ODYSSEE-MURE

Danish Energy Agency

Energy efficiency, structural change and energy savings in the manufacturing sector with special focus on Denmark

Odyssee-Mure webinar series on Energy Efficiency
organised by Leonardo ENERGY

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ADEME
AGENCE DE LA TRANSITION ÉCOLOGIQUE

About ODYSSEE-MURE

- This webinar is organized in the framework of the ODYSSEE-MURE project, that is supported by the H2020 programme of the European Commission. The project is coordinated by ADEME, with the support of Enerdata and Fraunhofer-ISI. www.odyssee-mure.eu
- The webinar relies on data and energy efficiency indicators prepared in the framework of the project and disseminated in a database, called **ODYSSEE**, and in 5 data tools.
- ODYSSEE covers 31 countries*. It is updated up to 2018 from national sources and
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** 27 EU Member States + UK, Norway, Serbia and Switzerland*

*** See methodology at https://www.odyssee-mure.eu/publications/other/early-estimates-methodology.html*

They main topics

Part 1: Based on ODYSSEE data

- The level of energy efficiency – energy intensity
  - Comparison between countries
  - The role of structure of the manufacturing sector
- The development of energy efficiency – energy intensity
  - Comparison and the role of structural change

Part 2: The Danish case

- The role of structural change
- The relation between energy efficiency improvements and measured energy savings

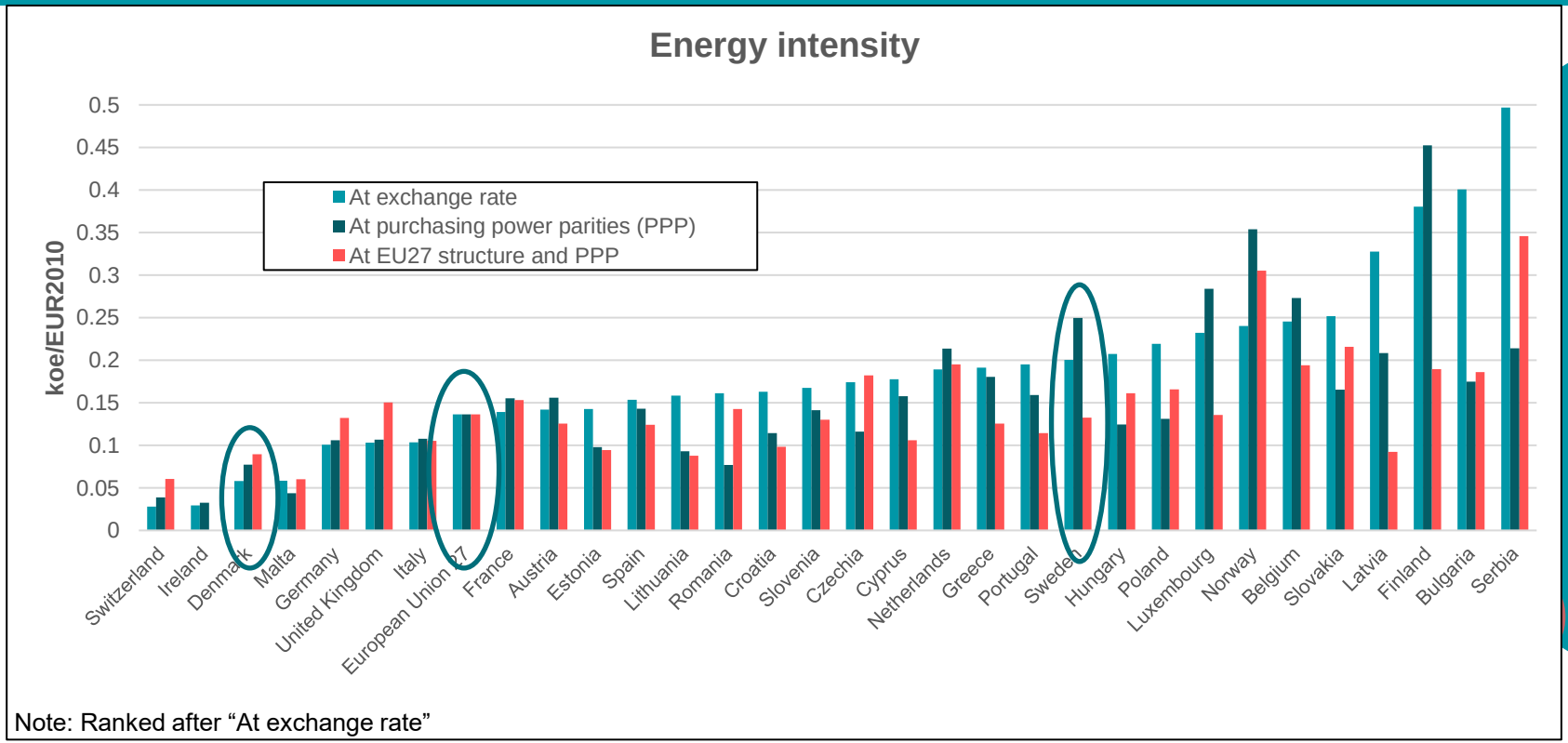
Part 1: Comparison between EU countries - based on ODYSSE data

