

# **What does Energy Transition mean in Denmark?**

**Bucharest, Romania – 16 October 2019**

**Lars Gullev  
CEO, VEKS  
Vice-chair, IEA ExCo DHC**



# Agenda

- What does Energy Transition mean in Denmark?
  - New Danish Government, June 2019
  - "Letter of Understanding" - Climate and environment
- How does decarbonisation look in Denmark?
- What is the Danish approach to energy efficiency and/or experience with District Heating.
- Summary



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# New Danish Government, June 2019

## “Letter of Understanding” - Climate and environment

### Binding climate law

- The government must make a proposal for a **binding climate law** that elaborates on specific measures.
- The proposal will be **presented** within the **first** parliamentary **year**.
- The goal is to **reduce greenhouse gas** emissions by **70 % by 2030** compared with 1990.
- This is to **ensure** that Denmark meets the temperature targets of the **Paris Agreement**.



# New Danish Government, June 2019

## “Letter of Understanding” - Climate and environment

### Transformation of the transport sector:

- Stop for the sale of new diesel and petrol cars in 2030 as well as sharpened environmental zones.
- Climate and environmental considerations should play a greater role in the agreement on infrastructure, which requires investments in
  - public transport
  - cycling
- In addition, initiatives to ensure more sustainable air transport.



# New Danish Government, June 2019

## “Letter of Understanding” - Climate and environment

### Agricultural climate contribution

- Binding reduction targets must be set for agriculture.
- Agricultural aid should be used as an incentive tool.
- A new government will take the initiative for land reform involving the utilization of agricultural land for nature.



# New Danish Government, June 2019



## “Letter of Understanding” - Climate and environment

### Climate Action Plan

- The Climate Act must be followed by the Climate Action Plan, which contains eight points:

- 1) Energy efficiency improvements in i.a. public buildings.
- 2) National strategy for sustainable building construction.
- 3) Strategy for electrification in the transport sector, industry and society in general.
- 4) More funding for green research and demonstration programs.



# New Danish Government, June 2019



## "Letter of Understanding" - Climate and environment

### Climate Action Plan

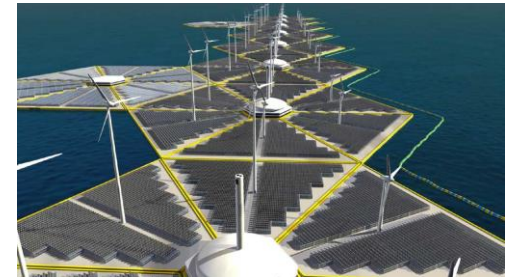
- The Climate Act must be followed by the Climate Action Plan, which contains eight points:

5) Investigation in the possibility that Denmark and the North Sea countries can make a joint strategy for exploiting offshore wind potential.

6) Investigation the possibility that Denmark by 2030 will build an energy island with a minimum of 10 GW connected electric power.

7) Support afforestation (new forest).

8) Climate adaptation including better coordination of coastal protection.



