

The role and development of biogas in the Danish energy supply – regulatory framework

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These are the headline results for 2020:

More than 35% renewable energy in final energy consumption

Approximately 50% of electricity consumption to be supplied by wind power

7,6% reduction in gross energy consumption in relation to 2010

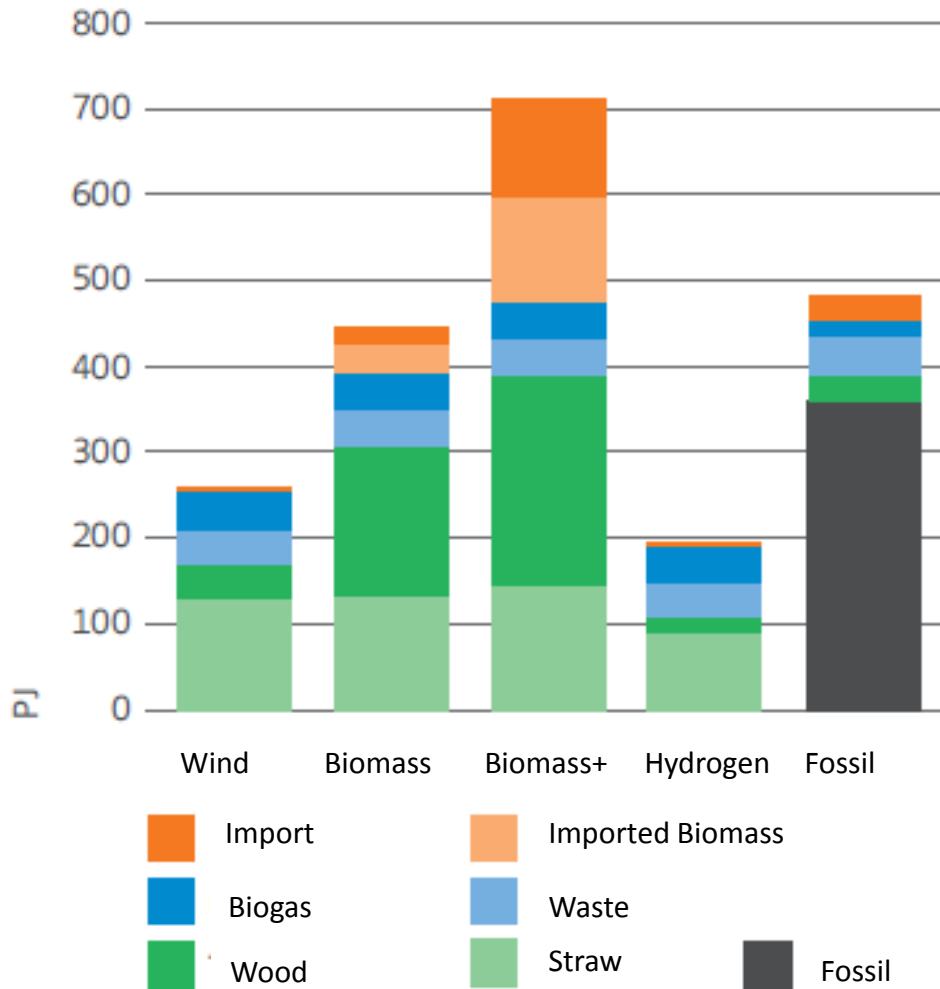
34% reduction in greenhouse gas emissions in relation to 1990

2035: Denmark should be completely free of fossil fuels for heat and electricity

2050: Denmark should be completely free of fossil fuels



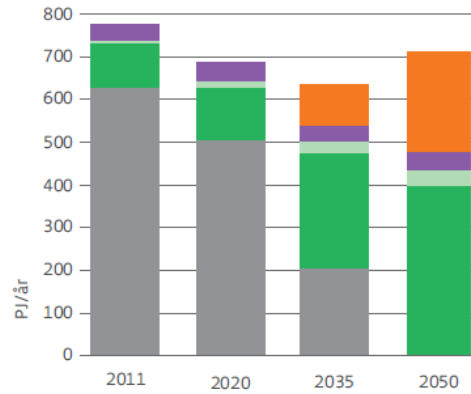
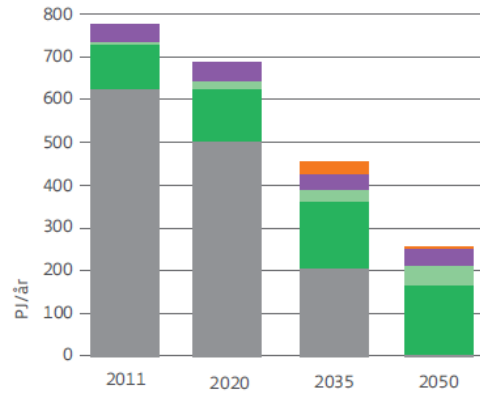
- Production of energy
- Improved use of animal manure and organic waste for soil amelioration, plant nutrition
- Recycling of organic waste from society
- Reduction of greenhouse gas emission – methane and nitrous oxide
- Reduced NO_3 leaching
- Sanitation of manure
- Reduction of odour
- Storable energy in a future energy system with high fluctuations