First step: The level of energy intensity of manufacturing

- Energy intensity: The ration between the final energy consumption and the value added at constant price
  - Important to be clear on the definition of energy intensity
  - The levels and ranking depend of the definition

- Will show the data for three different definitions/indicators:
  - Values added at exchange rates
  - Value added at purchasing power parities (PPP)
  - At EU27 structure and PPP: For each branch the actual intensity of the country and the industrial structure (ie. the share of each branch in the value added of manufacturing) of EU average as reference

Strong impact of correction for purchasing power and structure

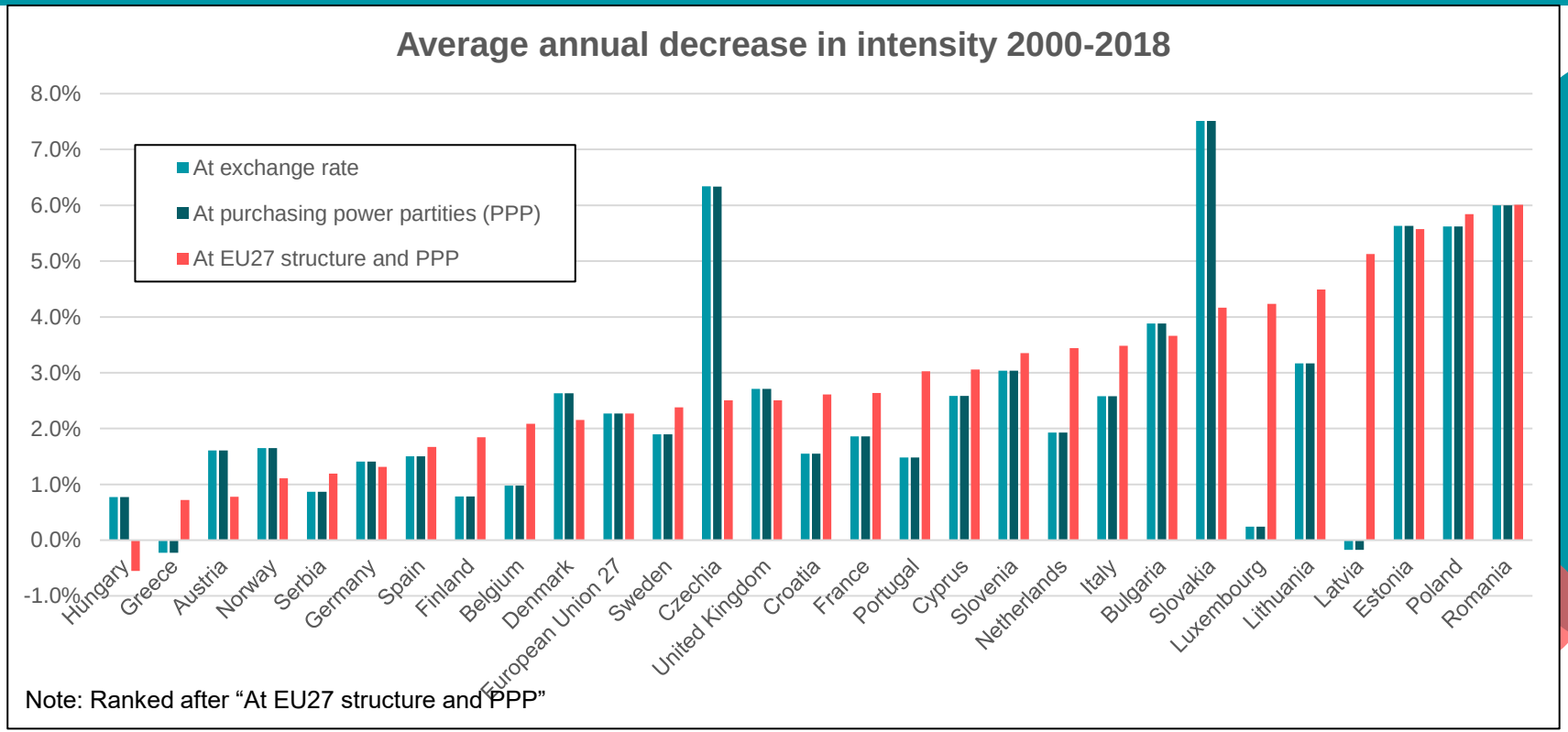


Note: Ranked after “At exchange rate”

Second step: Development of energy intensity

- Look at the period 2000-2018
- The result depend on the definition of intensity
  - Especially for some countries
  - For most countries higher reduction of intensity with use of EU27 structure
  - But there is also countries where the EU27 structure result in lower improvements

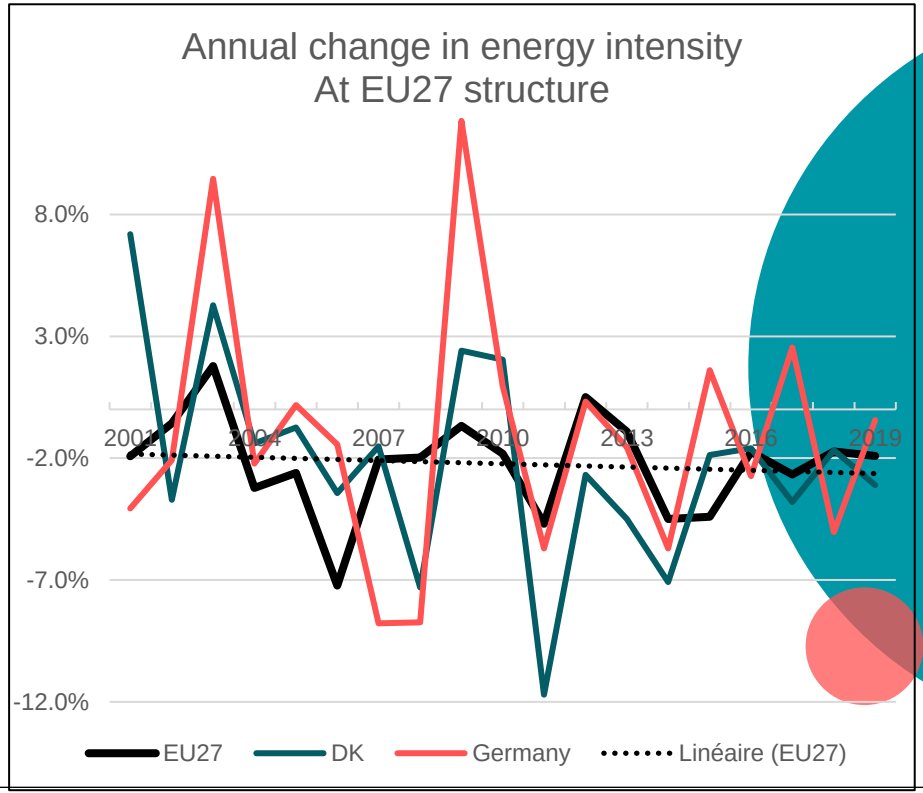
Development in energy intensity



Note: Ranked after “At EU27 structure and PPP”

