

Energy action planning on local level

Experience of Region Zealand

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Region Zealand

Experience of Region Zealand

Topic:

- **Short description of the situation:**
 - ressources
 - energy production
 - greenhouse gasses
- **The energy action planning**
 - expected development
 - principles
 - examples
 - development of agriculture
 - SEAP



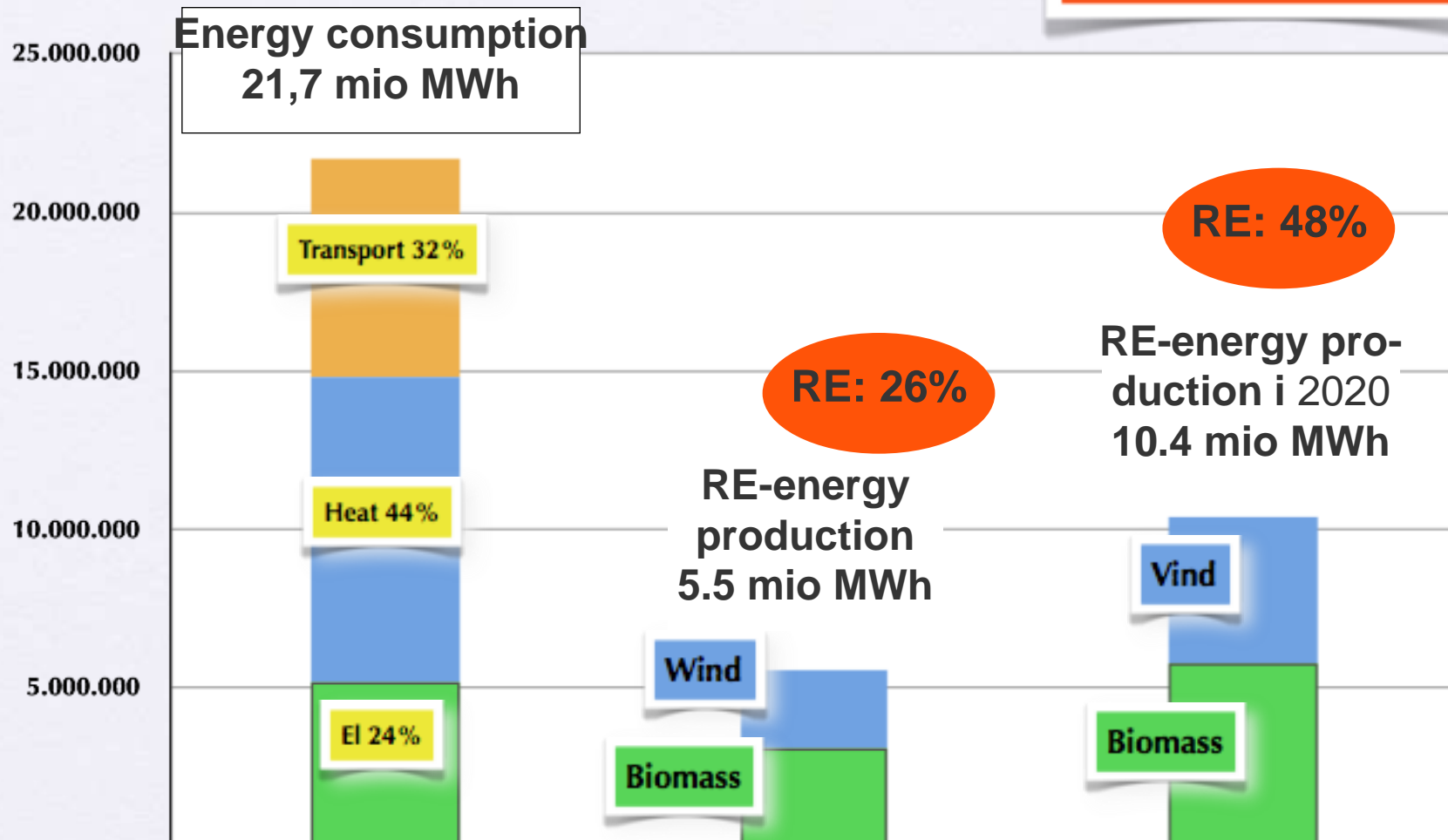
Overview

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



Overview

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:

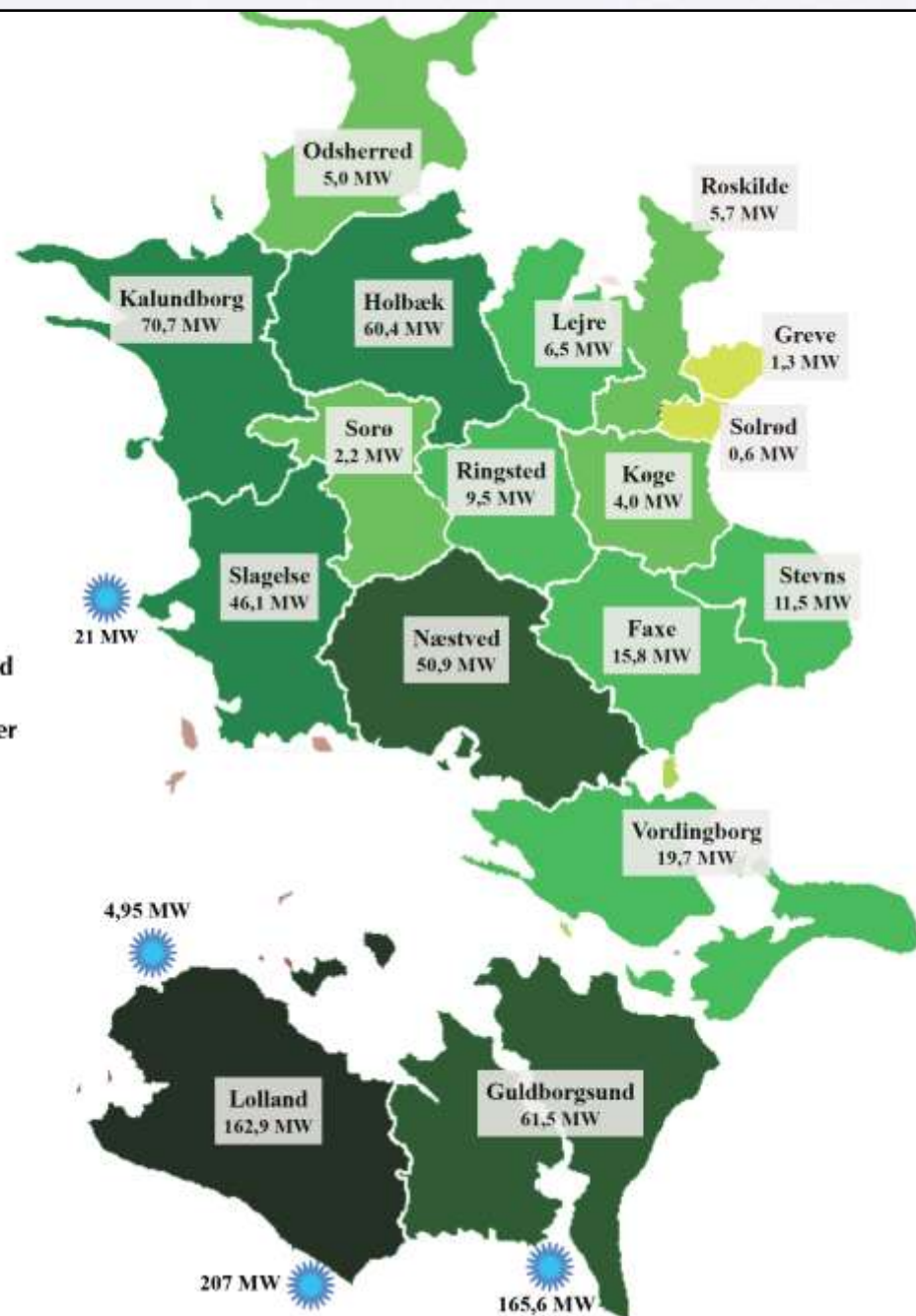
- Towards 2020 new onshore wind turbines will be built with a total capacity of 1,800 MW. In the same period is expected dismantled of a capacity of 1,300 MW.
- A change in payment for new onshore wind turbines connected to the grid from the first January 2014, with premium on 3,3 €cent per kWh for the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

Wind turbine production land/sea

- 2 GWh or less
- 2-10 GWh
- 10-50 GWh
- 50-100 GWh
- 100-300 GWh
- 300 GWh or more