Use of biomass in 2050
In 5 scenarios

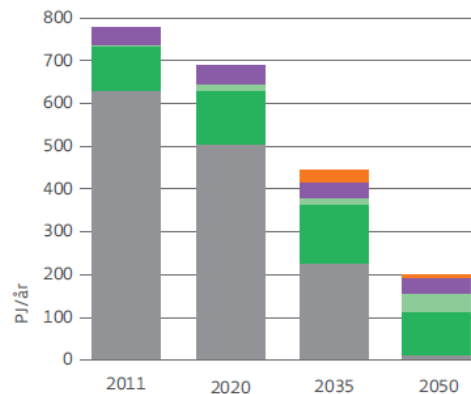
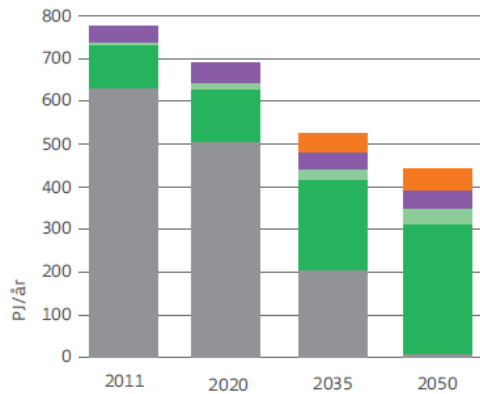
Scenarie >	Wind	Biomass	Biomass+	Hydrogen	Fossil
Gross energy demand PJ	575	590	674	562	546

Tabel 11.7. Bruttoenergiforbruget i de fem scenarier.



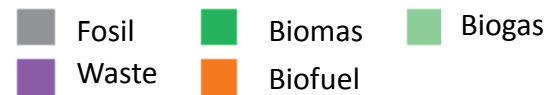
Wind scenarie

Biomass+



Biomass

Hydrogen



An important challenge for Denmark is to ensure the expansion of biogas. Biogas is useful in the energy system, and the technology reduces environmental problems. The ambitious plan for biogas expansion is underpinned by the following initiatives in the Energy Agreement:

- Funding of biogas for CHP to continue
- Introduction of subsidy equality so that biogas sold to the natural gas grid receives the same subsidy as biogas used at CHP plants
- Introduction of a new subsidy when biogas is used in industrial processes or as a fuel for transport
- The start-up aid for new biogas projects has been increased from 20% to 30%
- A task force has been established with the view of studying and supporting specific biogas projects
- If the required number of new biogas projects is not realised in 2012 and 2013, the parties behind the Energy Agreement will discuss further options, e.g. a proposal for a duty to purchase biogas in order to secure expansion

