SCANDRIA Workshop
February 28 2012

The current political obstacles towards the introduction of biogas for the road transport

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Danish Biogas Association





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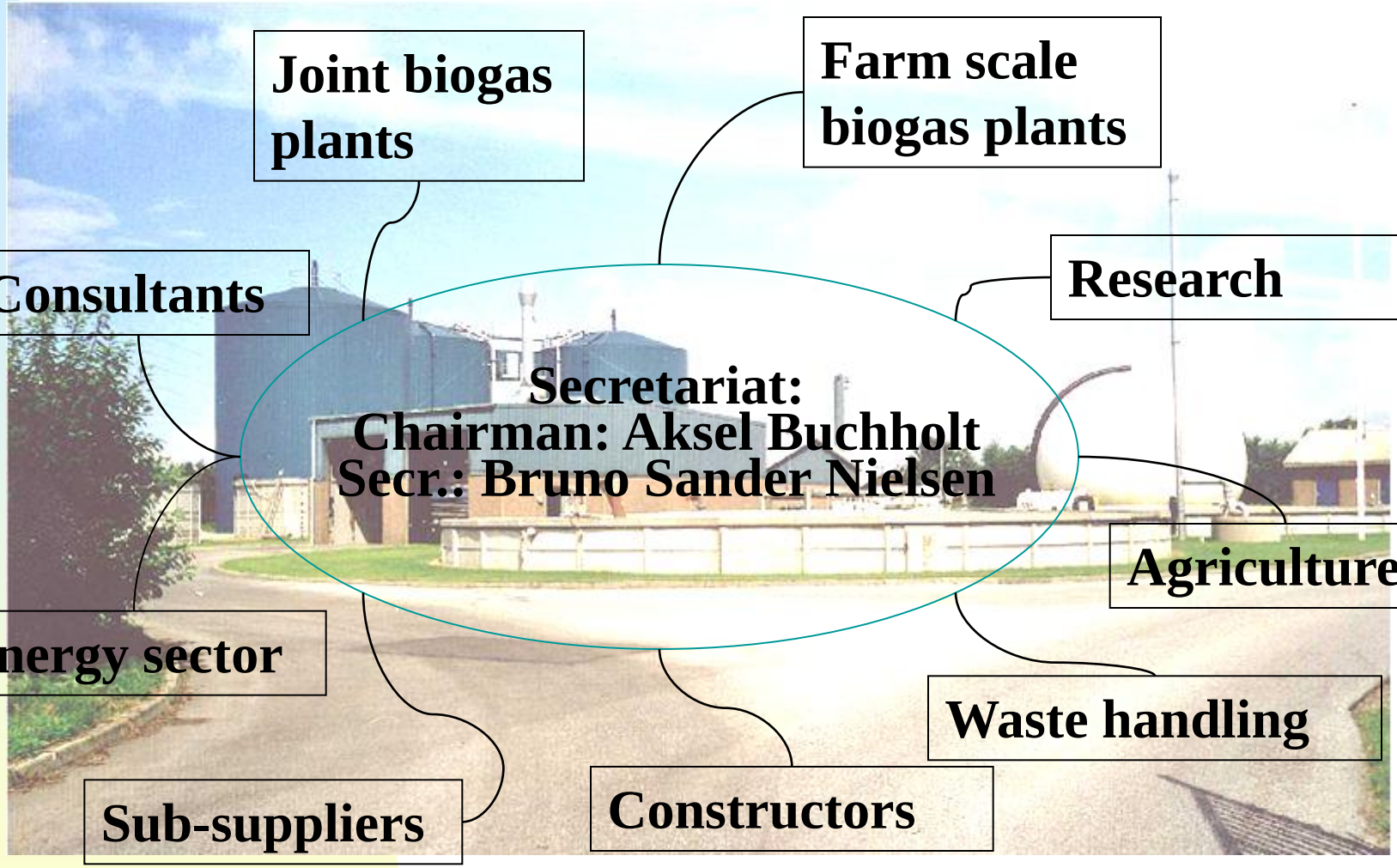
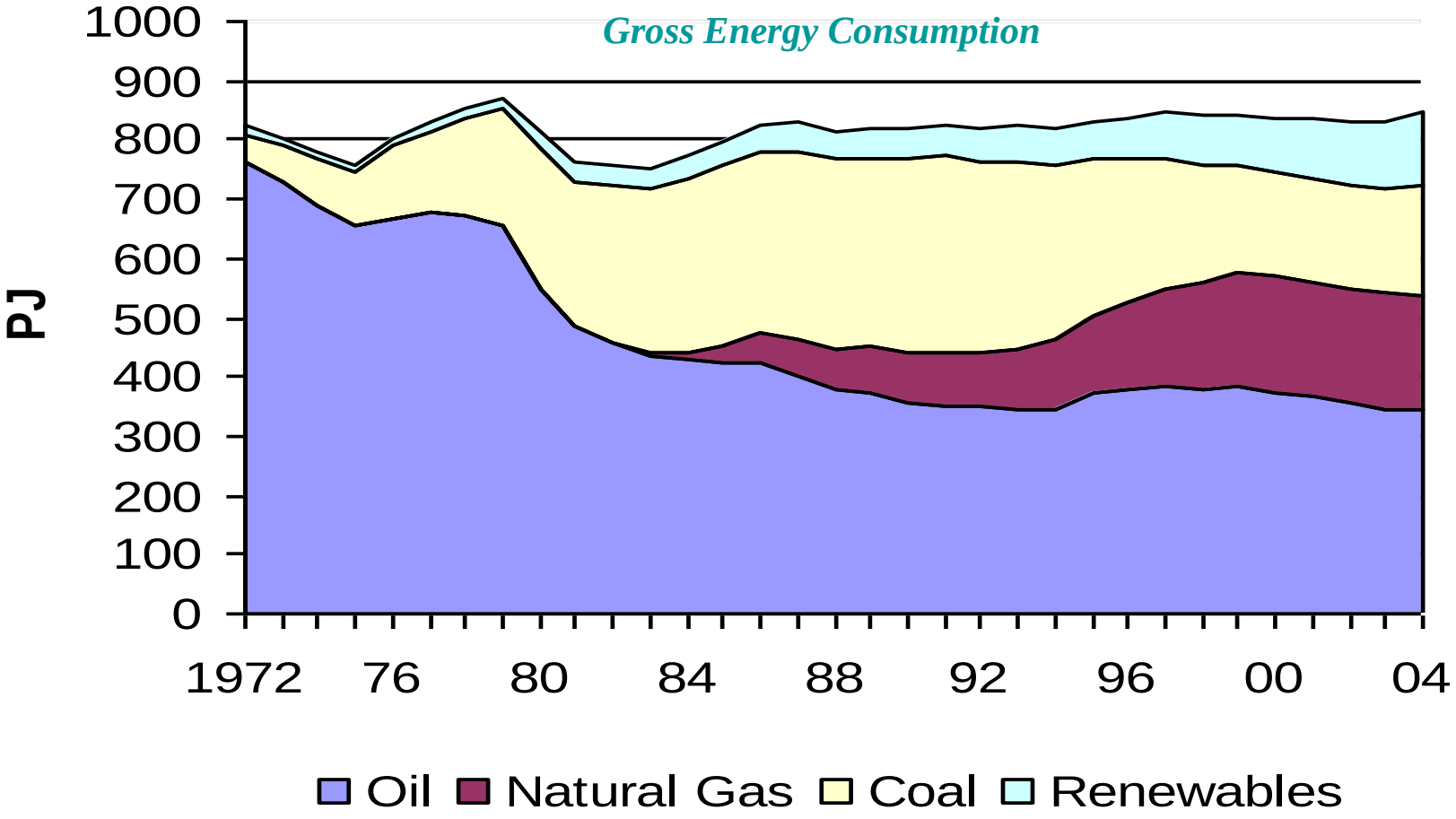


