

elcome

Denmark's best practice in
delivering renewables for
social benefit

n Mortensen,
Executive Director,
State of Green

EA National Bioenergy Conference,
February 3, 2015



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What is State of Green?

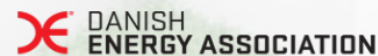
State of Green is a public-private partnership
led by:

Danish Government
Confederation of Danish Industry
Danish Energy Association
Danish Agriculture & Food Council
Danish Wind Industry Association

Crown Prince Frederik of Denmark
Honorary Patron of State of Green



Confederation of Danish Industry



Danish Ministry
of Energy, Utilities
and Climate



Ministry of Environment
and Food of Denmark



Danish Agriculture
& Food Council



DANISH WIND
INDUSTRY ASSOCIATION

Premium partners



Associate partners



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Sharing Denmark's green know-how

- » Wind Power
- » Energy Efficiency
- » District Heating & Cooling
- » Intelligent Energy
- » Water
- » Bioenergy
- » Solar & other renewables
- » Resources & Environment
- » Sustainable Transportation
- » Climate Adaptation

+550
Profiles

+1,200
Solutions

State of Green Tours

Events

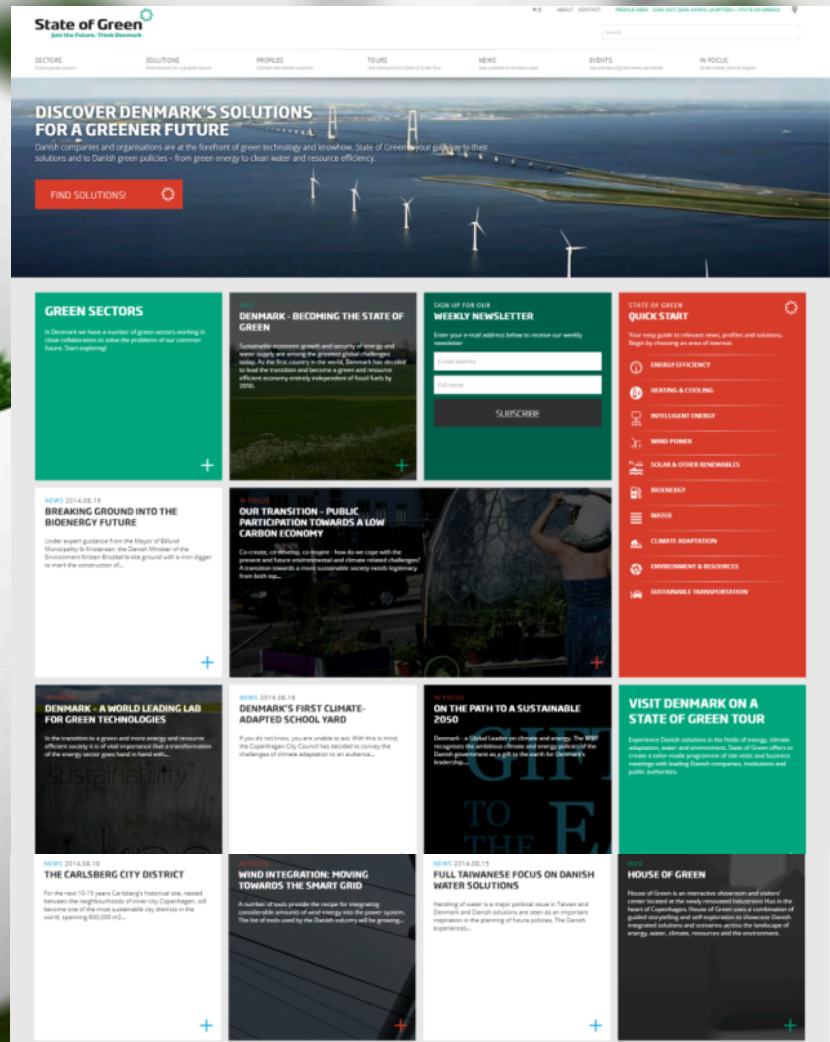
Website

House of Green

Press & Communication

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ateofgreen.com



45,000
monthly
visits

+1,200
solutions

News
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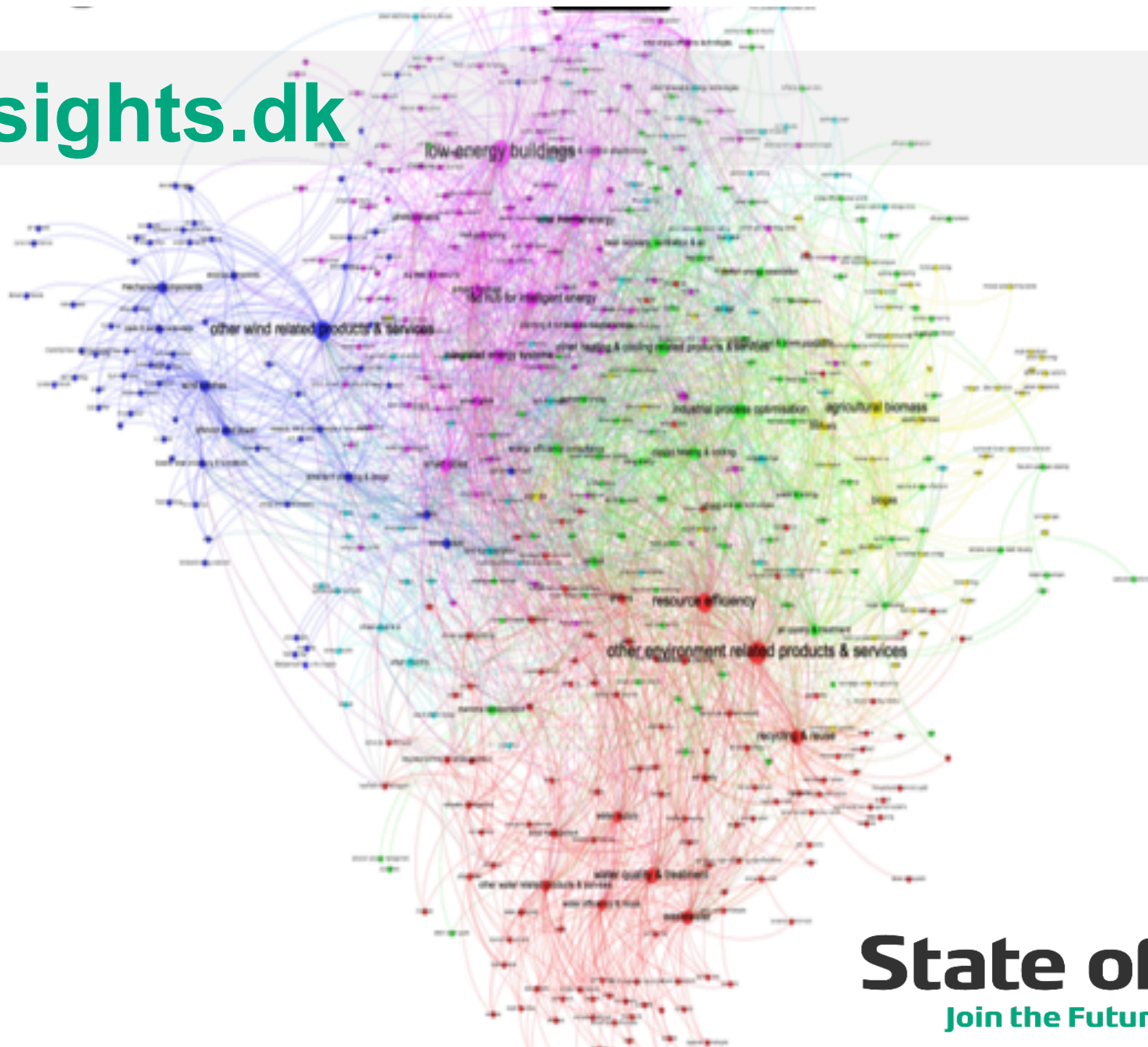
+550
profiles

English
Chinese
Japanese

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www.netsights.dk



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White Paper



- Technical and regulatory approaches to encourage bioenergy use
- Biomass challenges and potentials
- State-of-the-art bioenergy solutions

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The Danish point of departure

1973-74 oil crisis

99% dependent on imported energy

Pollution caused by fossil fuels

Growing public concerns about environmental policy



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The Danish story of bioenergy development

1976: The Danish Energy Plan from 1976. First steps in transforming the energy system.