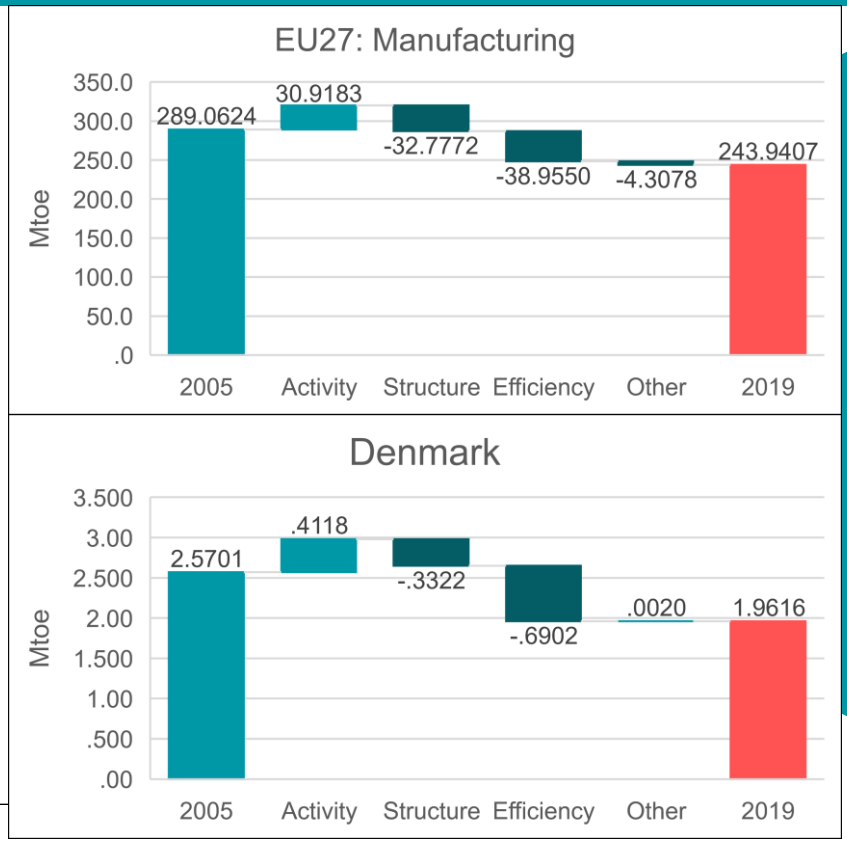
Step 2: Development over the period

- Strong variation in energy intensity improvements from year to year
  - Not so easy to explain the variations
  - The trend for EU27 seem to be stable



Step 3: Decomposition

- Development in activity increase energy consumption
- Structural effects reduce consumption
  - Almost equal to the activity effect
- Efficiency (technical savings) reduce consumption
  - The effect almost equal to the reduction of the consumption
- The efficiency effect a bit higher for Denmark then for EU27



