Kaunas • Lithuania • Thursday 25th November, 2010

Co-creating a bioenergy-region based on sustainable development

Promoting sustainable bioenergy production and use - policies, showcases and business solutions

Co-creating a bioenergy-region based on sustainable development principles and approaches

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Region Zealand, Denmark

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The presentation

- The challenges - The Danish perspective
- The challenges and new approaches
- The regional climate strategy - promotion of sustainable energy in Region Zealand
- Example - Kalundborg Municipality
- Bioenergy promotion in the municipality and the region
- The role of the region

REGION SJÆLLAND

The challenges - The Danish perspective

Most important elements

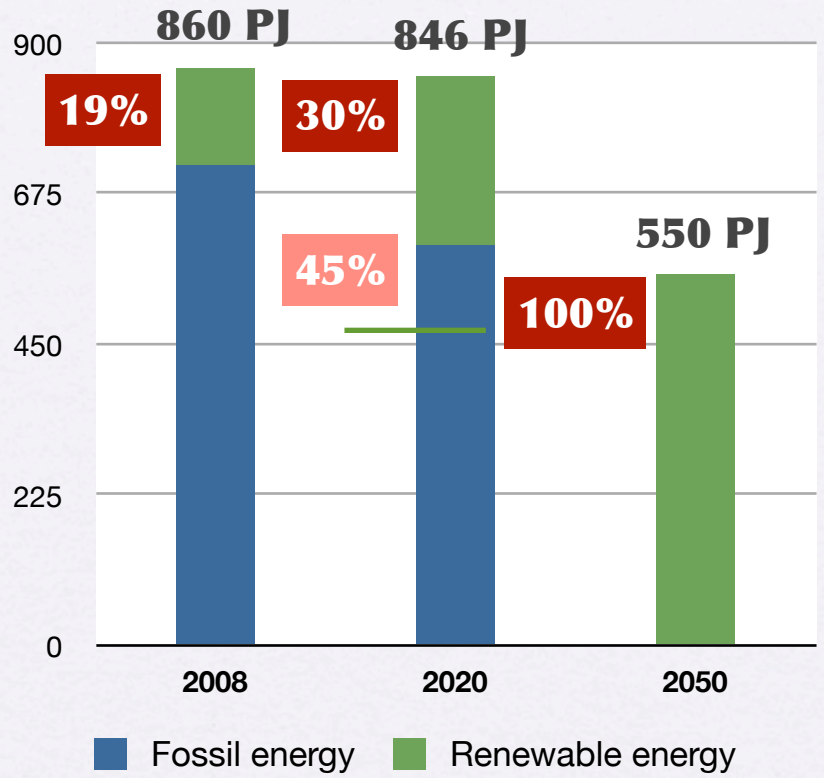
- Greenhouse gas reduction -> zero
- 100% RES in 2050

- RES from 19% in 2008 to 100% in 2050, mainly based on biomass and wind

- More efficient energy systems with a total saving of 300-350 PJ

- Developments in the next decade will determine the development tracks for the subsequent 30 years

Denmark: Total energy consumption, (calculated input) from 2008 to 2050



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The challenges and new approaches

- Citizen involvement policies
- Awareness raising on Sustainable development
- Innovation for Sustainable development - business, social, etc.
- The 5 roles of local government
- The Local Agenda 21 Change Agent - facilitation skills

The 5 roles of local government

1. Leader, showing the way
2. Authority, regulator, planner, controller
3. Service provider, practical services, and also information/advice
4. Enterprise, consumer, end-user
5. Facilitator, development dynamo

How to use our roles? How to strengthen our function as a change agent for local sustainable development?