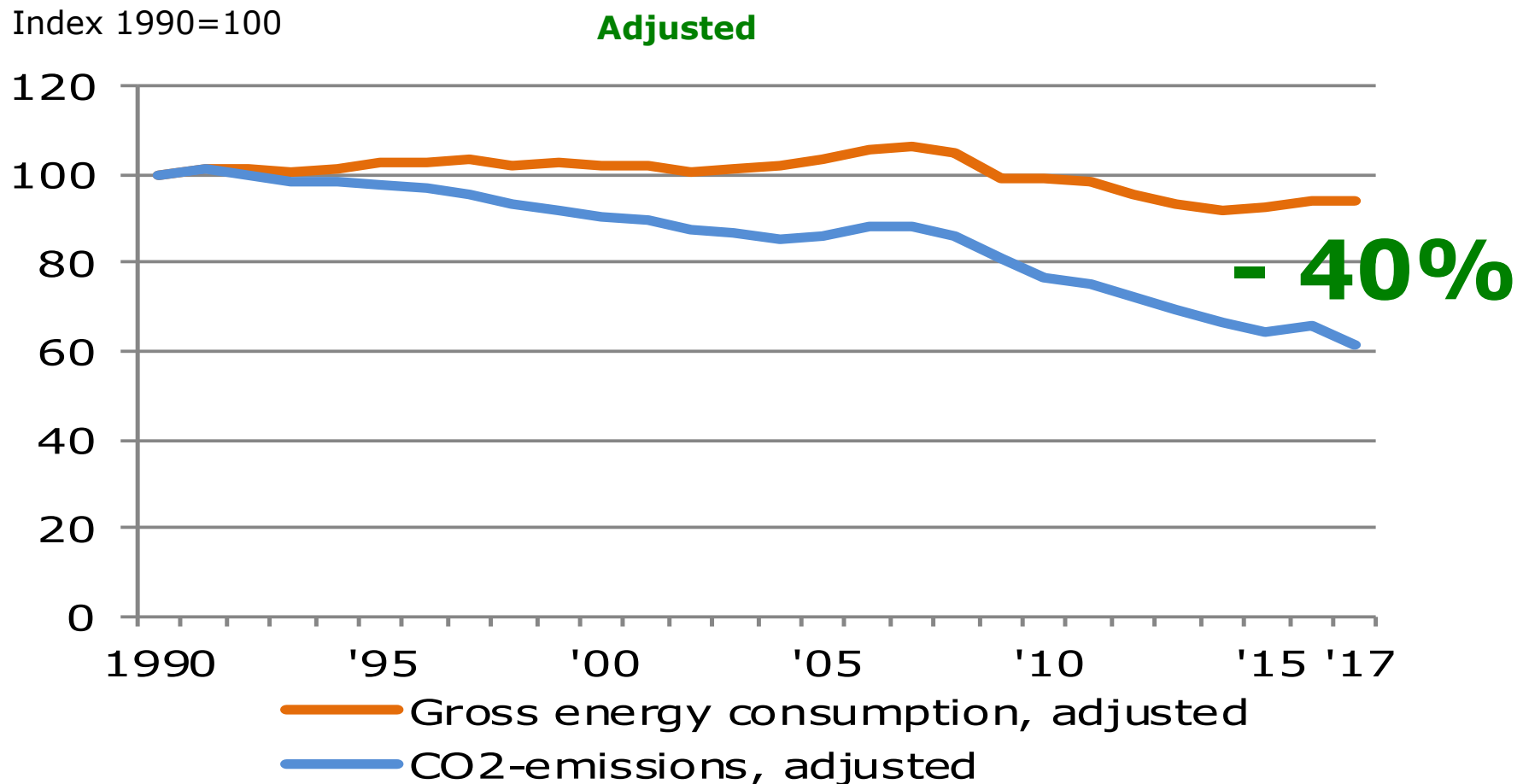


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# Gross energy consumption and CO<sub>2</sub>-emissions





