



Energy action planning

Regional and Local Level

Tyge Kjær - tk@ruc.dk
Roskilde University Denmark



Introduction

Region Zealand

Experience of Region Zealand

Topic:

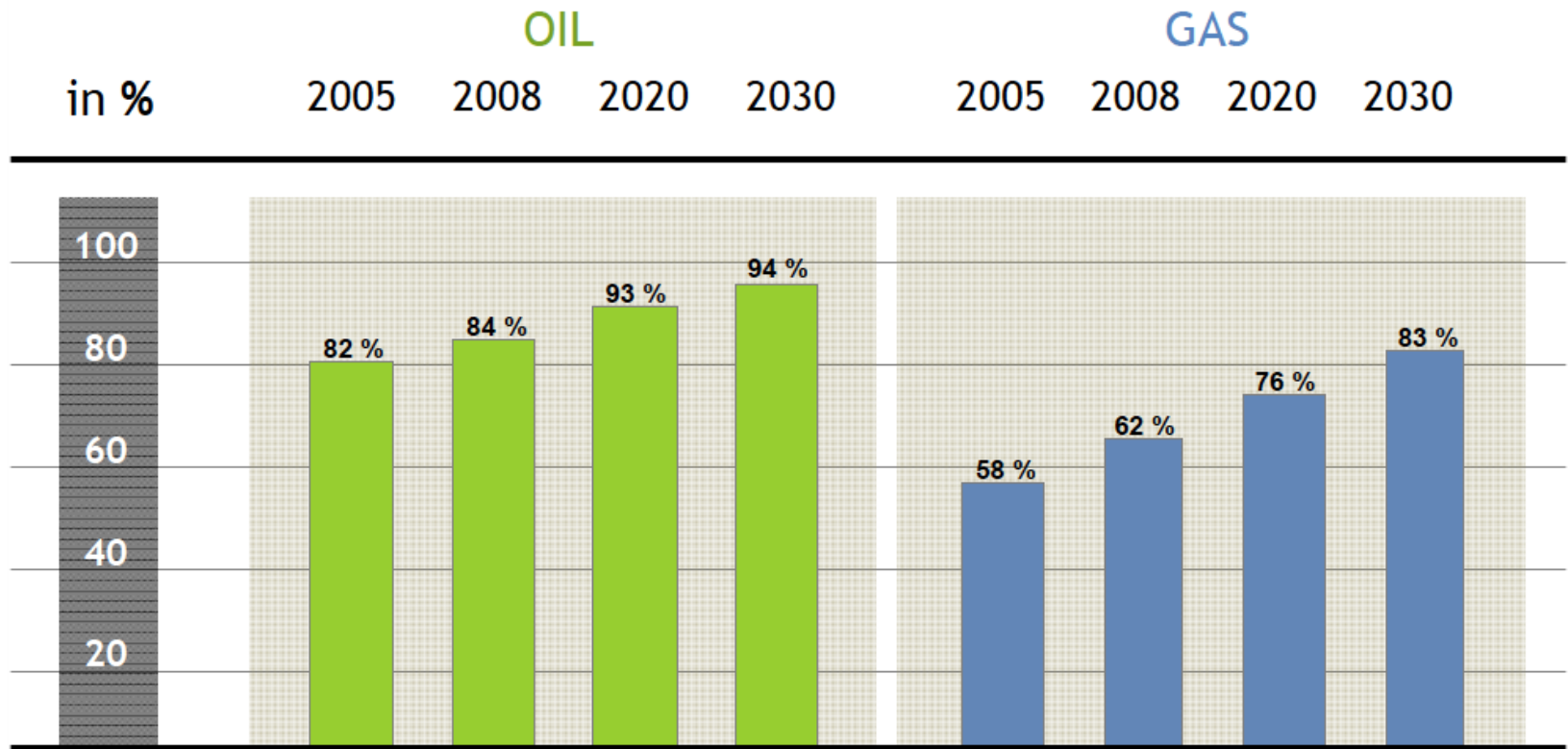
- EU Policy
 - Reduction of greenhouse gasses
 - Energy Supply security
 - Job creation
- The National policy
 - Energy & Climate Action
 - The new energy system
 - New electricity grid system
 - Support schemes
- The local actions
 - Renewable energy plants
 - New cooperation between cities and rural areas
 - Agriculture as energy producer



Five reasons

The EU supply situation

EU import dependency on oil and gas - need for energy efficiency



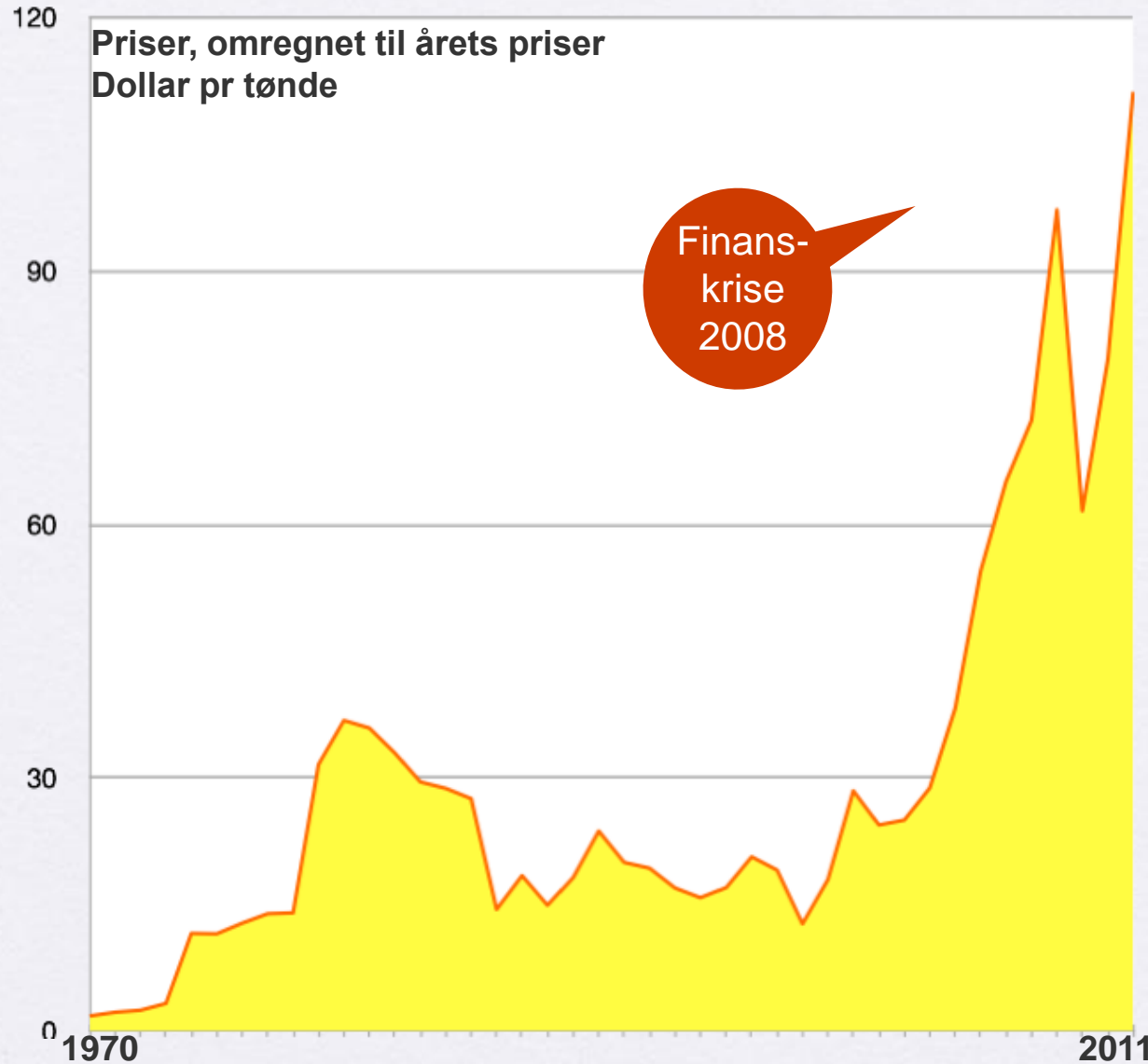
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LIGHTHOUSE PROJECT

Bioenergy Promotion

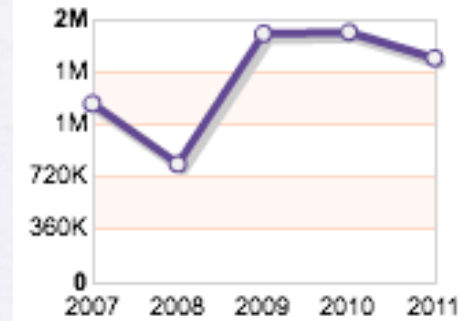
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Five reasons