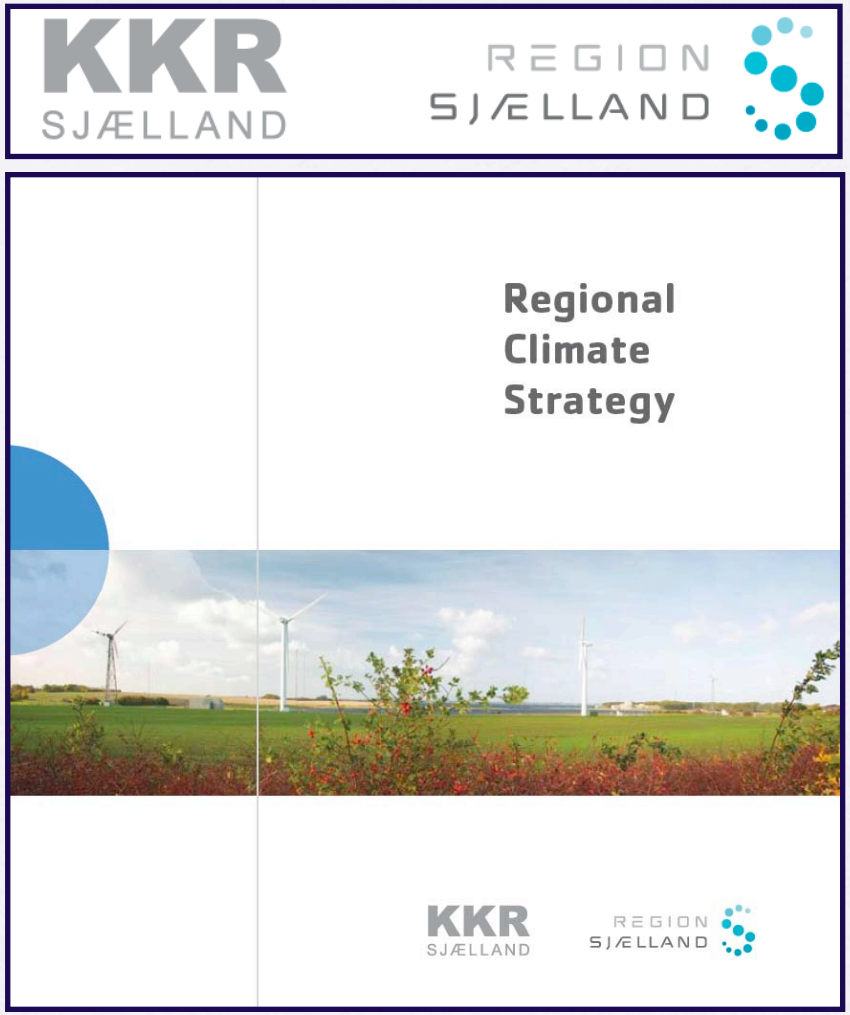
The Change Agent is

- The innovation access to the organization
- Promoter of new ideas, solutions, directions
- Innovation marketer and communicator

The Regional Climate Strategy

Development of the strategy

- One region and 17 municipalities
- Screening of all climate actions by regional and local government
- Multi-stakeholder involvement
- 9 thematic workshops with regional actors and experts - based on a triple helix principle
- Two local government workshops
- Conference with high level decision-makers



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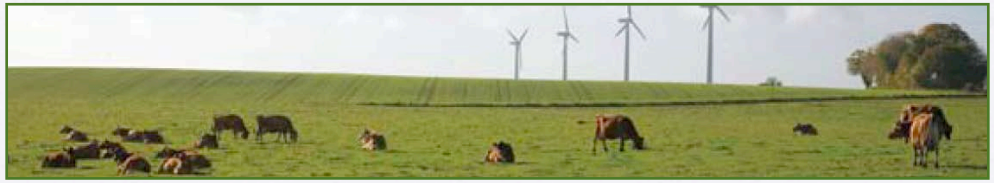
8 Action Programmes

Mitigation - adaptation - innovation

- Regional energy system
- Agriculture
- Industry and technology
- Transport
- Towns and buildings
- Open land
- Health care and emergency management
- Regional and municipal organizations



The Regional Energy System

Objectives

- To convert the regional energy system gradually to use of renewable energy.
- To promote more effective use of energy.

Fields of action

- Utilizing the potential for biomass in the region.
- Continued utilization of the region's wind power potential.
- Disseminating and integrating new types of renewable energy facilities.
- Saving energy in households, institutions, commercial and service organizations as well as in industry.
- Preparing heat and energy plans.

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Training and support

- Training activities for the municipalities in the region
- Support in the development of local action plans - **SEAP** Sustainable Energy Action Plan