2030

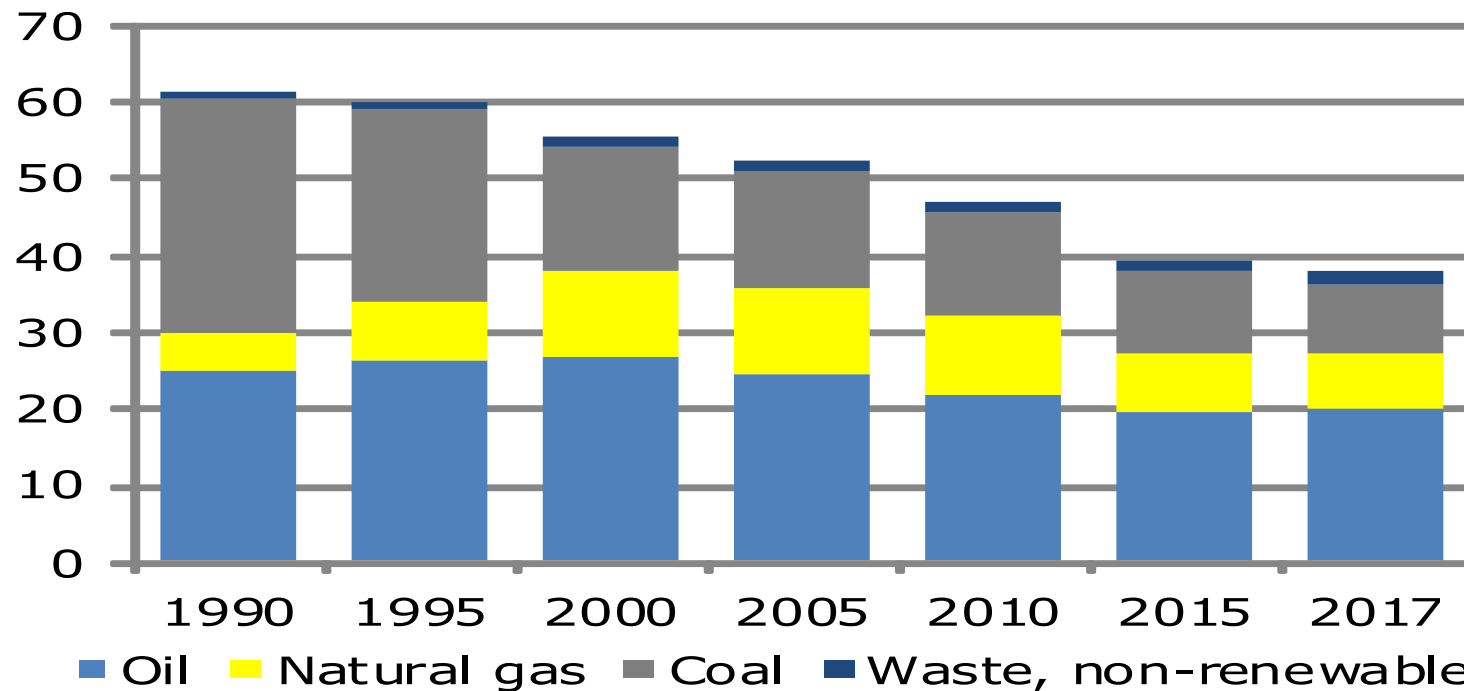


- 70%

# CO<sub>2</sub> emissions by fuel

Adjusted

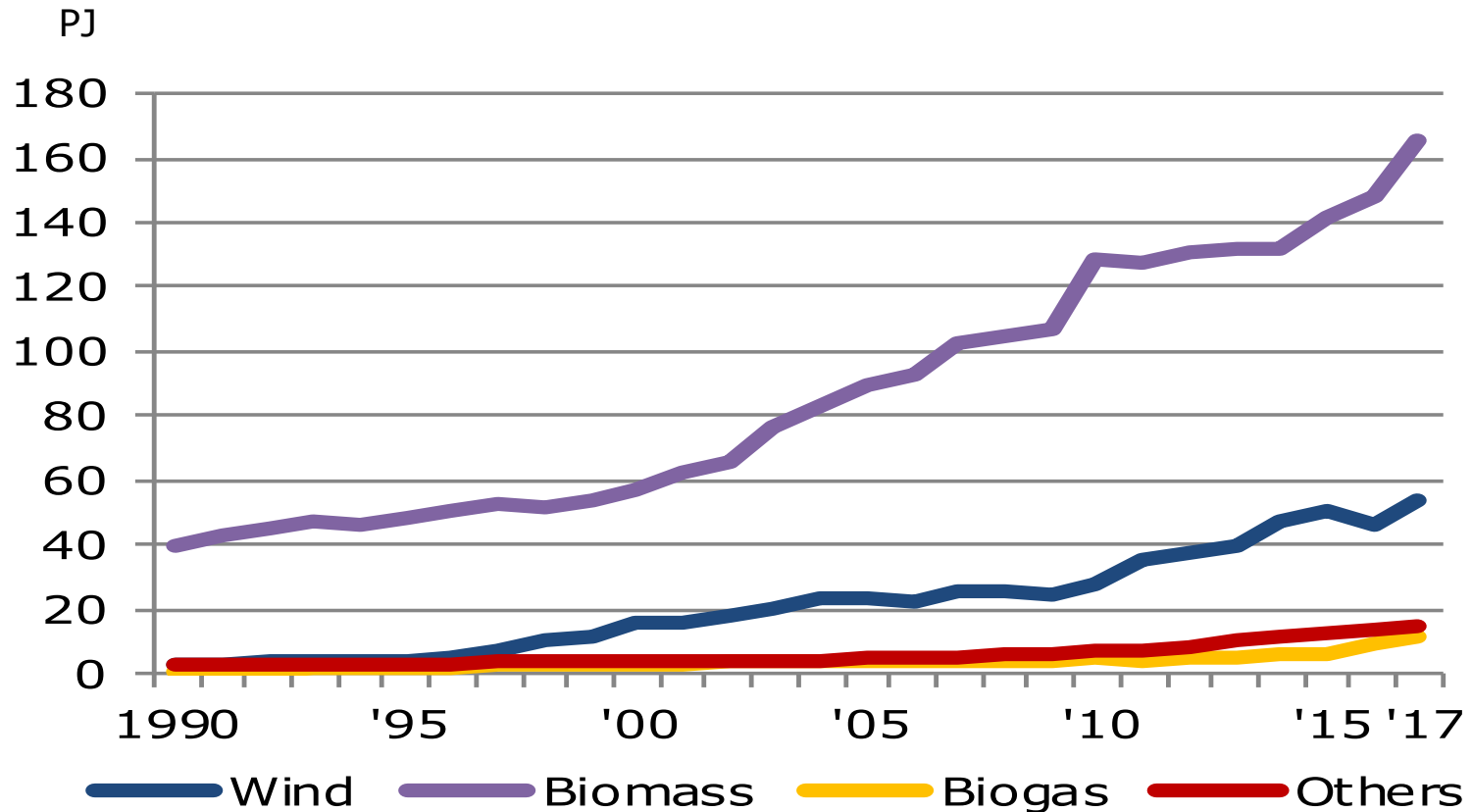
Million tonnes CO<sub>2</sub>



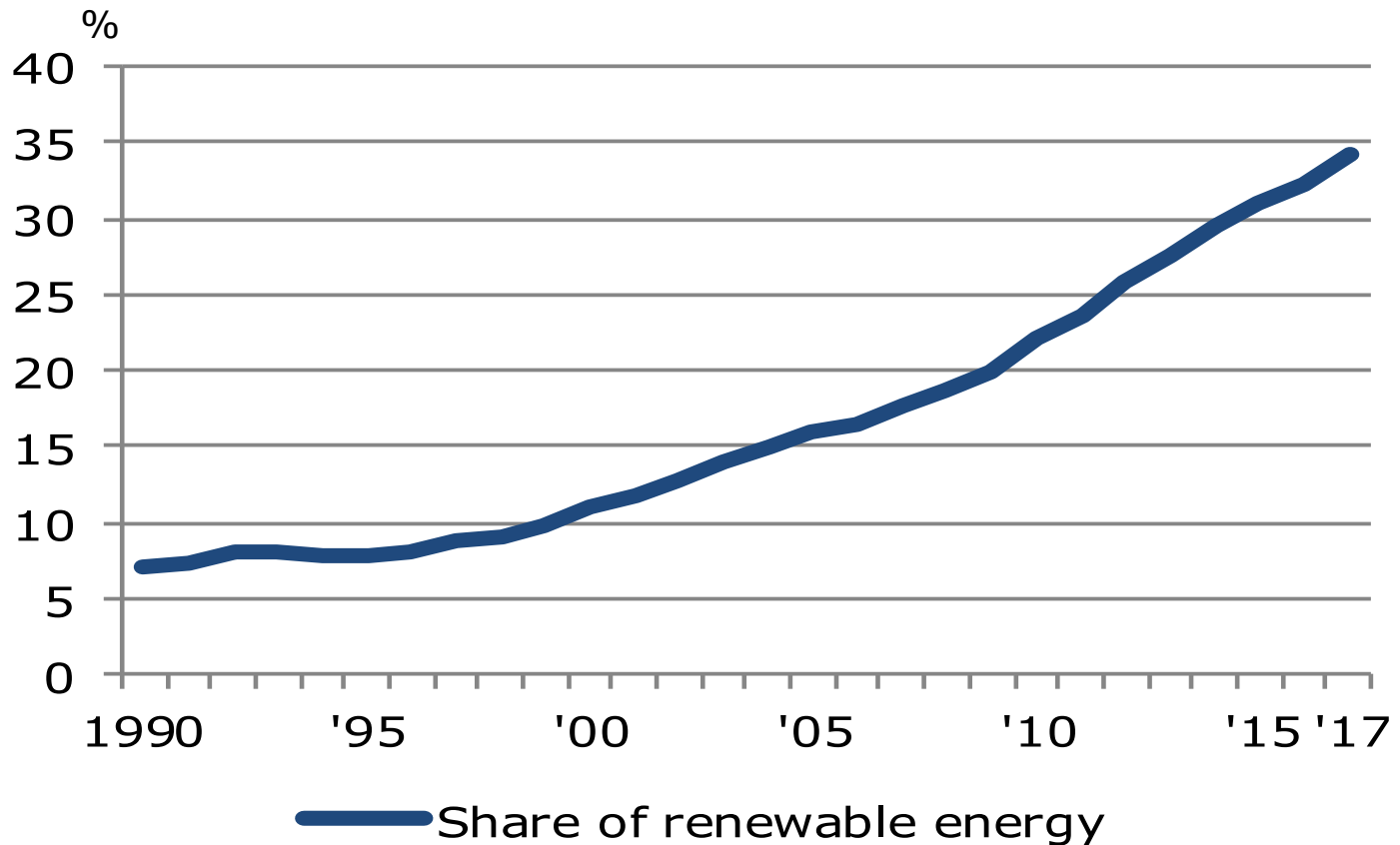


# Renewable energy

## Consumption by energy product



# Share of renewable energy according to the EU method of calculation



# Development in share of RE (renewable energy)

Source: The Danish Energy Agency's Basic Projections 2019 – Published 30 August 2019

# CO<sub>2</sub> prices

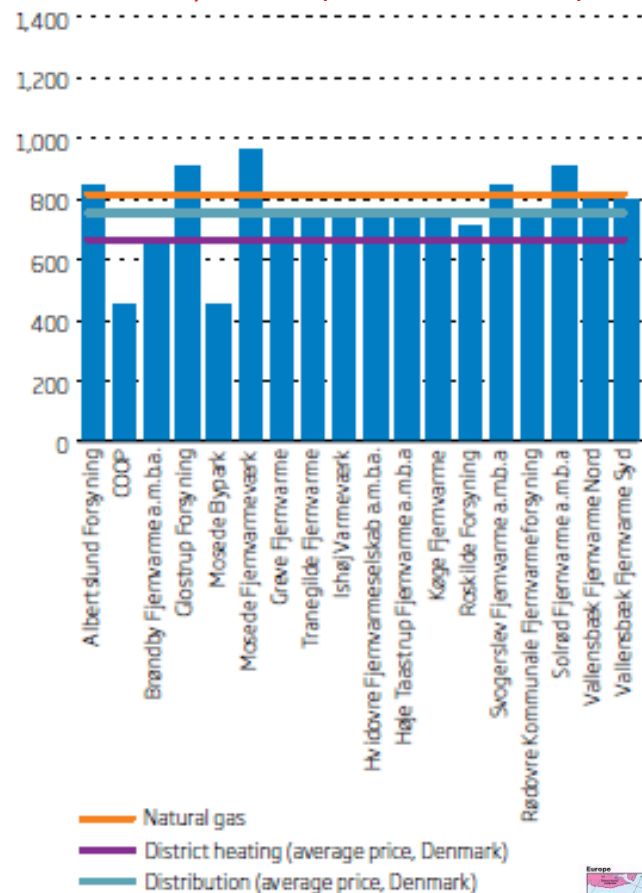
EUR/tonne





## Heating prices paid by the customer

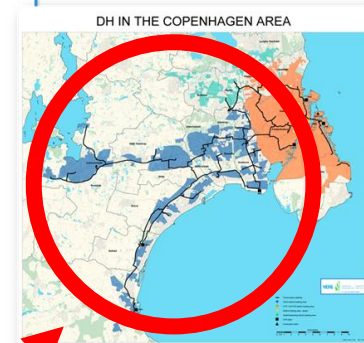
DKK/MWh 1,000 DKK/MWh = 150 Euro/MWh



Heating prices paid by the district heating customers in Vestegnen

Pre-requisites:

- Prices according to the price statistics of the Danish Energy Regulatory Authority reported by the local district heating companies, December 2018. If the prices were not reported, the public prices are used – stated in their respective websites.
- The average heating price is based on calculations made by the Danish District Heating Association for a "standard home" of 130m<sup>2</sup> with an annual consumption of 18.1MWh.
- There is no guarantee that all companies supply the type of "standard home" mentioned.
- The price is exclusive of connection fees.
- The supply point between district heating company and customer may vary from company to company.
- The price of heating with natural gas is provided by the Danish District Heating Association.
- The prices are inclusive of VAT.