Diversification of Energy Supply



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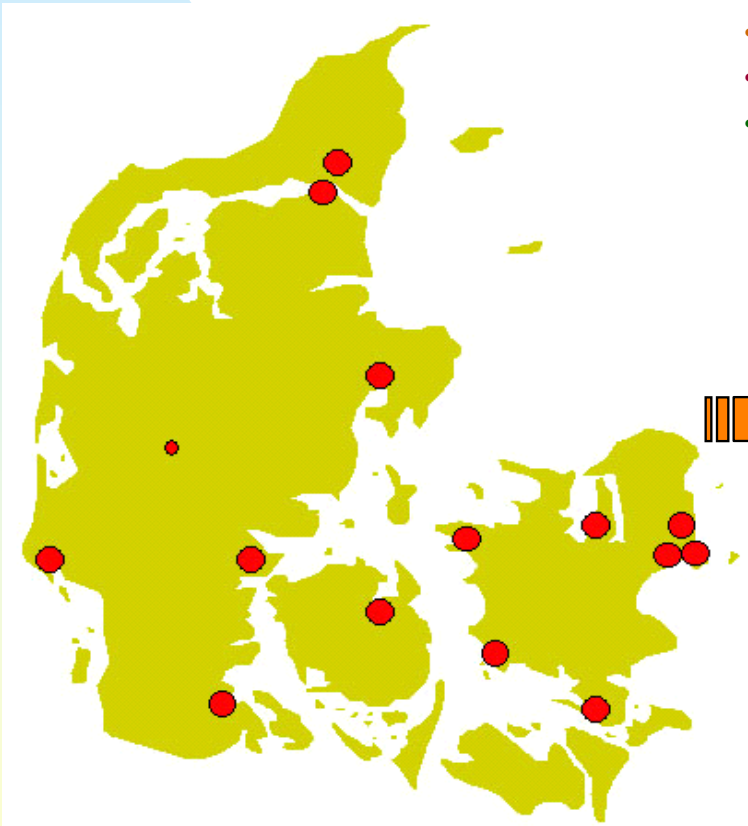
Danish energy sector

From centralized power plants to decentralized production

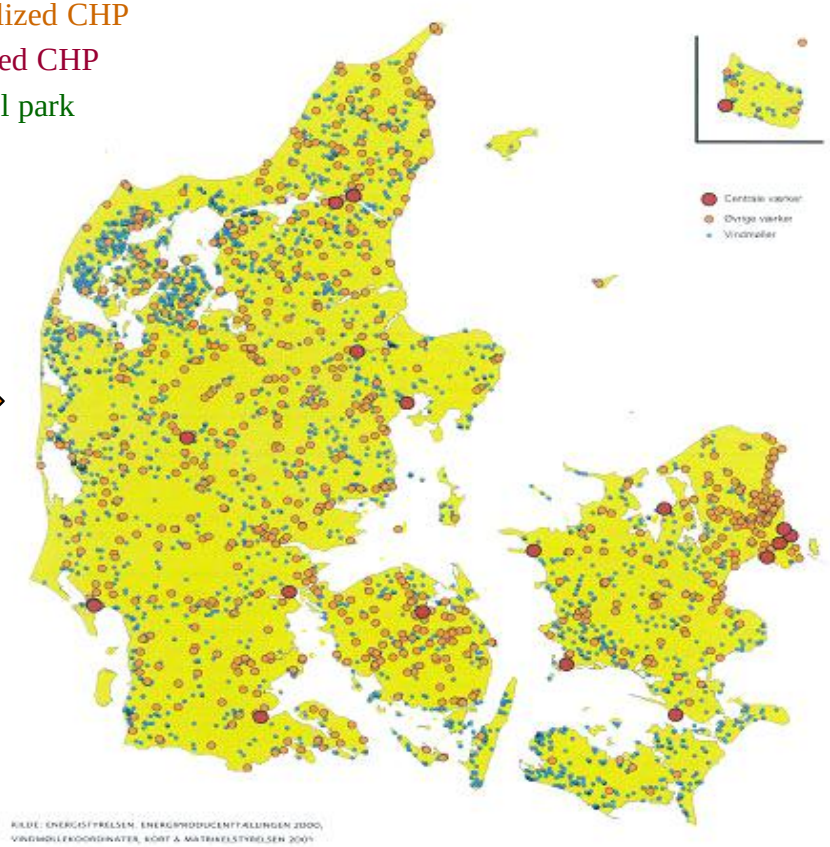
Centralized production in the mid 80's



Legend:

- Decentralized CHP
- Centralized CHP
- Wind mill park

Decentralized production of today



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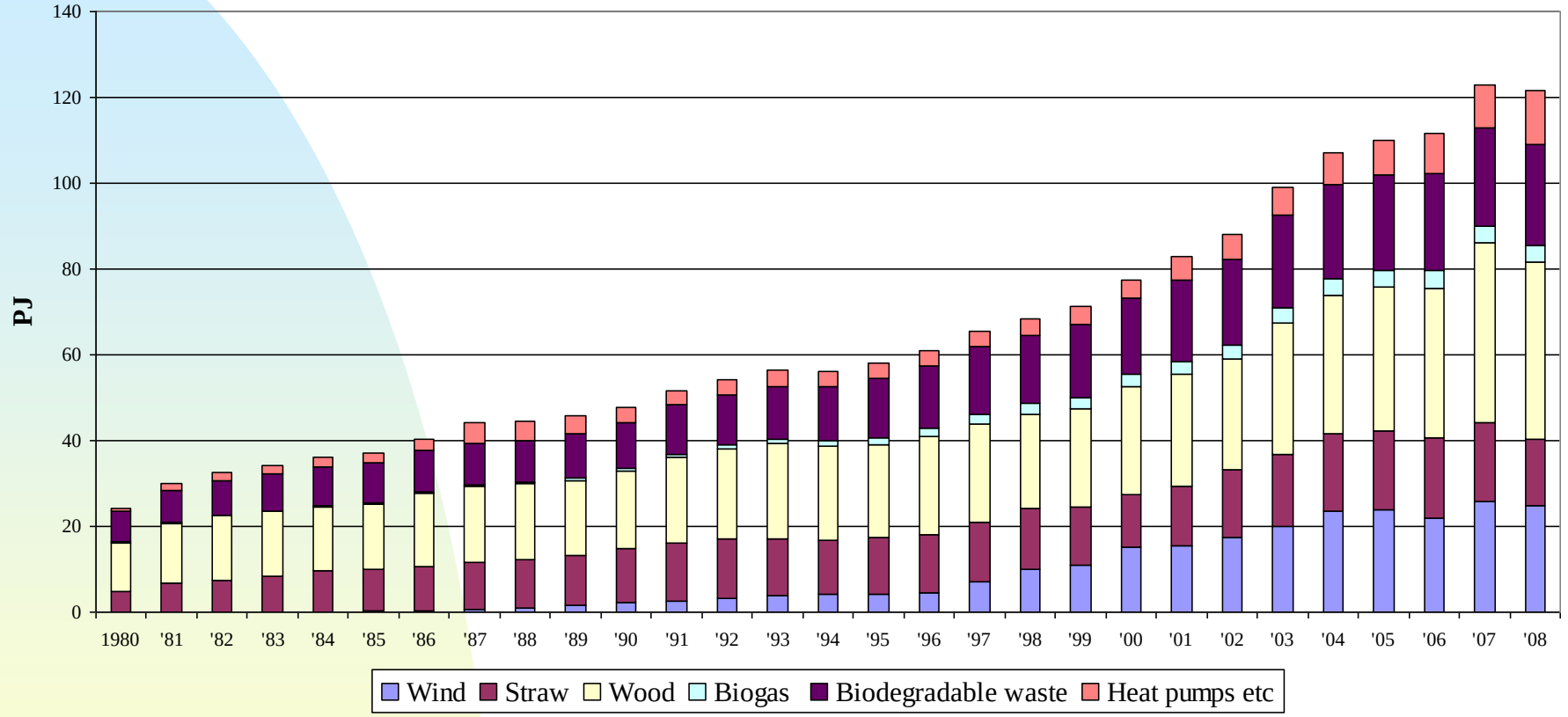
Renewable energy in Denmark



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Danish energy policy

- From oil to coal, natural gas and renewables
- Widespread natural gas grid
- From centralised power plants to decentralised co-generation of power and district heating
- Transportation is fossil
  - No tax reductions on biofuels
  - Market finansing 5,75 and 10 per cent renewables
- High share of windpower in power system
  - Renewable but unpredictable and unreliable
  - Backup systems needed

Biogas -stable and flexible

Biogas production

- Continous, stable and predictable
- Up/down regulation through seasons

Biogas utilisation

- Adaptation to demand
- Storage on biogas plant
- Back-up for windpower
- Injection into gas grid
- Transportation
- Engines and fuel cells