Municipalities
Installed wind turbines - MW

Offshore wind installations - in MW



Bioenergy Promotion



Overview

Region Zealand

Straw potentials

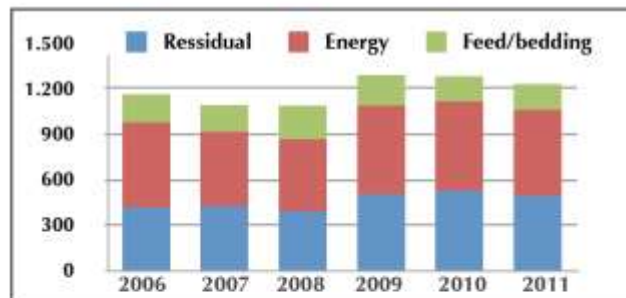
Straw production 2010: 1.209.900 tons

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



Bioenergy Promotion



Overview

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

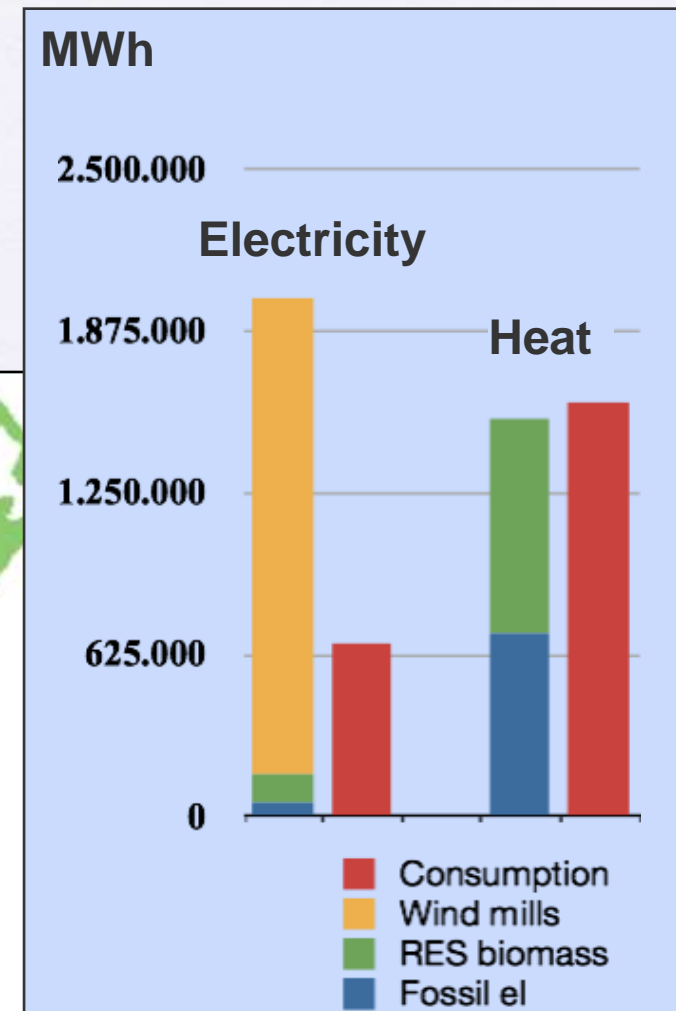
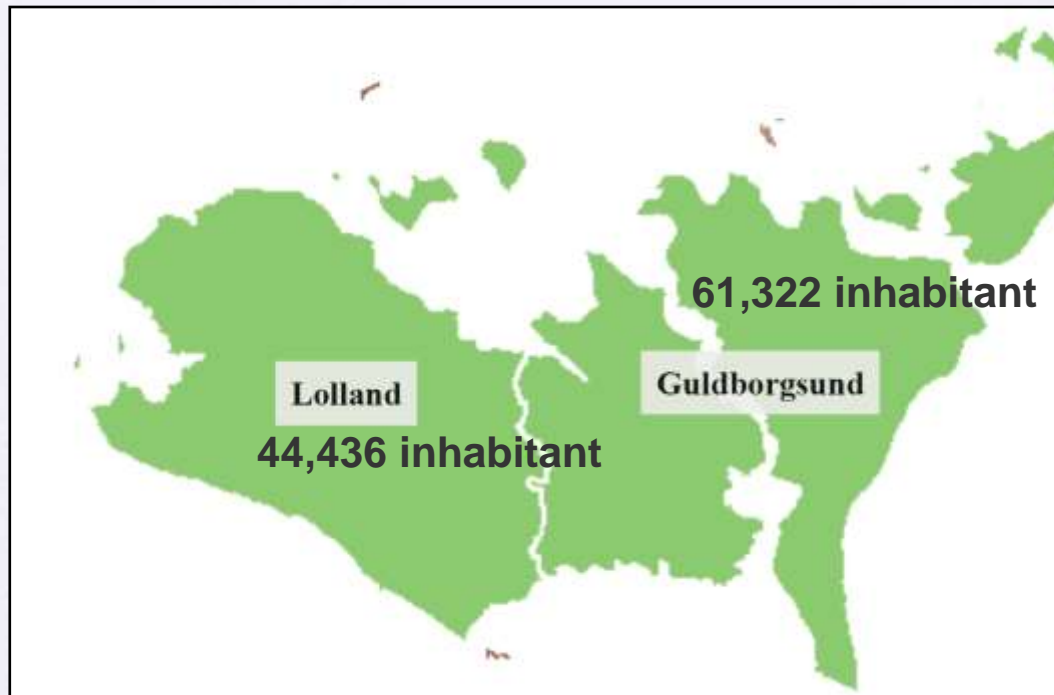


Overview

The two south municipalities

Yearly value of local renewable energy production
in the two municipalities:

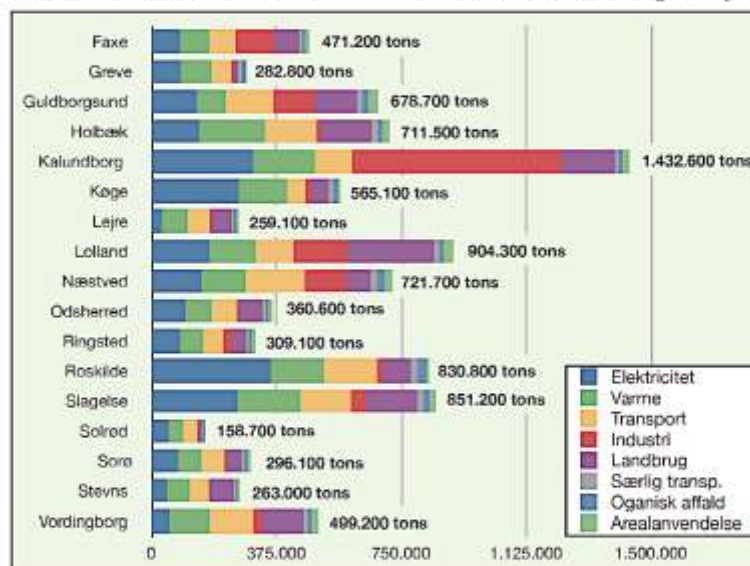
1.6 billion Danish kroner
155 million LVL