1981: The Energy Plan 81. High priority to socio-economic and environmental considerations.

1993: The Danish Parliament agrees on increased use of biomass in the energy supply sector.

2009: Renewable Energy Directive. 30% of Denmark's energy consumption to derive from RE in 2020.

2012: The Danish Energy Agreement. An example of cross-party collaboration in action.

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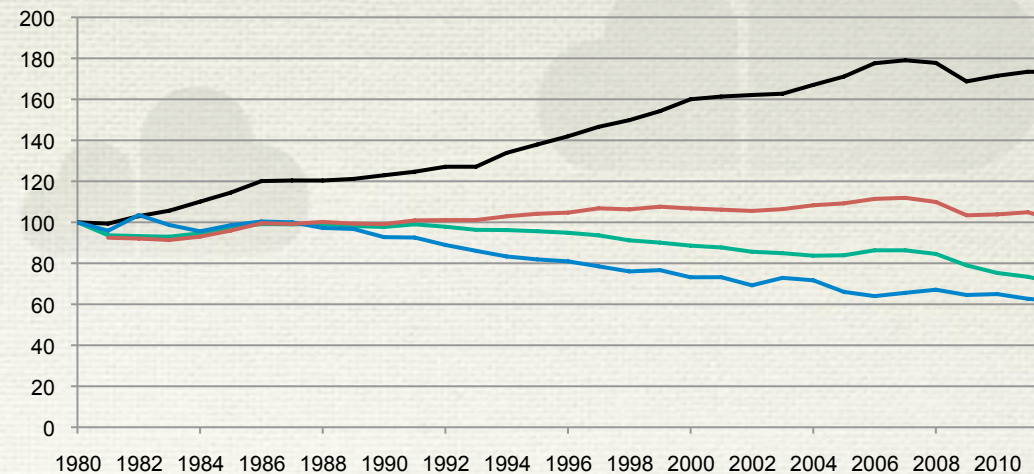
The Danish example (1980 = index 100)

The economy has grown by more than 70% since 1980

Gross energy consumption has remained the same

CO₂ emissions have been reduced

Total water consumption has been reduced by 40%



Source: Statistics Denmark, the Danish Energy Agency and DANVA

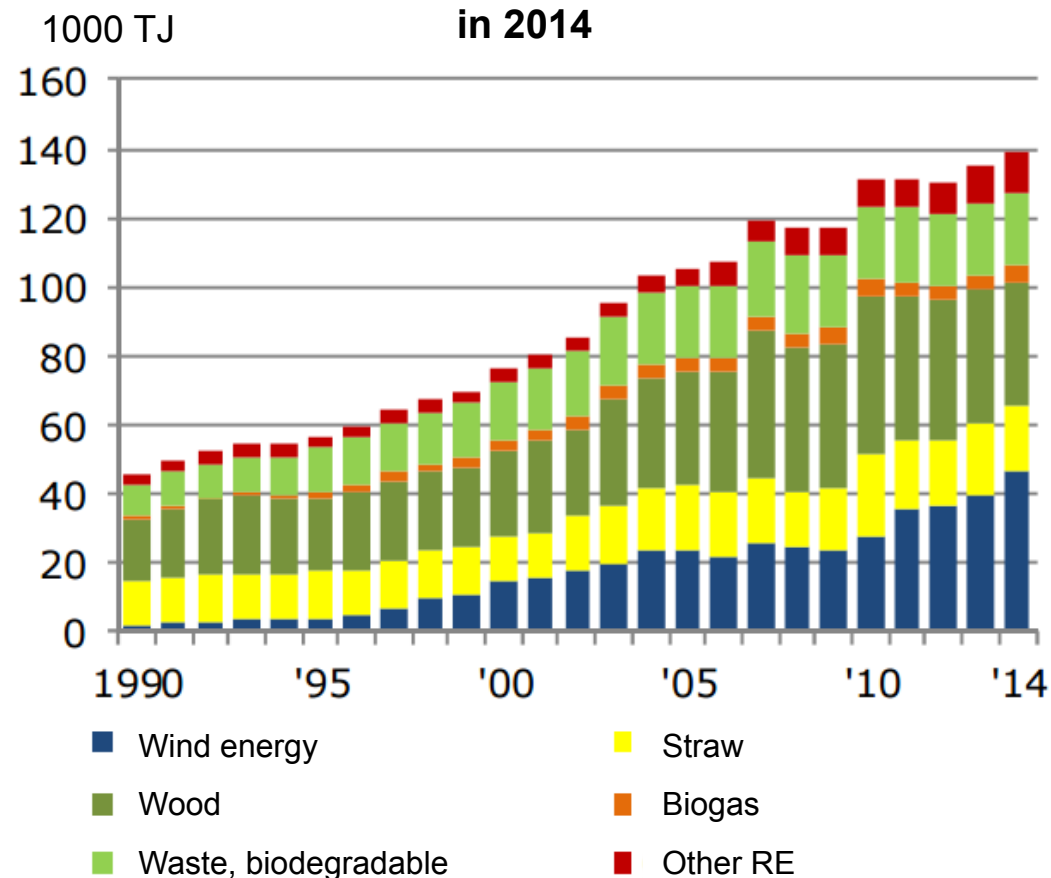
- GDP in real terms
- Gross energy consumption climate adjusted
- CO₂ emissions
- Total water consumption