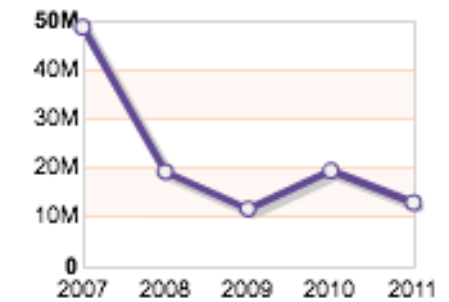
Oilprices - crises



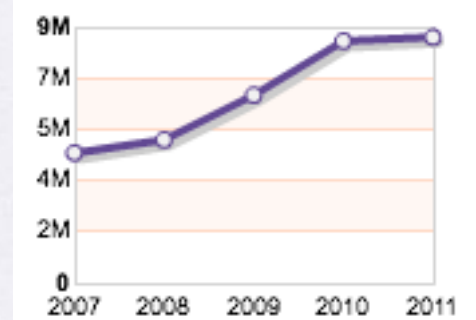
Dansk Poly Fabrik A/S



Air Liquide Danmark A/S



Bigadan A/S



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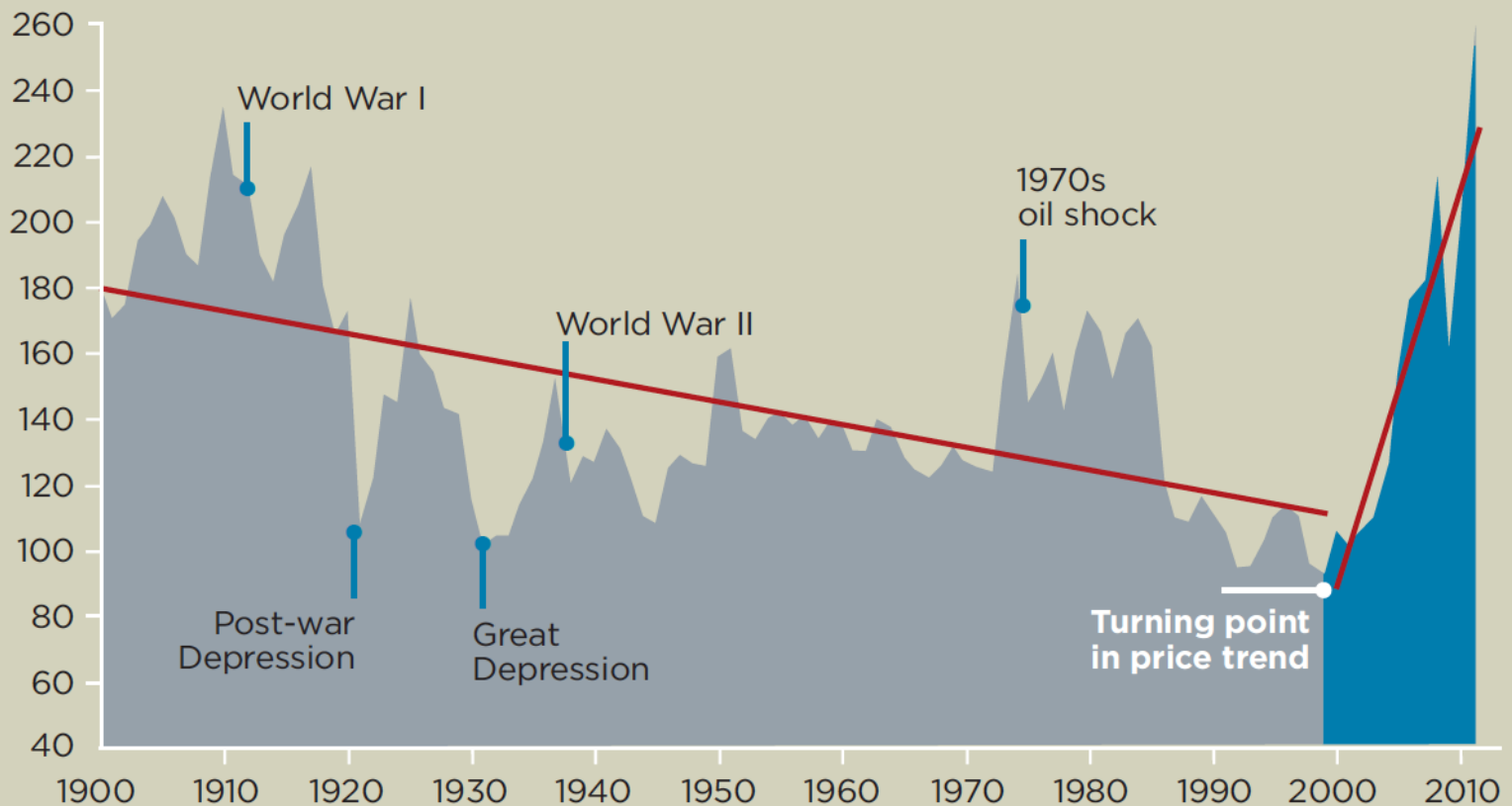
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Five reasons

Sharp increasing prices on raw materials

FIGURE 4
Sharp price increases in commodities since 2000 have erased all the real price declines of the 20th century
McKinsey Commodity Price Index (years 1999-2001 = 100)¹



Five reasons

Natural gas supply dependency



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Five reasons

Climate change



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EU Policy

EU Policy

Main elements

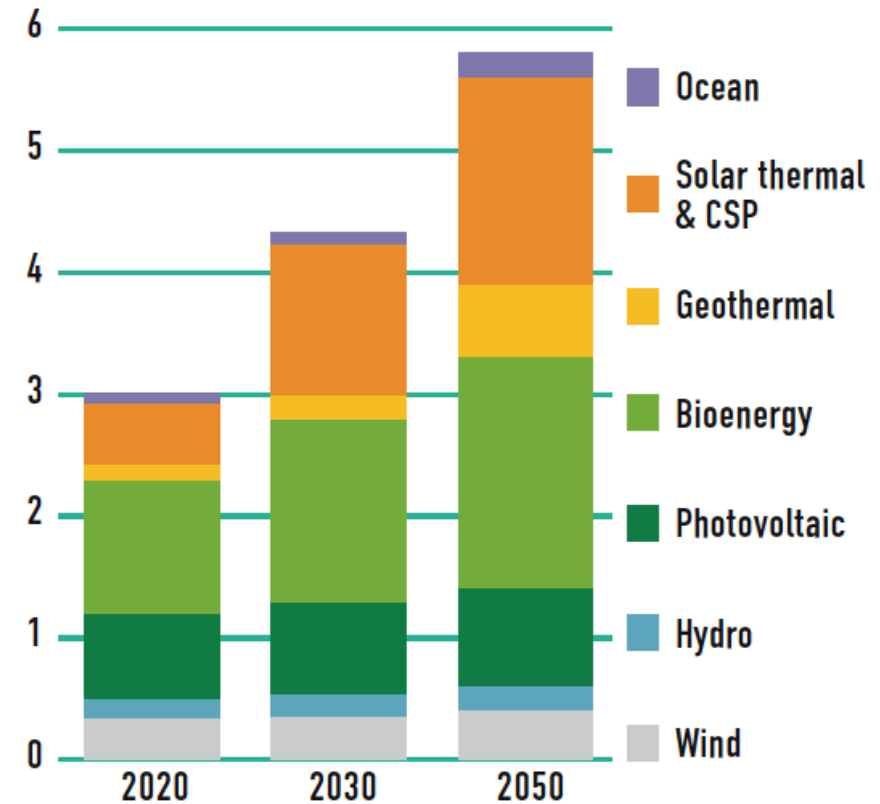
The targets

Known as the "20-20-20" targets, set three key objectives for 2020:

- A 20% reduction in EU greenhouse gas emissions from 1990 levels;
- Raising the share of EU energy consumption produced from renewable resources to 20%;
- A 20% improvement in the EU's energy efficiency.