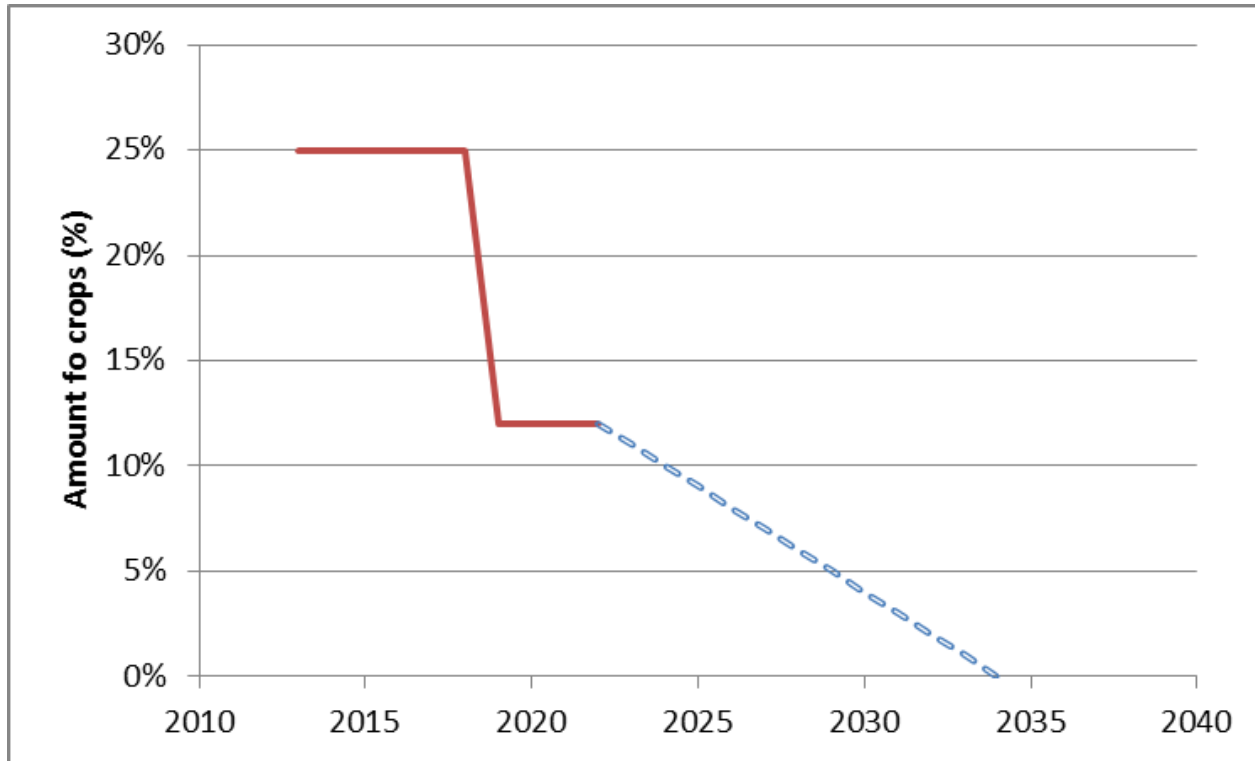


Green growth agreement 2009

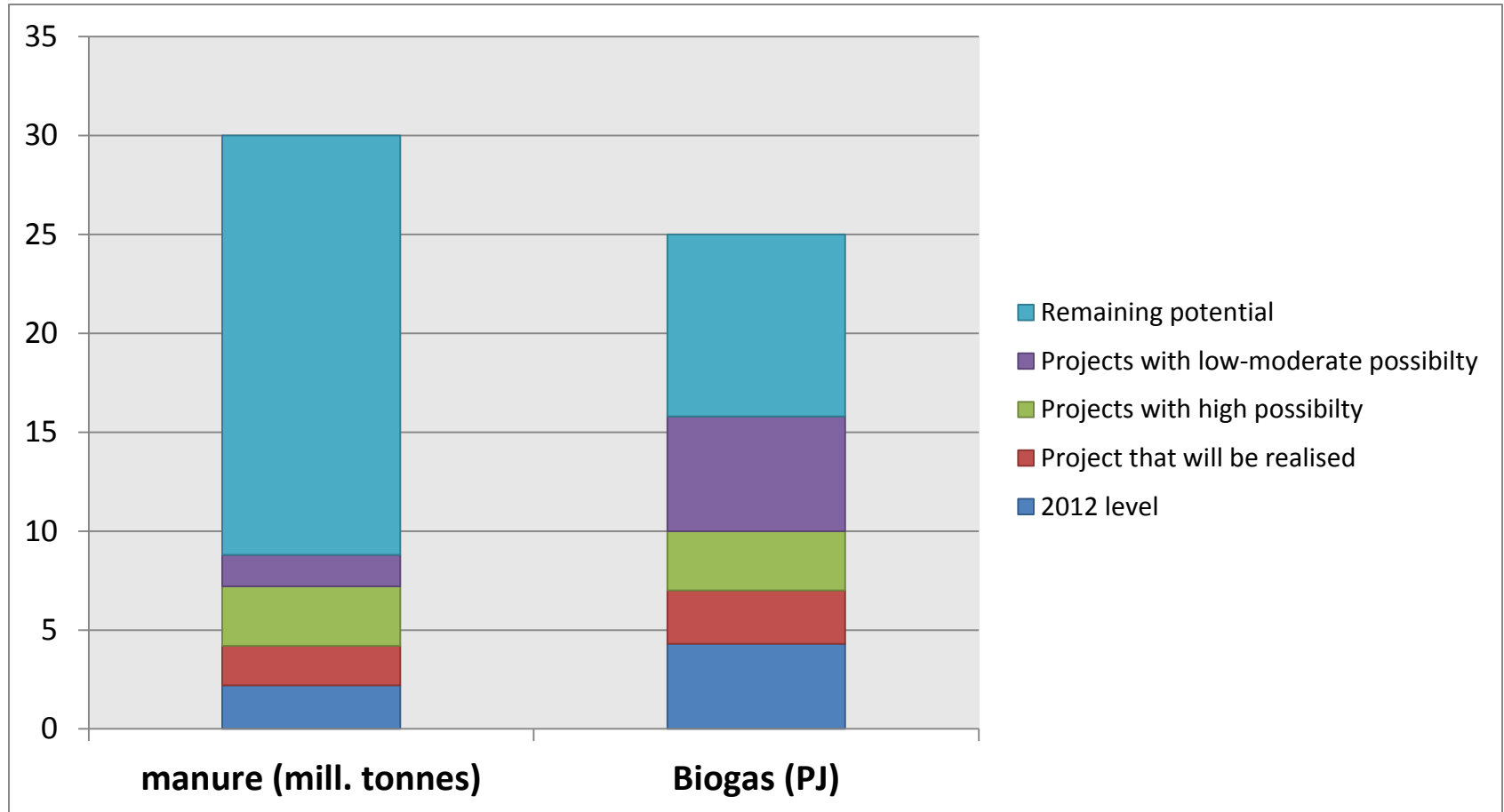
- ❖ 50% of manure in biogas in 2020 (today:9%)
- ❖ 20% investment grant (increases to 30% in 2012)

