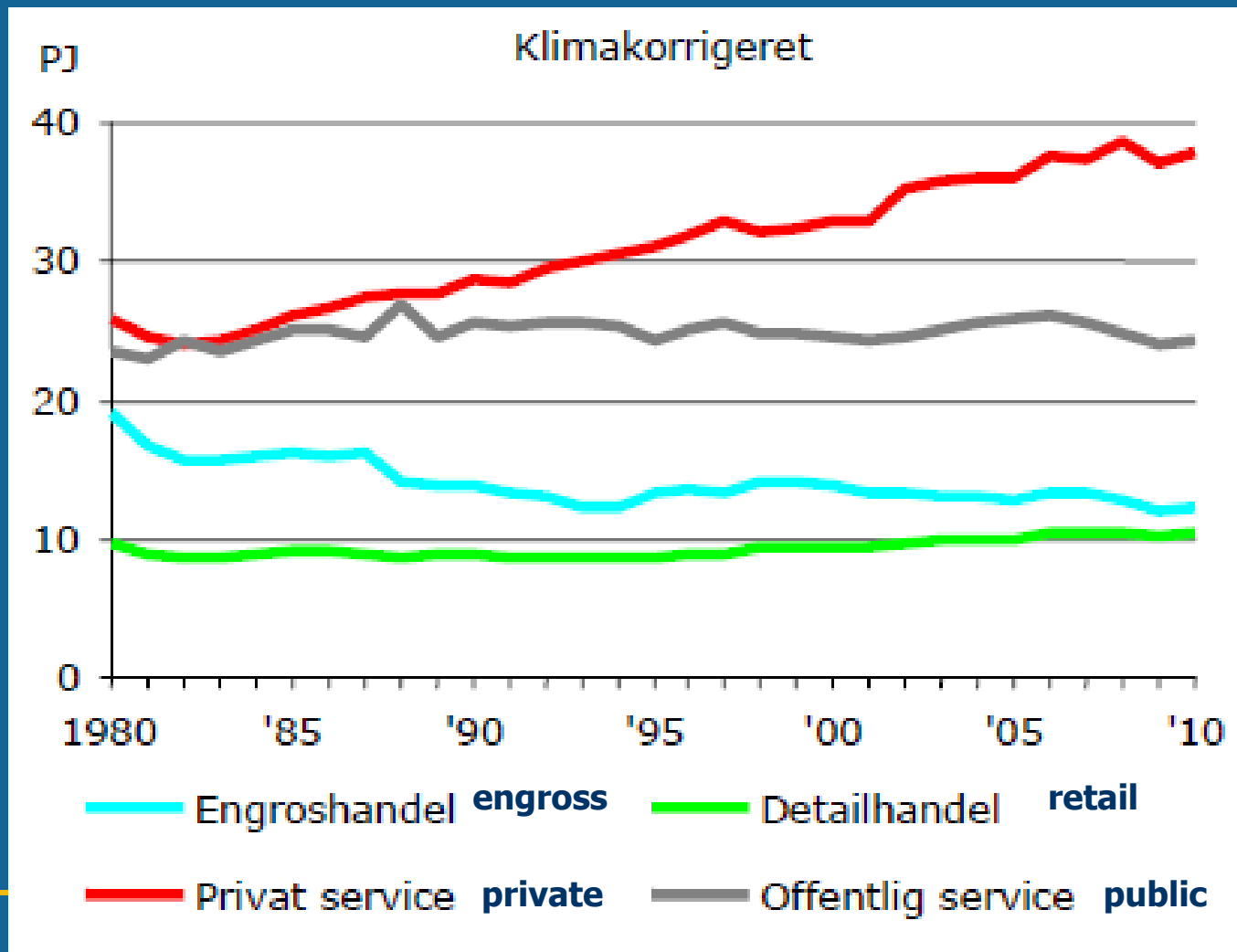
- building heating: aligned to households