Part 2: The Danish case

Data used

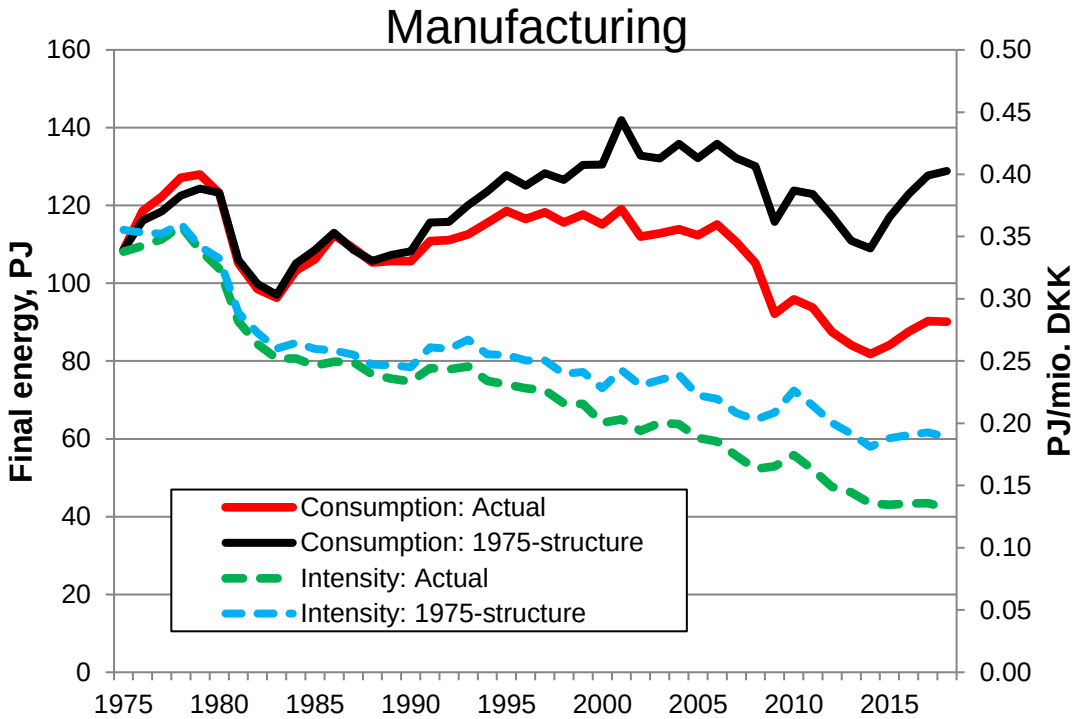
- Energy consumption at 13 branches from Statistic Denmark
- Economic output (production values) for the same 13 branches from Statistic Denmark
    - Not value added
- Reported energy savings from the Danish Energy Efficiency obligation scheme

DK: Structural change have a substantial impact

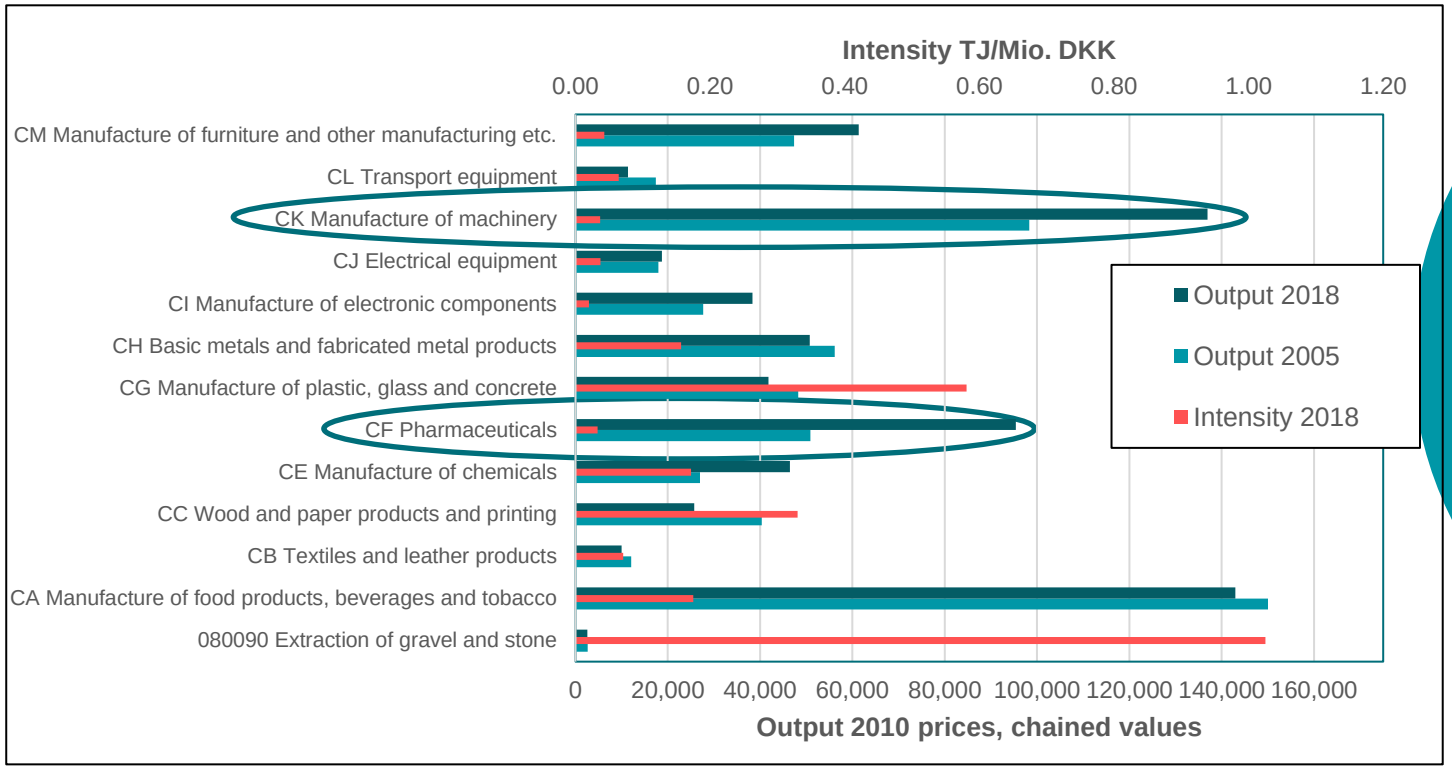
Structural change has reduced energy consumption since 1990