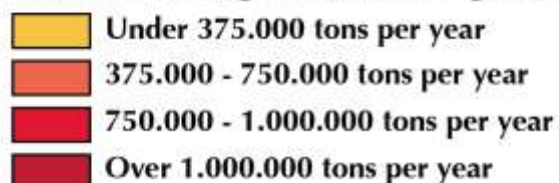
Overview

Region Zealand Greenhouse gases in the region

Total emissions: : 9.595.400 tons per year

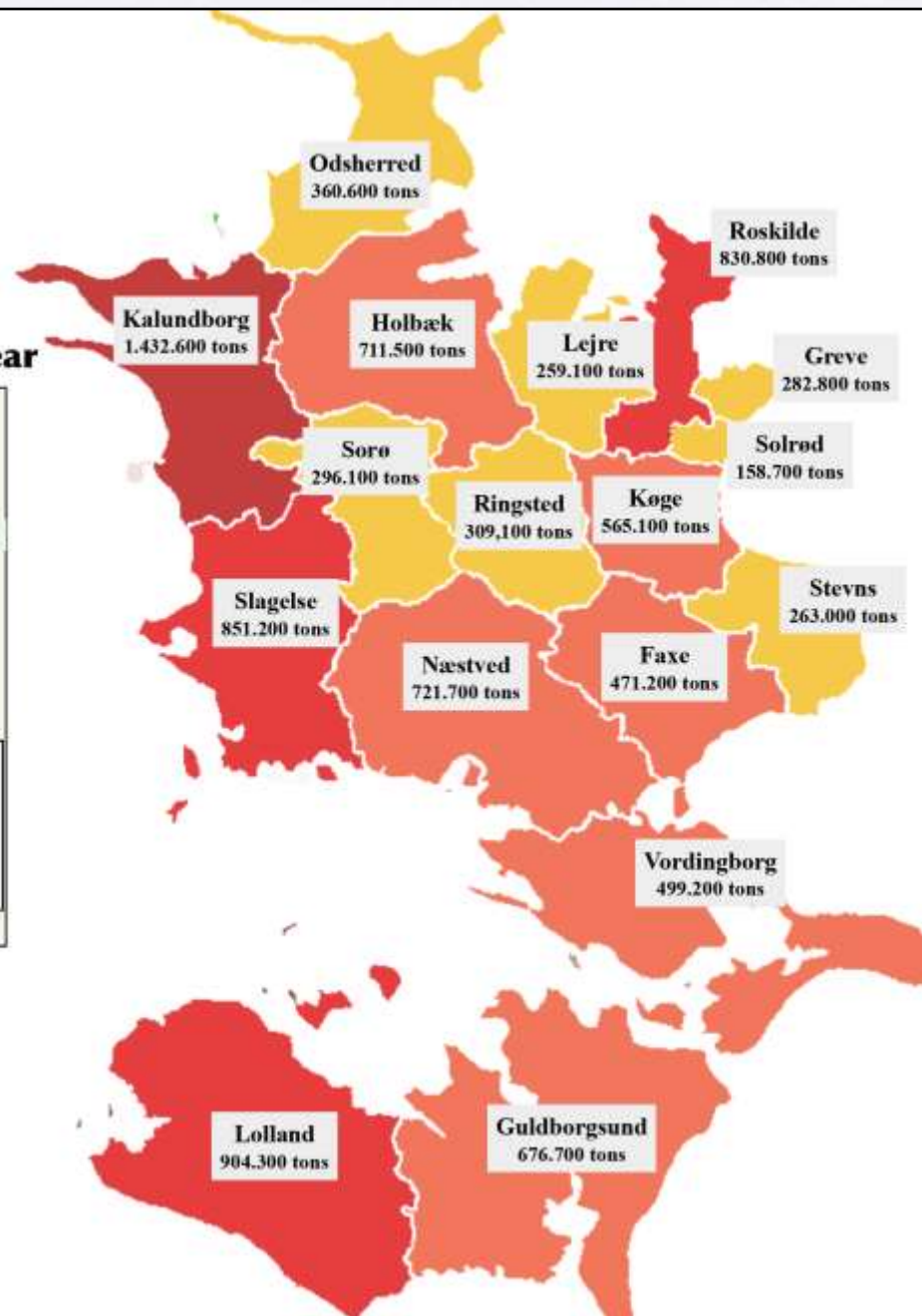


Emission of greenhouse gases



Municipality

Emission of greenhouse gases in tons



Bioenergy Promotion



Experience

Three experience

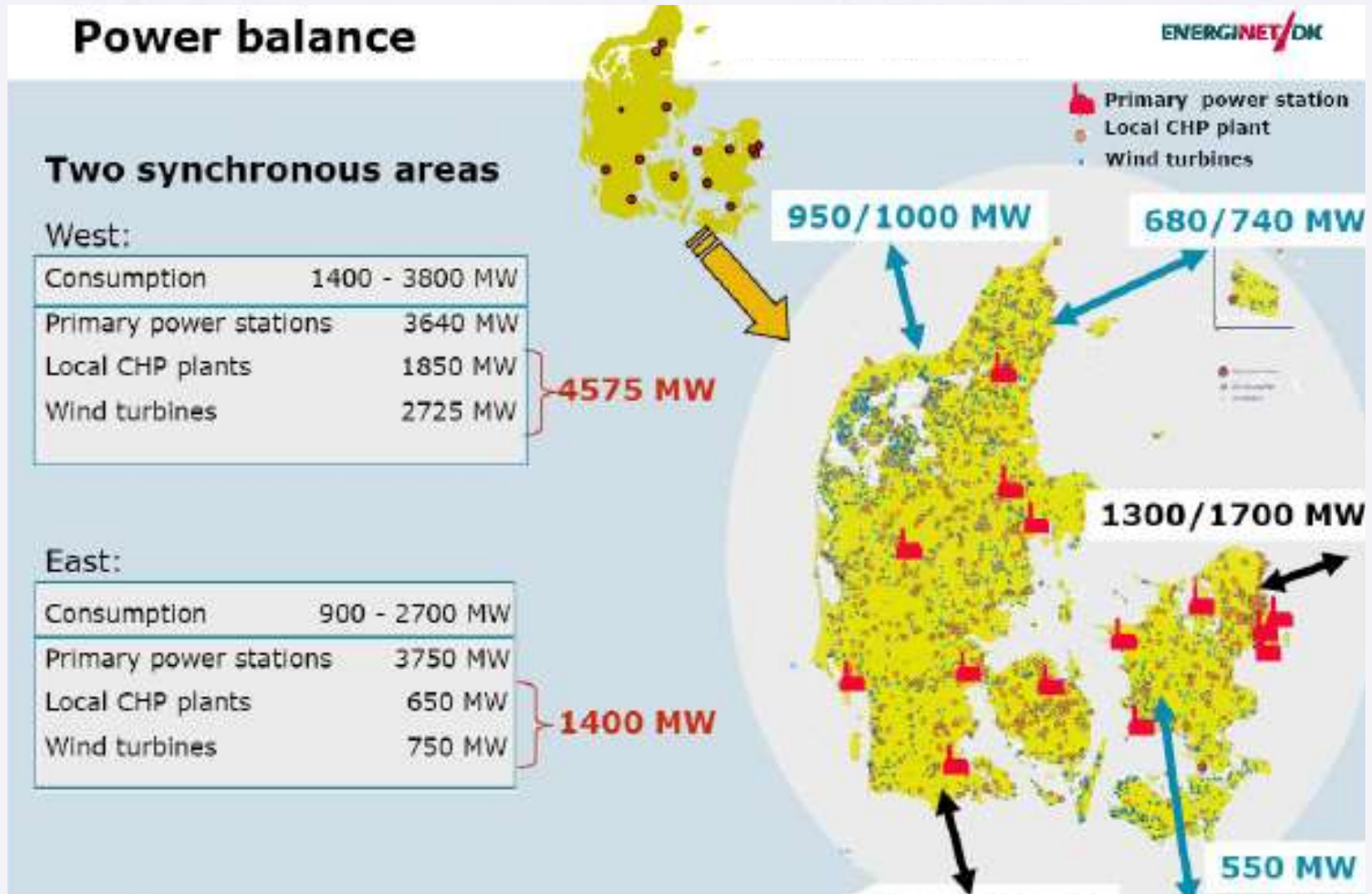
Three important elements now and in the coming period

- Development of a decentralized energy system
From a few very large inflexible power system to a flexible system with much wind power
- Development of strategy and planning activities
Development of a comprehensive planning activity, in particular encouraged by the Covenant of Mayors: SEAP or Sustainable Energy Action Plan
- From technologies to systems
The development of a energy system, which is based on
sources in their own terms.