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Production of renewable energy in 2014

TJ	2014	Change 1990-2014
	3,371	3,277 %
	47,083	2,043 %
	54	-46,1 %
	166	245 %
	75,911	89,8 %
	18,409	47,5 %
ps	10,842	529 %
	15,634	78,5 %
ps	1,951	23,9 %
ste	7,053	13,9 %
odegradable	21,296	150 %
	725	-2,6 %
	5,143	584 %
s	7,245	220 %
	138,972	206 %

Production of renewable energy based on sources in 2014

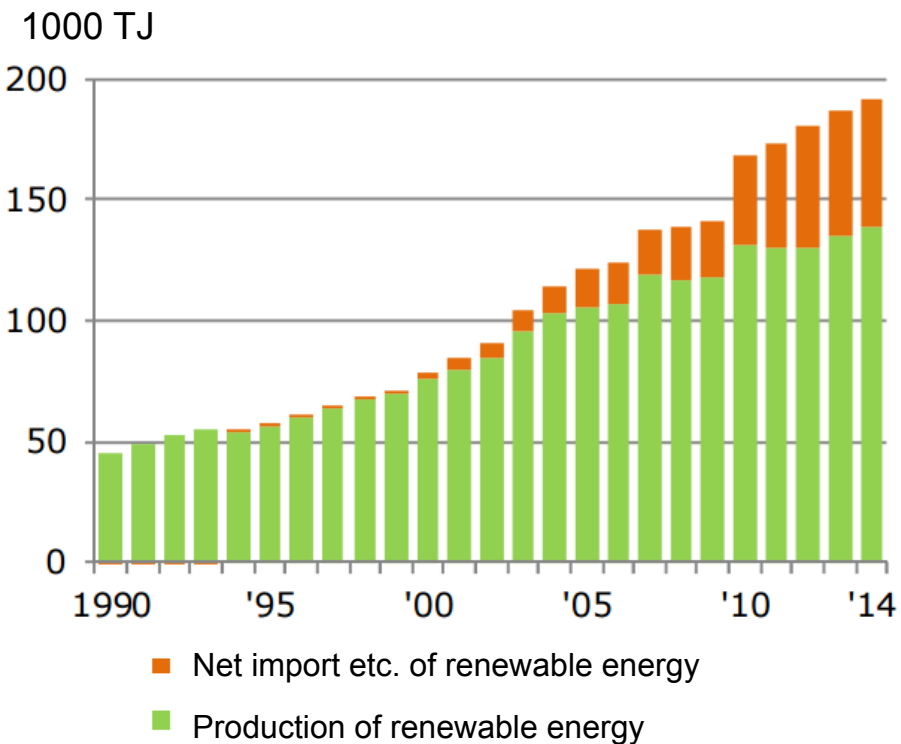


Source: Danish Energy Agency's Annual Energy Statistics 2014

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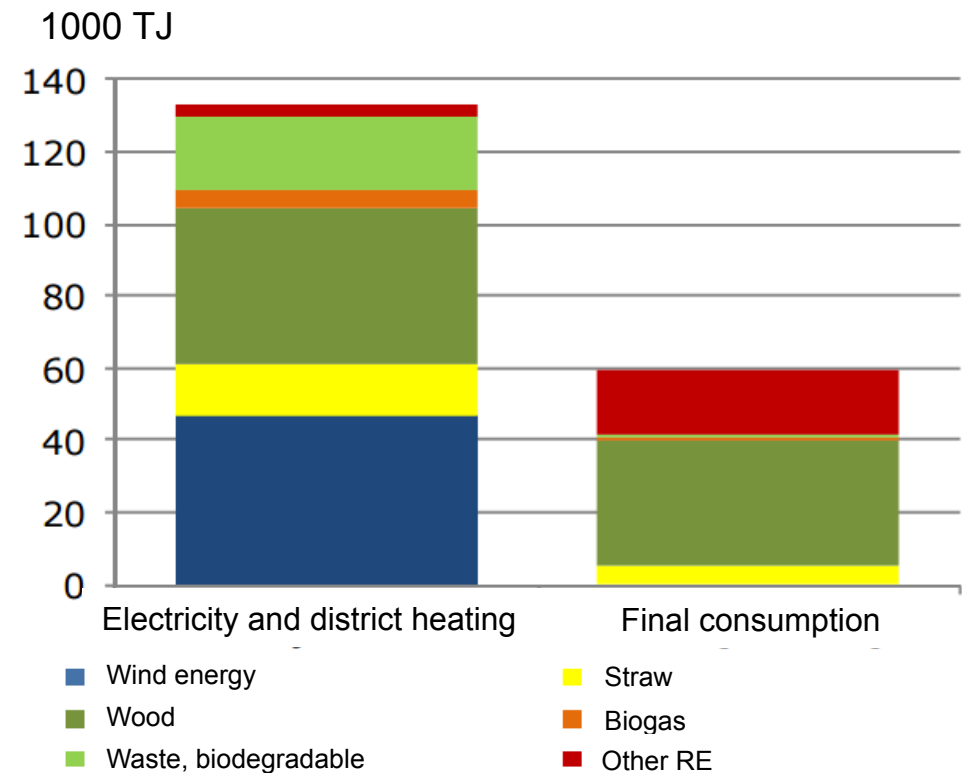
Consumption of renewable energy in 2014

Consumption of renewable energy in 2014



Source: Danish Energy Agency's Annual Energy Statistics 2014

Utilisation of renewable energy in 2014



Source: Danish Energy Agency's Annual Energy Statistics 2014

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The green transition – from 2014 to 2020