- No impact from 1975-1990

Avag. annual change in intensity	Actual structure	1975 structure
1979-1983	-7,1%	-6,4%
1983-1993	-0,3%	-0,3%
1993-2018	-2,5%	-1,5/



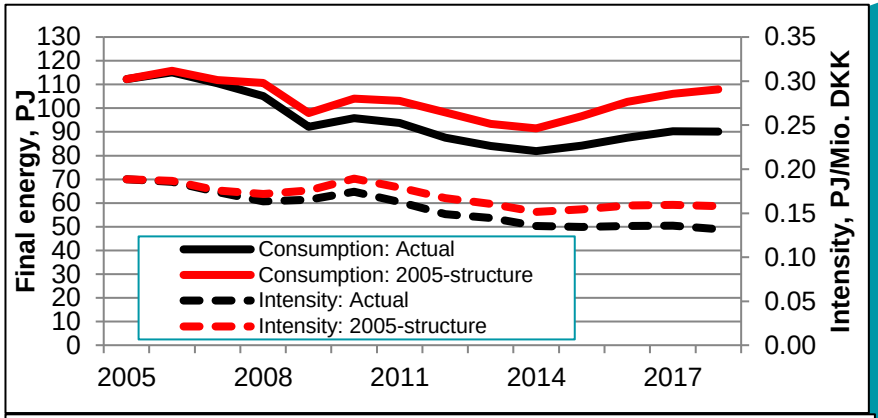
Primarily growth in sectors with low energy intensity

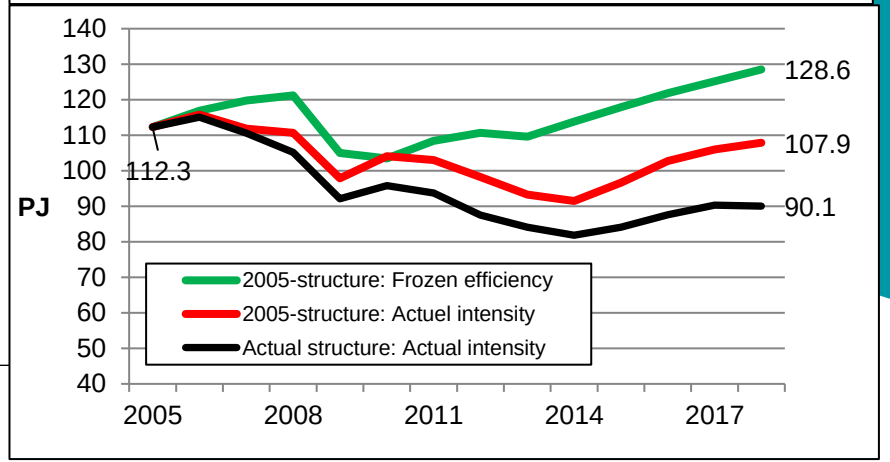


A more detail look at 2005-2018

- A substantial impact of structural change
- Energy efficiency has also reduced consumption
  - Especial from 2010 to 2014

