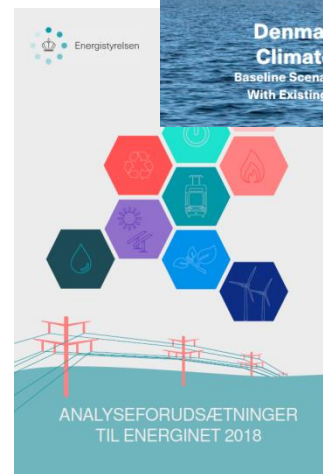


1. oktober 2018

# Denmark's Energy and Climate Outlook

*An Integrated Platform for WEM, WAM, WOM*



# What is Denmark's Energy and Climate Outlook?

Technical assessments of energy demand, energy production, and emissions. Providing insight into status and challenges in relation to Denmark's energy and climate policies and obligations.

1. WEM 2030 ("with existing measures"): Ex-ante. "Arm's-length principle". Not specifying effects of individual measures.
2. WAM 2040 ("with additional measures"): Ex-ante – strategic stakeholder process aimed at policy targets and trends. Not specifying effects of individual measures. 2018 draft. To be included in 2019.
3. WOM 1990 Base Year ("frozen system") : Ex-post/Ex-ante. Indicative impacts of grouped measures (RE, EE, Land).

# Smart objectives (3 pillars: RE, EE, CO2)



- EU 2020
  - 30 pct. (DK)
- EU 2030
  - 32 pct. (all)
- **DK 2030**
  - **Overall : 55 pct.**
  - **Elec. : >100 pct.**
  - **DH: >90 pct.**



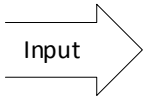
- EU 2020
  - 20 pct. (all)
- EU 2030
  - 32,5 pct. (all)
- EU 2030
  - 0,8 pct./year (DK)



- EU/UN 2020/2005
  - 20 pct. (DK)
- EU/UN 2030/1990
  - 40 pct. (all)
- EU/UN 2030/2005
  - ETS: 43 pct. (all)
  - nETS: 30 pct. (all)
- **DK 2050**
  - **Zero net emissions**

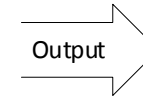
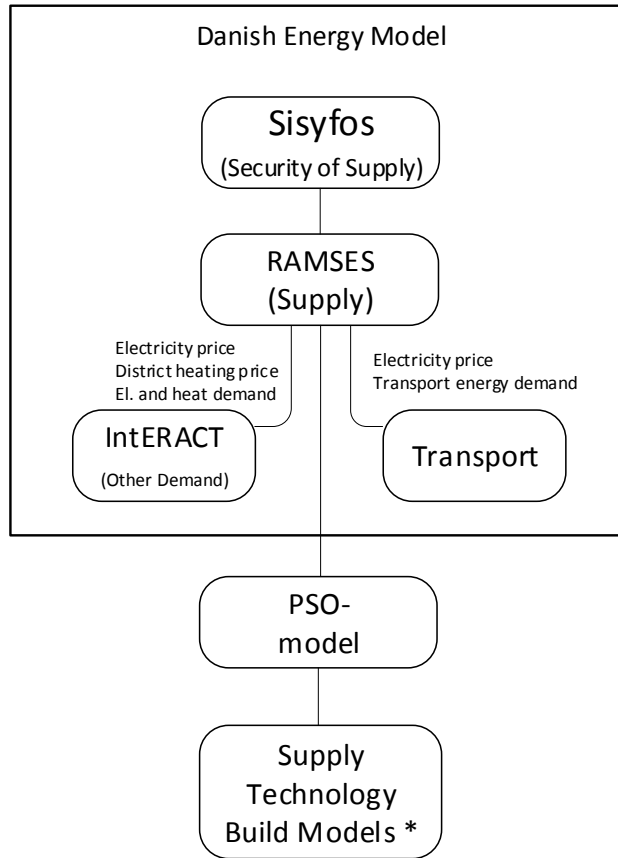
A man in a dark suit is shown from the back, looking thoughtful with his hand on his chin. The background is a vibrant blue filled with white line-art icons representing business and technology: a bar chart, a pie chart with a slice removed, a lightbulb, a dollar sign, a clock, a cloud, a computer monitor, and server racks. A semi-transparent grey banner is positioned across the middle of the image.