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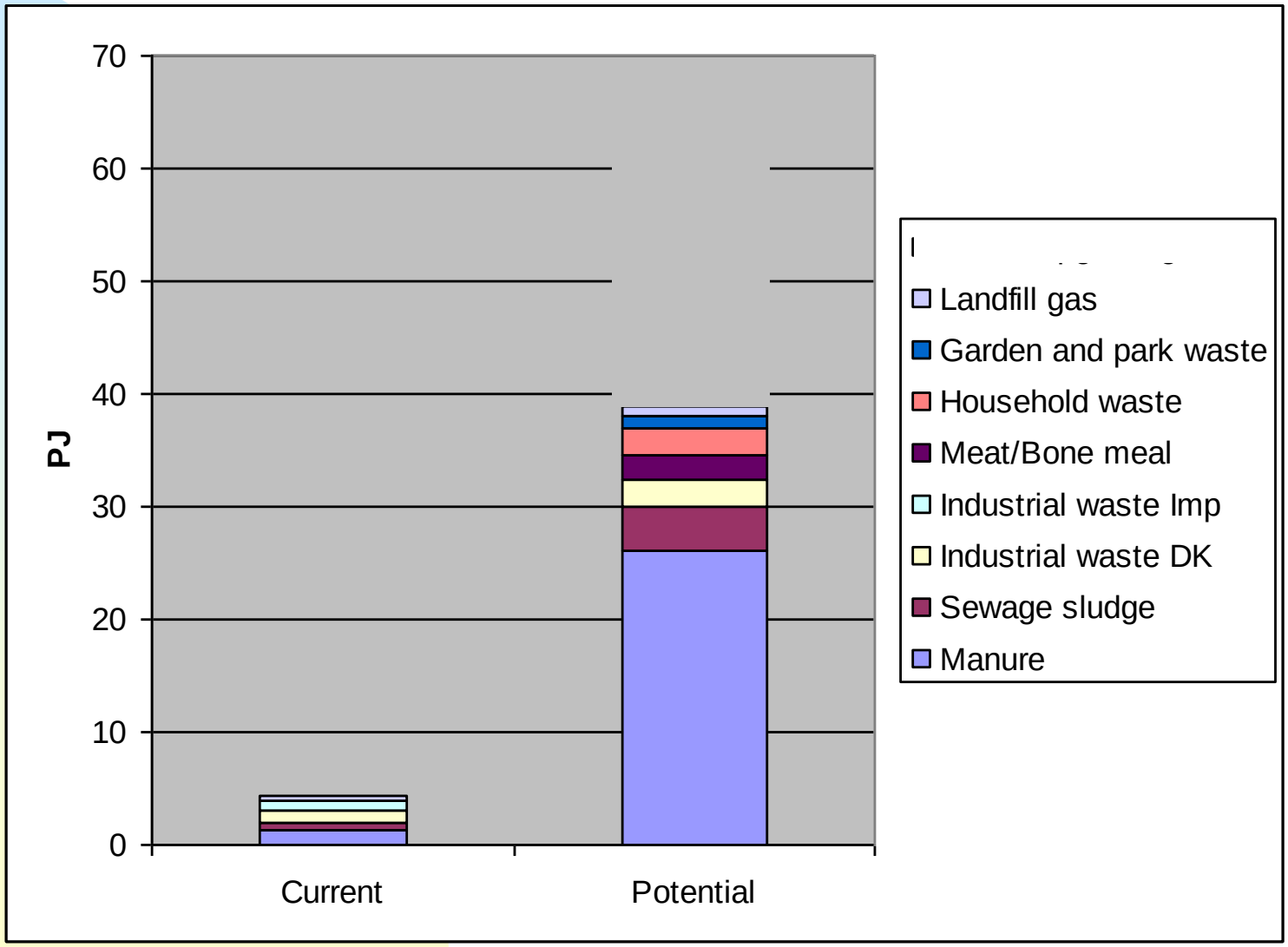
Biogas – currently and potential



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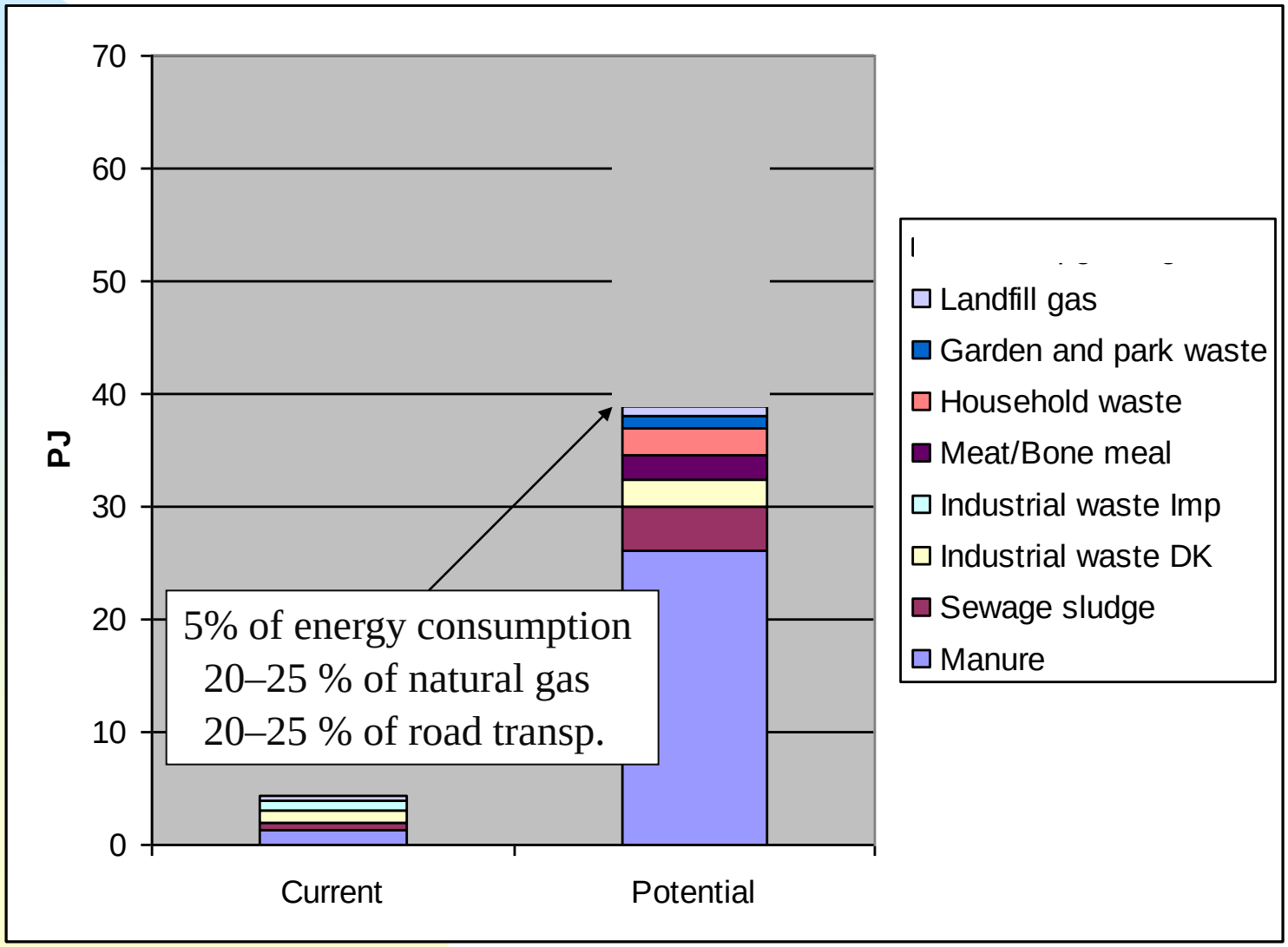
Biogas – currently and potential