Average annual change in intensity	2005-2018
Actual structure	-2,7%
2005-structure	-1,3%





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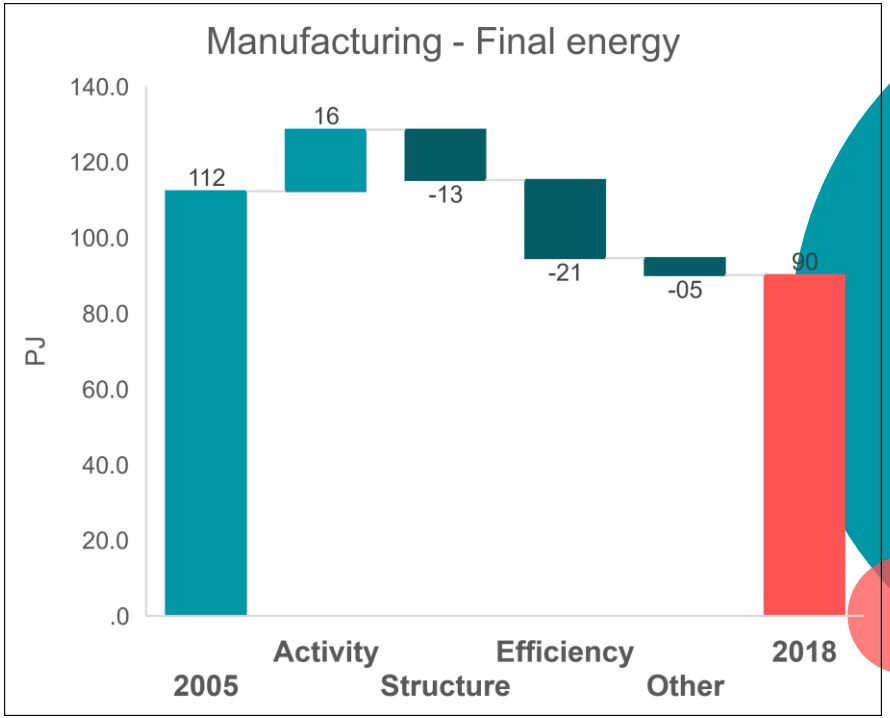
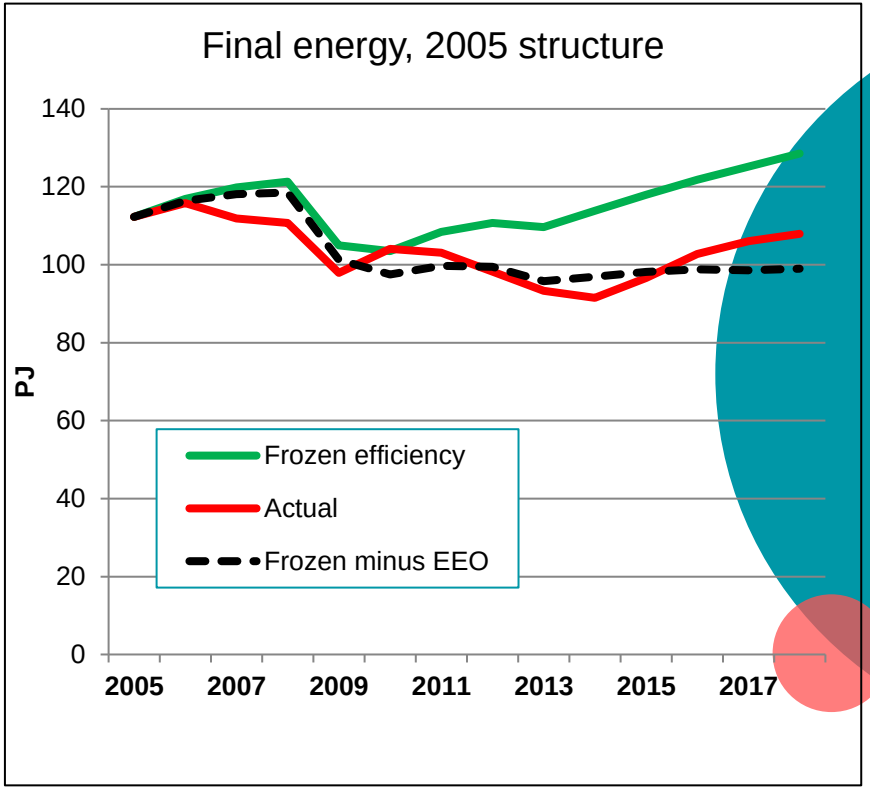
Decomposition