## Modeling and analytics platform



Input

- Economic growth, industrial productivity (MoF)
- Demographics and housing (DEC)
- Fuel and CO2 markets (IEA/MoF)
- Plant data and hourly variations
- Energy statistics and input-output matrices
- 23 countries energy sector development with capacity and interconnectors (ENTSO-E)
- Technology catalogues



Output

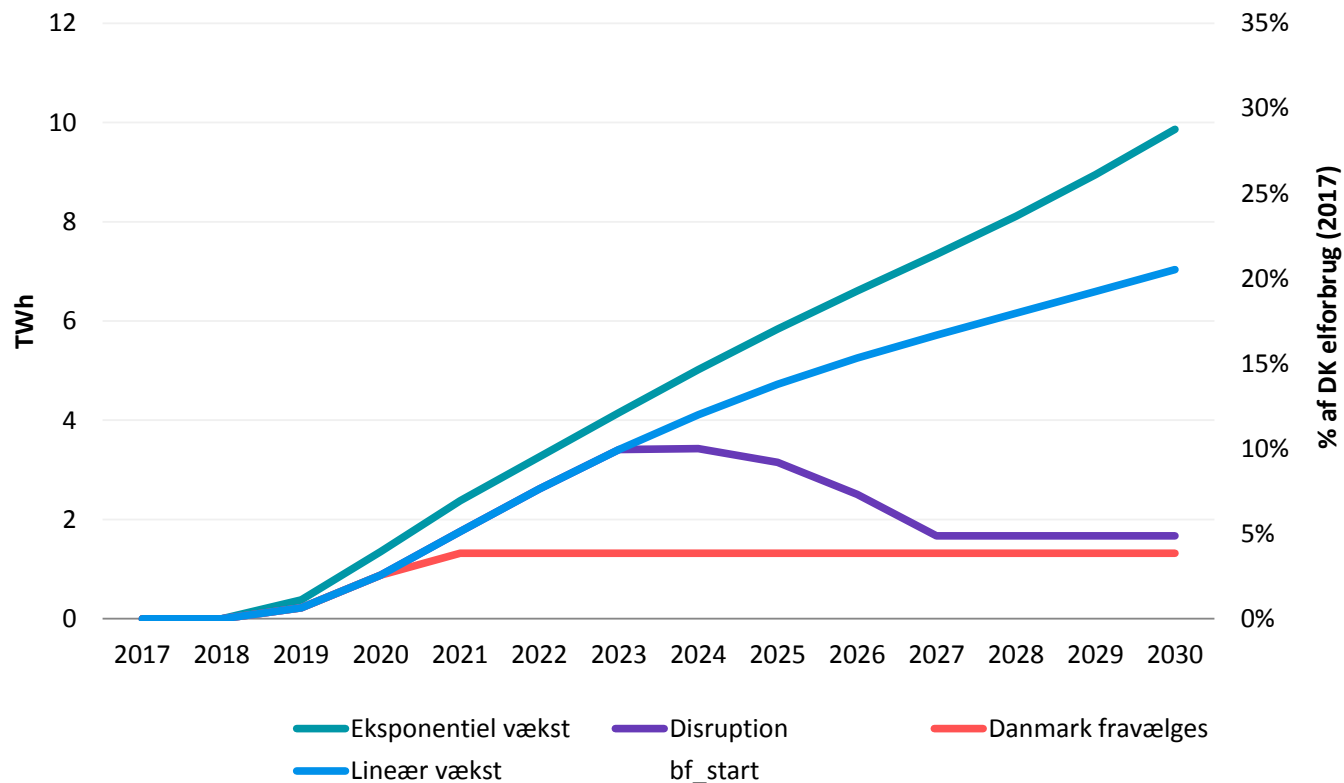
- Energy balances 2015-2030/40 for DK e.g.: 34 district heating areas, 18 demand sectors, 11 end-uses
- RES-shares EU-norm
- CO2 emissions (via DCE emission model)
- Electricity price and exchange DK1, DK2, 23 countries, Power balances, Security of supply
- PSO-projection
- Fiscal revenue impacts
- Financial and economic operational costs
- Energy intensities