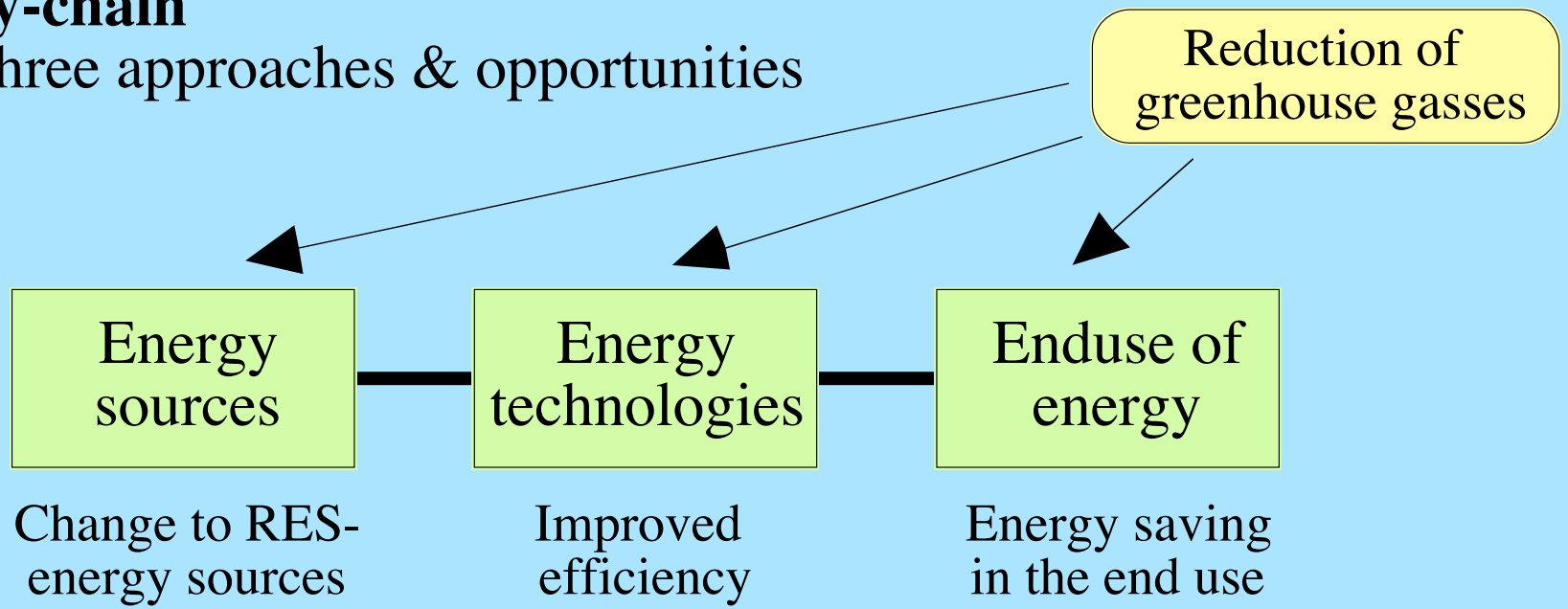
Energy balance

Energy balance = the whole production chain:

Three approaches:

(1) change of sources: RES
(2) more efficient and carbon efficient conversion
(3) savings in end-use

Energy-chain
- The three approaches & opportunities



Planning - Four important steps

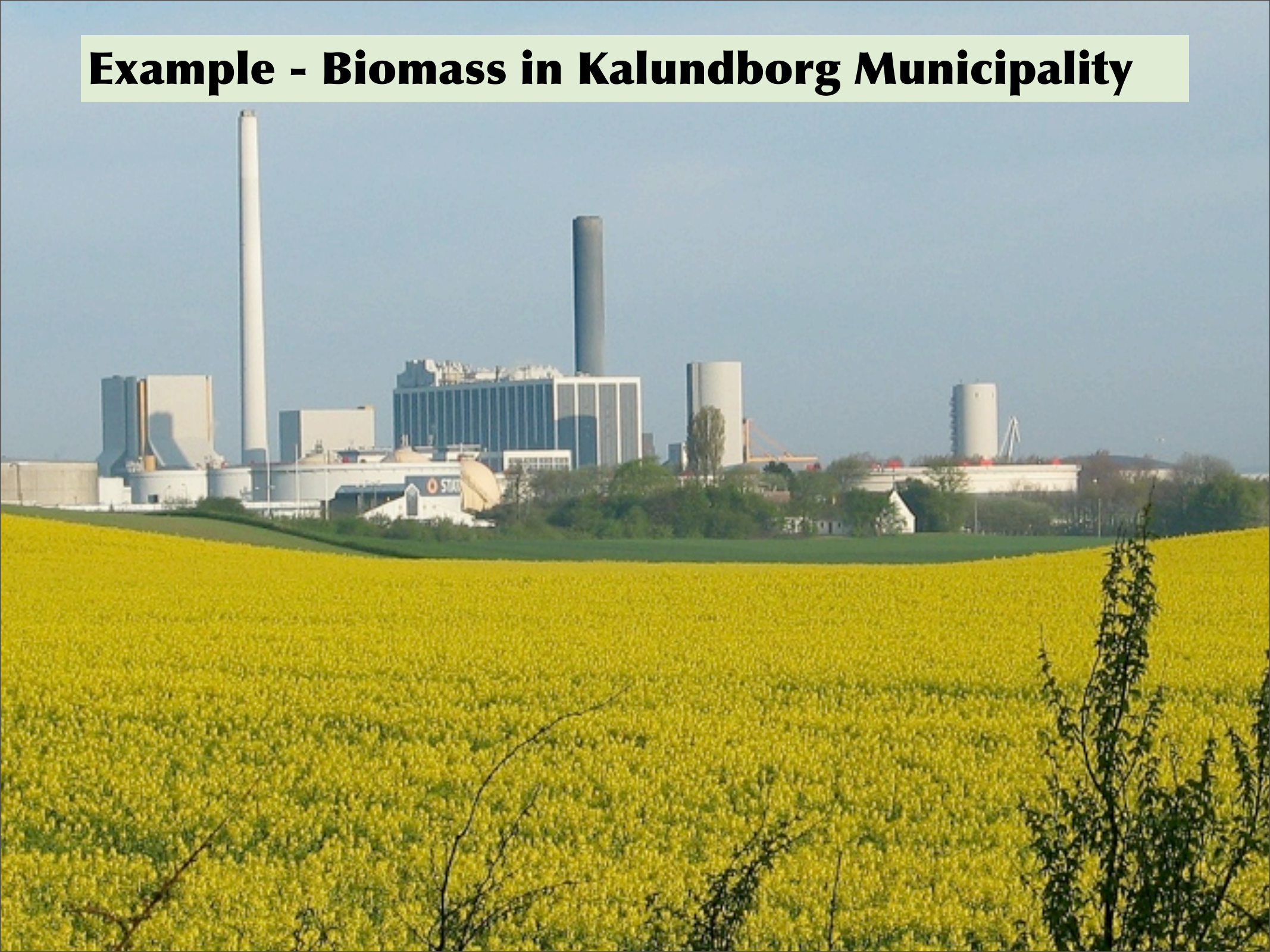
Four steps:

- **Energy balance** to identify the energy consumption (input and output) and the amount/origin of the greenhouse gasses
- **Projection** of energy consumption (input/output) and the emission of the greenhouse gasses - to create a baseline
- Identification of **opportunities** for implementation of biomass and reduction of greenhouse gasses
- Establish a **biomass action plan**

Presentation:

Example from Kalundborg Muncipality

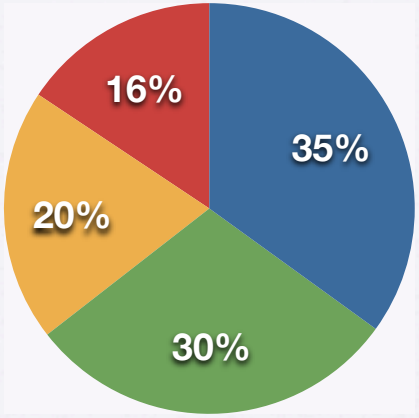
Example - Biomass in Kalundborg Municipality



Kalundborg - Energy consumption 2008

An example

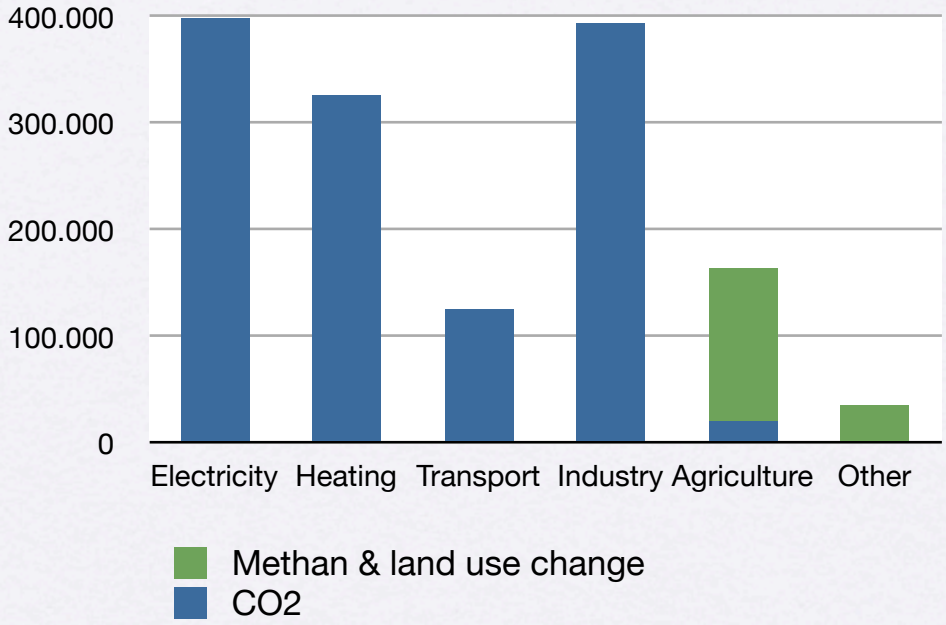
Total energy consumption 2008



Electricity:	866.500 MWh
Heating:	731.100 MWh
Transport:	492.600 MWh
Process energy:	387.700 MWh
In total	2.477.900 MWh