- Very similarly to the decomposition based on ODYSSEE data
- The decrease in consumption mainly from 2006 to 2014
  - From 2006 to 2010 mainly structural effect
- Efficiency improvements highest from 2010 to 2014



Efficiency compared with the EEO-savings

- Denmark had an Energy Efficiency Obligation scheme (EEO) from 2006 to 2020
  - Low target until 2010 – then increased target
  - A substantial part of the savings was in the manufacturing sector
- In the figure is the reported savings from the EEO compared with the efficiency improvements with 2005 structure

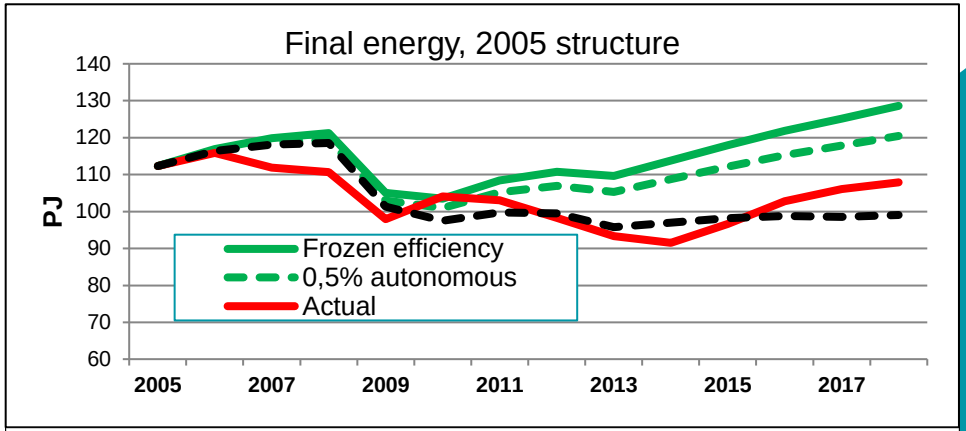


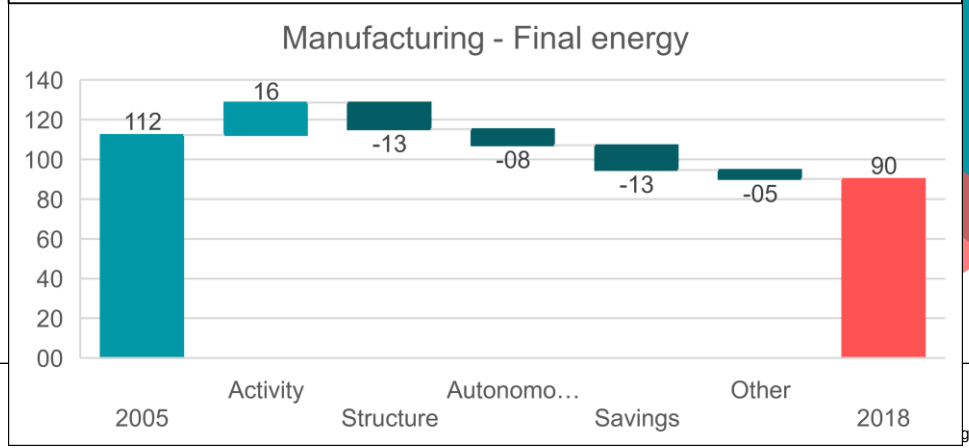
Autonomous efficiency and additionality

- A part of the energy efficiency is not a effect of policies and measures – not energy saving
  - There is an autonomous part
  - Link to technology development
  - Not clear how big it is
- If autonomous efficiency improvements 0,5% p.a.

  ⇒ Additionality of the programme is around 45%

  (70% with 0 pct. autonomous)






Thank you for your attention
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