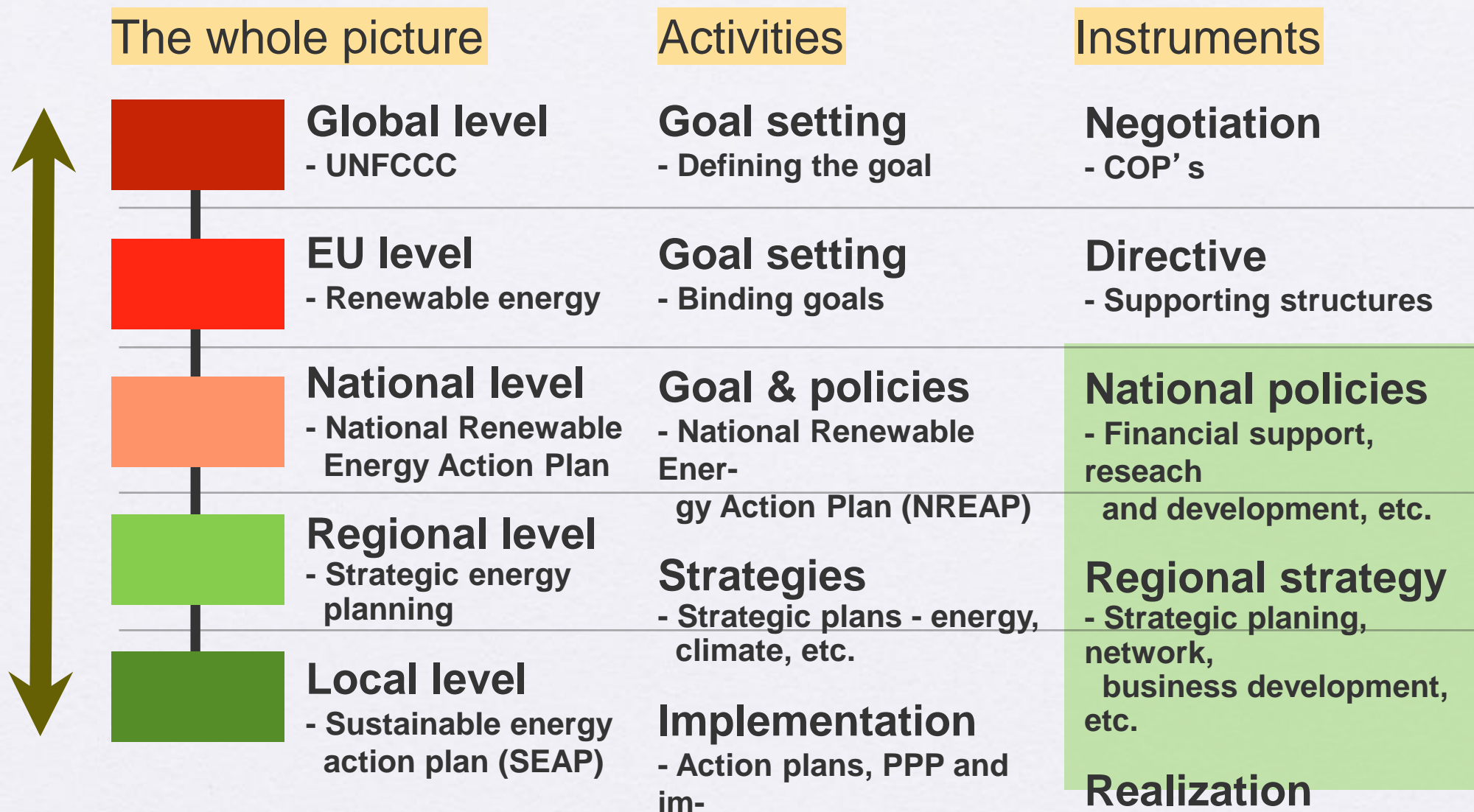
Jobs in the renewable energy sector

Employees (millions) by year 2020 / 2030 / 2050 ^{[6] [A]}



EU Policy

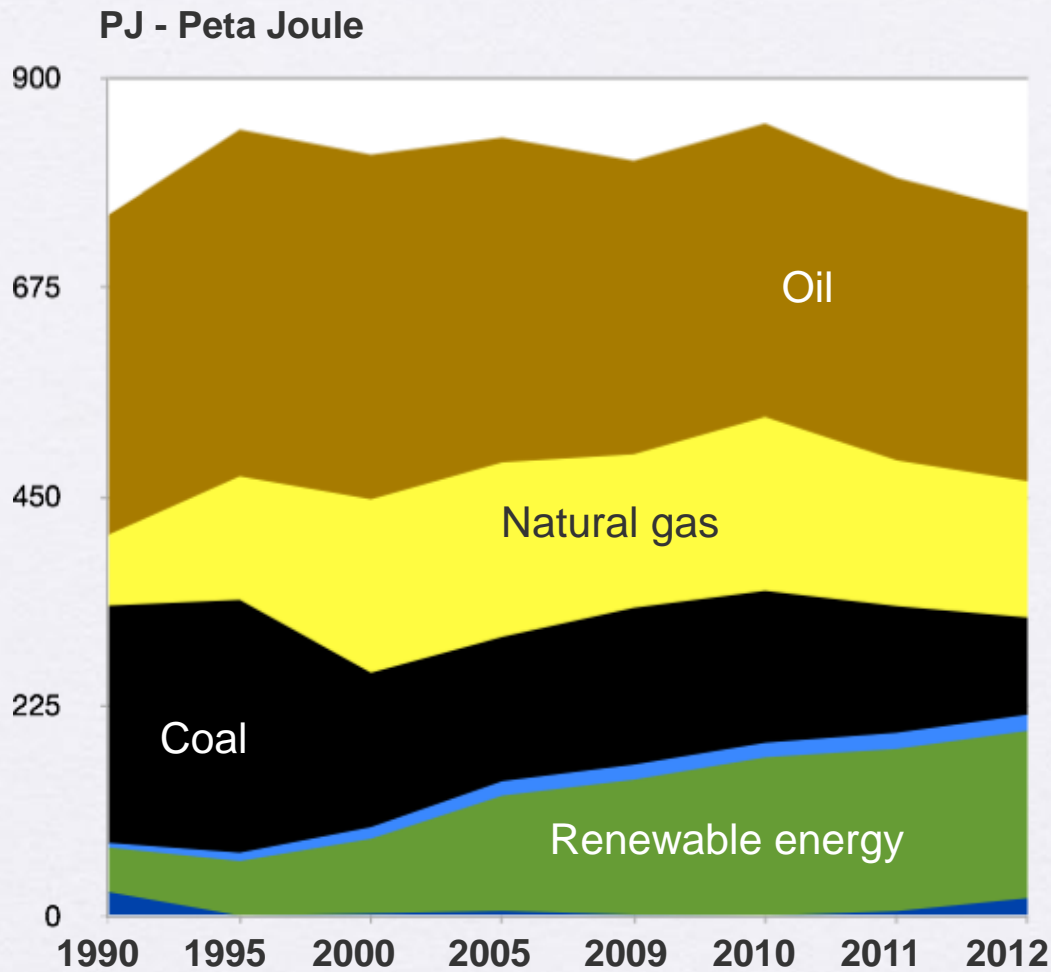
Multilevel energy policy: Planning & implementation



The Danish national policy

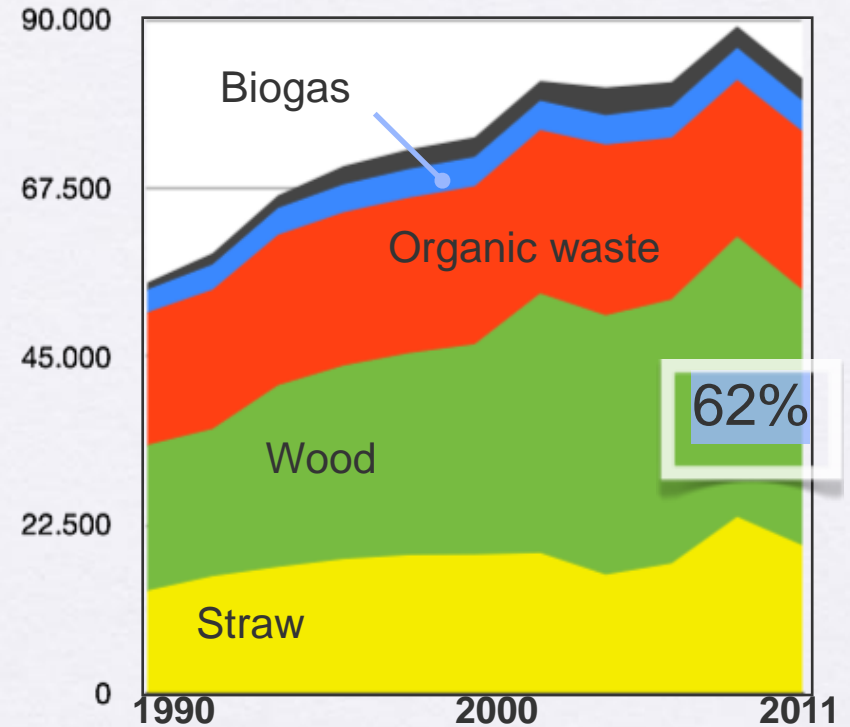
Danish development

Energy consumption 1990-2012



Production of biomass energy

TJ - Peta Joule



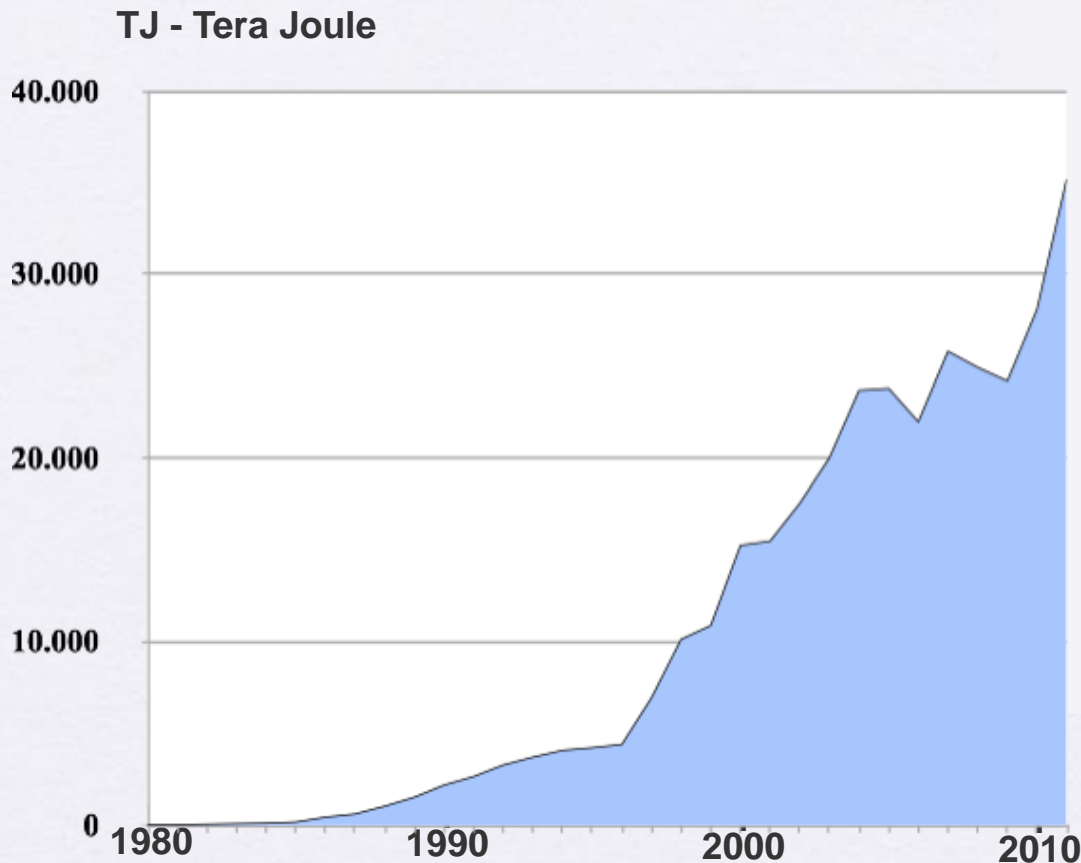
- Oil
- Natural gas
- Coal
- Non-organic waste
- Renewable energy
- Imported electricity