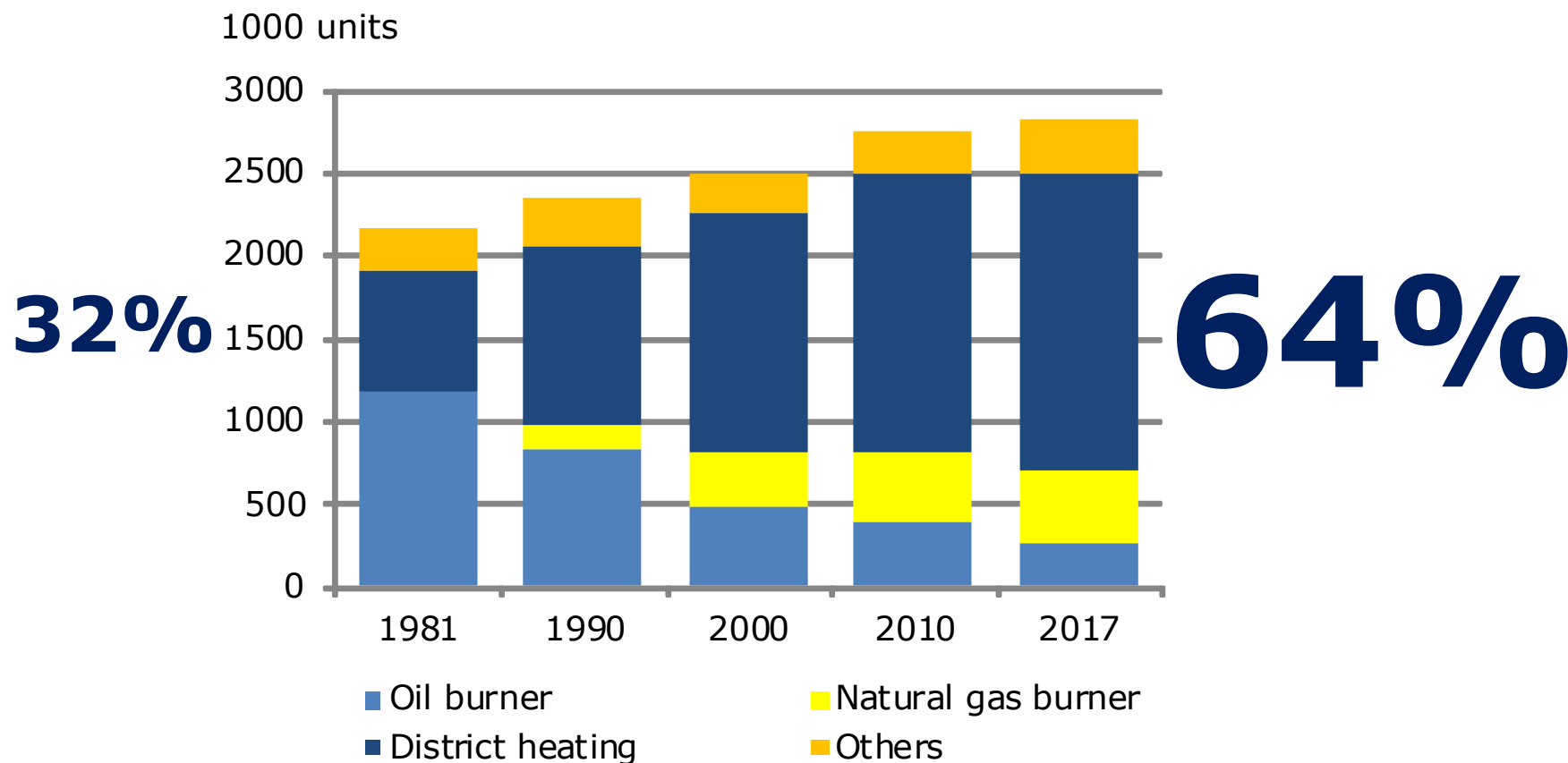
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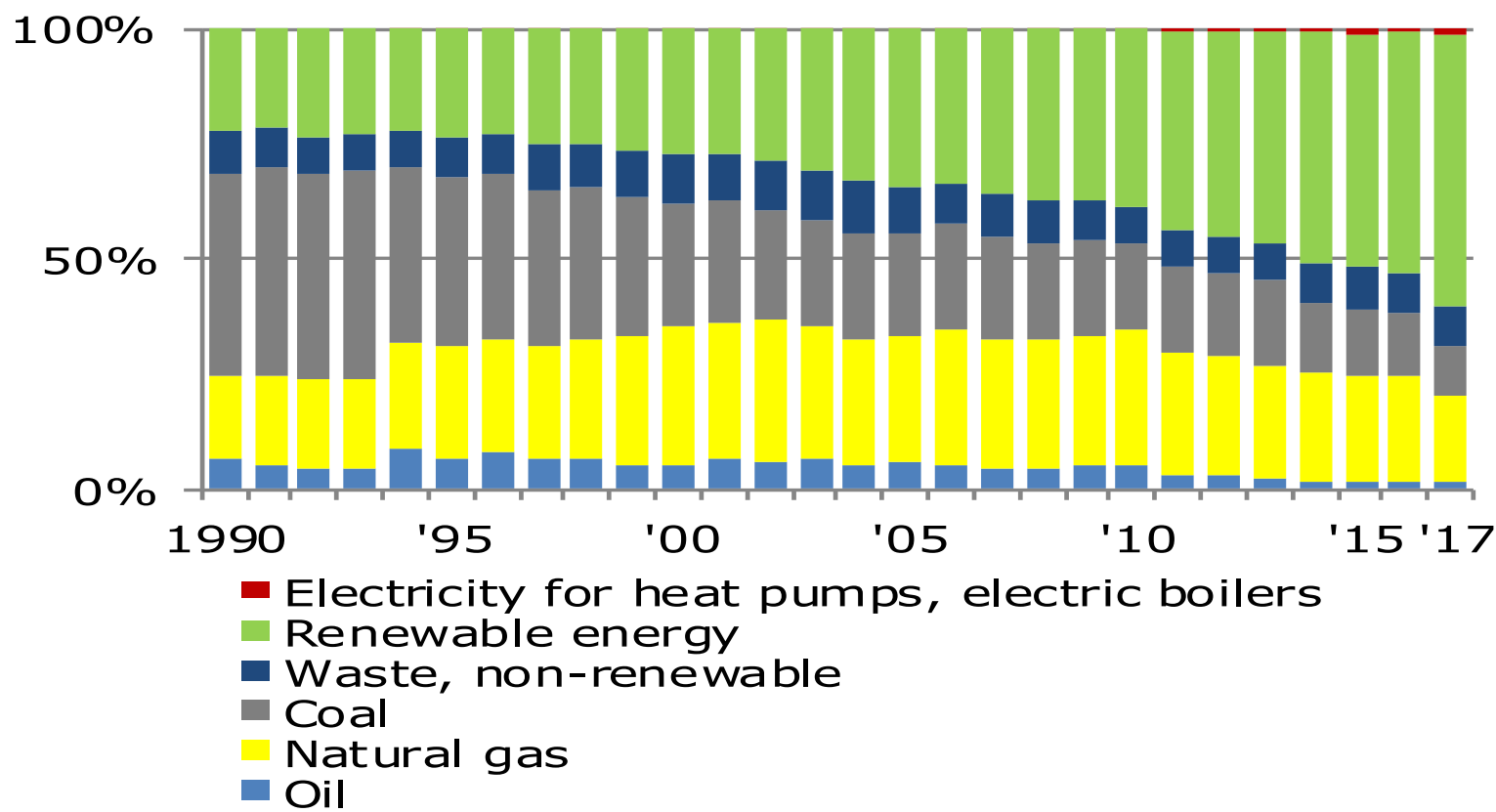