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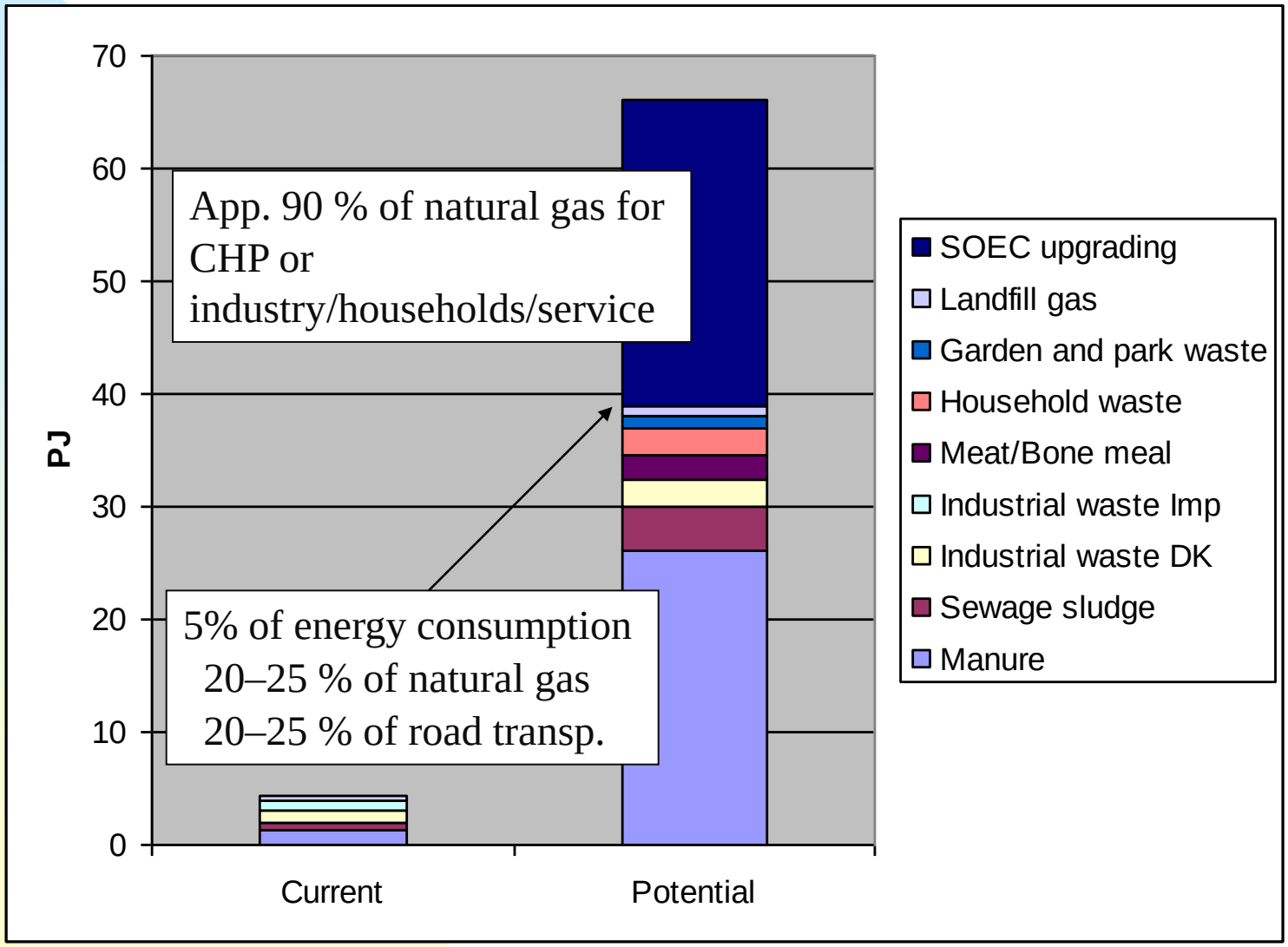

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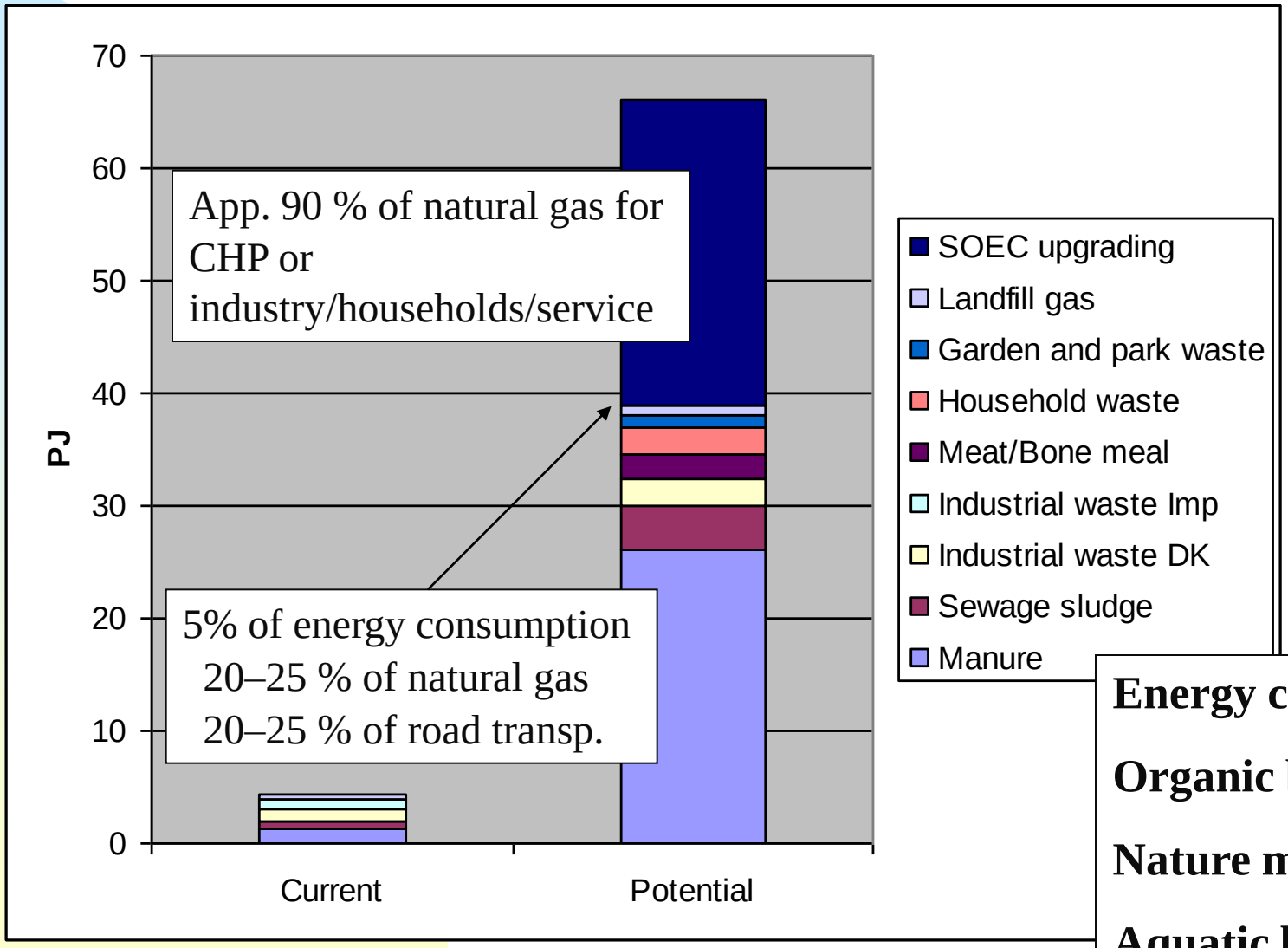
Biogas – currently and potential