Renewable energy in 2012: 23,8%

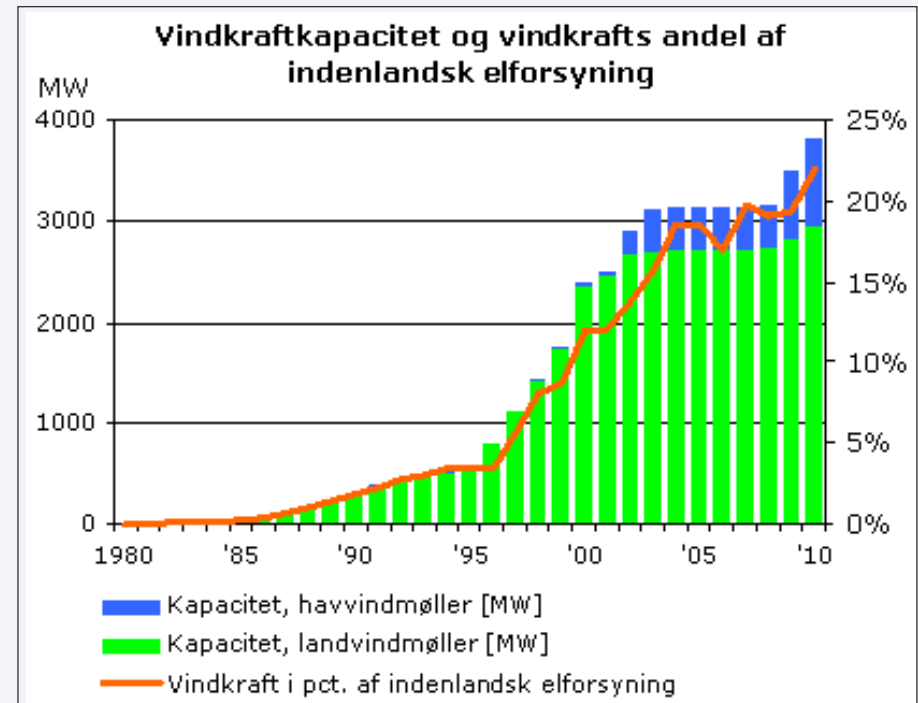
The Danish national policy

Danish development

Windpower production



Windpower capacity



**Wind energy of
elproduction
2012:
27,8%**

The Danish national policy

Energy & Climate Action

2050: 100% Renewable Energy onshore offshore - much wind - biomass and then everything else

2035: Electricity and heat supply must be 100% based on renewable energy

2020: Renewable energy to account at least 30% of total energy supply

Priorities in the energy agreement:

- **More energy efficient society, less losses**
- **Wind power: 1,500 MW coastal and offshore wind and 1,800 MW onshore wind**
- **Biomass CHP, district heating, renewable energy in buildings and business**
- **Biogas**
- **Electricity and biomass in transport**

Den 22. marts 2012

Aftale

mellem regeringen (Socialdemokraterne, Det Radikale Venstre, Socialistisk Folkeparti) og Venstre, Dansk Folkeparti, Enhedslisten og Det Konservative Folkeparti

om den danske energipolitik 2012-2020

Parterne er enige om, at omstillingen til et Danmark med en energiforsyning dækket af vedvarende energi hviler på troværdige, stabile og langsigtede rammer om den danske energipolitik. Med denne aftale fastlægges konkrete energipolitiske initiativer for perioden 2012-2020. Aftalen vil understøtte fælles EU-målsætninger.

Aftalens længde:

- Aftalen dækker perioden 2012-2020.
- Parterne gør årligt status for aftalte nye initiativer, analyser og eventuel videreførelse af initiativer, der løber ud.
- Regeringen gør årligt status for realiserede besparelser, jf. aftalte billiggørelsestiltag. Hvis de forventede besparelser som følge af reguleringseftersynet mod forventning ikke realiseres, forpligter parterne sig til at tilvejebringe alternativ finansiering. Hvis dette ikke er muligt, justeres energieffektiviseringsindsatsen tilsvarende.
- Parterne mødes i 2015 for at drøfte videreførelse af initiativer og finansiering i aftalen, herunder udmøntning af 60 mio. kr. årligt fra energieffektiviseringspakken i perioden efter 2015.
- Parterne forpligter sig til inden udgangen af 2018 at offentliggøre og gennemføre eventuelle supplerende initiativer for perioden efter 2020.

**Wind
Biomass**

Med henblik på at opfylde aftalens formål er parterne enige om følgende initiativer:

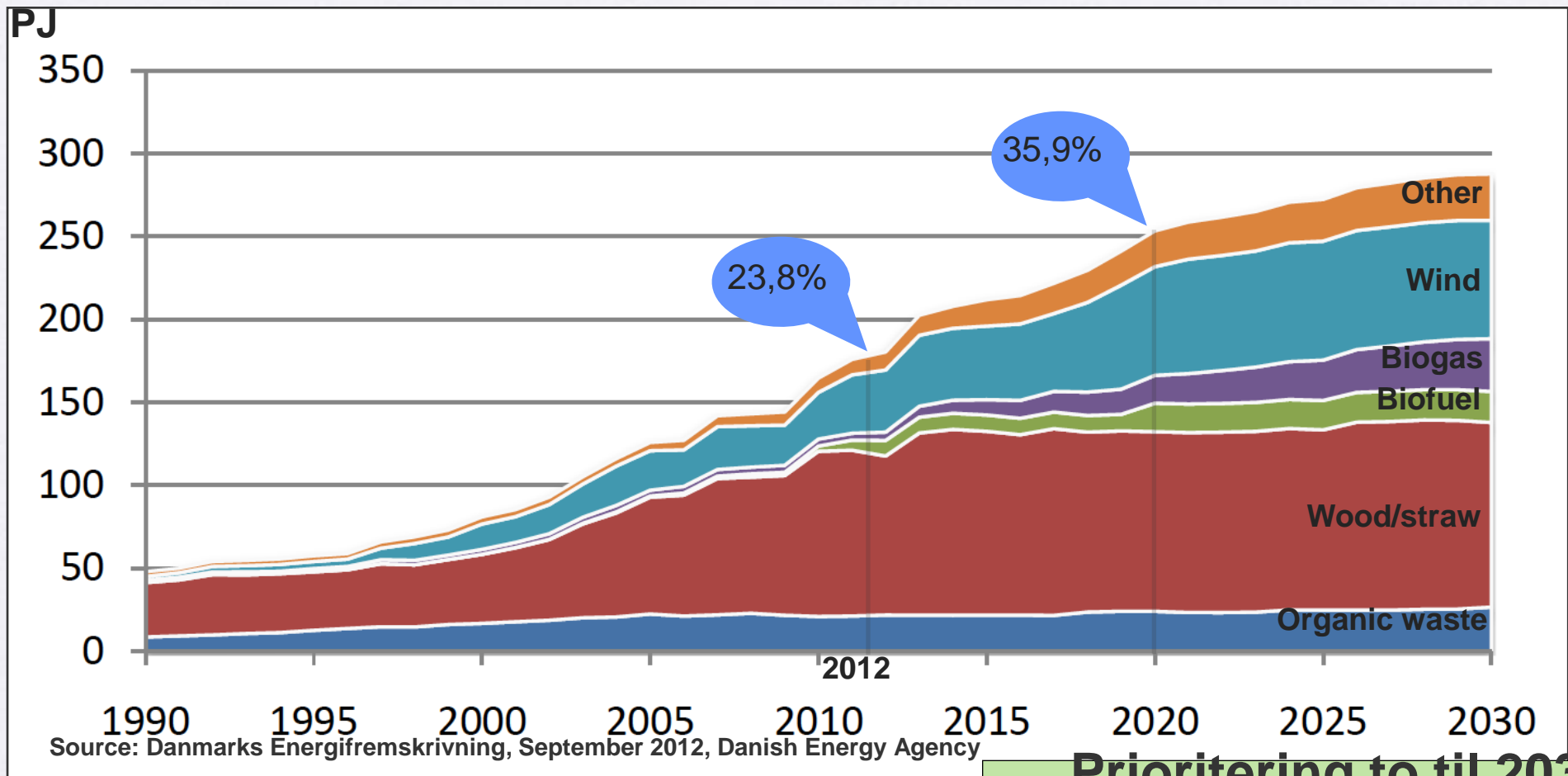
Et energieffektivt samfund med mindre energispild

Realisering af målet om en energiforsyning dækket af vedvarende energi forudsætter en øget energieffektivisering, som minimerer energispildet og energiforbruget i alle sektorer. Parterne noterer sig, at det med finansloven er besluttet at indføre en tilskudspulje for energirenovering i boliger i 2013 og 2014. Parterne er derudover enige om følgende:

The Danish national policy

Priorities and expected development

Renewable energy now: 23,8% • EU-goal 2020: 30,0% • Expected in 2020: 35,9%



Prioritering to til 2030

The Danish national policy

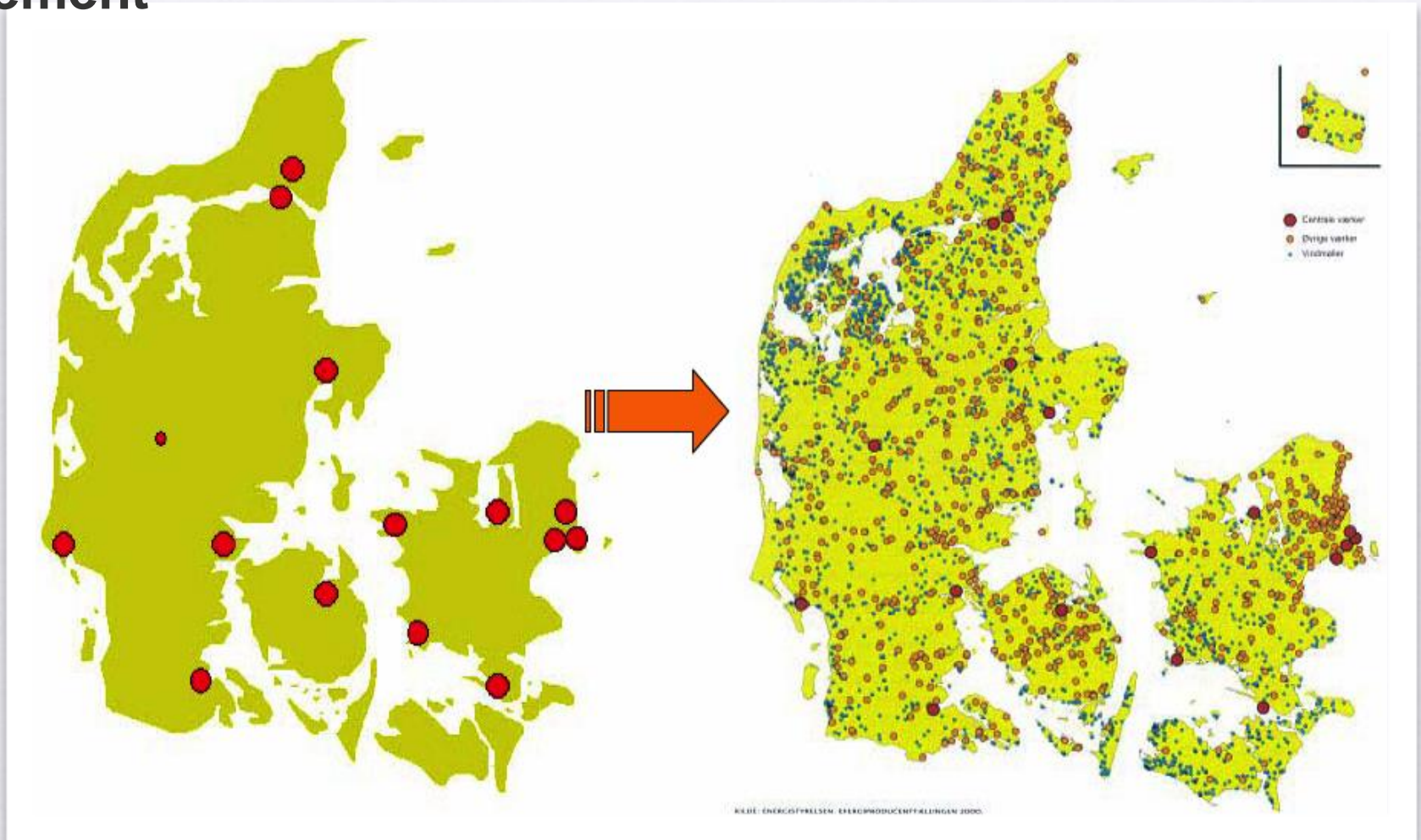
Renewable energy = new energy structure
- Local production - local resources - smart national management