# Heating installations in dwellings



# District heating

## Fuel consumption for production





# Strategic Energy Planning - Capital Region

## One of five regions in DK



- 1,8 m. inhabitants (5,7 in total in DK)
- Energy consumption:
  - 40 % heating, buildings
  - 20 % electricity
  - 40 % transport

# Energy Vision for the Greater Copenhagen area

- The Capital Region must be a leading Region for green transition and growth.
- By the year 2035 the Capital Region must produce all heat and electricity without use of fossil fuels.
- By the year 2050 also the transport sector must be without use of fossil fuels.



Energy Vision adopted by the Regional Council in 2015

# What is Strategic Energy Planning?

- Energy Planning “across borders” between:
  - Municipalities
  - Regions
  - Companies (DH, natural gas, waste, electricity)
  - Sectors (heating, process, transport)





- 33 Municipalities
- 10 Utilities
- Capital Region
- Gate 21 (project org.)

# Participants



Region  
Hovedstaden

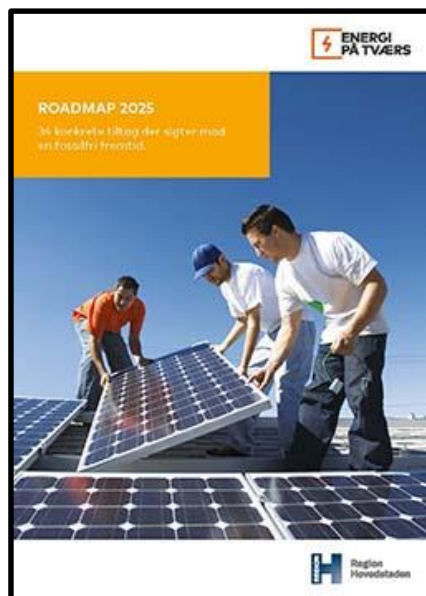


VESTFORBRÆNDING

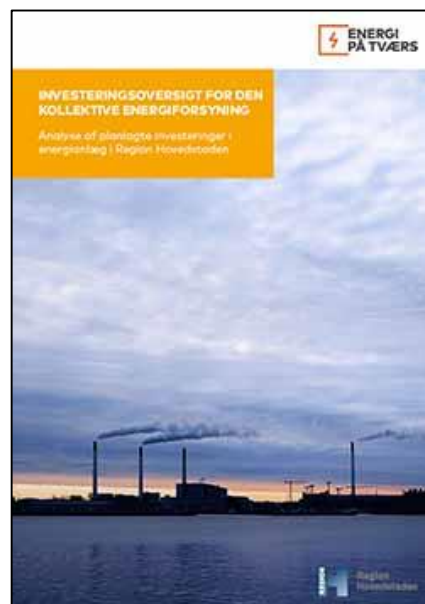




# Publications, Guides and Case descriptions.



- **Roadmap 2025** suggest **action** points for municipalities on how to develop a **green transition**.