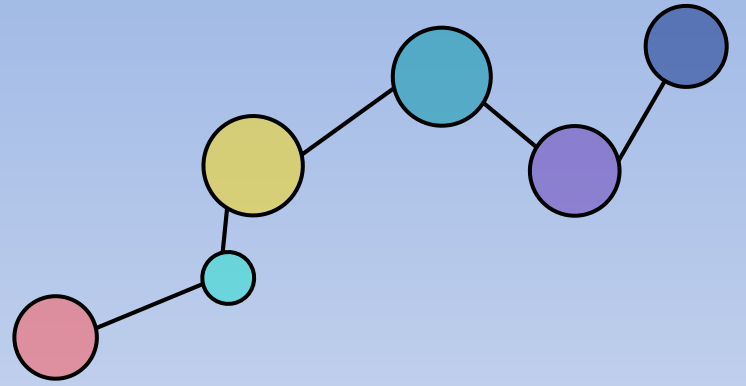
\* E.g. on-shore wind, PV/CSP, large-scale heat pumps

A wide-angle, high-angle photograph of a massive hyperscale datacenter. The room is filled with rows of server racks, each illuminated with a warm yellow light. The ceiling is a complex, dark metal structure with numerous pipes and conduits. The floor is a light-colored, polished surface. The overall atmosphere is one of a highly organized and technologically advanced environment.