Energy crops

Organic biogas

Nature management

Aquatic biomass

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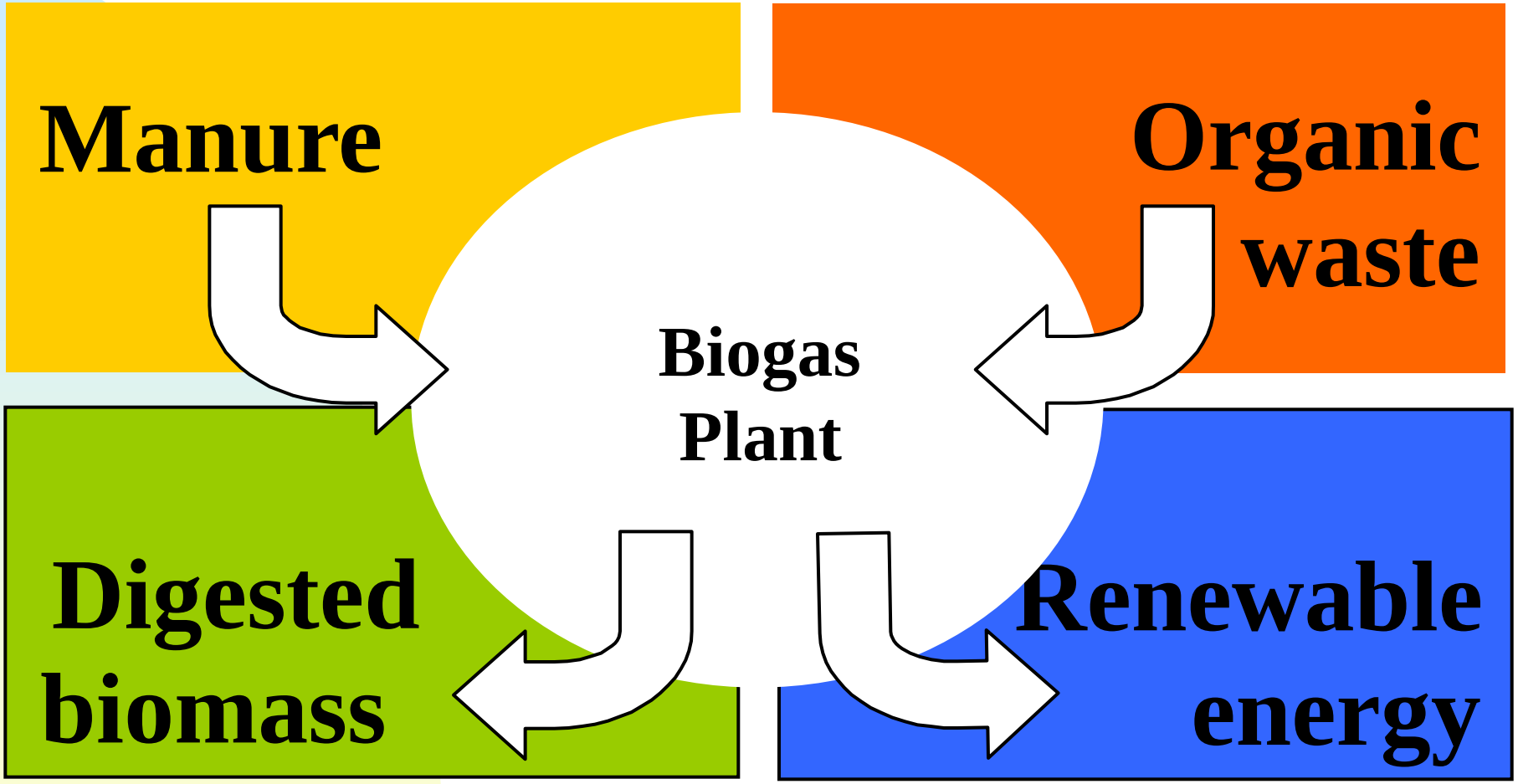
25 years of Danish biogas experience

Manure - from a farmers problems to an opportunity for the whole society

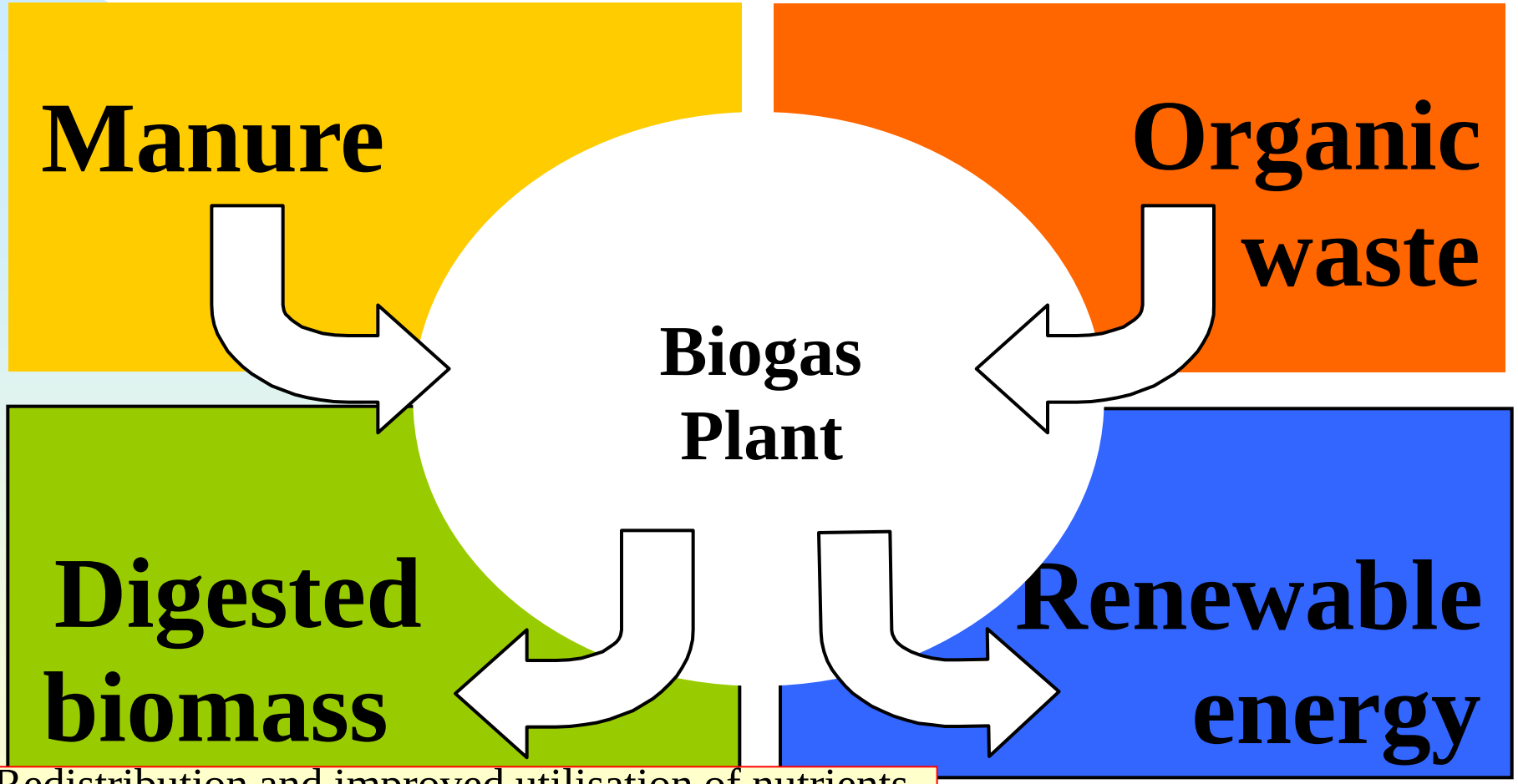
Biogas plants

- Not only for production of renewable energy
- But a multifunctional tecnology for
  - Renewable energy and energy supply security
  - Sustainable agricultural development
  - Environmental protection
  - Rural development