Energy agreement in march 2012: feed in tariffs

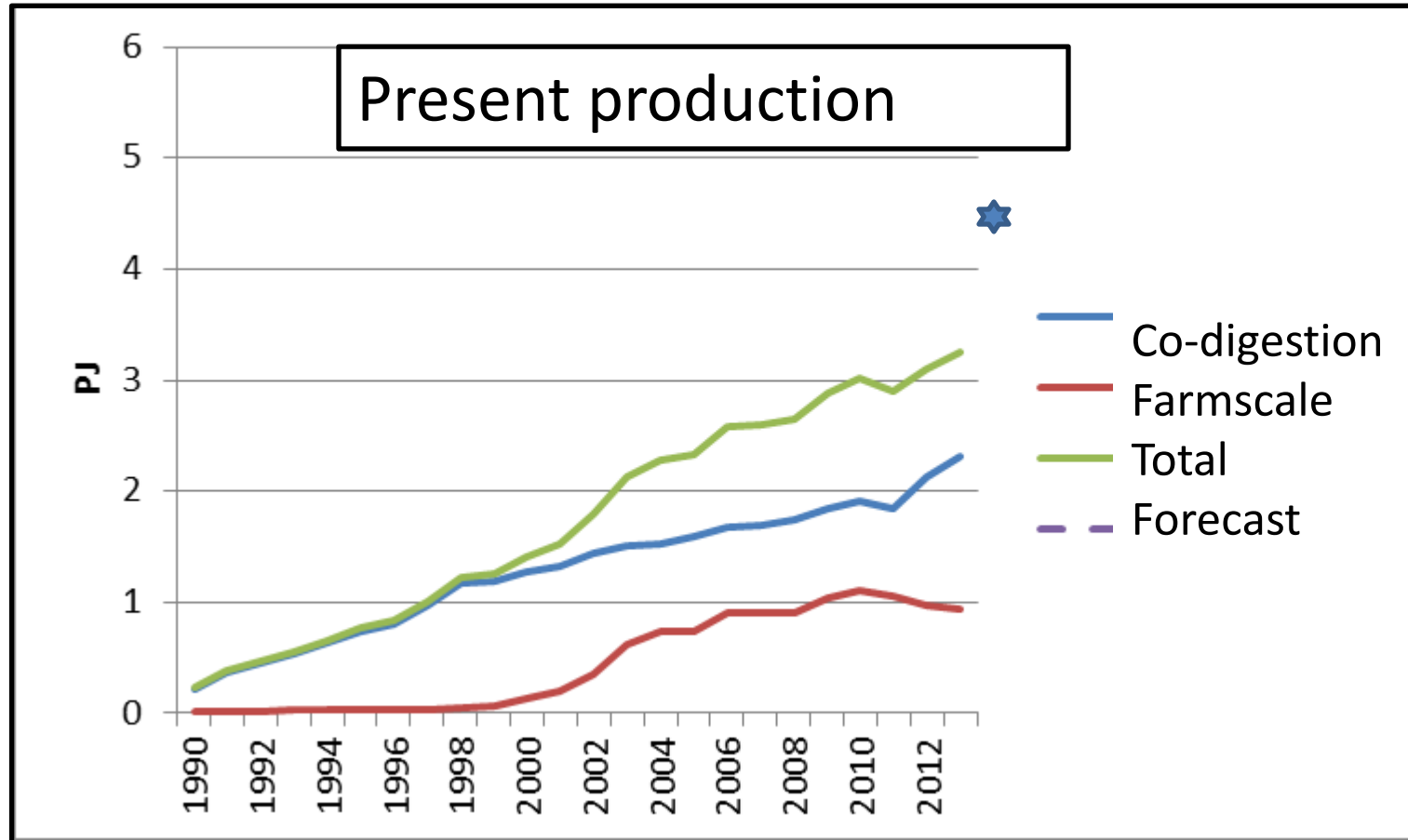
- ❖ A basic grant for biogas to process in enterprises and transport on the net 39 DKK/GJ;
- ❖ A grant of DKK 26/GJ for all uses of biogas.
- ❖ A further grant of DKK 10/GJ for all uses of biogas.
- ❖ The existing support of 79 DKK/GJ for biogas used in combined heat and power plants continued as the basic allowance
- ❖ Biomethane in the grid 115 DKK/GJ



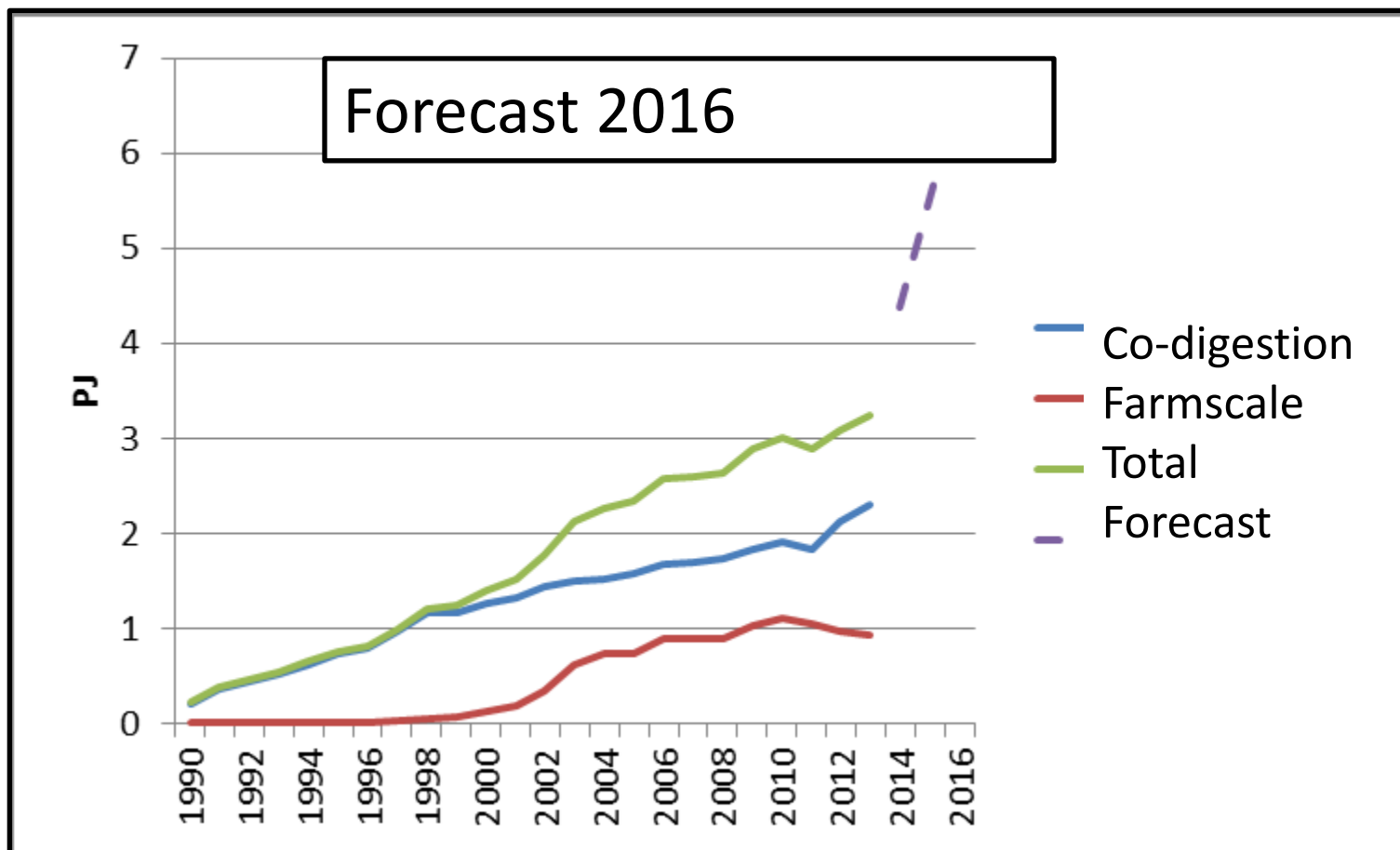
- I. Maize
- II. Beets
- III. Cereals
- IV. Grass
- V. Clovergrass
- VI. Jerusalem artichoke