## 2018 Deep Dive: Hyperscale datacenters

# Datacenters: Scenarios – extreme uncertainty

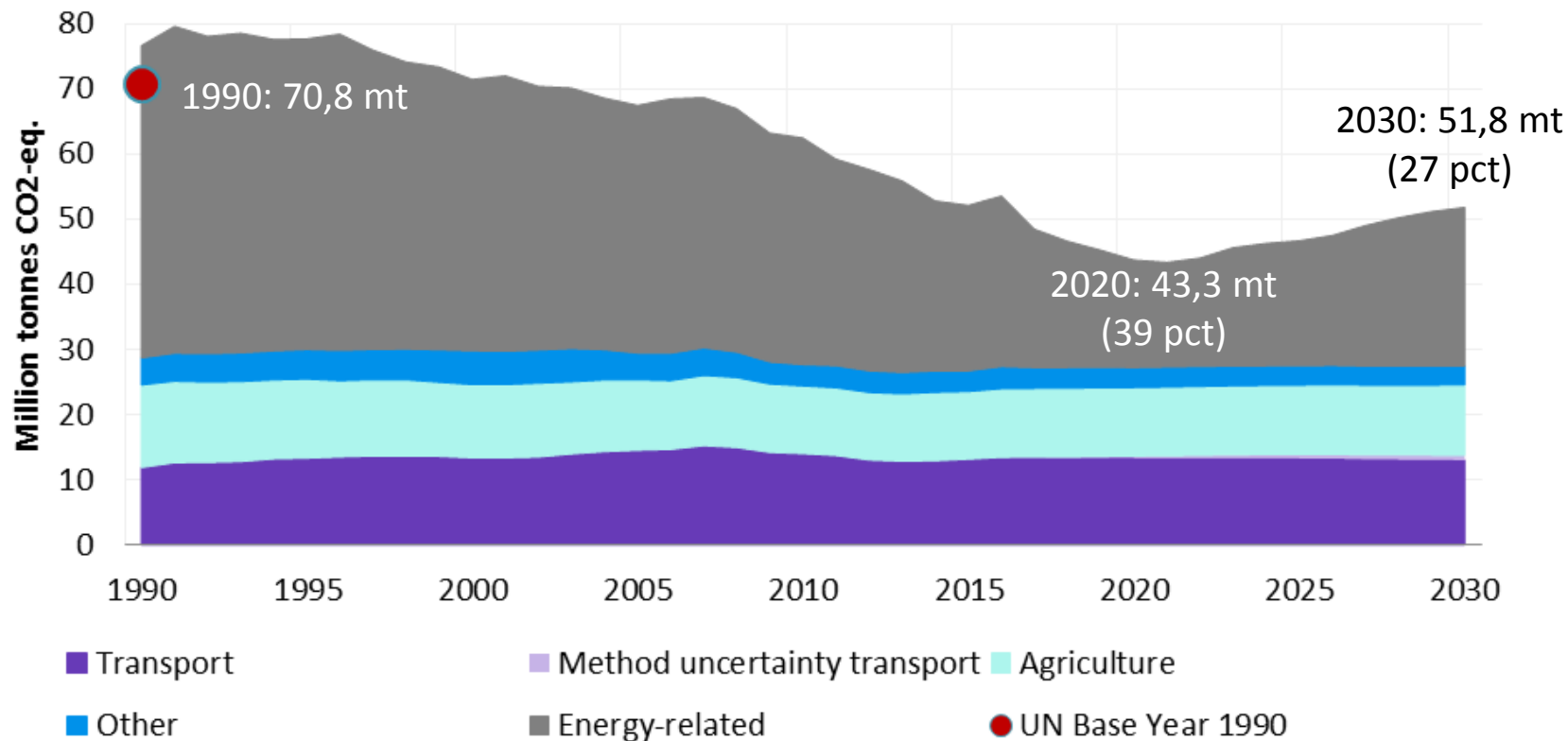




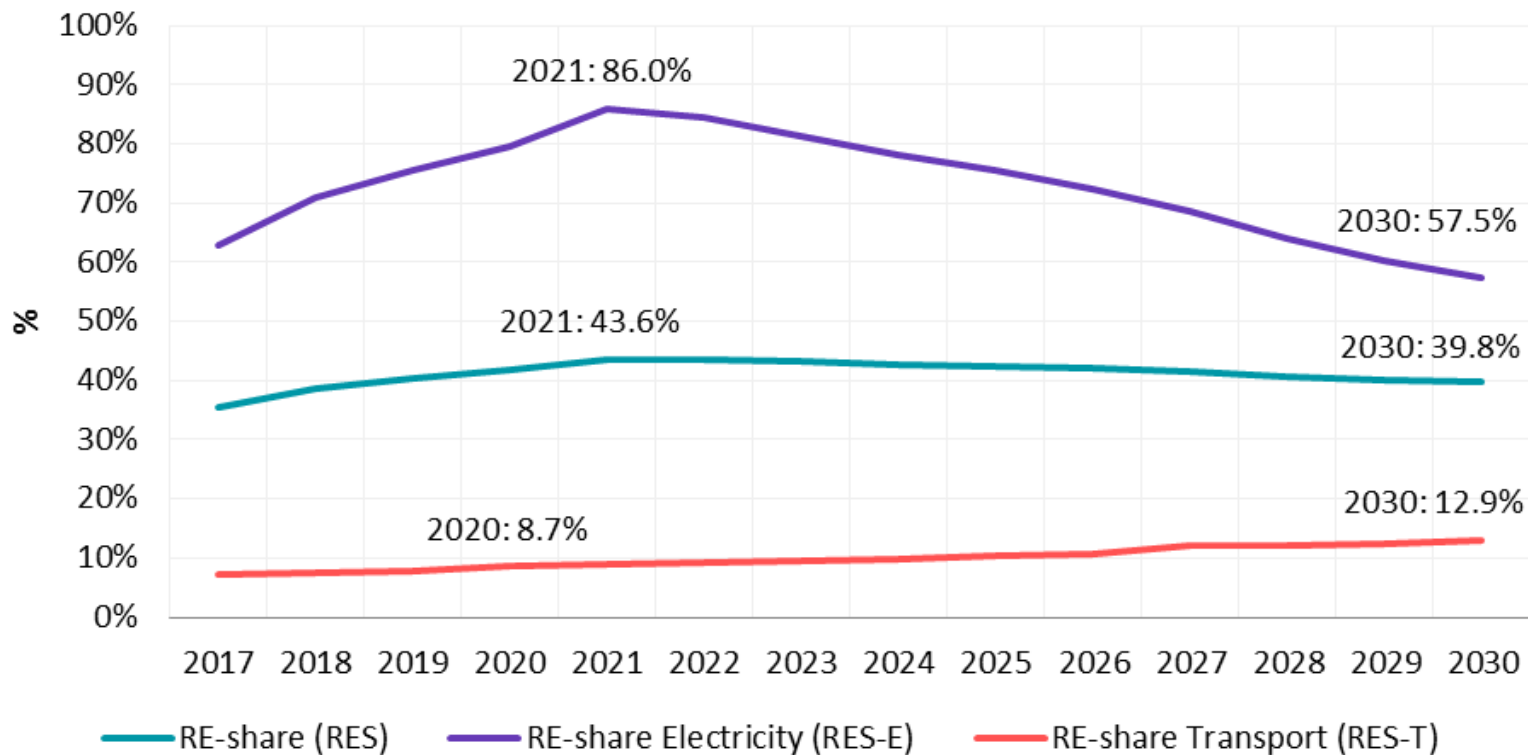
**Results**



# Total CO2 emissions

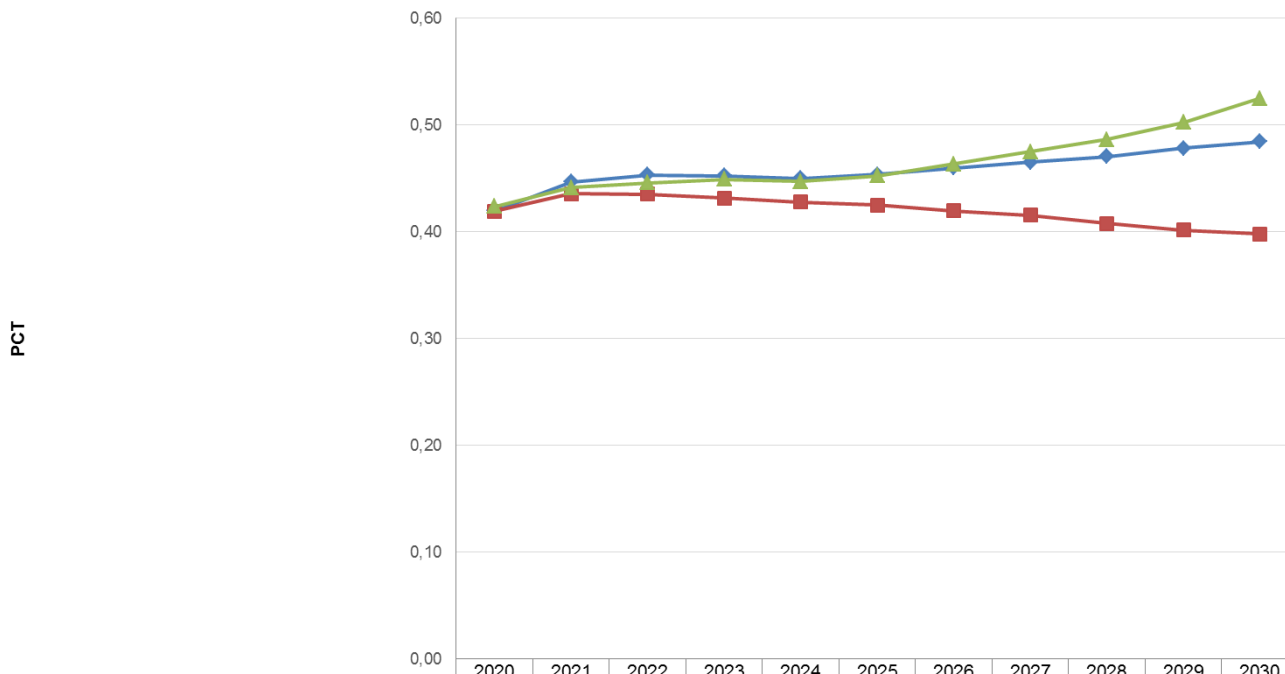


# RES-shares (Eurostat method)



# RES – WEM / WAM / July 2018 policy initiatives

## RES Renewable Energy Share



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
VE_andel[pct] - SFM_2018-09-19_DataR_BF18plus_TVAR2014_2017_2030_Y S1_S3_O2_C1506981.xlsb	0,42	0,45	0,45	0,45	0,45	0,45	0,46	0,47	0,47	0,48	0,48
VE_andel[pct] - SFM_BF.xlsb	0,42	0,44	0,44	0,43	0,43	0,42	0,42	0,42	0,41	0,40	0,40
VE_andel[pct] - SFM_AF_V18_AEv2.xlsb	0,42	0,44	0,45	0,45	0,45	0,45	0,46	0,47	0,49	0,50	0,52