Greenhouse gas emission 2008

Greenhouse gas emission in total: 1.427.600 tons



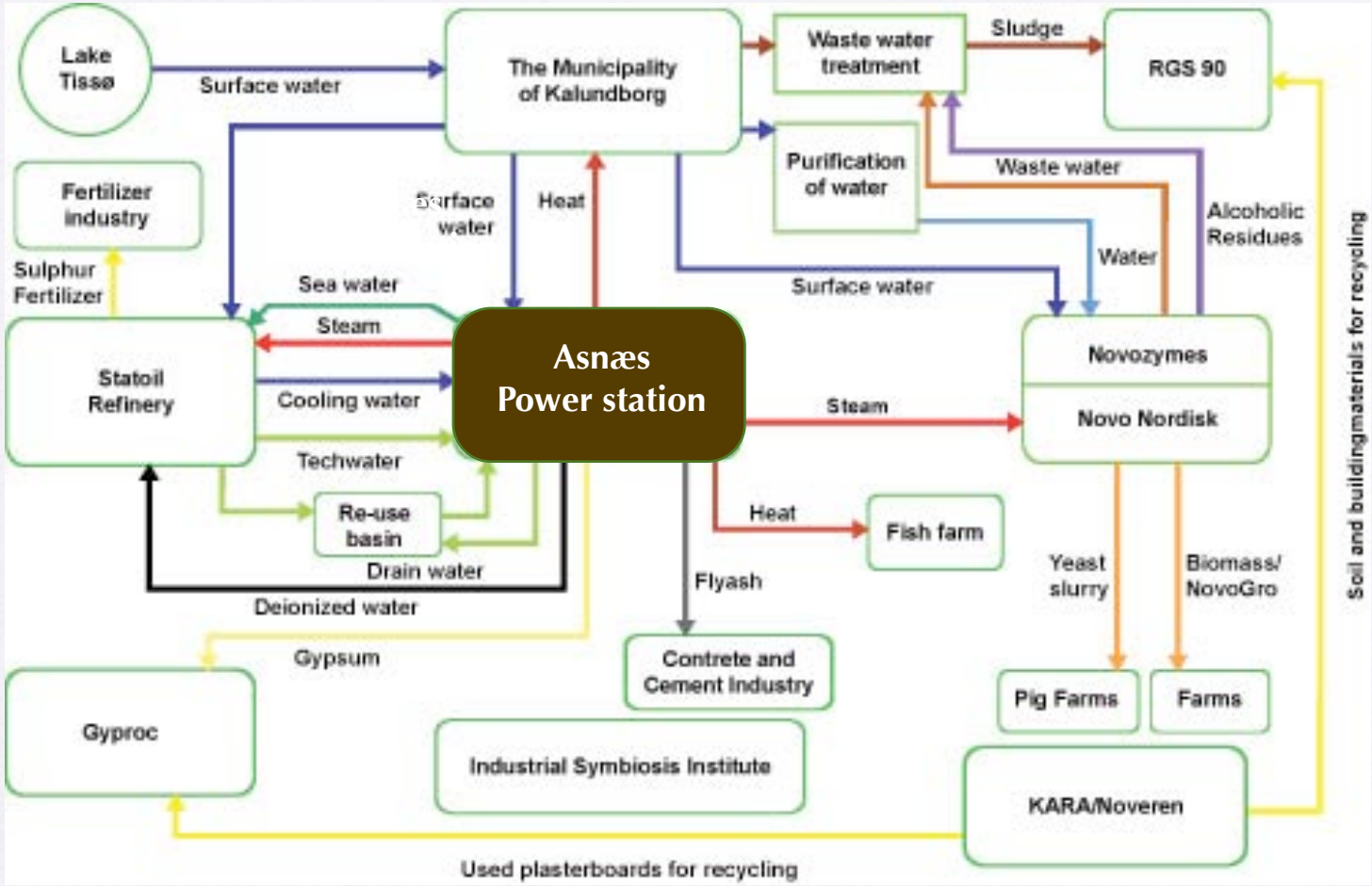
Industrial symbiosis in Kalundborg

The energy sources in the industrial symbiosis in Kalundborg

Coal fired

Industrial symbiosis

- Use of waste and surplus heat from one company as raw material for another
- Reduction/reuse of waste: 287.800 tons
- Greenhouse gas reduktion: 210.000 tons
- District heating based on the symbiosis: 1.948.300 m2
- Energy consumption of the industries in the symbiosis: 1.108.600 MWh



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Long term - 2050

Kalundborg Municipality

Expected national development:

- Main energy sources in 2050:
  Wind (60-70%) and biomass (30-40%)
  Danish Climate Commission, Sep. 2010

Kalundborg:

Energy efficiency - improvement

- Actual consumption: 2.477.900 MWh
- After improvement: 2.040.000 MWh

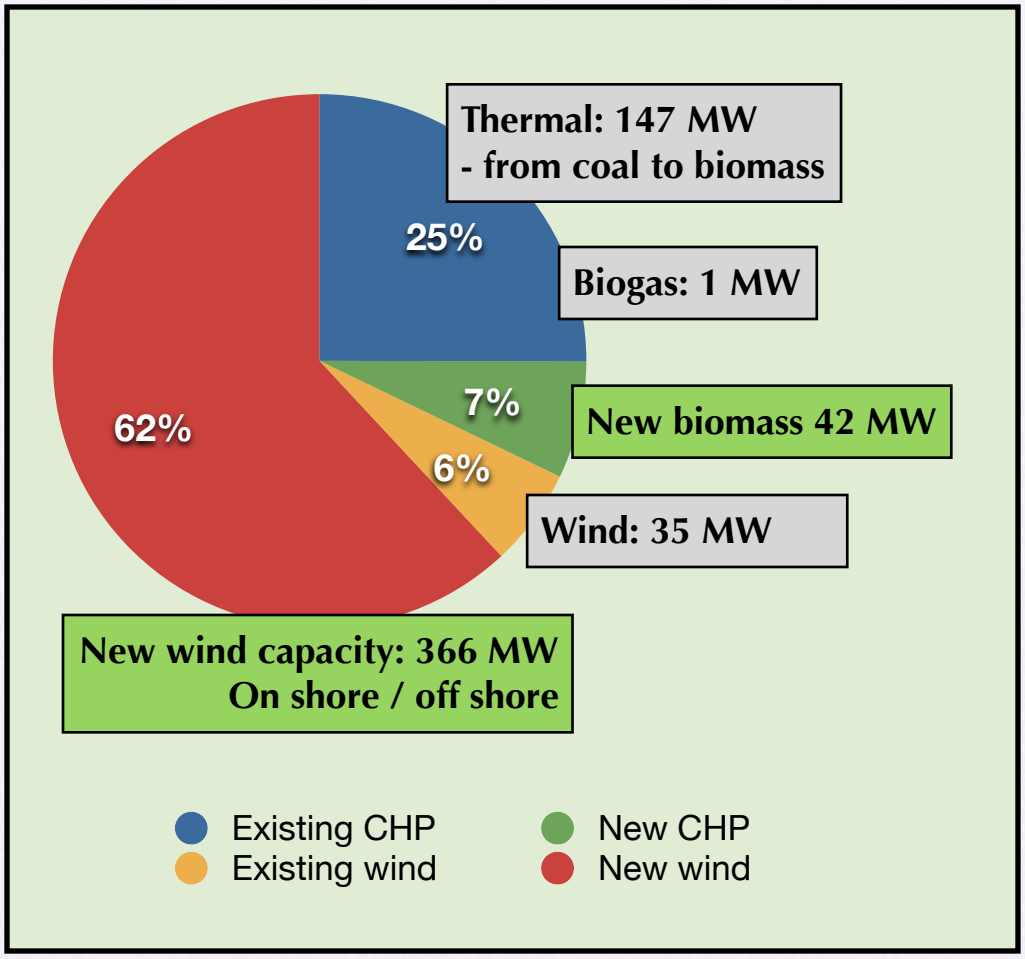
Long term distribution on sources

- Windpower (60-70%): 60%
- Biomass (30-40%): 40%

Needed capacity in MW

- Biomass (CHP): 190 MW
- Windpower: 400 MW

The future energy prodution capacity



Short term 2020 - greening the symbiosis

New energy sources - biomass - to the industrial symbiosis in Kalundborg Municipality