Biogas - in principle



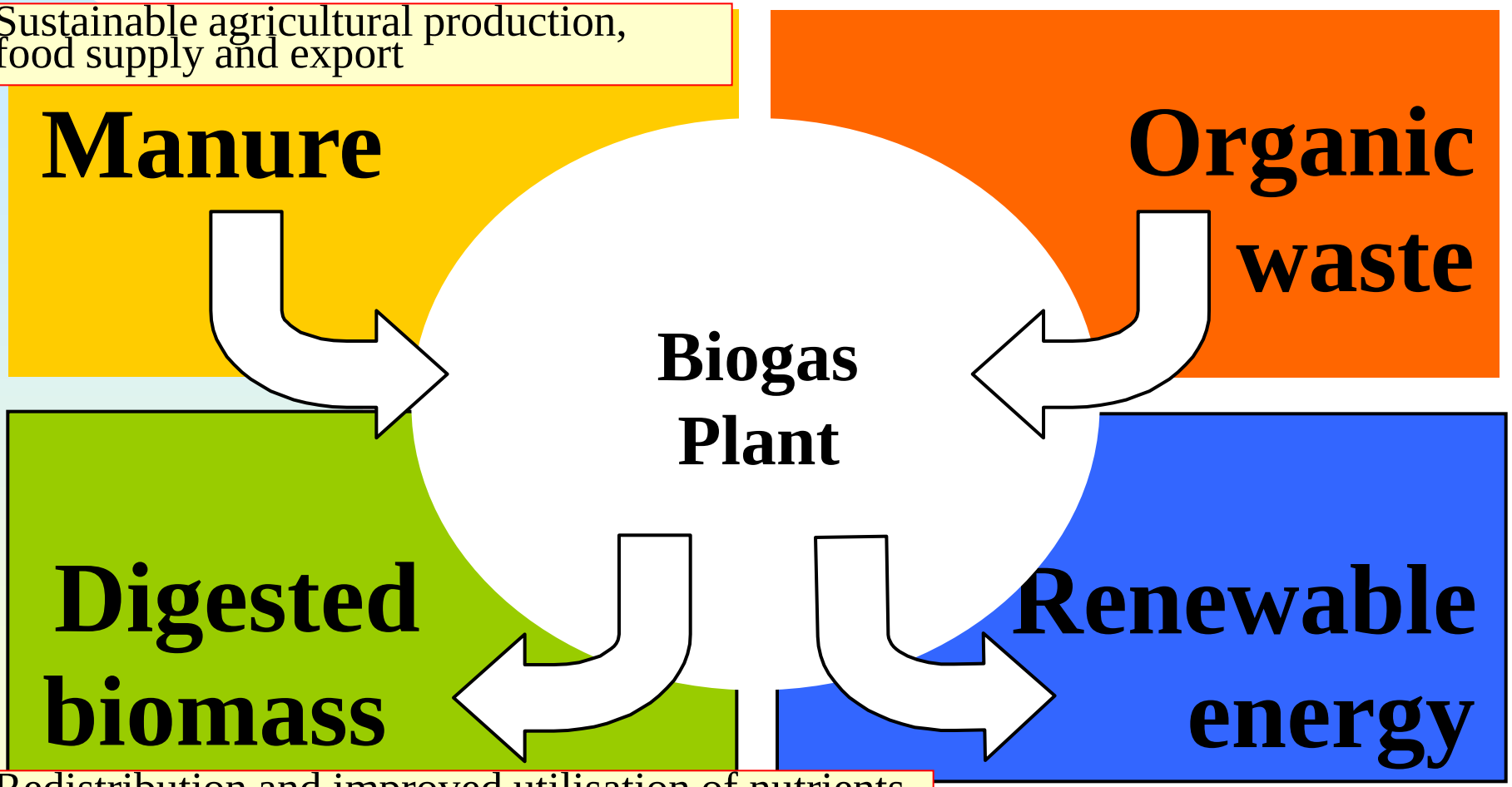
Biogas - in principle



Redistribution and improved utilisation of nutrients
Protection of aquatic environment, less smell

Biogas - in principle

Sustainable agricultural production,
food supply and export



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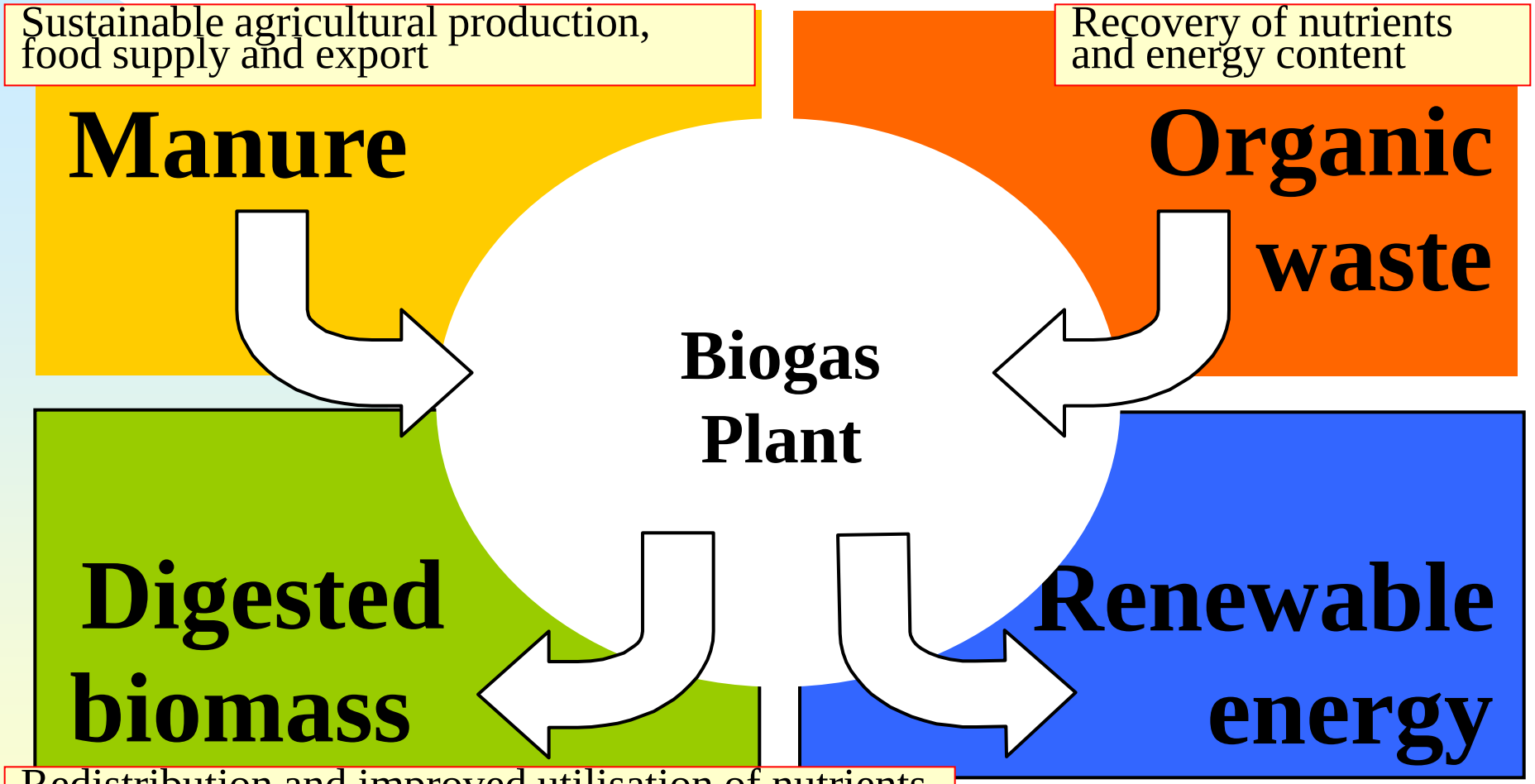
Biogas - in principle



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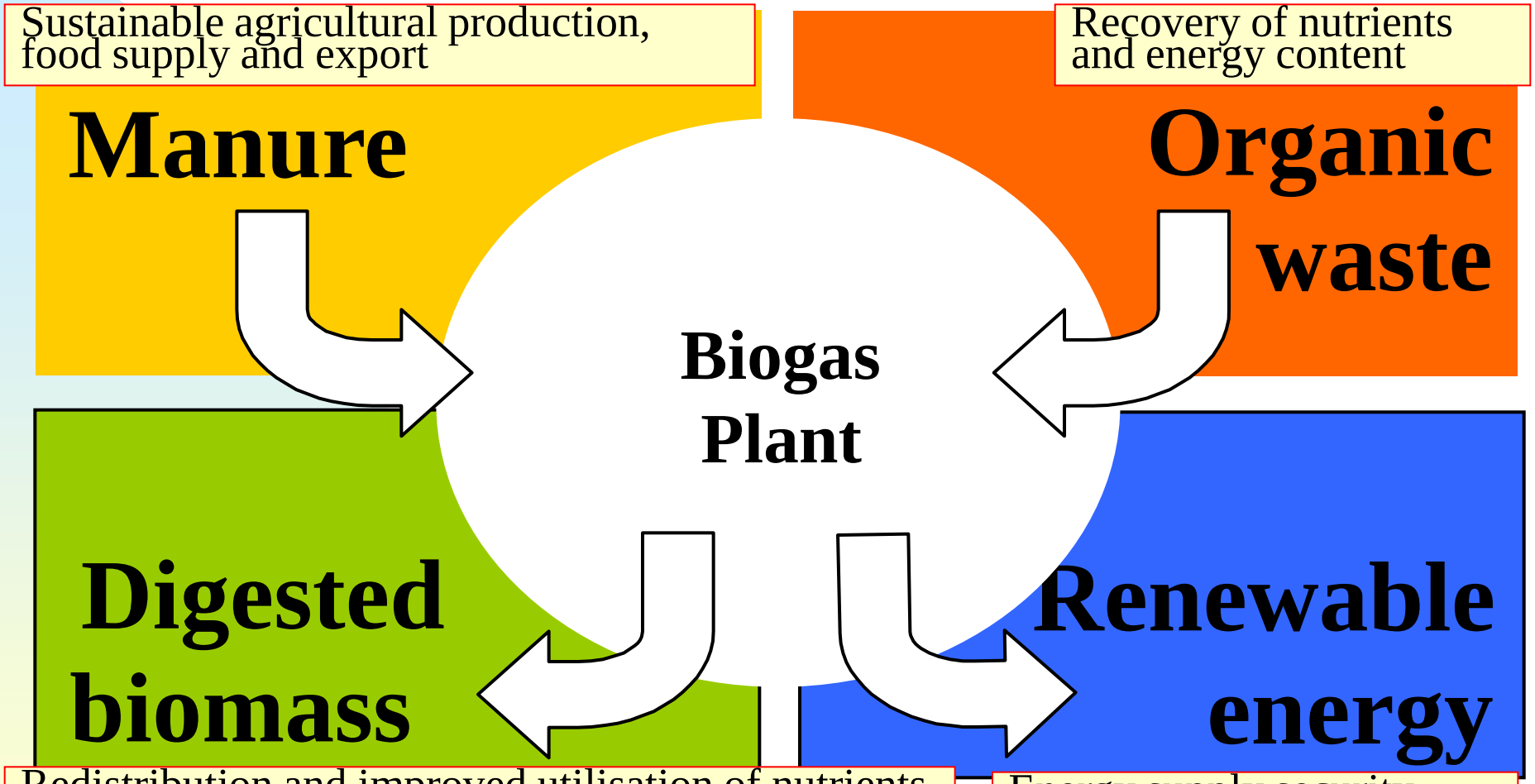
Biogas - in principle