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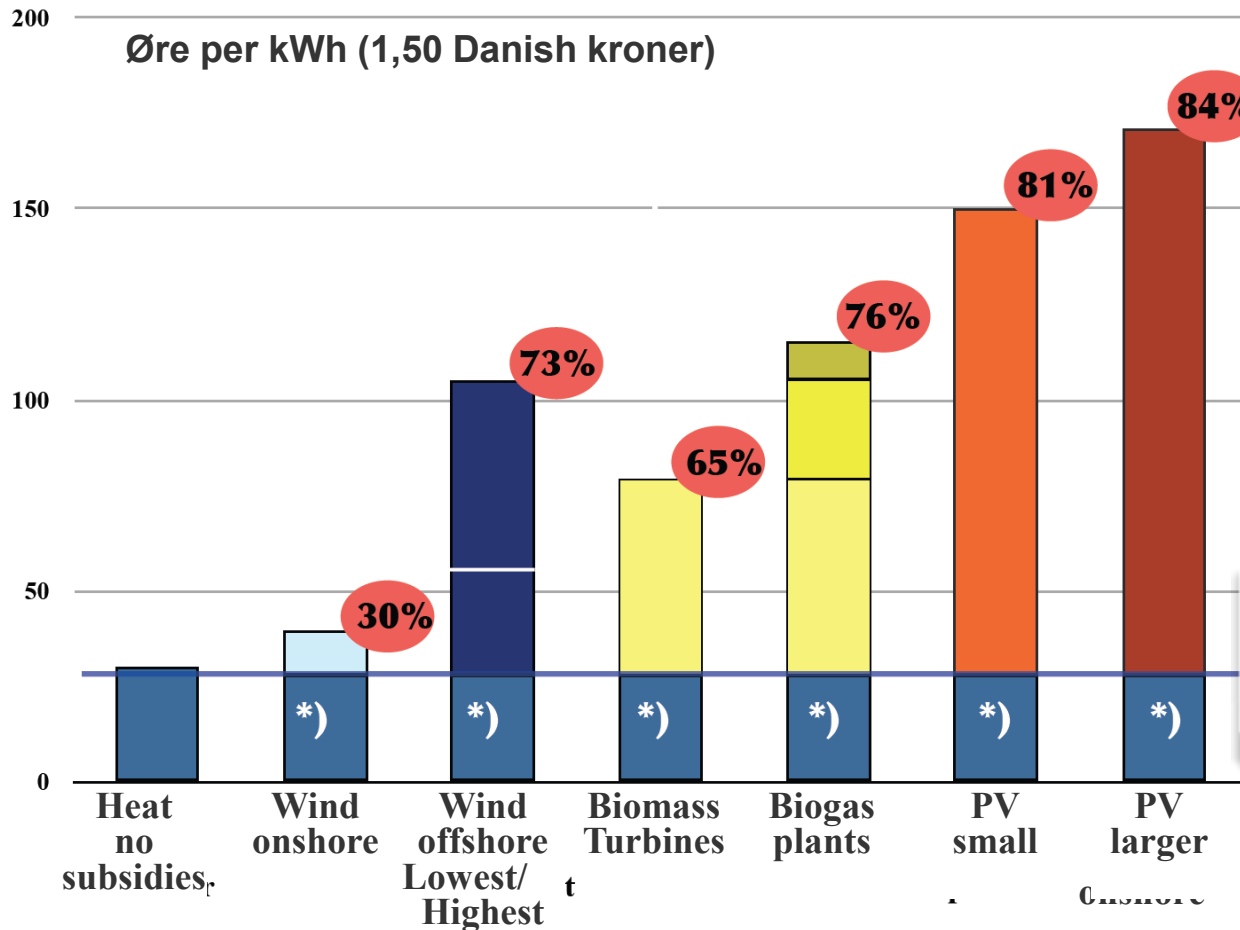


The Danish national policy

Subsidies - Premium

Øre/kWh

Øre per kWh (1,50 Danish kroner)



Premium
(Pristillæg)

Market price
27,95 øre/kWh
27,95 øre/kWh

* Gennemsnitlig markedspris i 2012 på spotmarkedet: 27.95 øre / kWh

52% Tilskud som % af hele betalingen

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History



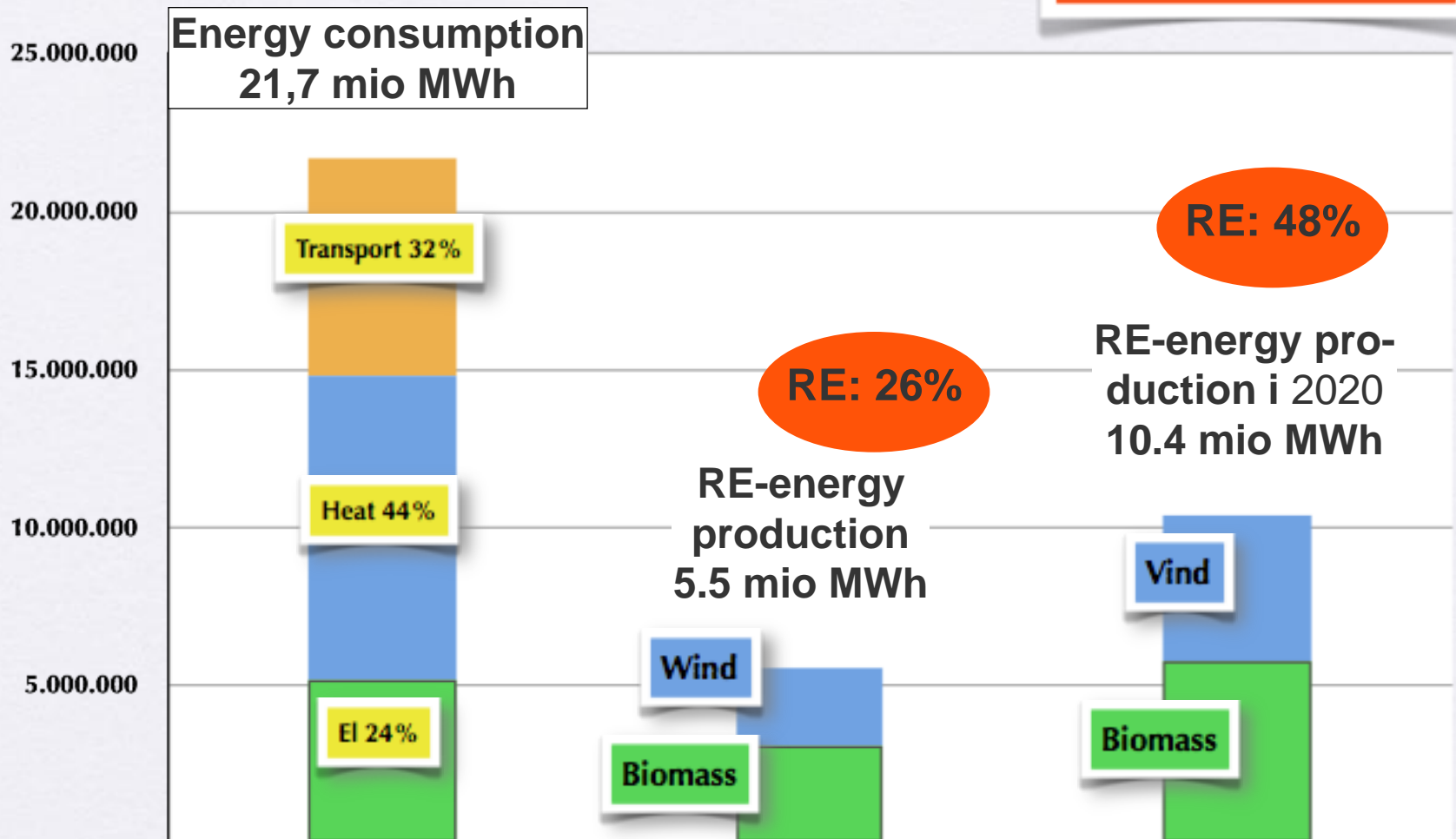
The local level

Renewable energy in Zealand

Potential for expansion of biomass and wind power

MORE RES:

- wood 0.6 mio MWh
- straw: 1.1 mio MWh
- biogas: 1.0 mio MWh
- Wind: 2.2 mio MWh