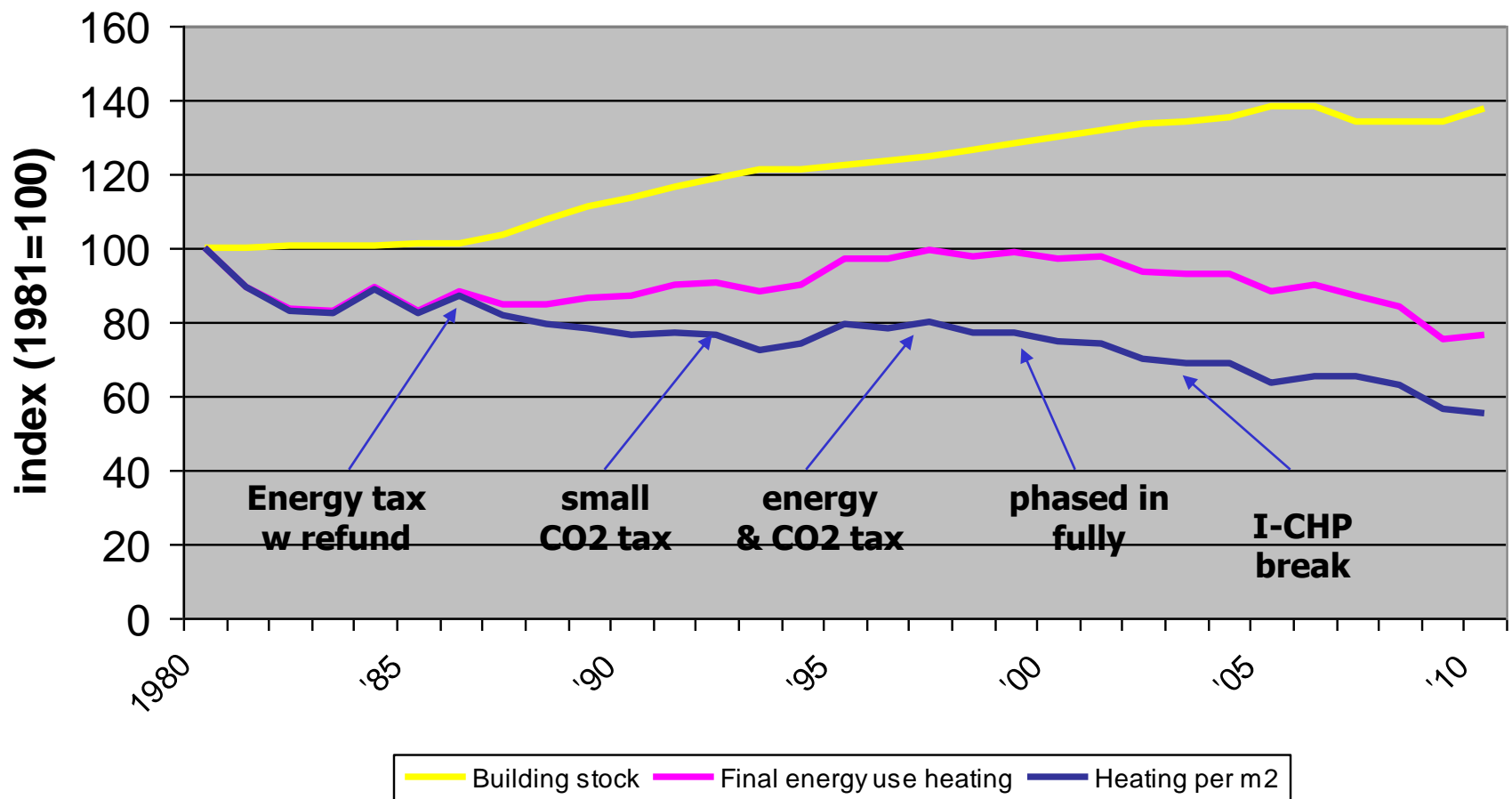
# Trade and services: down 46% per m<sup>2</sup> (building heating; excl. industry)



# A closer look at final energy use in trade and services



# Manufacturing industry: down 45% per m<sup>2</sup>



# Lessons from Danish experience

- Energy taxes support enforcement of new building codes and specific standards useful for refurbishments
- Light services and households are less sensitive to taxation,
- Manufacturing industry and engross trade more responsive to price signals
- Rebound effects .....despite deep reductions in building energy use of 40-45%



# Environmental tax reform

- Denmark's ETR shifted 2% of total taxes in the years from 1995-1999
- Revenue-neutral shifting of tax burden, away from labour, penalising resource use and pollution
- Labour taxes are distorting, but internalising energy and resource taxes are not
- Potential for double dividend



# Electricity meter “running backwards” for solar power & RE



- Tax relief for own-purpose solar power (<6kW)
- Electricity/CO<sub>2</sub> tax of 10 cents/kWh<sub>+VAT</sub>
- Storage on grid; effective relief is tax + price (28 c)
- Quadrupling of new solar power in 2011





# Thank you for your attention

<http://www.eea.europa.eu>