# The WOM ("Without Measures")

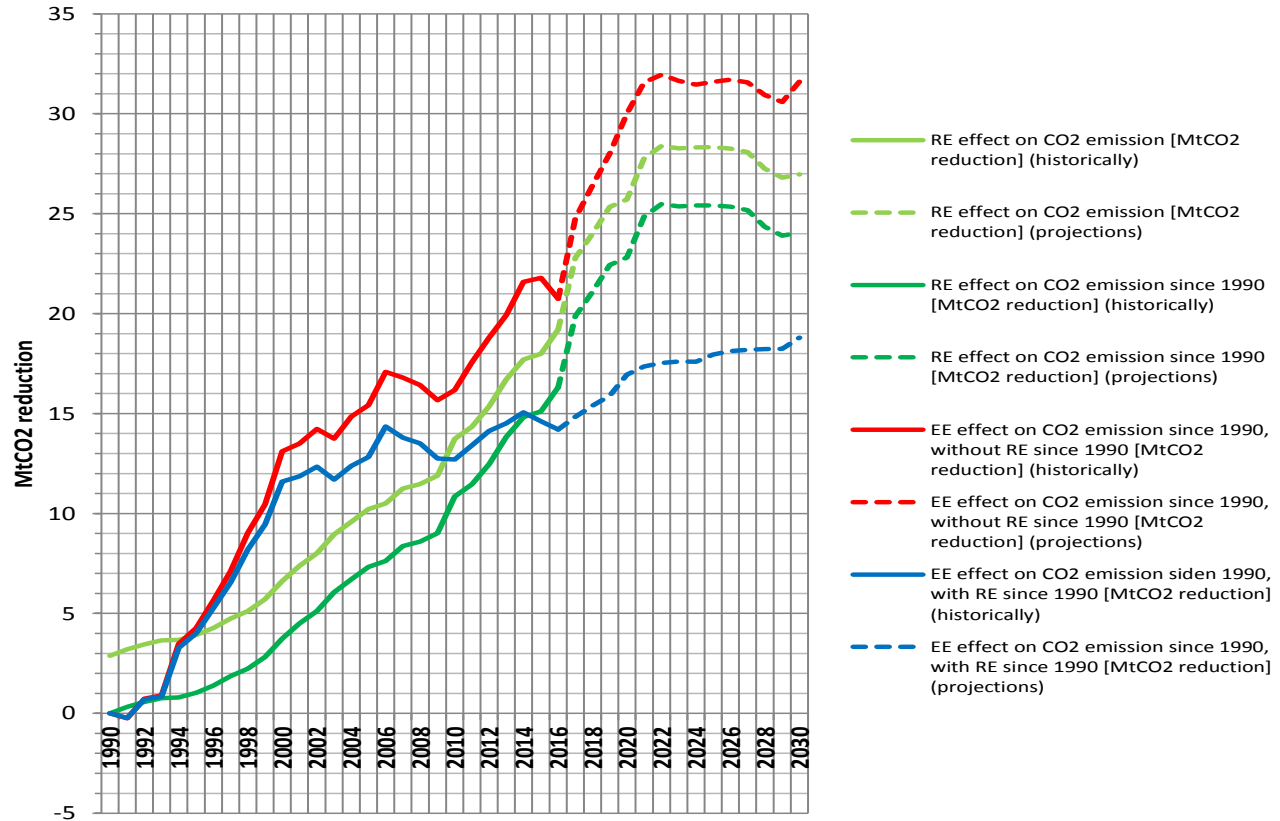
RE-PAMs

EE-PAMs

1990-2016 ex-post  
based on energy stats

2017-2030 ex-ante  
based on the 2017  
WEM projection

## RE- and EE-CO<sub>2</sub>-reduction effects 1990-2030



# Off-shore wind and coal-fired power plants





Thank you!