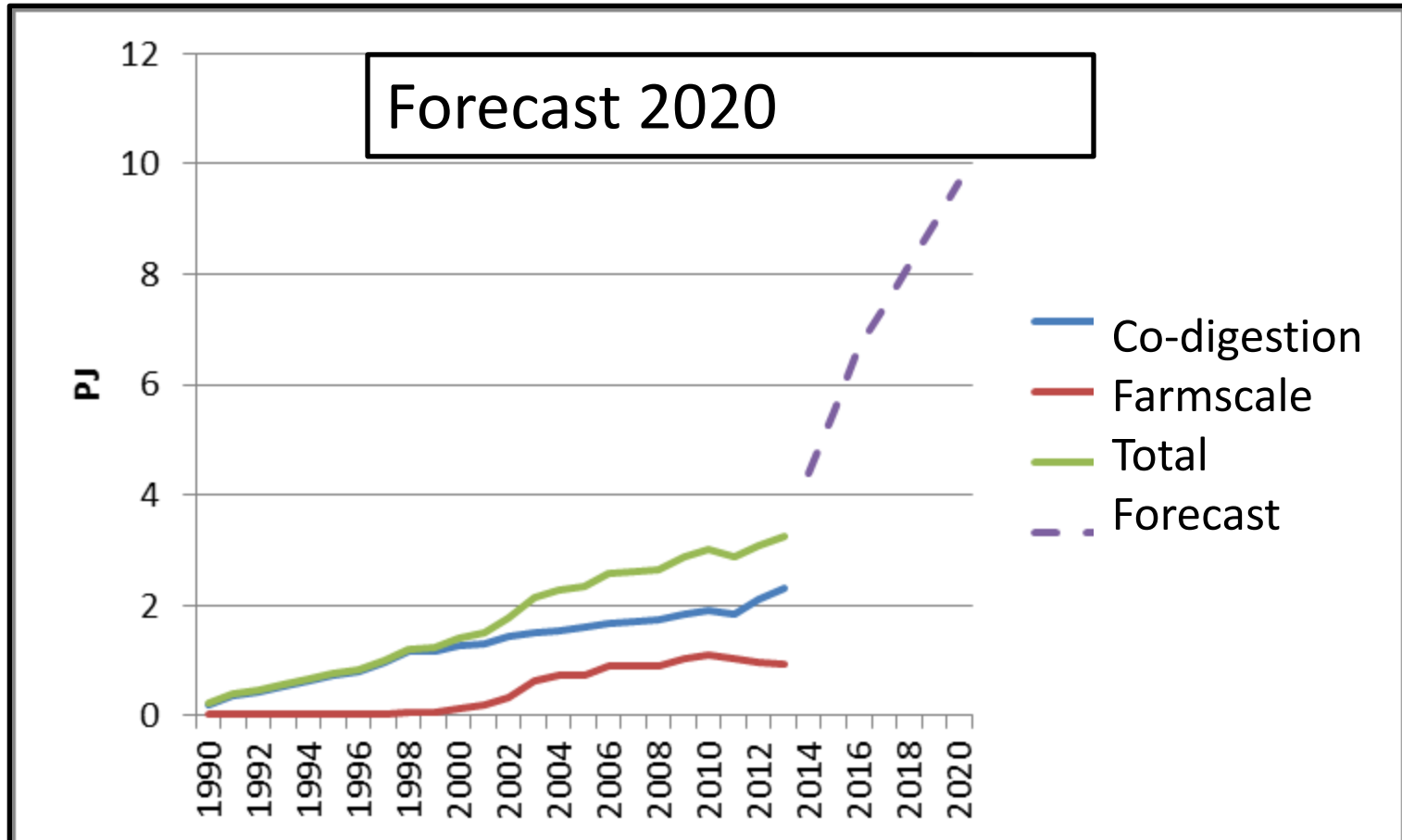
Biogas production



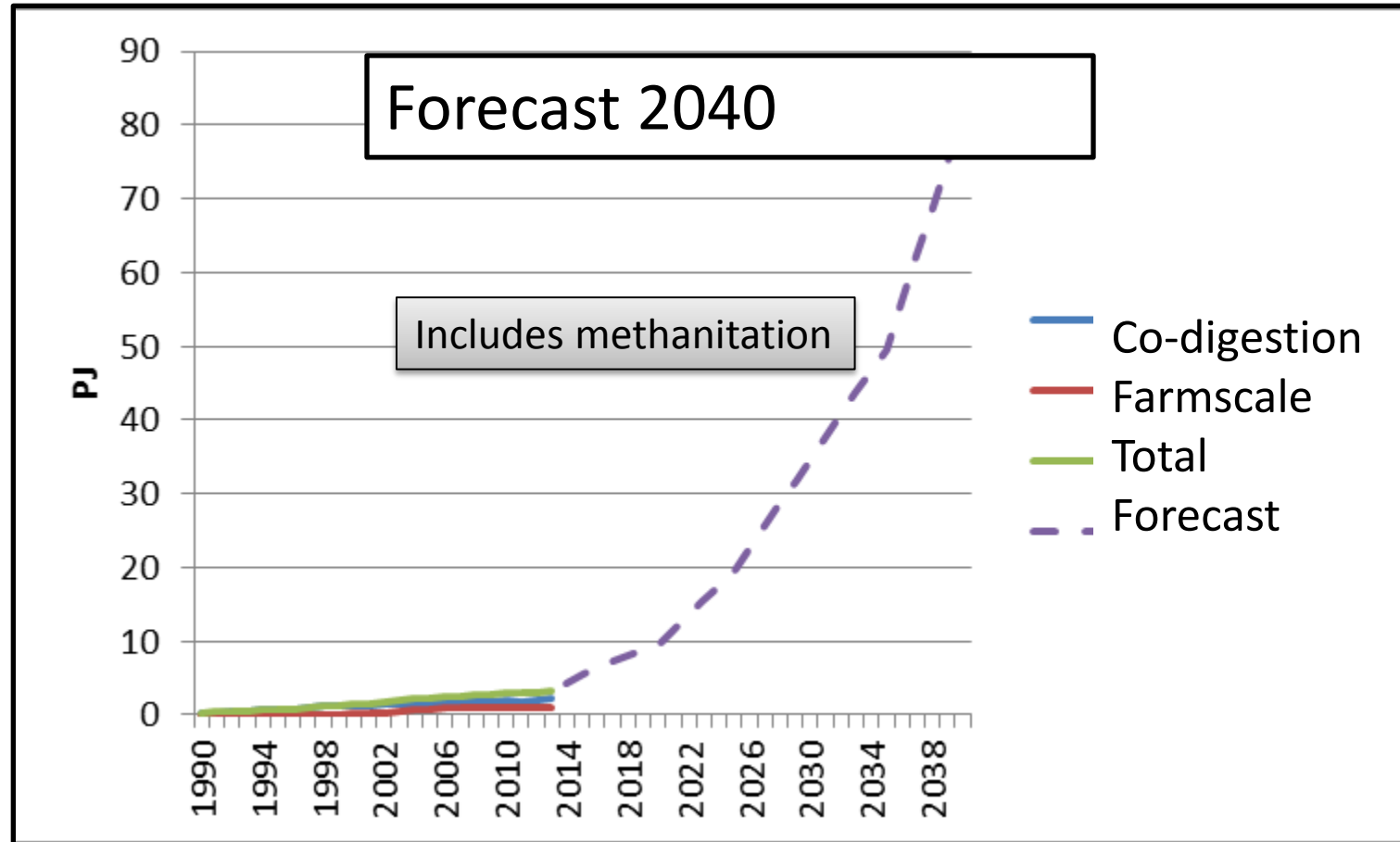