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Danish biogas plants

Number of plants

- 22 centralised biogas plants
- 60 farm scale biogas plants

Biomass in biogas plants

Manure	2 mill. t
Organic residues	0.5 mill. ton
Total	2.5 mill. ton

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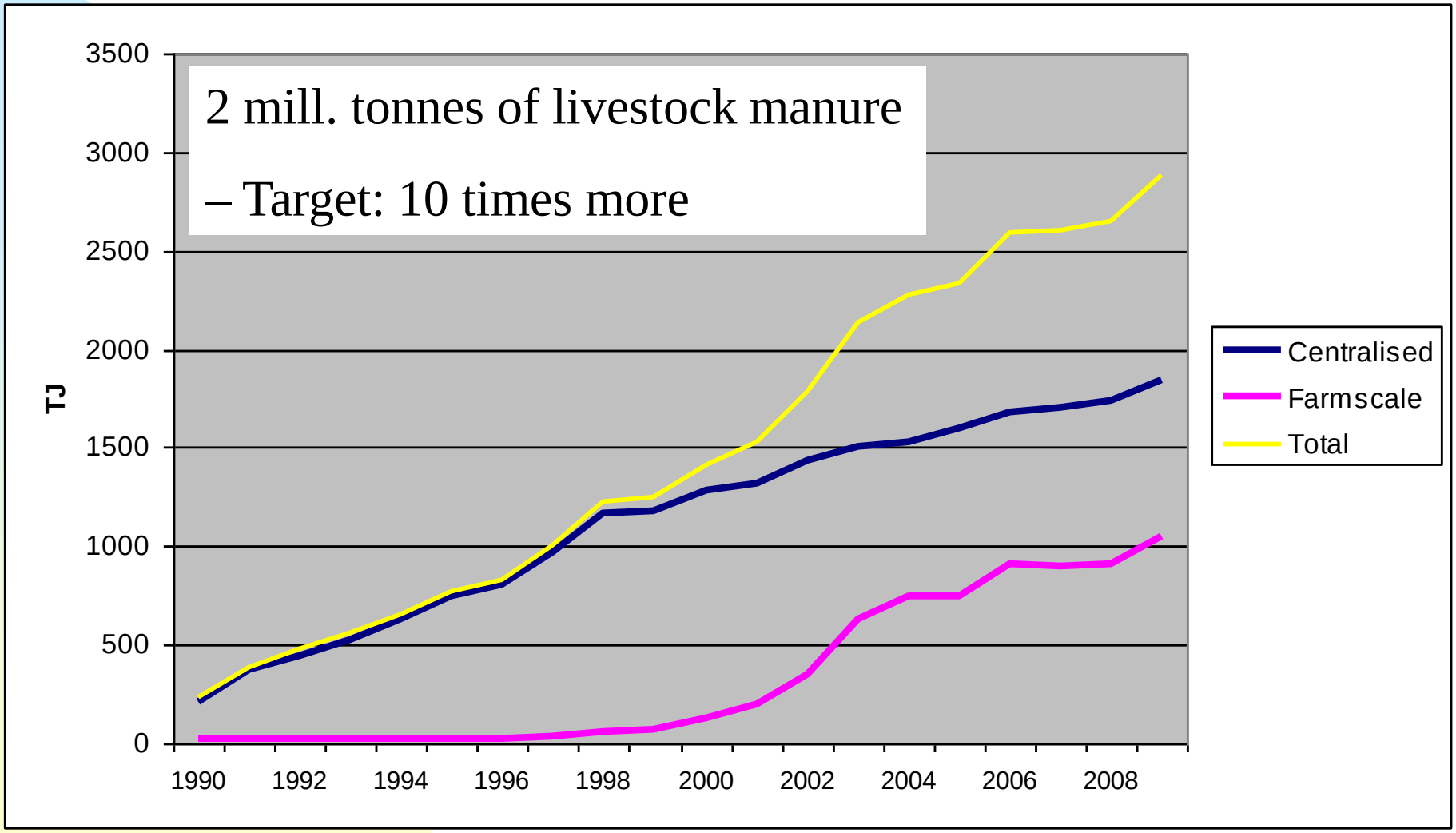
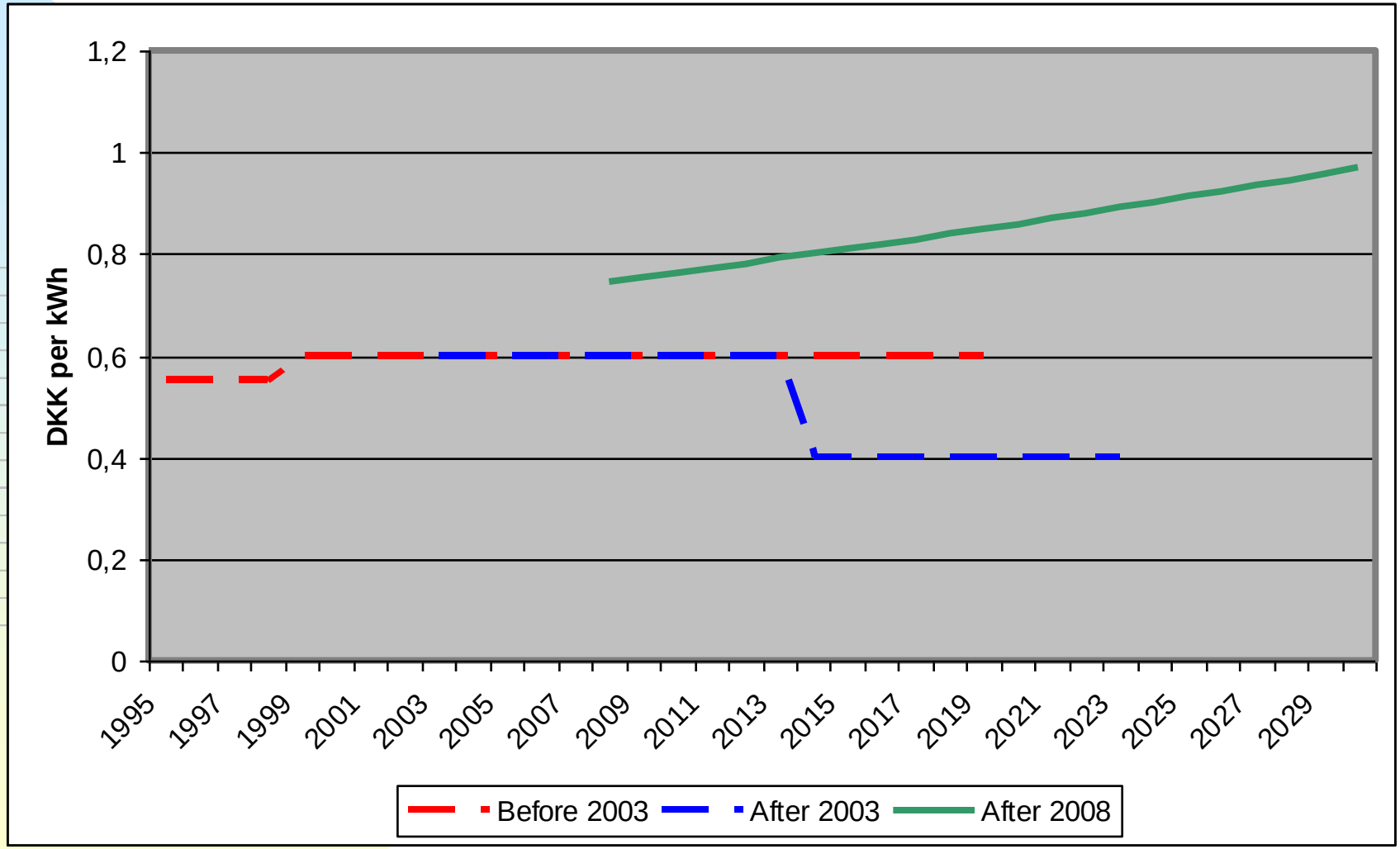
Manurebased biogas