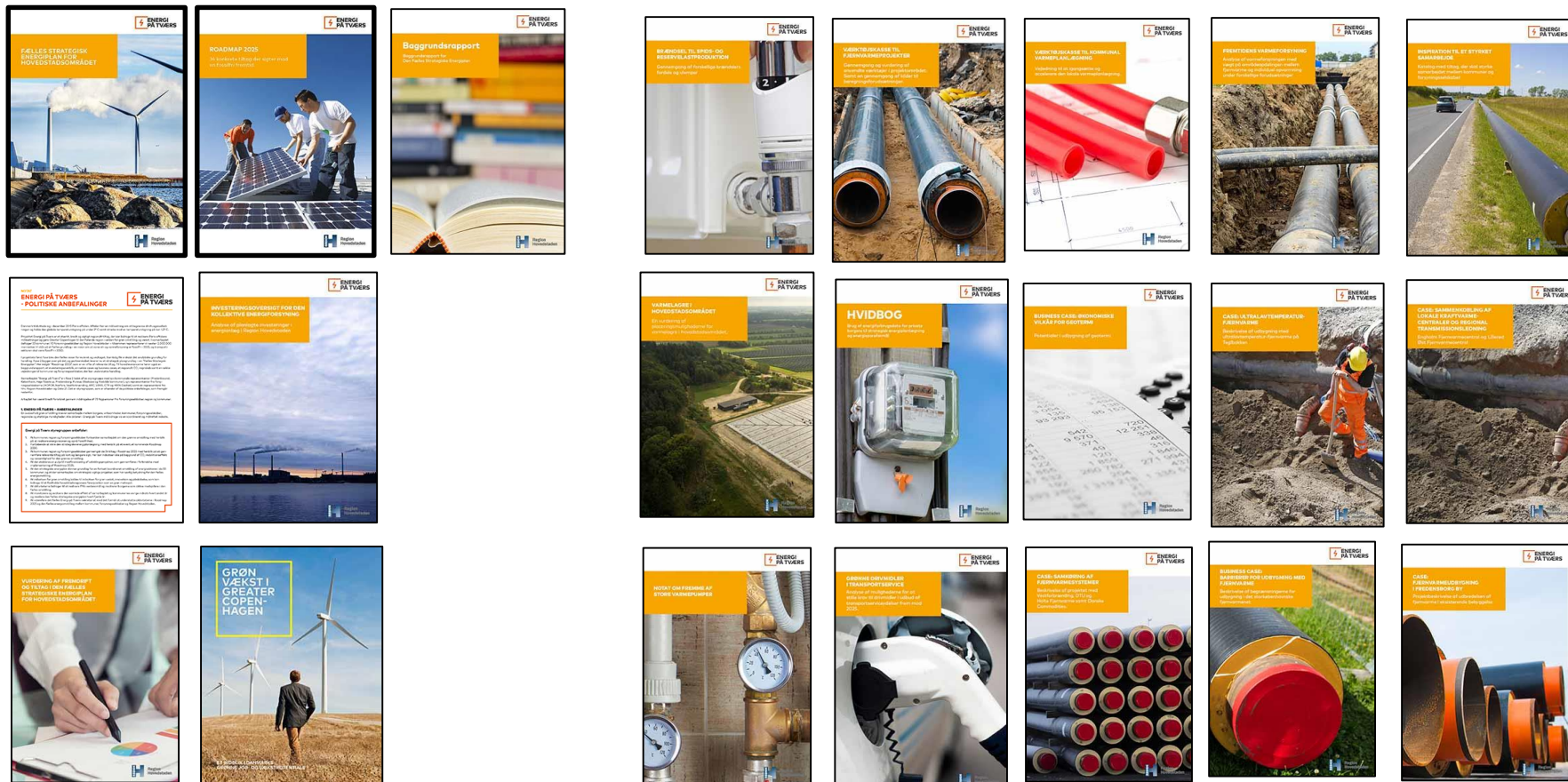
**Guides** gives technical **information** on **complex issues** (heat planning, heat storage etc.) to **municipal** employees and persons in the **utilities**.

**Business Cases** describe how **existing projects** has been developed and carried out **successfully**.

# Energy in Capital Region 2018



22 publications in total



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# Strategic Energy Plan

## Roadmap 2025 - Initiatives



- District heating and CHP production
- Heat supply
- Electricity system
- Natural gas system
- Transport sector
- Energy savings



# Strategic Energy Plan



## Roadmap 2025 – DH and CHP production - Areas



1. Integration of solar heating i DH.
2. Development and implementation of large heat pumps.
3. Expansion of geothermal energy.
4. Utilization of waste capacity.
5. Common definition of parameters for determining security of supply.
6. Conversion of peak and reserve load units to RE.
7. Large scale heat storages.



# 2 - Large heat pump

## R&D Project

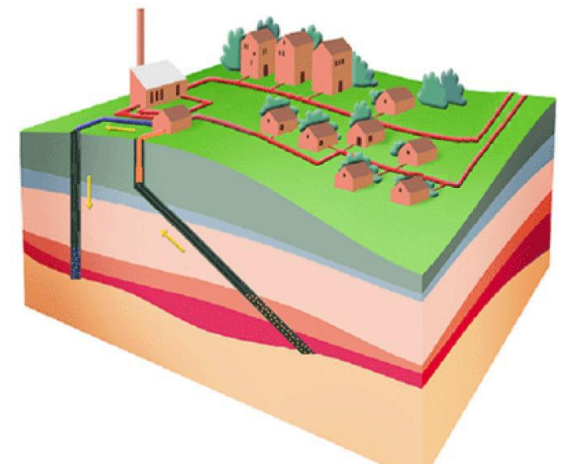
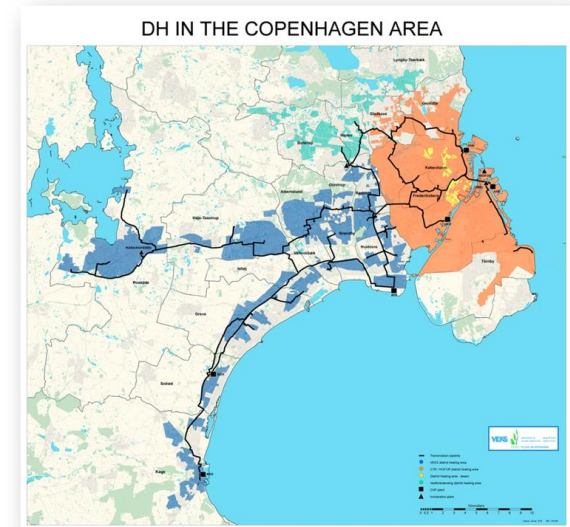
- Place:
  - Copenhagen harbor
- Heat source:
  - Sea- and sewage water
- Capacity:
  - 5 MJ/s
- Start operation
  - April 2019



# 3 – Geothermal Energy

## Status in Copenhagen

- June 2019 concession area in Copenhagen given back to the Danish Energy Agency, to ensure that professional players can apply for future concession.
- The first application deadline was September 1, 2019, where two players submitted tenders.
- Next step is to sign a Letter of Intent (LoI) with one or two partners.





# 6 – Conversion boilers to RE

Conversion of peak and reserveload boilers to RE.

- Conversion from
  - Fossil fuels as oil and natural gas.