Biogas production



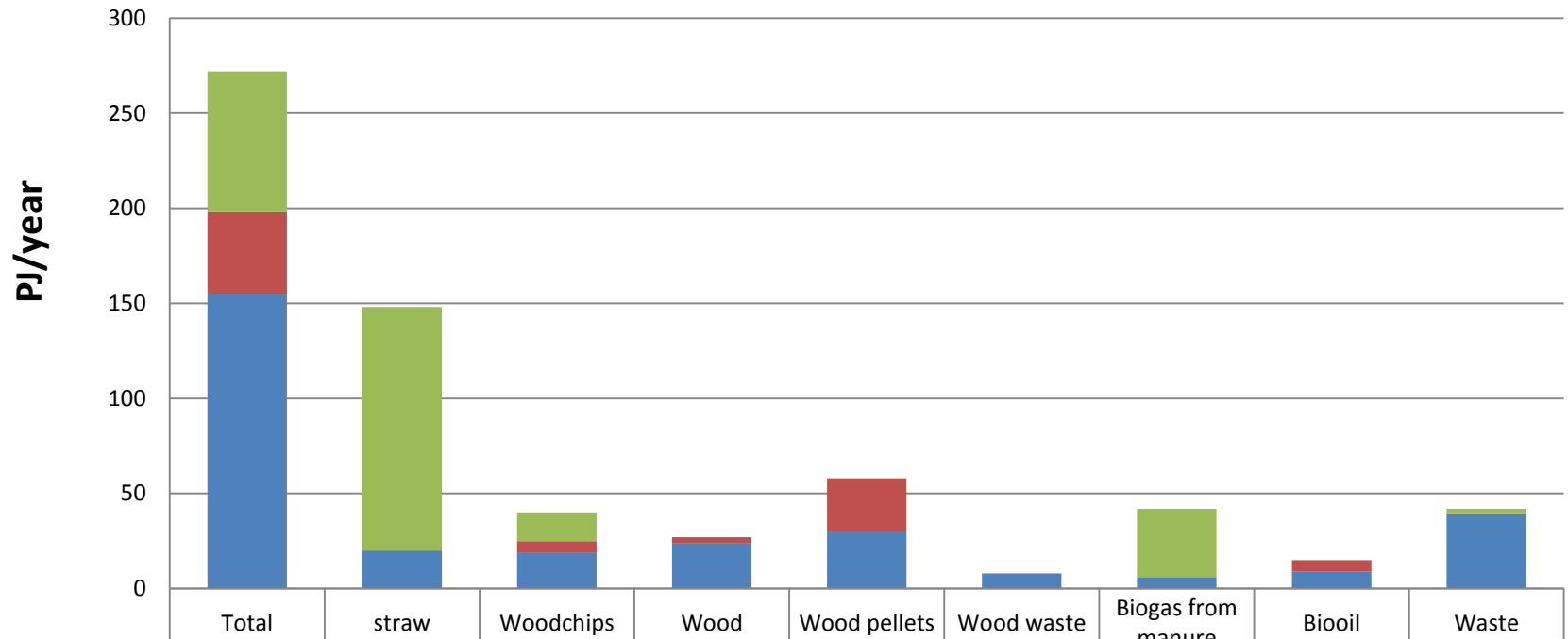
Biogas production