Targets

n. 35% renewable energy in final energy consumption by 2020

prox. 50% of electricity power to be supplied from wind power by 2020

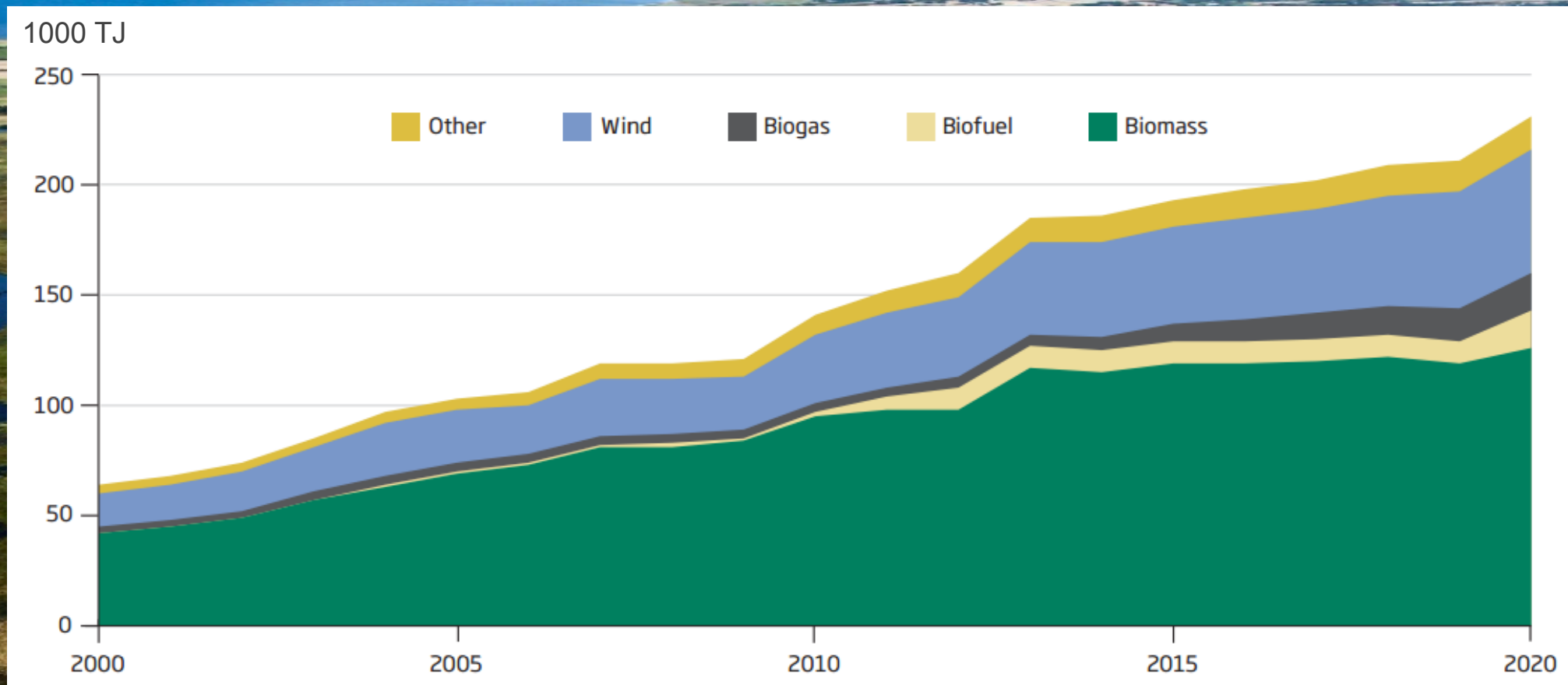
n. 7.5% reduction in gross energy consumption by 2020 (compared to 2010 level)

% reduction in greenhouse gas emissions by 2020 (compared to 1990 level)