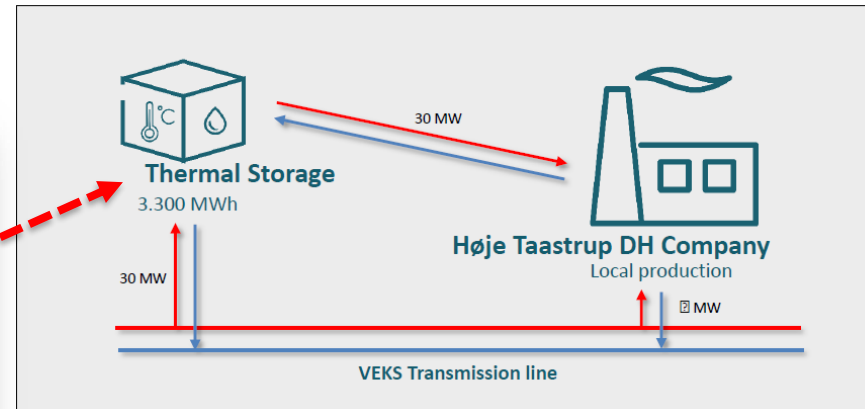
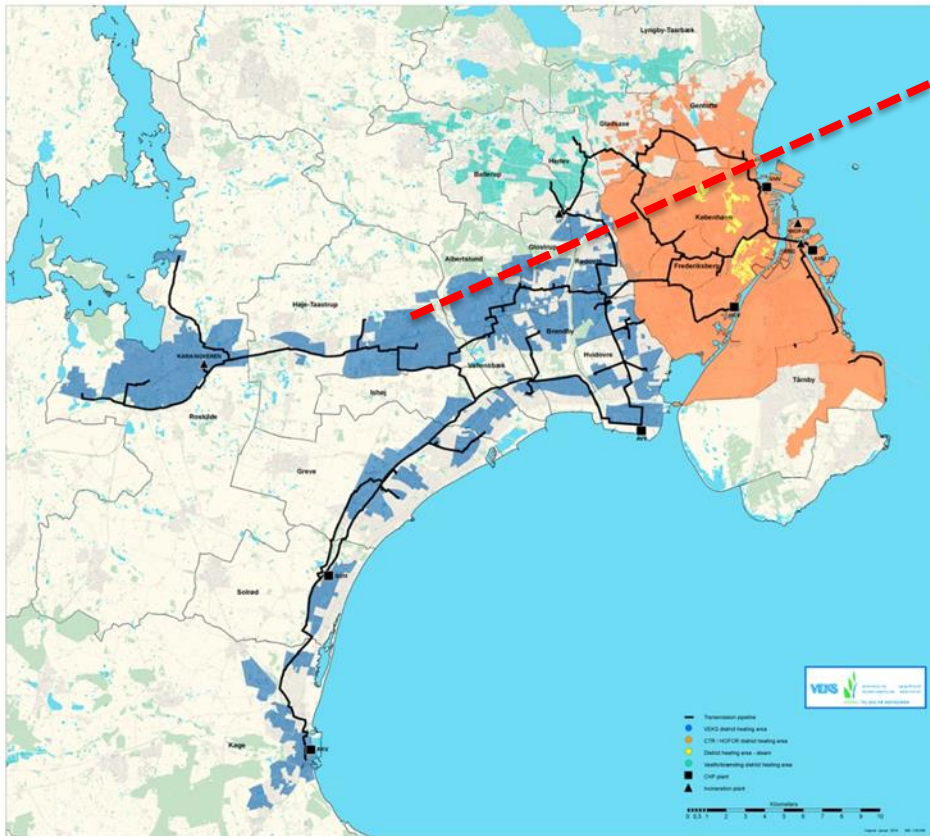
- Convert to:
  - Bio-fuel
  - Electric boilers
  - Green gas (biogas)



# 7 - Thermal Pit storage

Construction started Q2-2019

DH IN THE COPENHAGEN AREA



Thermal storage – 70,000 m<sup>3</sup> - connected to VEKS DH transmission flow pipe for loading the storage.

Storage connected to VEKS DH transmission return line – or HTF flow line - for re-loading the storage.

The load temperature to the thermal storage is ~ 95° C and the supply temperature to the distribution network (HTF) is ~ 75° C.

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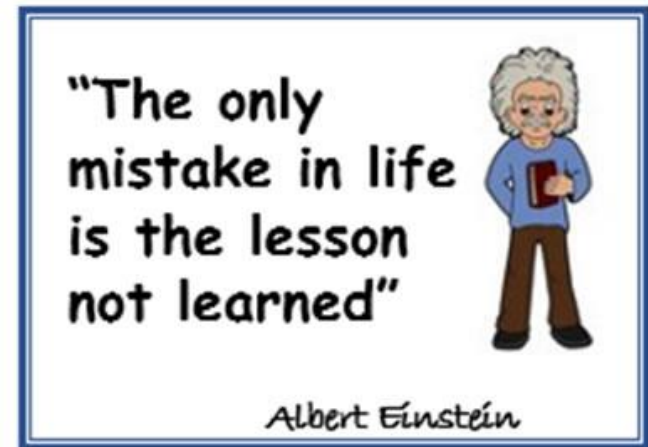
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# Many lessons learned

## Summary

- Green transition is an ongoing process.
- Set understandable and clear visions and goals.
- Involve the political level from the beginning. They are key to continues resource allocation to the transition process.
- Allocate resources for information and communication activities. You can only get money for next phase if you communicate the progress you make.





# Thank you

Further information:

[www.veks.dk](http://www.veks.dk)

[lg@veks.dk](mailto:lg@veks.dk)