Experience

The Danish power system - Change 1980-2000

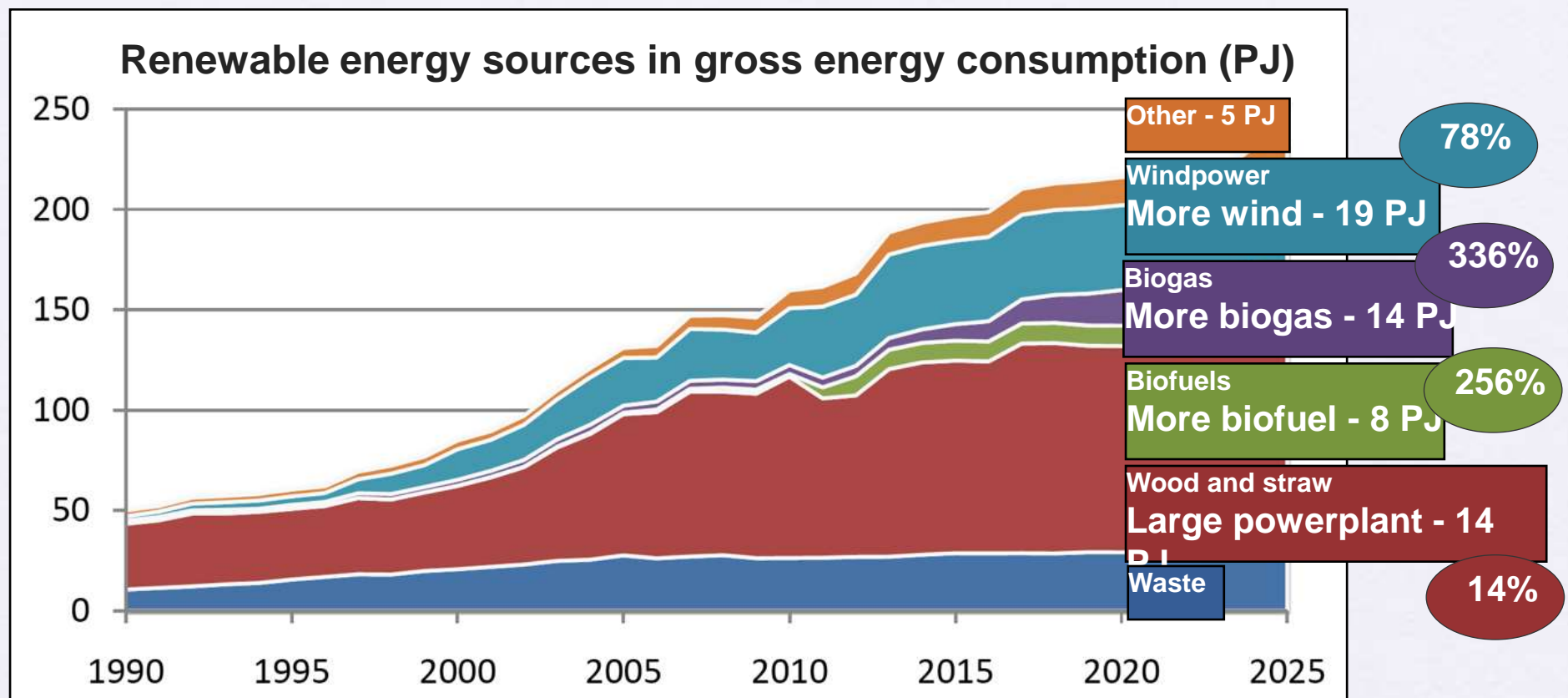


Experience

Priorities and expected development

Energy Agency projections to the year 2025 (54% electricity based on RE in 2020)

Priorities up to 2020

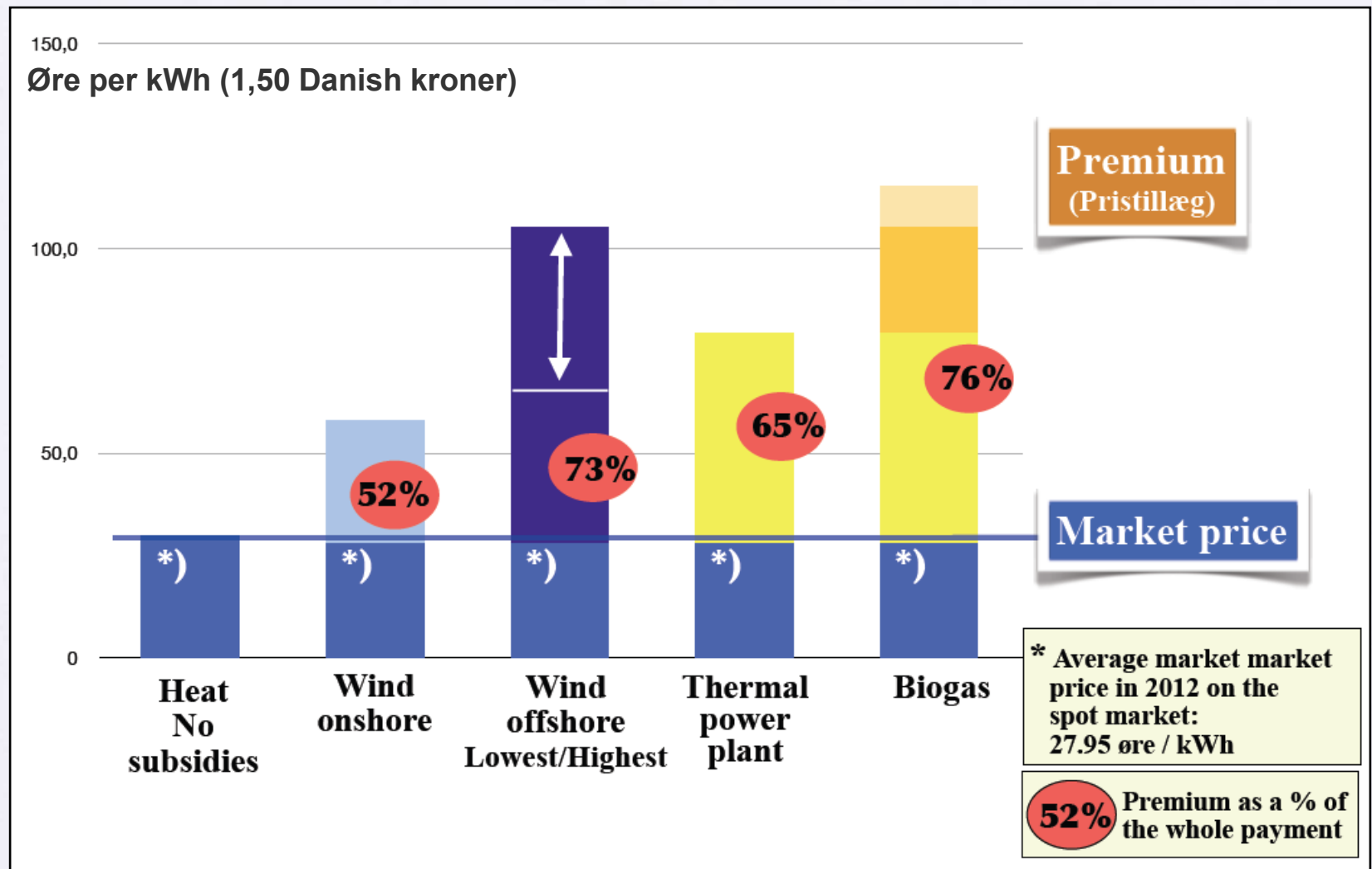


Sources: Danmarks Energifremskrivning, april 2011, Energistyrelsen

Experience

Subsidies - Premium

The new Danish energy policy



Experience

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



Experience

SEAP



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

4,418 Cities and municipalities

Covering in all

169 mio inhabitants (35% of EU)