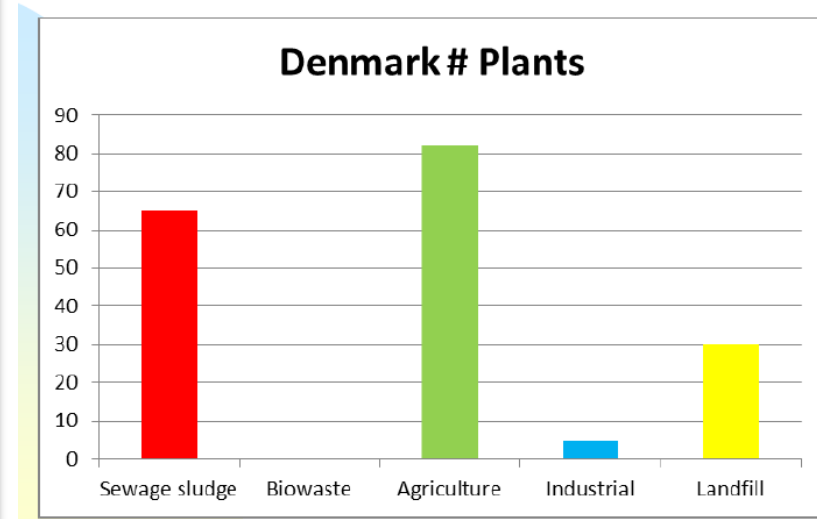
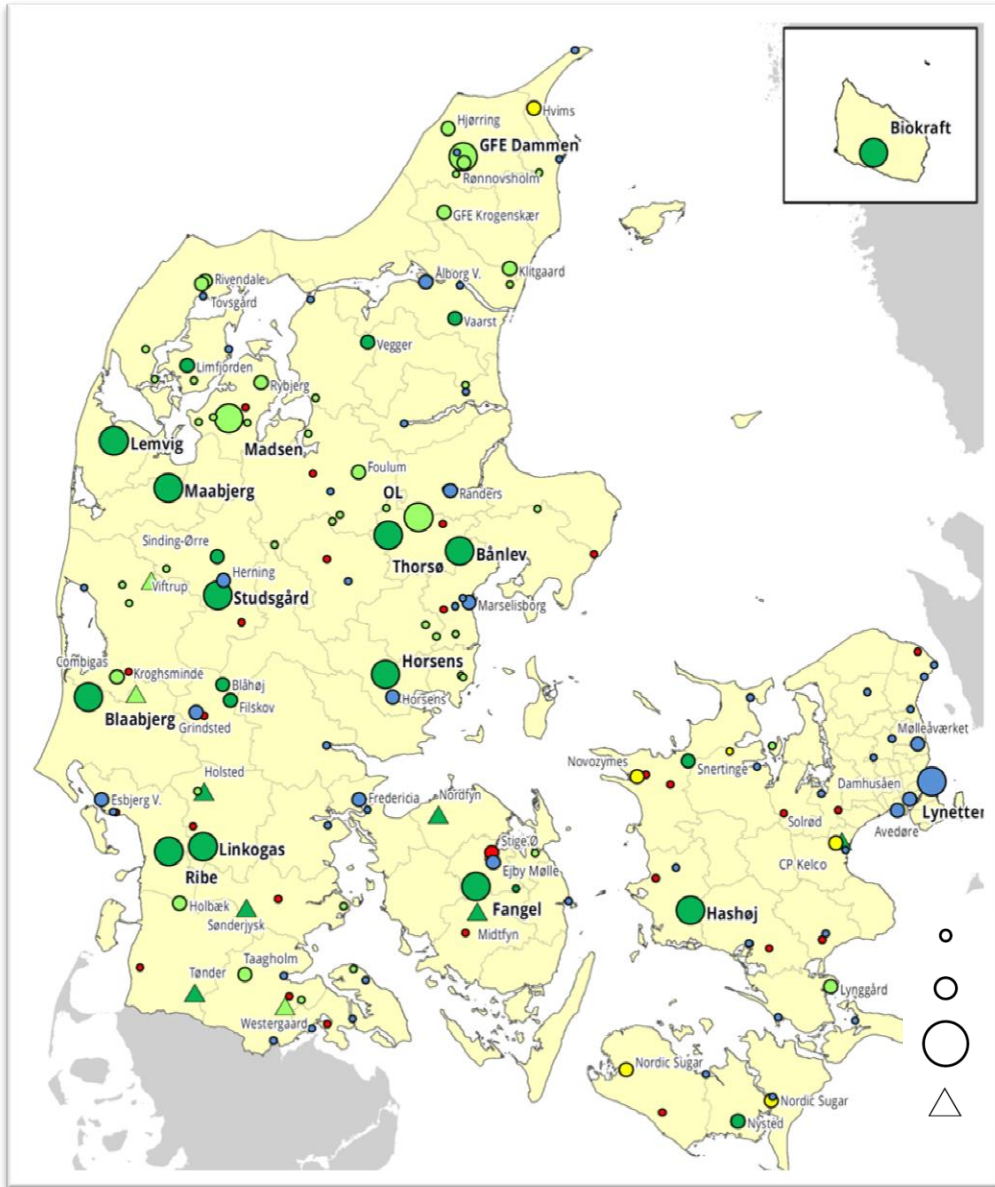
Biogas production