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The local level

Region Zealand

Wind Turbine Production in Region

Total installed capacity:

- Onshore wind turbines: 534 MW
- Offshore wind turbine: 399 MW

Production 2011:

- Onshore: 957 GWh (-> full load hours: 1,792 timer)
- Offshore: 1,509 GWh (-> full load hours: 3,782 timer)

Energy policy, March 2012:

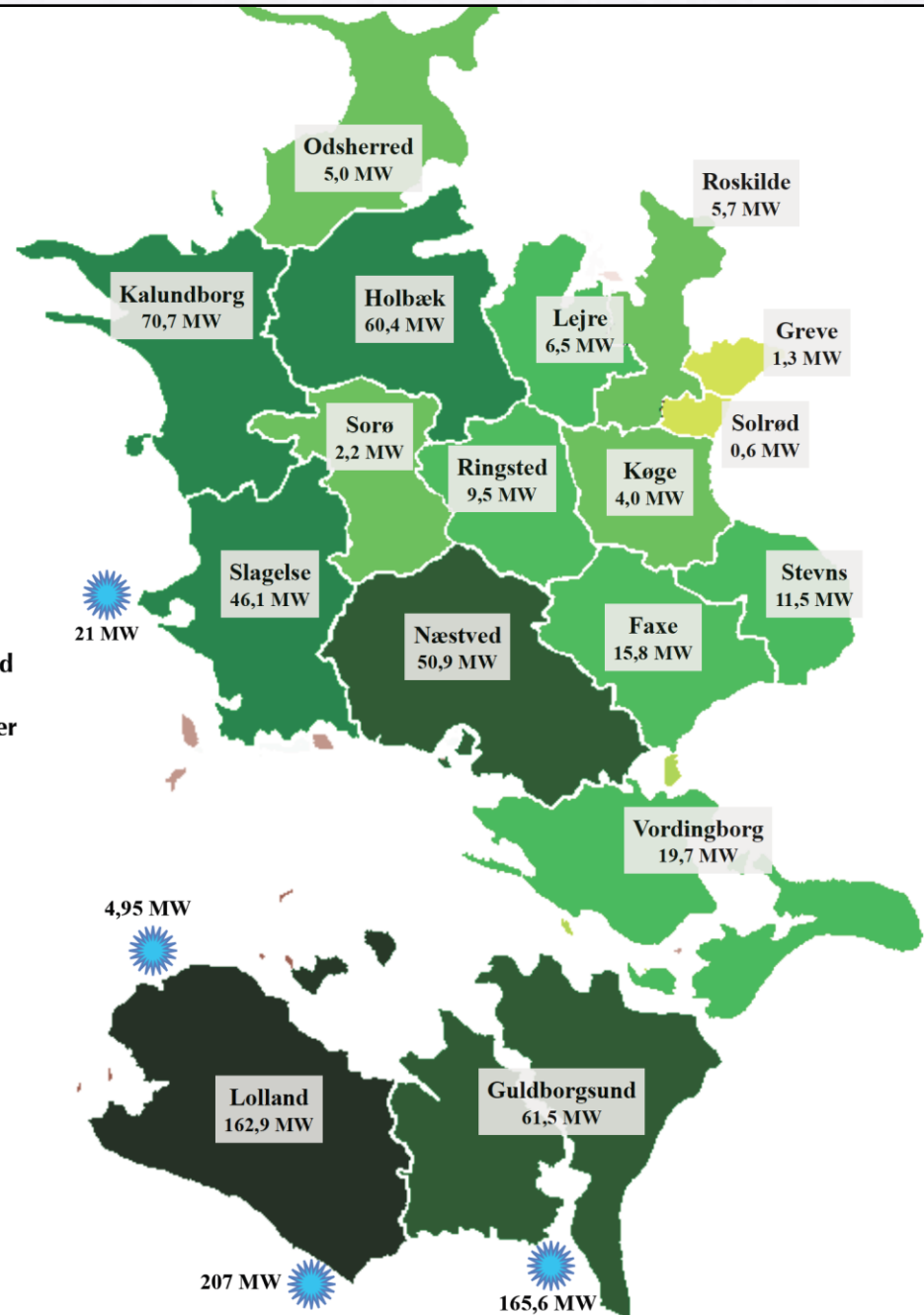
- Towards 2020 new onshore wind turbines will be built with a total capacity of 1,800 MW. In the same period is expected dismantled of a capacity of 1,300 MW.
- A change in payment for new onshore wind turbines connected to the grid from the first January 2014, with premium on 3,3 €cent per kWh for the first 22,000 full load hours [However max. 7,7 €cents per kWh]

Wind turbine production land/sea



Municipalities
Installed wind turbines - MW

Offshore wind installations - in MW



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The local level

Region Zealand

Straw potentials

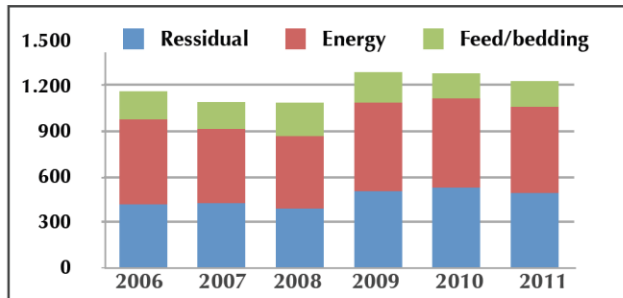
Straw production 2010: 1.209.900 tons

Application:

- Feed: 166.500 tons
- Energy Purpose: 517.100 tons
- Not used / not collected: 526.300 tons

Potential - hardly fully used:

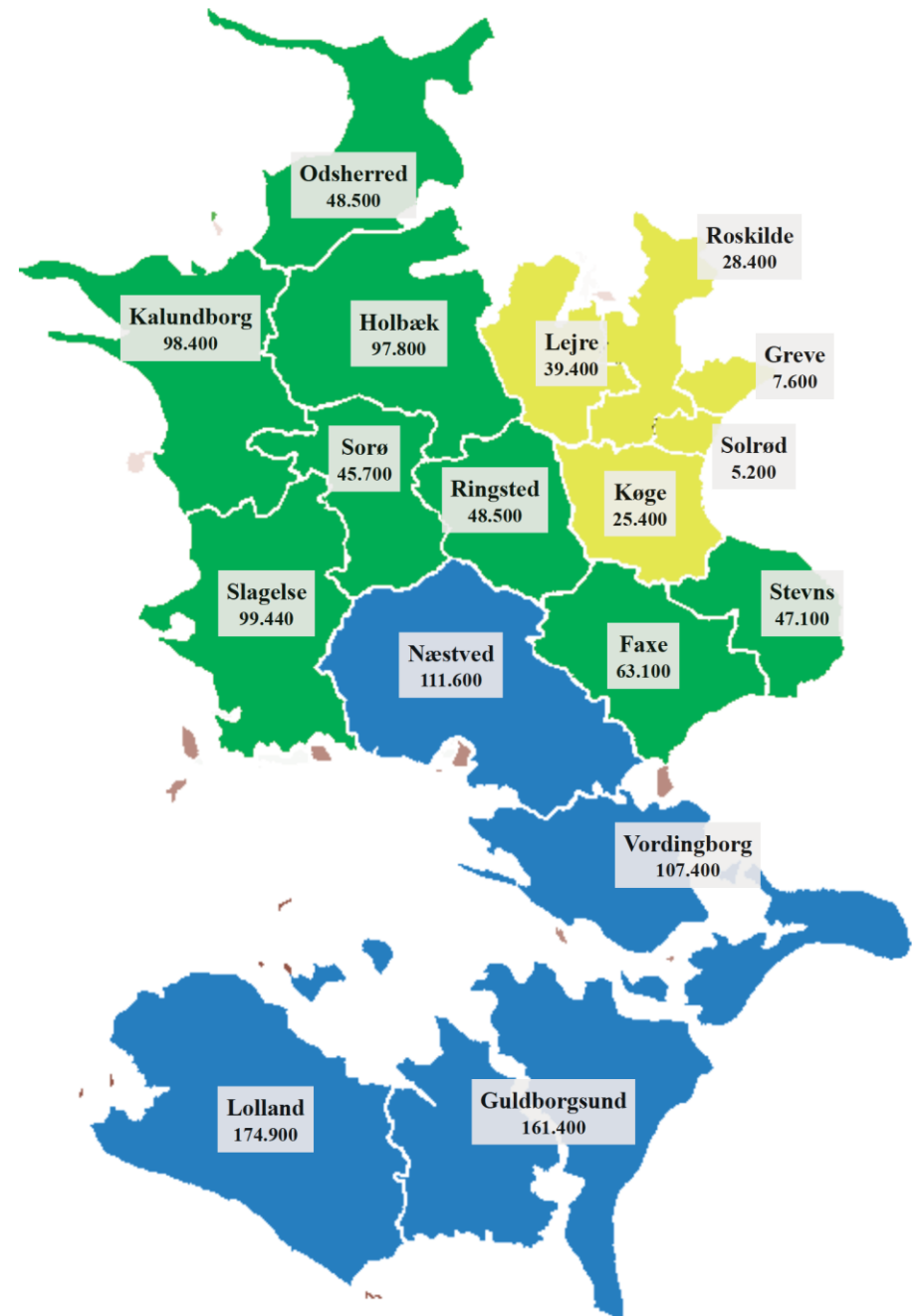
- 100% residual straw: 2.121.500 MWh
- 50% residual straw: 1.060.800 MWh
- 30% residual straw: 636.500 MWh



Straw production

- More than 100.000 tons per year
- 40.000-100.000 tons per year
- Under 40.000 tons per year

Municipality
Amount i tons



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The local level

Region Zealand

Biogas potentials

Total quantity of slurry: 3.100.000 tons
Intended use: 1.990.000 tons

Used in existing energy plants:

- Cattle and pig manure: 183.200 tons
- Industrial waste, etc: 65.000 tons
- Other, energy crops etc: 10.200 tons

Potential (and needs):

- Pigs and cattle manure: 1.990.000 tons
- Energy crops (12%): 331.000 tons
- Other (straw, catch crops): 331.000 tons

Needs

Potential energy production (gross): 1 million MWh

This requires that there can be provided the energy crops (max. 12%) and used organic residues

Energy policy, March 2012:

There should be an ambitious expansion of biogas. [...] The establishment of a task force to investigate and support the concrete biogas projects in order to ensure the assumed biogas development up to 2020.