Experience

Plans and plan systems

The natural steps

Vision

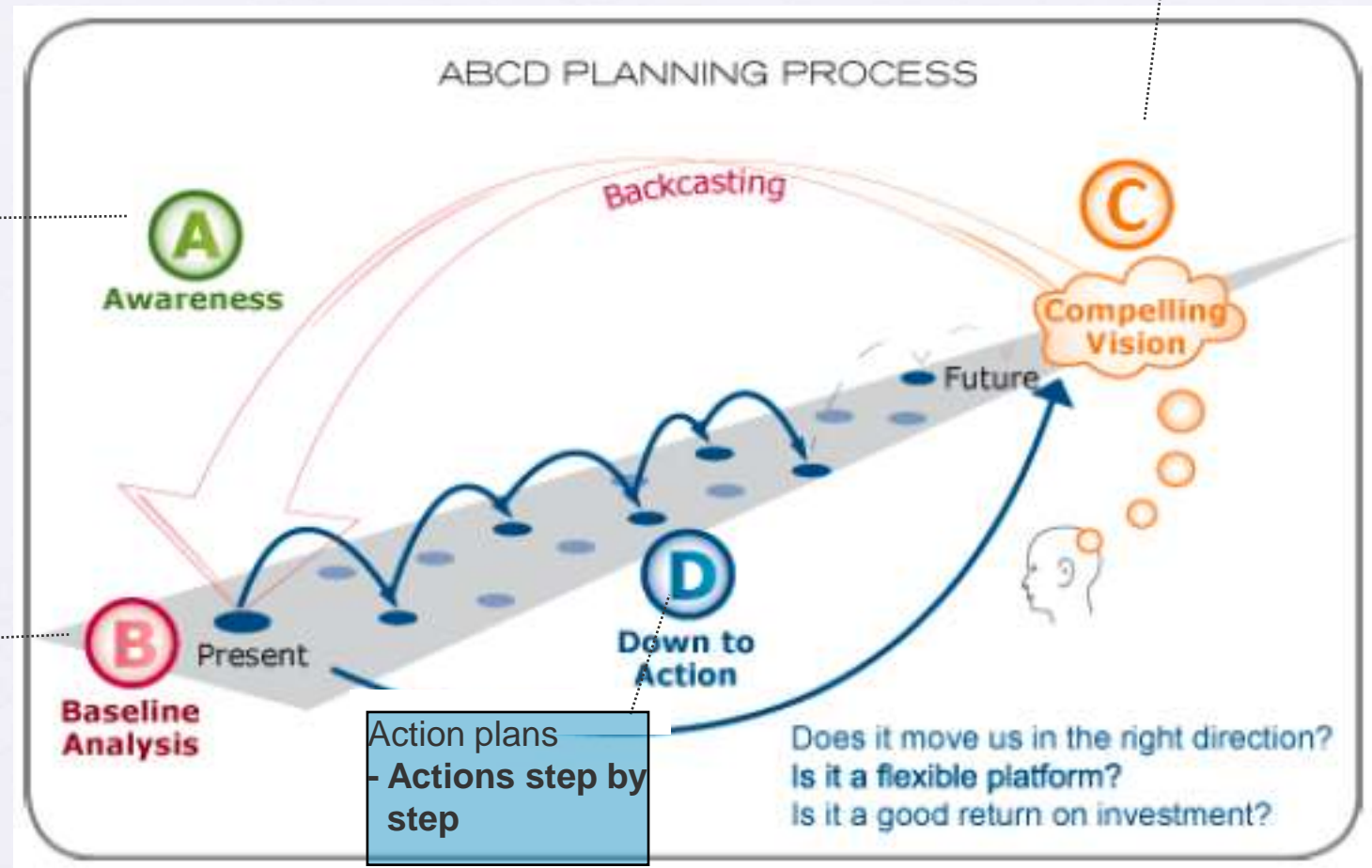
- 100% fossil free energy supply in 2050

Awareness:

- RE experience phase by phase
- Local Agenda 21
- Climate and energy plans
- Citizens' summits
- Capacity building

Baseline analysis

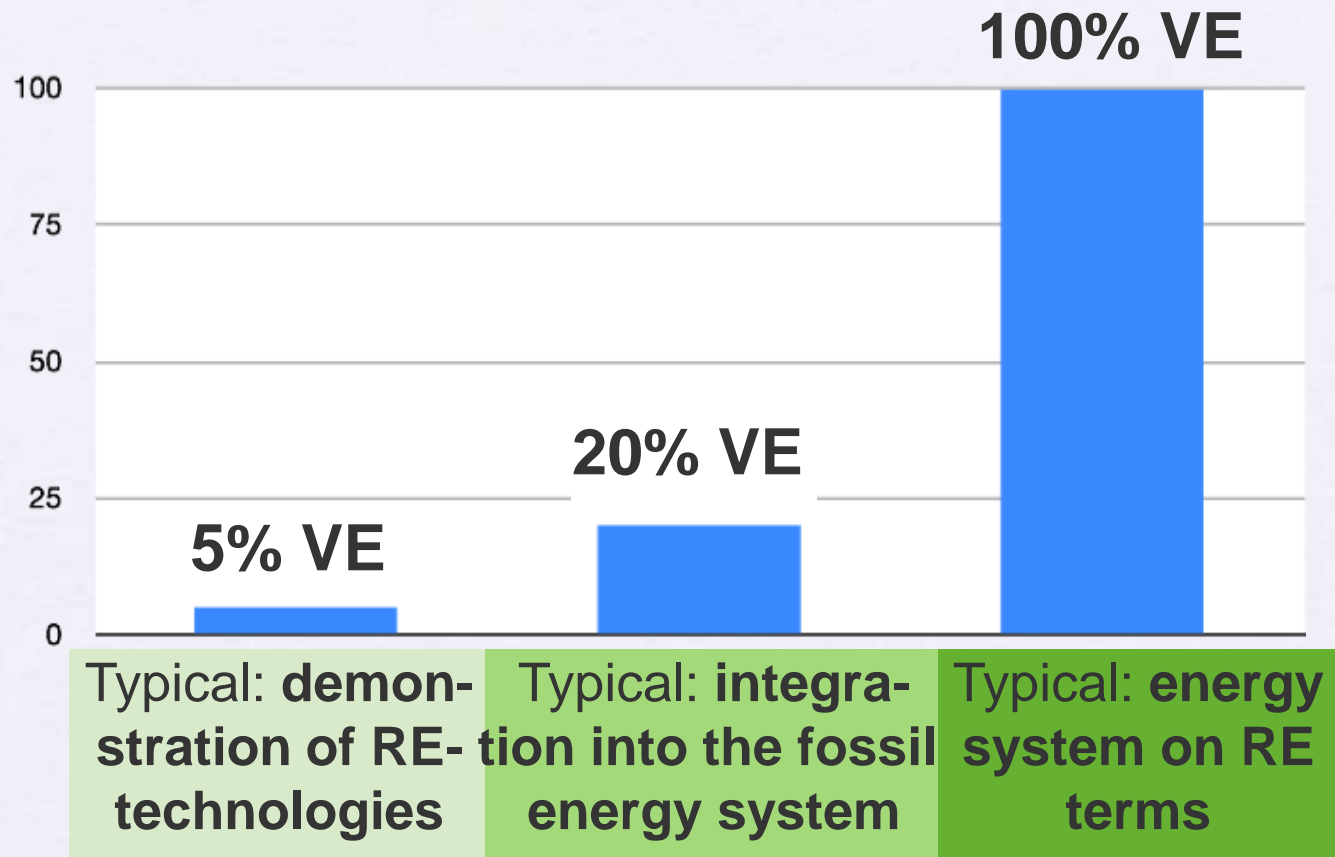
- Mapping of energy & GHG
- Projections
- Action options



Experience

From technologies to energy system

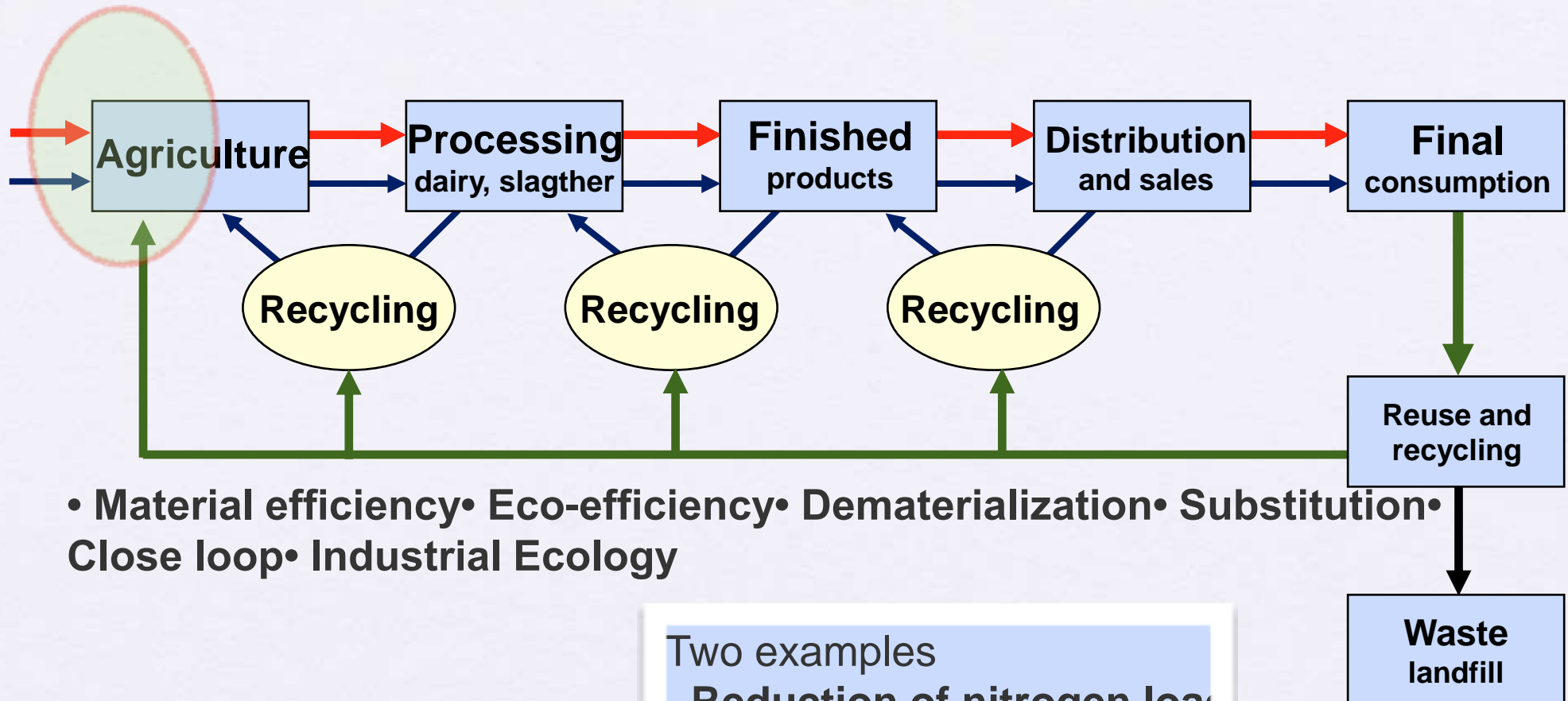
- First demonstration of technologies
- The integration of renewable energy in the fossil energy
- But now the establishment of a renewable energy system on its own terms