Energy in biomass

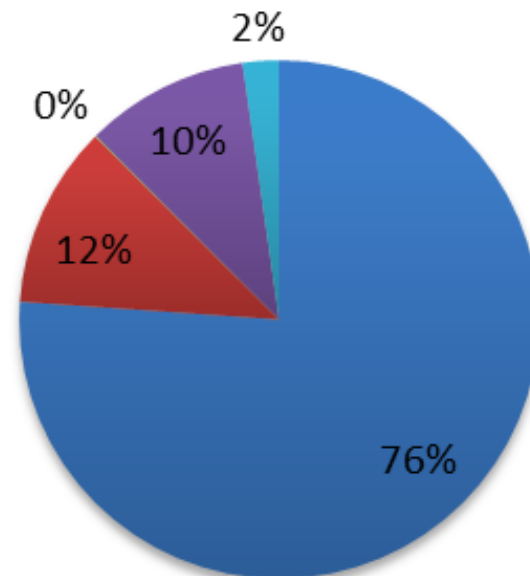


	Total	straw	Woodchips	Wood	Wood pellets	Wood waste	Biogas from manure	Biooil	Waste
■ Unused potential	74	128	15				36		3
■ Import	43	0	6	3	28	0	0	6	0
■ Used today	155	20	19	24	30	8	6	9	39



Utilisation of biogas in Denmark

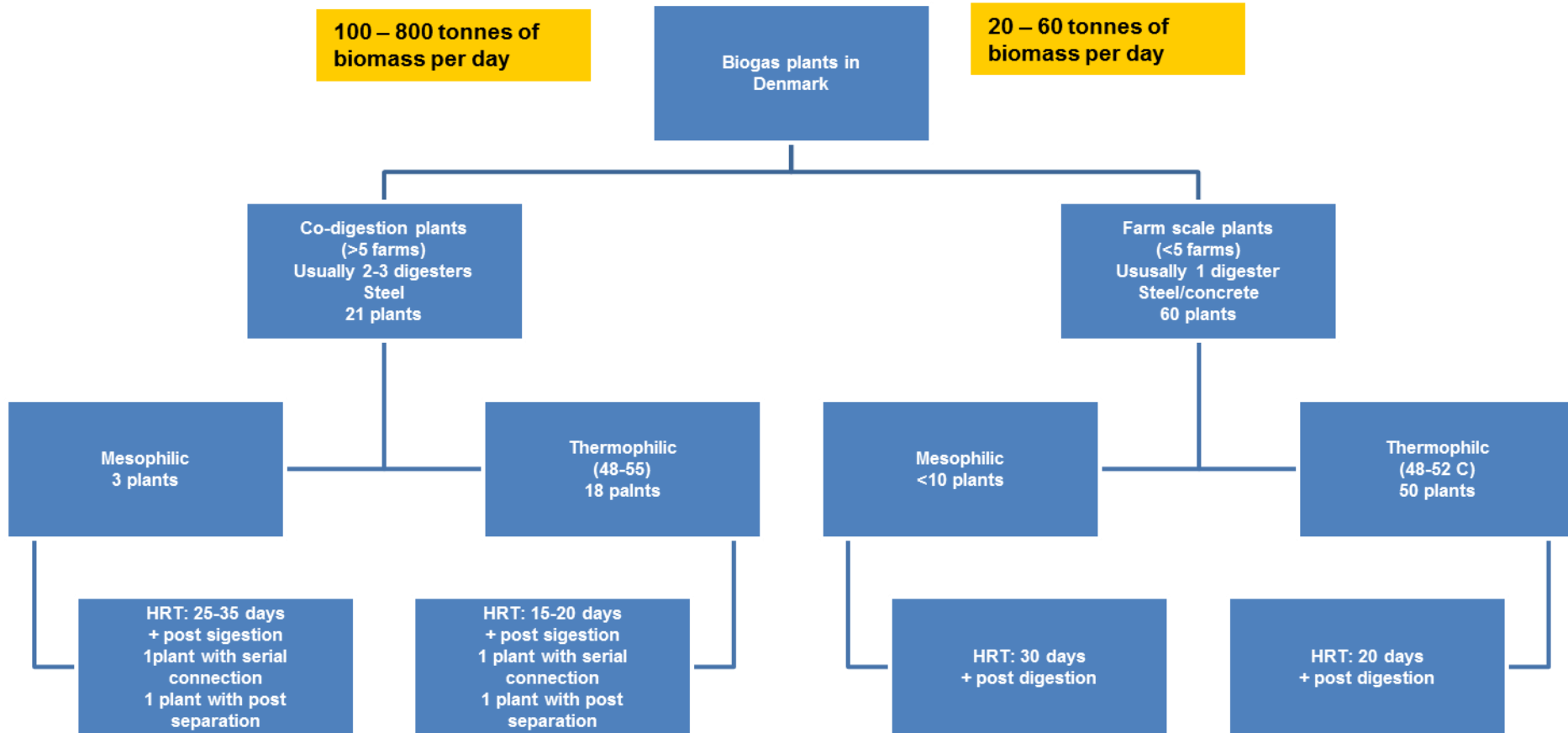
■ Direct CHP ■ Heat ■ Transportation ■ Flaring ■ Biomethane



Agricultural based biogas



Biogas in Denmark



Large scale centralized biogas plant

"Aiming at economies of scale"

- 500,000 tons biomass/year, hereof manure 450,000 tons
- Many substrates: Pig, cattle and chicken manure + wastes
- Heat and power
- Manure from 150 farms



Thanks for your
attention