Manure potential

- 7 tons or more per ha
- 5-7 tons per ha
- 0-4 tons per ha

Existing larger biogas plants

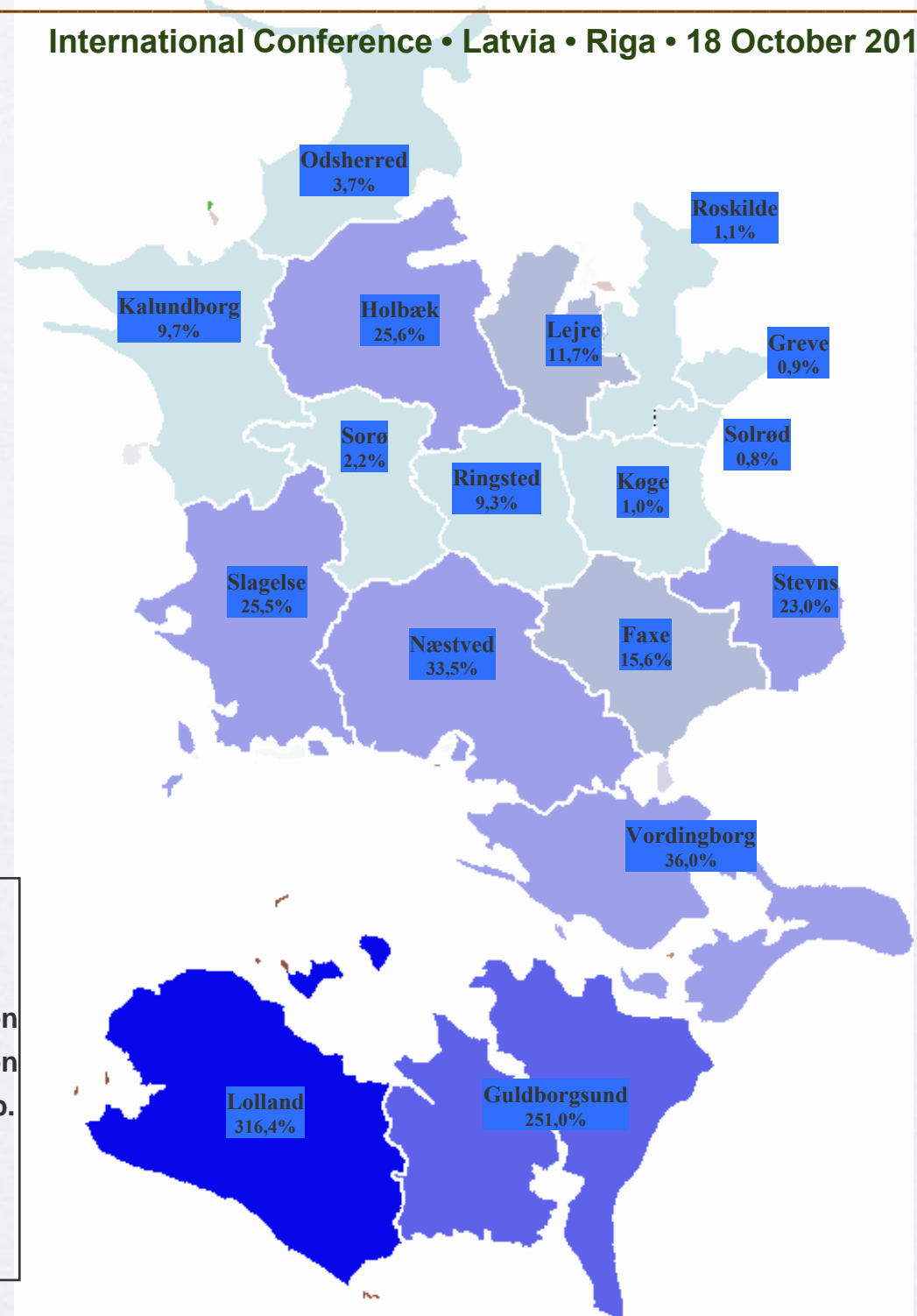


Bioenergy Promotion



Windpower in south

Consumption in north (Copenhagen area)



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Vindmølle-elektricitet i regionen

- Under 10% of the consumption
- Between 10-20% of the consumption
- Between 20-40% of the consumption
- Between 40%-300% of the consump.
- Over 300% of the consumption

Municipality
Consumption as a percentage of
wind turbine production

The local level - different opportunities

Different potentials

Today 37% RE - Expected 69% in 2020 plus new windpower



Sydhavsøerne

Lolland
Guldborgsund

Opgørelse er eksklusiv havmøllerne syd for Sydhavsøerne

MWh
4.000.000

3.168.301 MWh

3.000.000

2.000.000

1.000.000

0

Forbrug

VE forbrug

Mulig udbygning

- Ny vind
- Træ
- Halm
- Biogas
- Biomasse
- Wind
- El
- Varme
- Transport

El 21%

Varme 47%

Transport 32%

69% →

37%

69%

Ny vind

Træ

Halm

Biogas

biomasse

vind



The local level - different opportunities

Different potentials

Today 1.8% RE - only 13% i 2020



København Vest

Roskilde
Lejre

MWh
3.000.000

2.724.650 MWh

2.250.000

Varme 44%

1.500.000

Transport 37%

750.000

0

Forbrug

VE forbrug

Mulig udbygning

- Ny vind
- Træ
- Halm
- Biogas
- Biomasse
- Wind
- El
- Varme
- Transport

13%

biomass

vind

1,8%

87%

Ny vind

?

Træ

Halm

Biogas

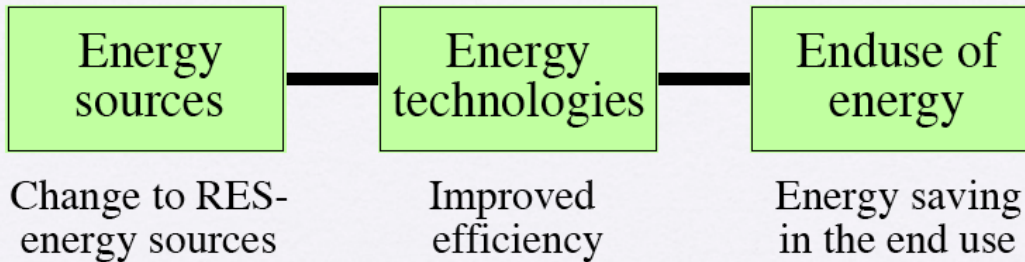


Planning

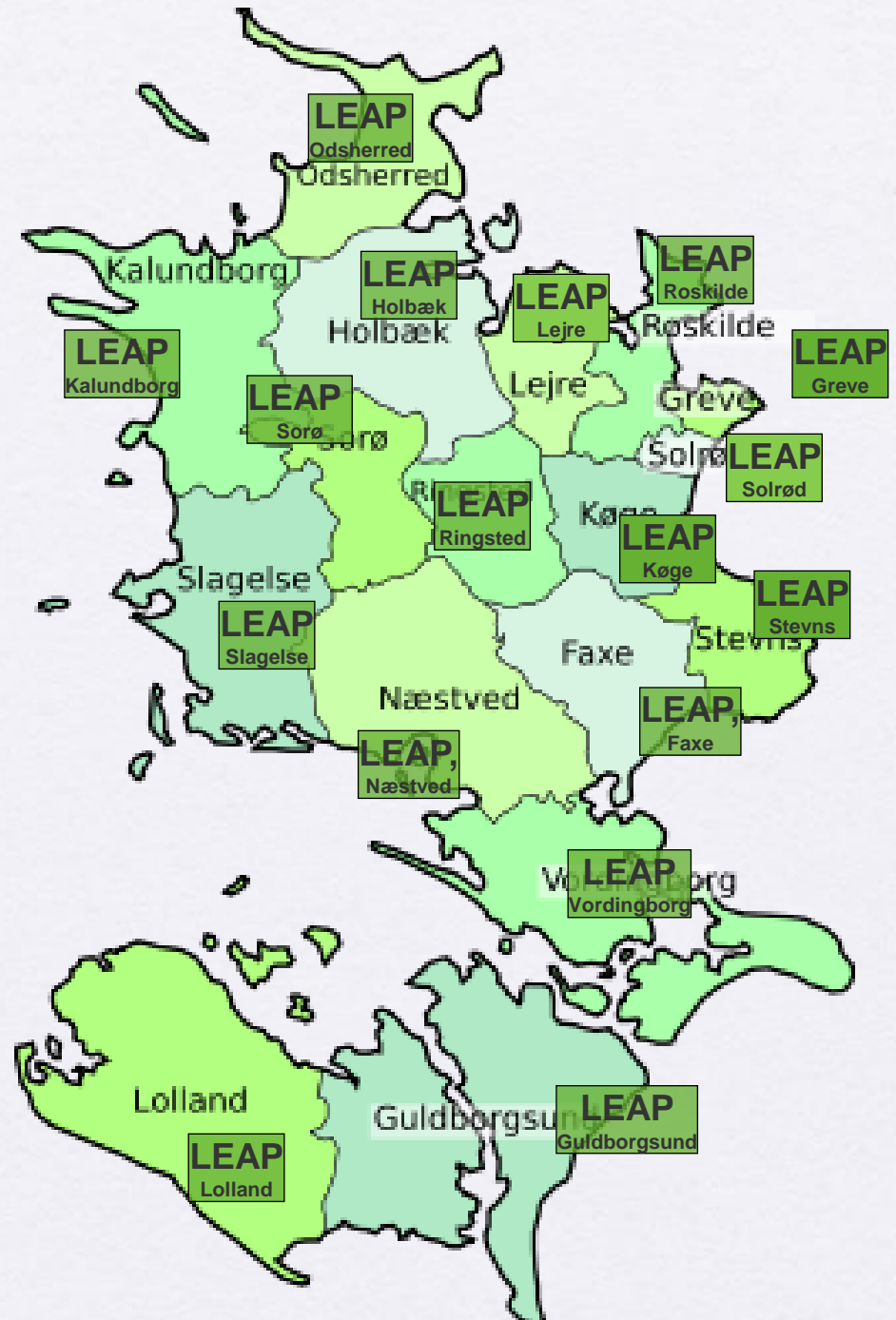
Local Energy Action Plans

What are we doing?