Opportunities

The opportunities - the whole chain

The agricultural sector



• Material efficiency • Eco-efficiency • Dematerialization • Substitution •
Close loop • Industrial Ecology

Two examples

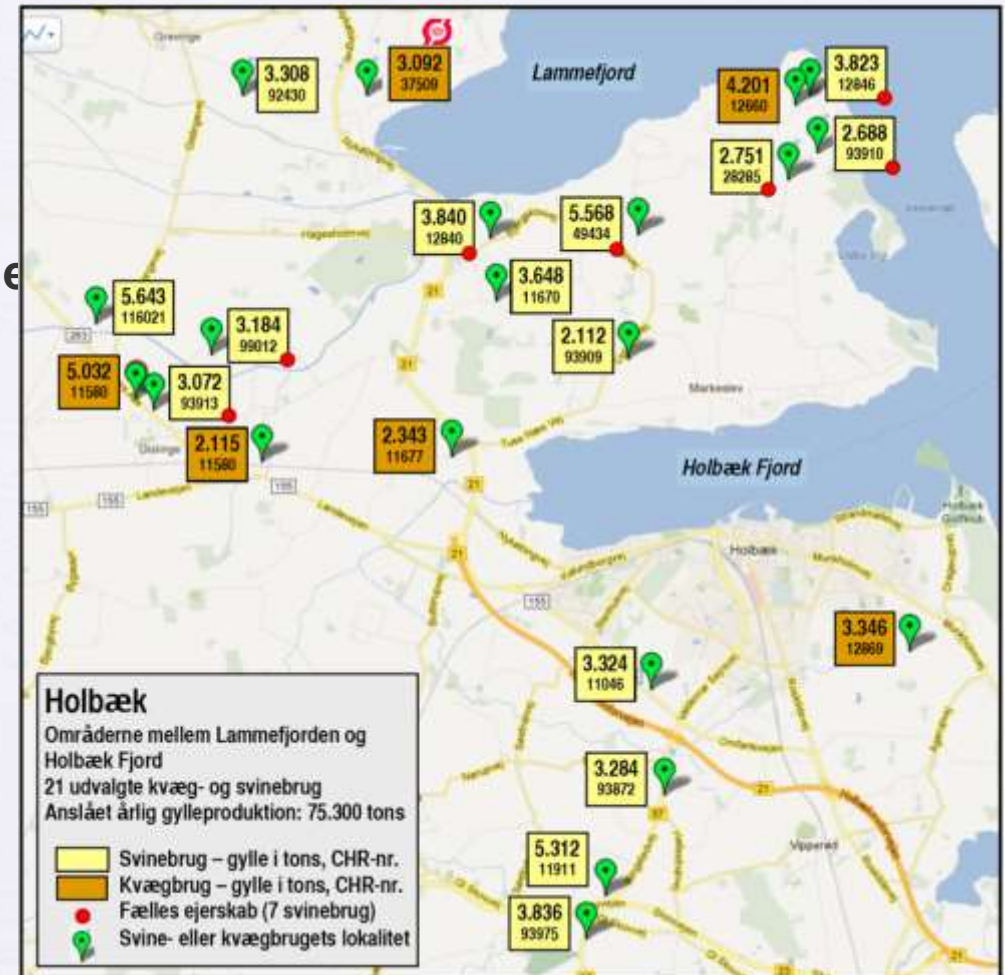
- Reduction of nitrogen load
- Recycling slaughterhouse

Example 1

Setting up a biogas plant

Goal

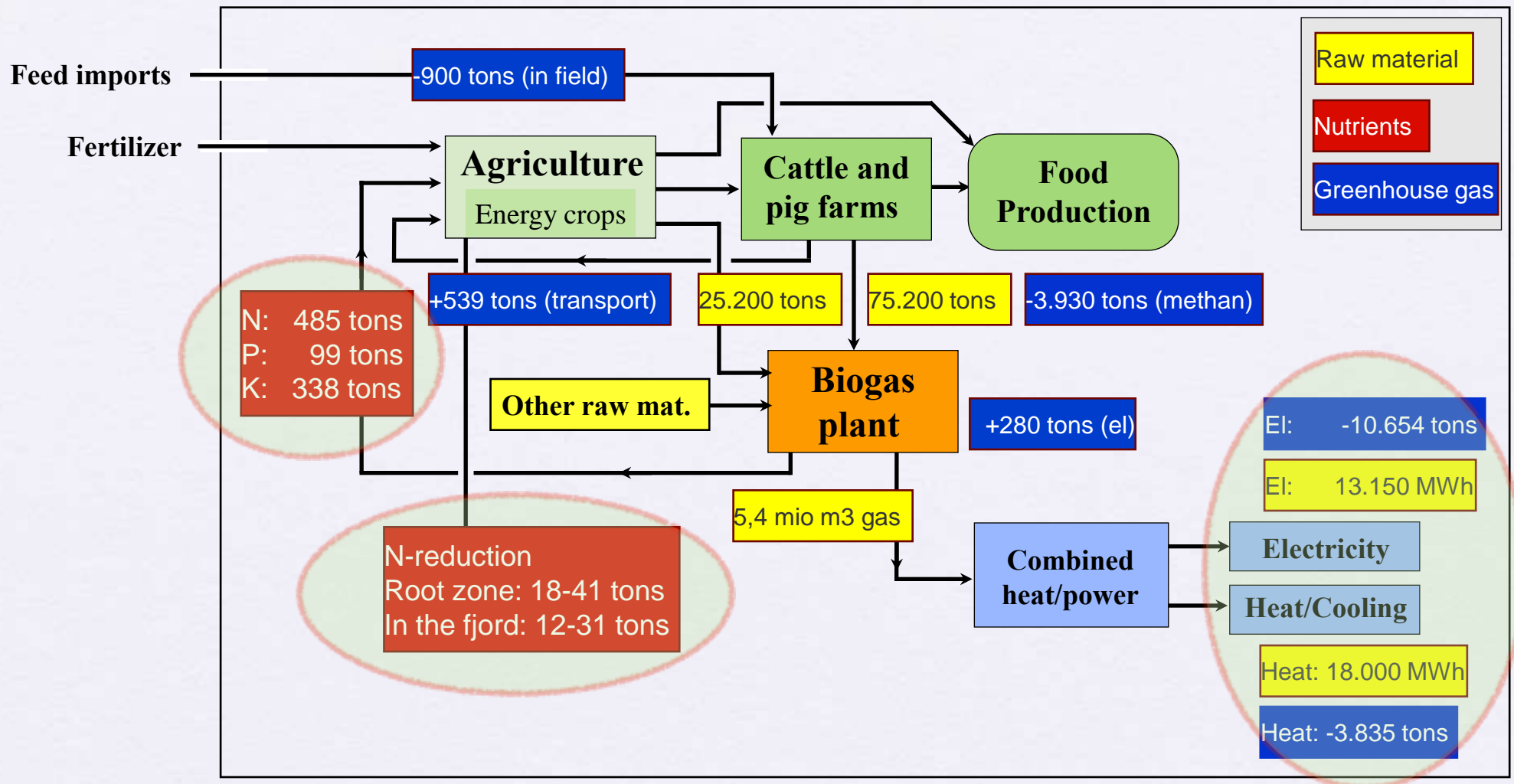
- Improve farming
- Increase Revenues energy
- Reduce e impacts on water streams and sea water (WFD)