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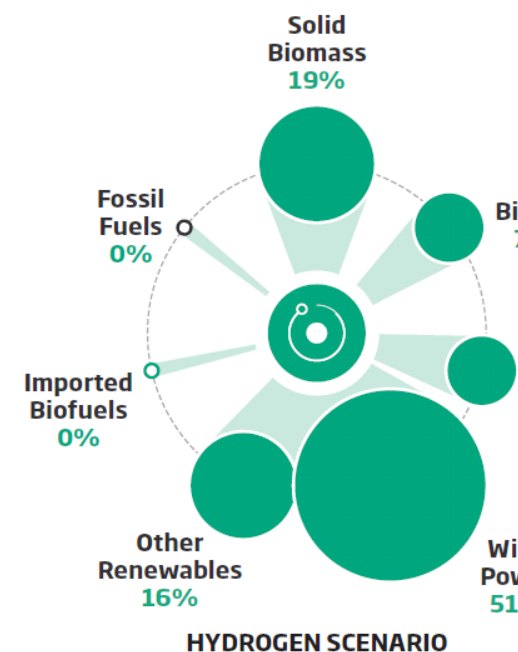
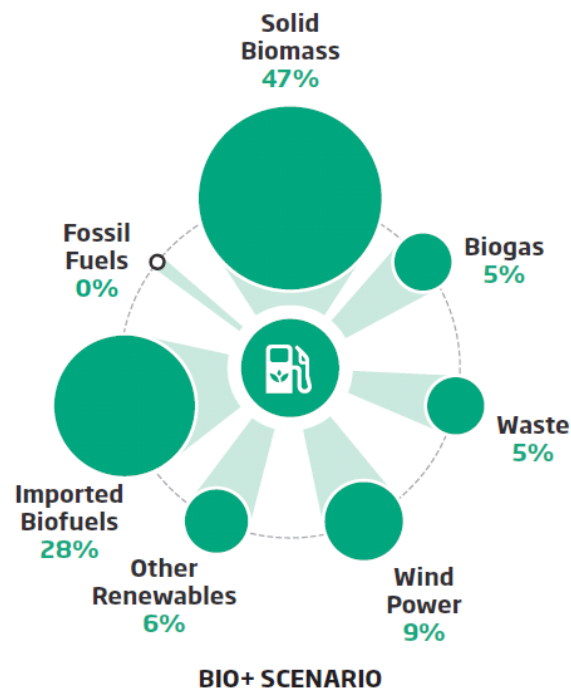
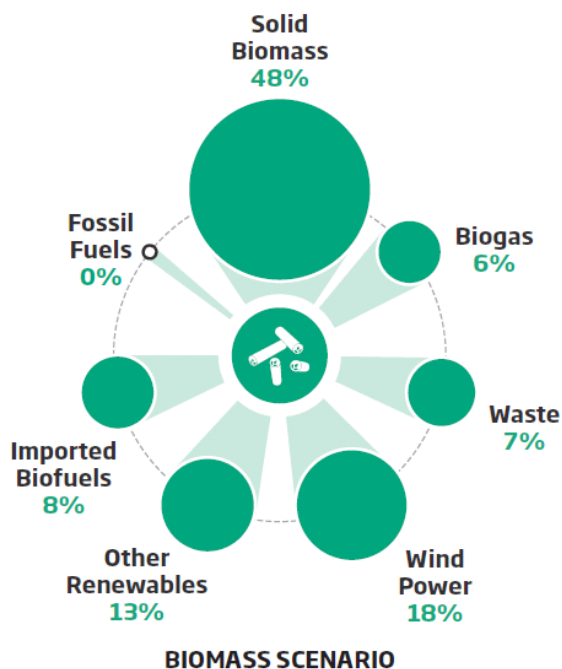
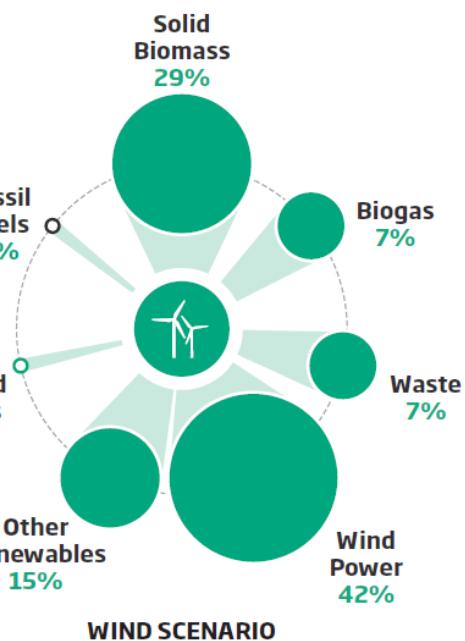
Denmark's RE mix towards 2020



With a significant increase in solid biomass, biogas as well as biofuels, bioenergy will continue to make up the majority of total Danish renewable energy consumption in 2020.

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Scenarios for 2050 – the energy supply of the future



Key figures from the scenario calculations for 2050, Danish Energy Agency

Green impacts on Danish society



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From sustainable biomass to competitive bioenergy

Bioenergy is a cornerstone in the Danish renewable energy mix.

The consumption of biomass for energy production in Denmark more than quadrupled between 1980 and 2009

Towards 2020, bioenergy will continue to make up the majority of total renewable energy consumption in Denmark



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Good biomass for energy

Wood pellets are the most used source of biomass for combustion in Denmark.

Wood pellets are primarily used in large Combined Heat and Power (CHP) plants, largely supplied by Europe and North America where the forest areas are growing and national legislation ensures sustainable forestry.

The Danish energy industry ensures sustainable biomass, locally and imported, through a voluntary agreement which was signed by the Danish Energy Association and the District Heating Association in 2014.

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Straw and biogas to energy

Agricultural residues based on dry fibers, such as straw, has been used as an energy resource for more than 25 years.

Denmark practices one of the world's highest utilisation rates of residual products from agriculture.

The infrastructure and logistics for collection, storage and delivery of straw to power plants is based on direct contracts between farmers and power companies.

The natural gas transmission network can be used to transport upgraded biogas produced from residues and waste.



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Denish biorefineries

Bio refineries hold significant potential

Growth & jobs in rural areas

Climate

Security of supply

Resource utilisation

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ecoEye on RTÉ One



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Thank you

For more information about State of Green

visit stateofgreen.com

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Executive Director

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