- Local Climate plans
- Local energy action plans (LEAP)
- Sustainable energy action plans (SEAP)
- **Energy-system-approach**



Optimizing the three sub-systems of the energy systems



Planning

SEAP: Sustainable Energy Action Plan



Covenant of Mayors
Committed to local sustainable energy

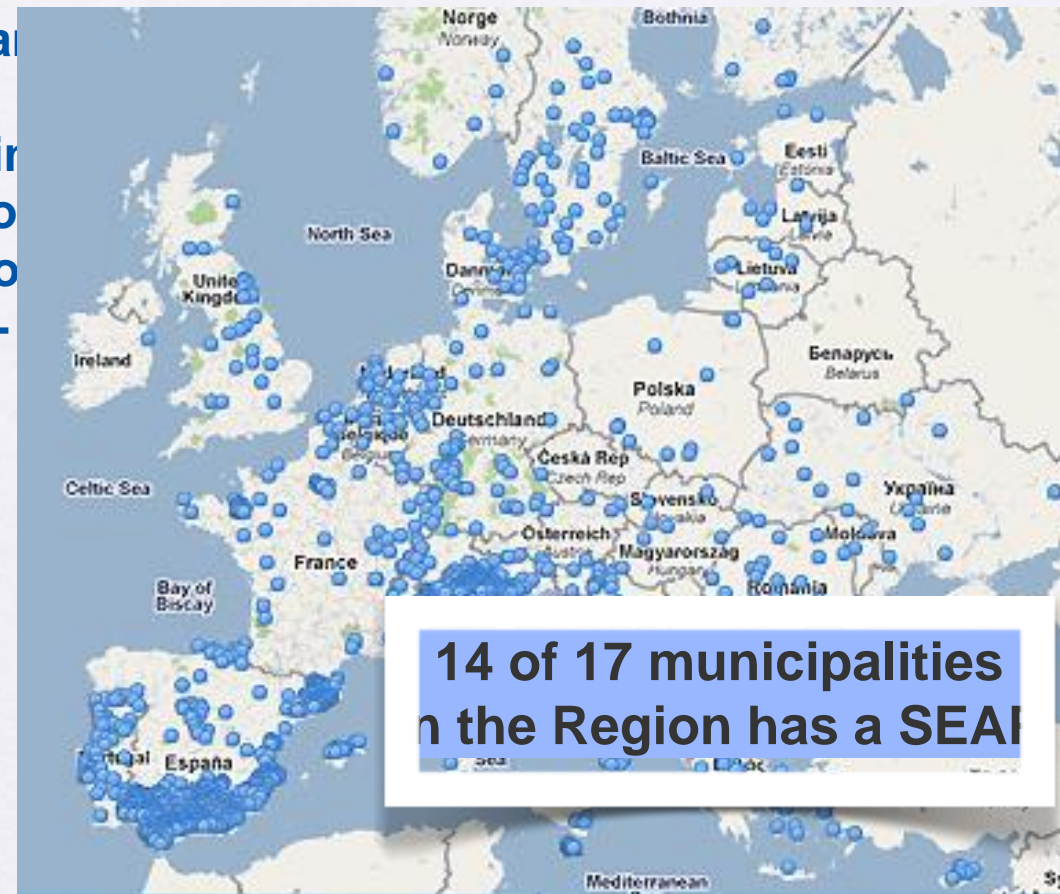
The Covenant of Mayors is the mainstream European movement involving local and regional authorities, voluntarily committing to increasing energy efficiency and use of renewable energy sources on their territories. By their commitment, Covenant signatories aim to meet and exceed the European Union 20% CO₂ reduction objective by 2020.

Signatories

5,066 Cities and municipalities

Covering in all

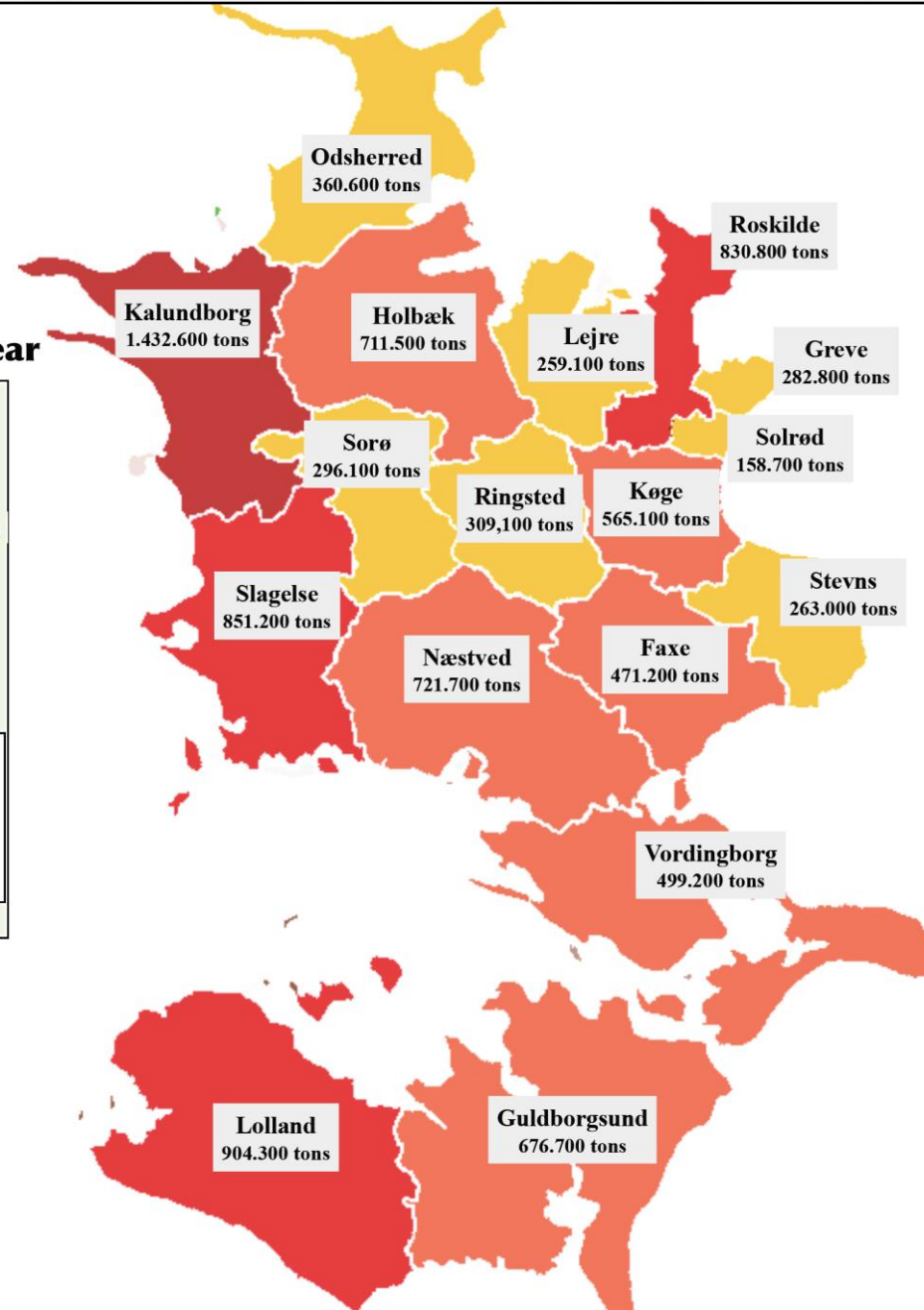
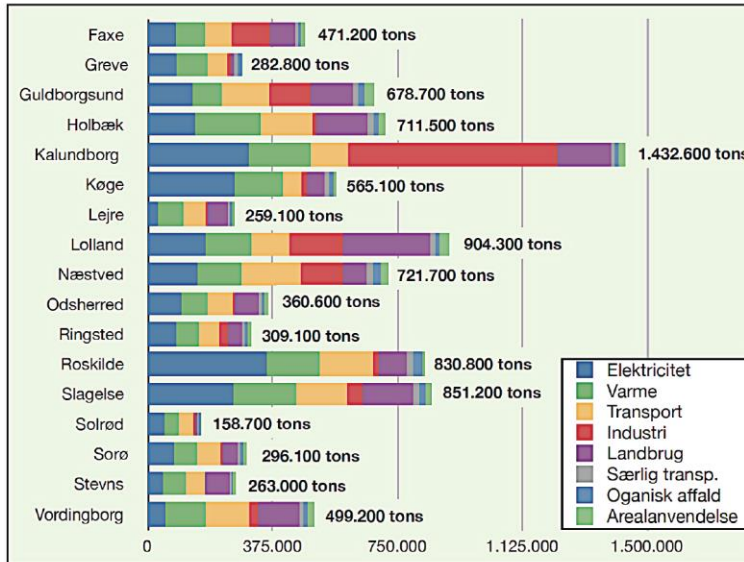
171 mio inhabitants (34% of EU)



Long term - long perspectives

Region Zealand Greenhouse gases in the region

Total emissions: : 9.595.400 tons per year



Emission of greenhouse gases

- Under 375.000 tons per year
- 375.000 - 750.000 tons per year
- 750.000 - 1.000.000 tons per year
- Over 1.000.000 tons per year

Municipality
Emission of greenhouse gases in tons

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Thank you for your attention