An example - Suggestion for a Biogas plant at Holbæk

Example 1

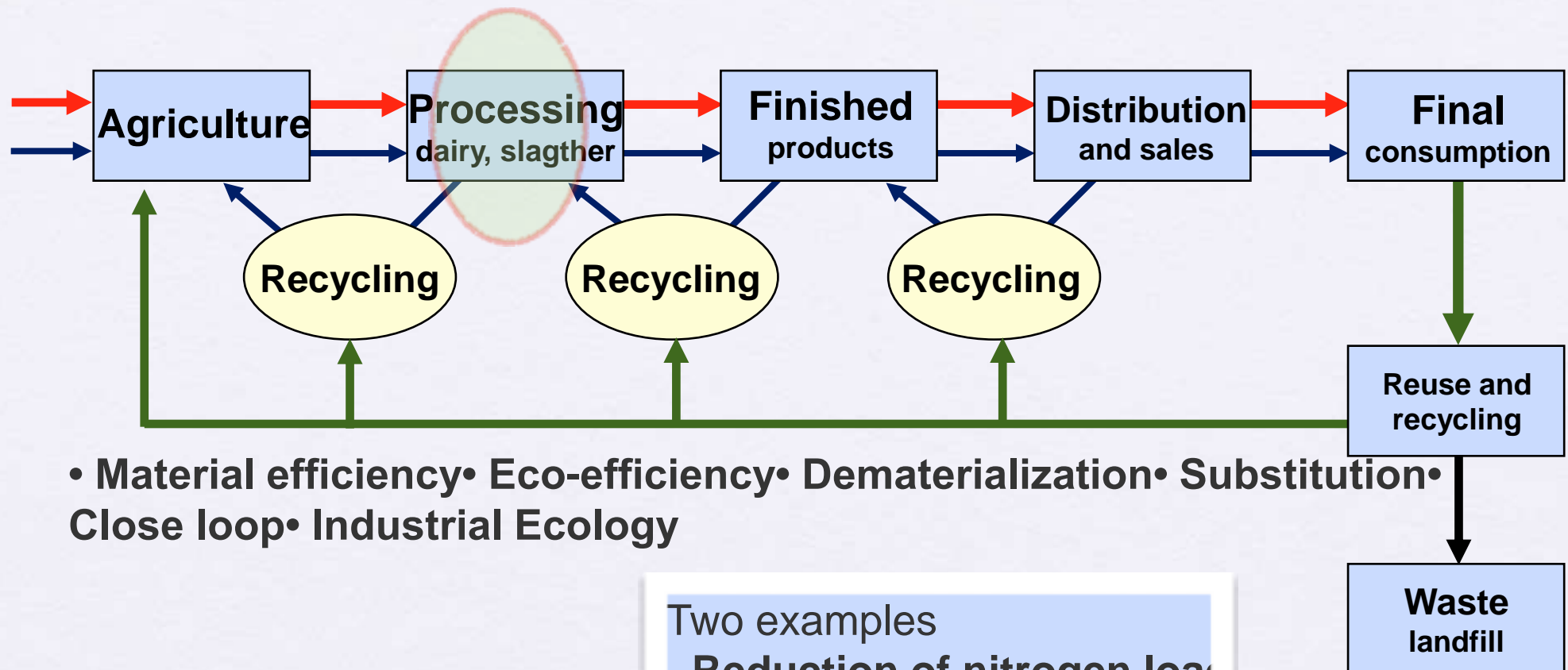
Example from Holbaek - Proposal for biogas



Opportunities

The opportunities - the whole chain

The agricultural sector



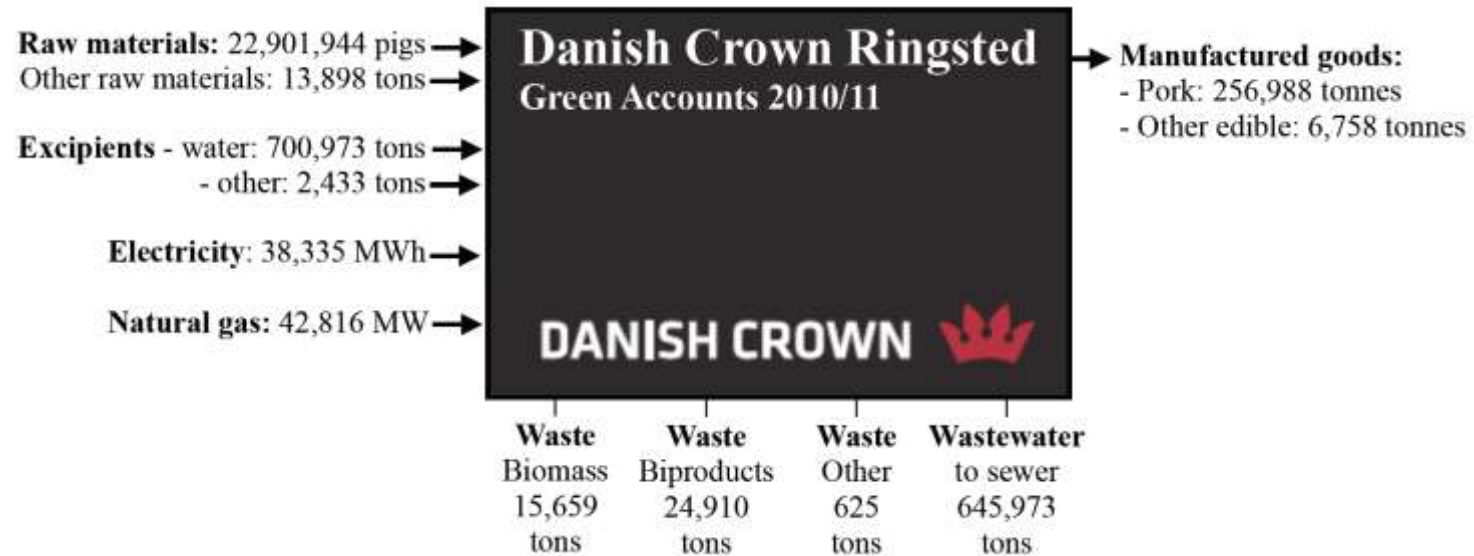
• Material efficiency • Eco-efficiency • Dematerialization • Substitution •
Close loop • Industrial Ecology