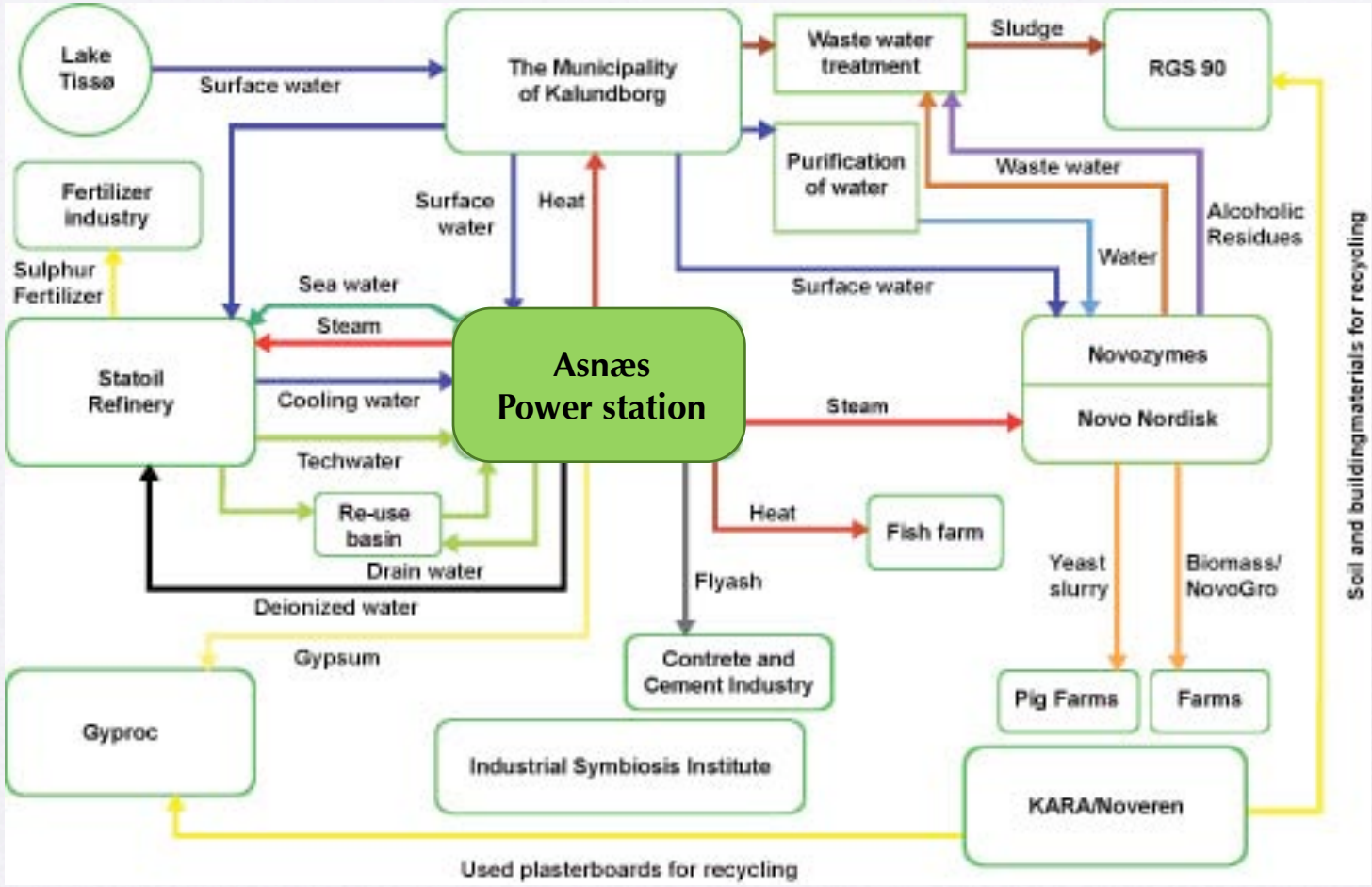
Industrial symbiosis

Biomass to substitute the coal in the industrial symbiosis

Biomass input in the level of 1.3 mill. MWh

Different activities in the next 10 years:
- rebuilding
- new plants and sources

The opportunities in Kalundborg

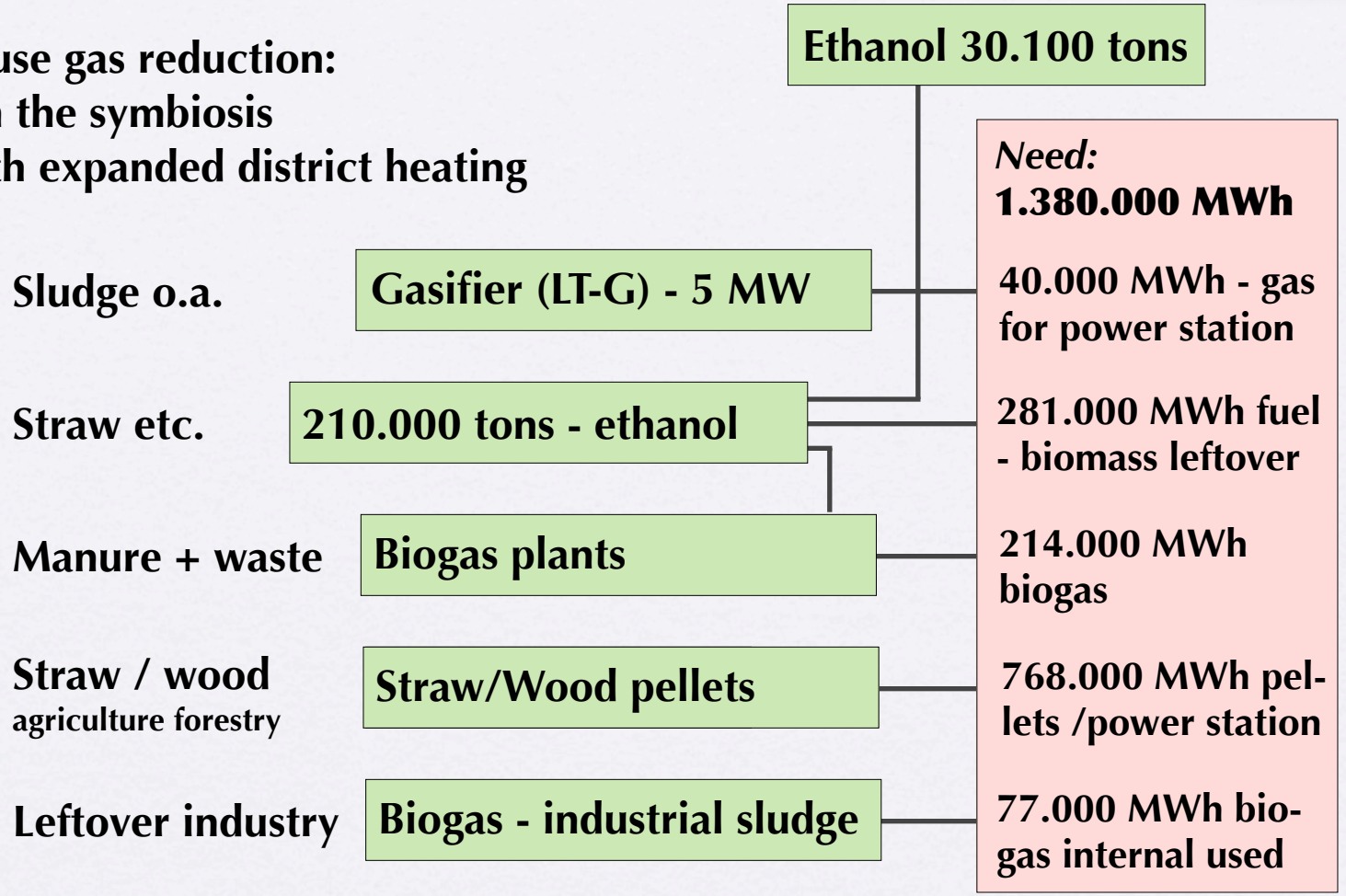


Short term - 2020

Biomass in the industrial symbiosis in Kalundborg Municipality

Biomass fired

Expected greenhouse gas reduction:
- 332.000 tons in the symbiosis
- 22.000 tons with expanded district heating



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The approaches

Biomass in the industrial symbiosis in Kalundborg Municipality

Multi-stakeholder involvement

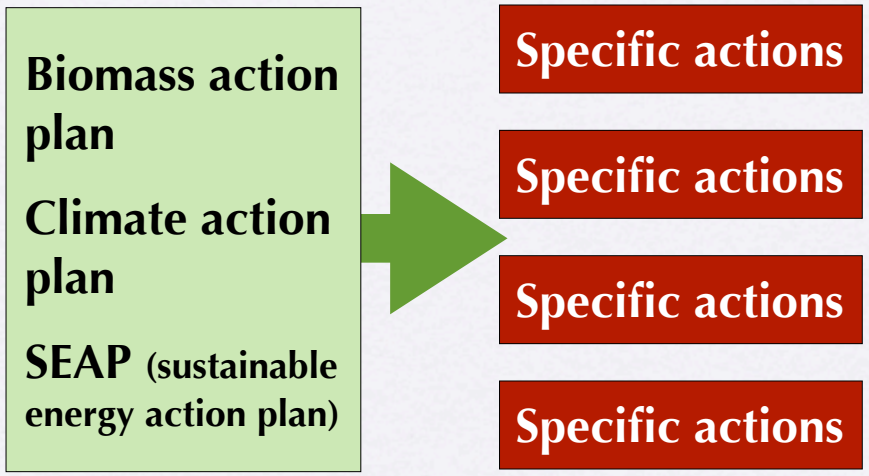
- Industrial symbiosis companies (six large companies), public utilities (district heating, etc.), other local companies, farmers and farmers association, different knowledge centers (among others Cluster Biofuel Denmark - CBD), authorities - Region Zealand, Kalundborg Municipality, Local Agenda 21 in the municipality, research and development institutions (universities, etc.) - basically organized by the municipality

Step by step approaches

- Biomass action plan
- Setting up goals and activities within each stakeholder
- Implementation - existing power company, new biomass plants & owners

Region: Supporting structure

2010 2020



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The role of the region

Four main elements

Strategy:

- Development of the climate strategy, including development of the regional energy system —> renewable energy —> biomass

Enabling innovation:

- Facilitation of innovative actions —> regional programmes and project funding on biomass potentials and RE-systems

Regional business development:

- Support for projects - feasibility study, development of pilot and demonstration plants, investment to support business development - priorities 2010 a.o: Climate, renewable energy, sustainable buildings

Public-private partnership:

- Regional networking, f.x. Biofuel Cluster Denmark, Green Centre (agricultural innovation). Joint companies between municipalities, utilities and industrial companies, triple-helix / quadruple helix

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