Two examples

- Reduction of nitrogen load
- Recycling slaughterhouse

Example 2

Here we have a slaughterhouse

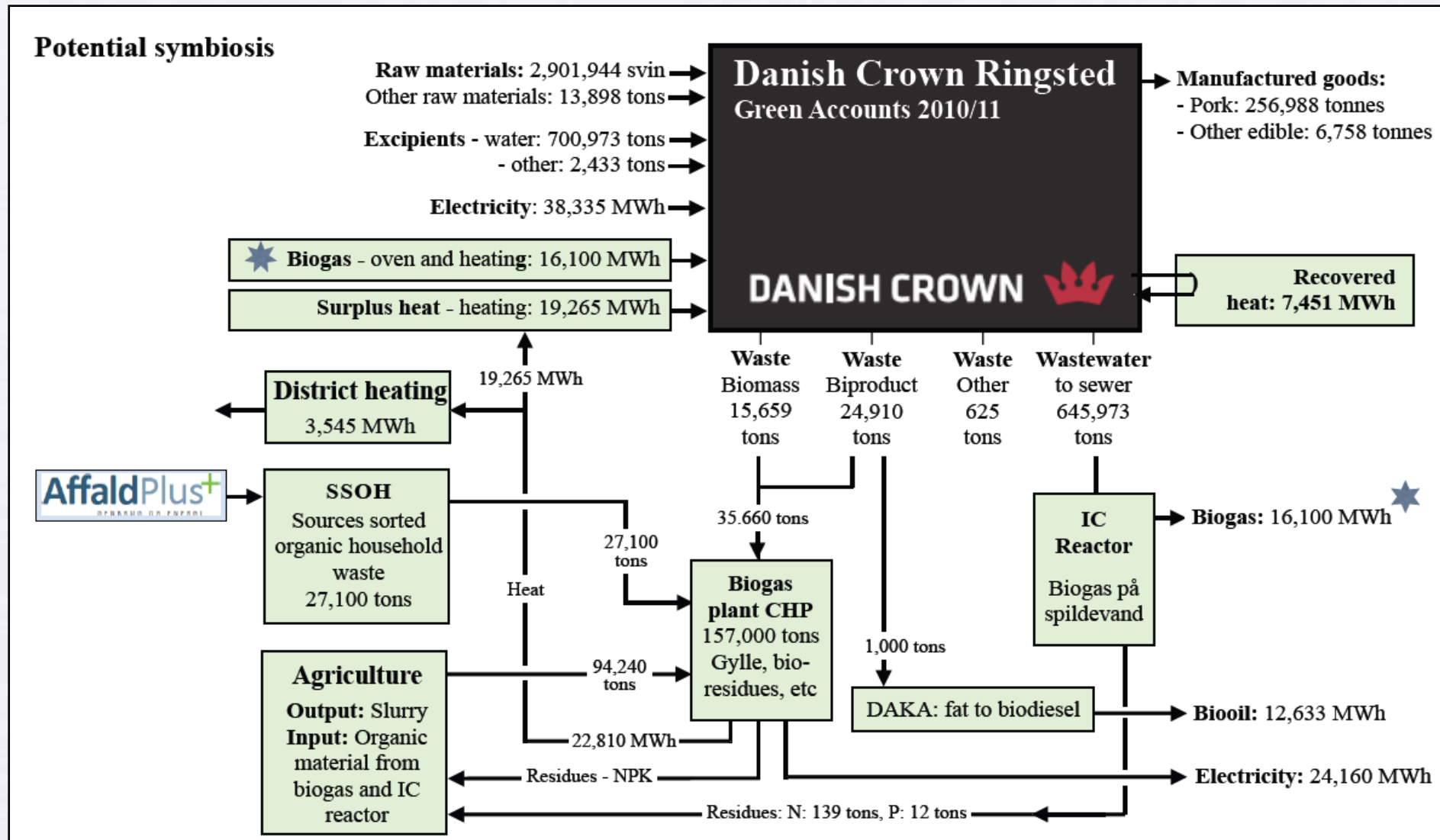


Transition Effects:

- Energy savings and energy efficiency-
- Savings on fossil energy-
- Reduction of greenhouse gas emissions-
- Significantly less waste and less costly waste handling-
- Significant production of renewable energy-
- Recycling of nutrients for agriculture

Example 2

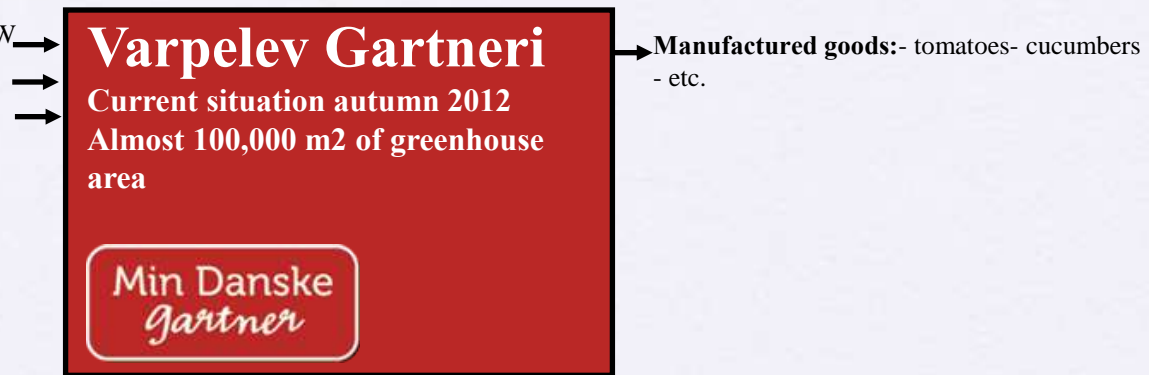
Industrial symbiosis - Slagterhouse



Example 3

Symbiosis (3) - Production of vegetables

Engine (natural gas)- Coal-fired boiler plants, 8 MW- Natural gas fired boiler plant, 14 MW



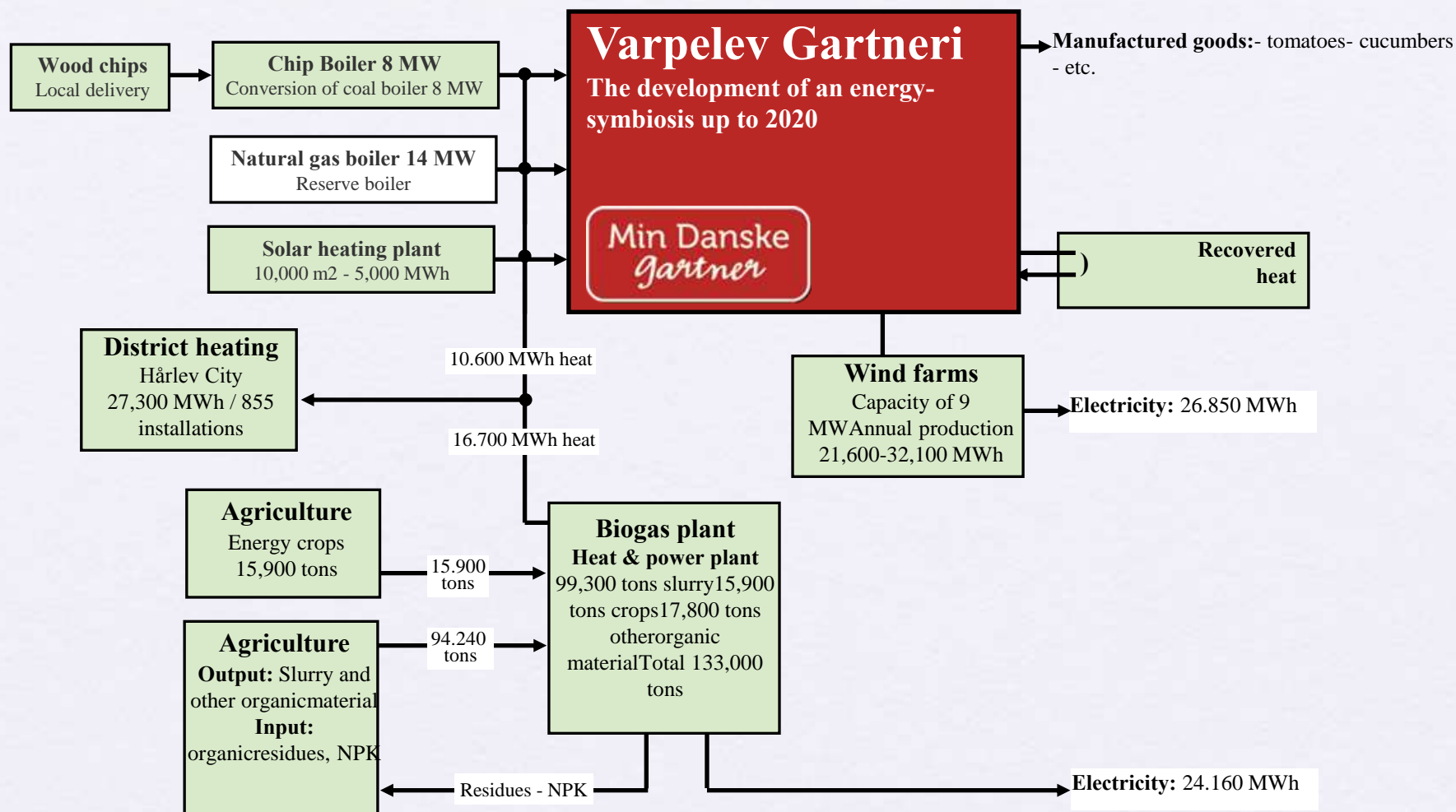
Transfer Effects:

- **Prerequisite: Production of vegetables in greenhouses (greenhouse)- Symbiosis effect particularly associated with high heat consumption in buildings**
- **in winter and high heat in the greenhouses early summer, summer and autumn-**
- **Energy savings and energy efficiency- Substantially cheaper heating for greenhouse- Significant revenue from the supply of district heating to Hårlev and from the sale of**
- **electricity from combined heat and power plant- Cheap and security of supply heat to the greenhouse and the local community- At full development quota-free glasshouse plants (current quota of 21,870 tonnes)- Recycling of nutrients for agriculture**



Example 3

Symbiosis (3) - Production of vegetables



Oil prices - crisis