Payment for electricity from biogas



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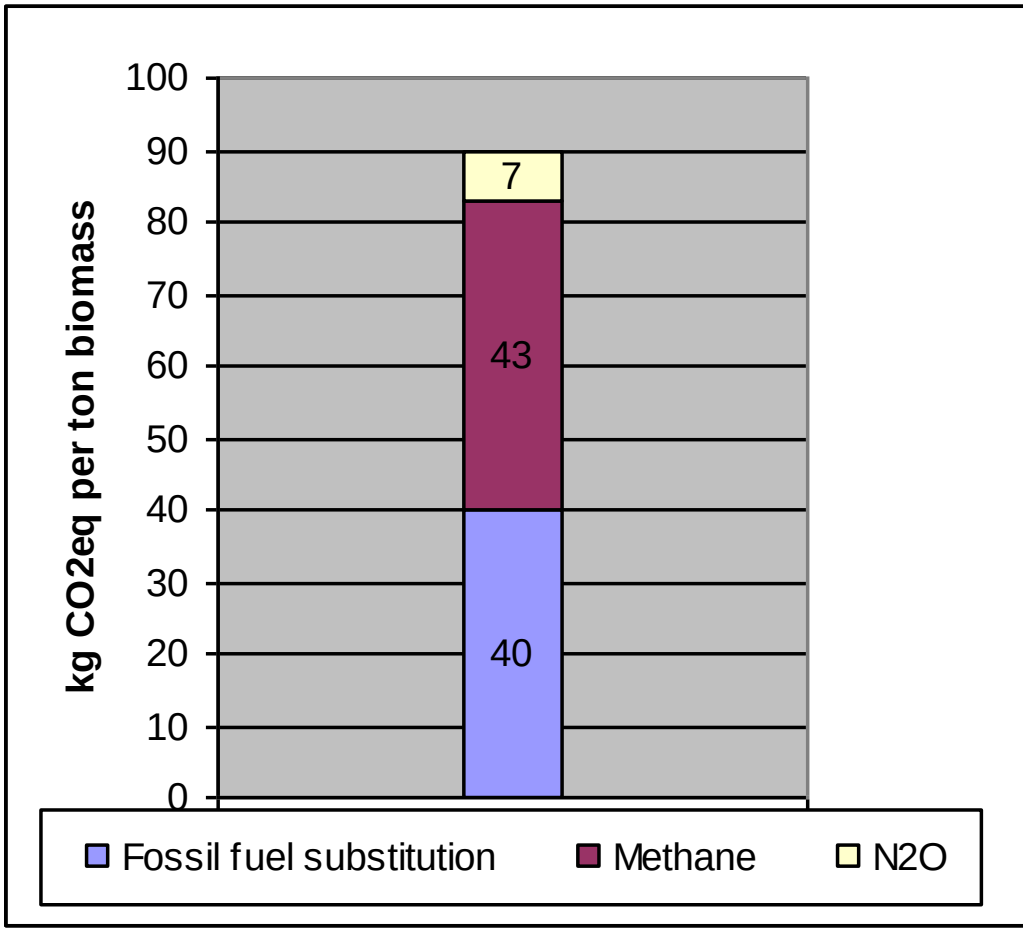
Advantages of biogas plants

- Greenhouse gas reduction
  - Efficient
    - heat and power: 220 %
    - transportation: 167 %
  - Cheap
    - 0 to 6 $



Why promote biogas?

- Renewable energy supply
- Stabilisation of wind dominated power system
- Efficient and cheap reduction of greenhouse gases
- Ready to go fuel for transportation
- Environmental protection (aquatic, smell etcetera)
- Recirculation of nutrients (phosphorous etcetera)
- Synergies to organic and conventional agriculture
- Growth and employment
- Export of food and biogas technologi

Utilisation of biogas

Current situation

Substitution of natural gas in CHP

- Fits into decentralised structure
- Directly in local CHP plant
  - Cheapest and most simple
  - - if the heat can be utilised
  - Feed-in tarif :10 cent/kWh 2008 + annually regulation (60 pct. inflation)

Future development

Upgrading and distributed in gas grid

- Storage capacity
- Improved utilisation of heat?
- Upgrading very expensive
- Downgrading of natural gas ?

Transportation fuel

- Most efficient biofuel
- New infrastructure necessary

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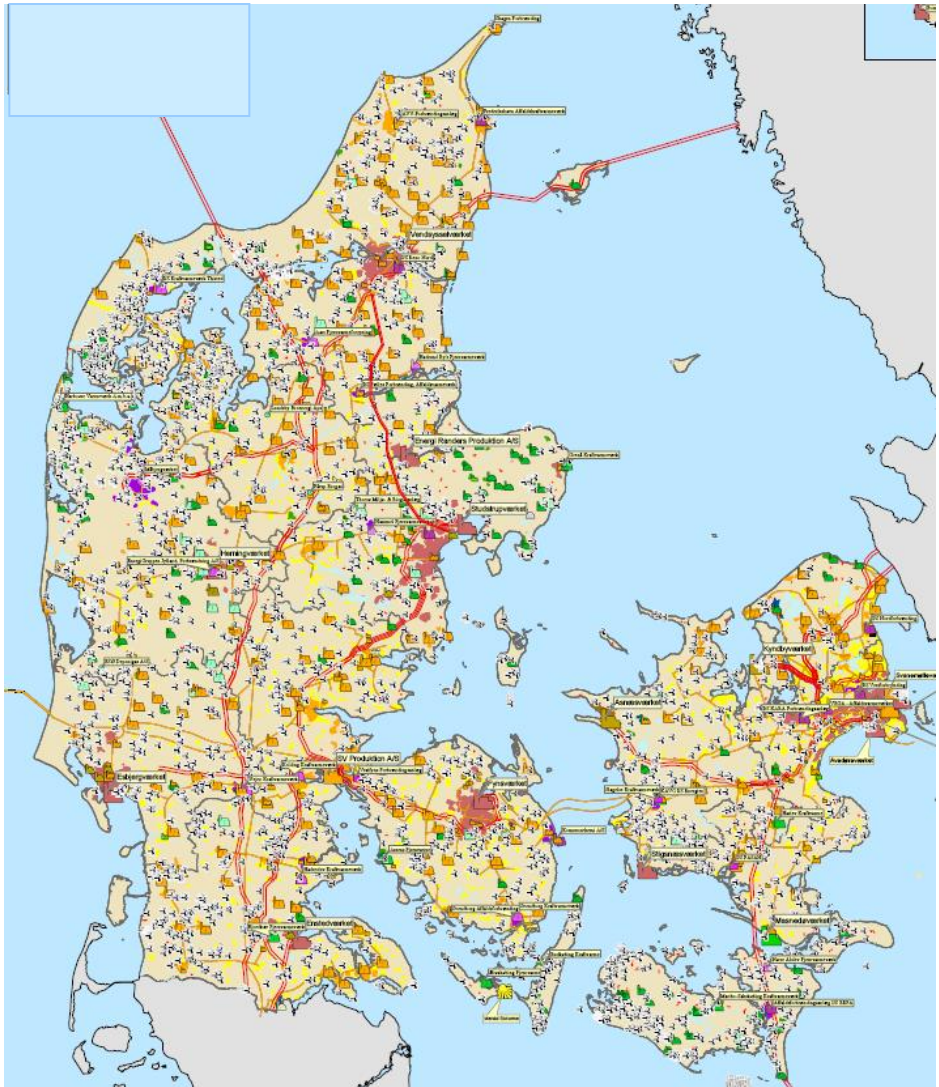

Government Green Growth Plan 2009

Promotion in biogas through

- From currently 5 % to 50 % of manure into biogas in 2020
- Co-ordination plan for construction of biogas plants
- Plan for integration of biogas into the energy sector
- Obligation for municipalities to point out where to build plants
- Distribution in natural gas grid on equal terms as direct co-generation
- Equal opportunities for biogas to earn money as natural gas suppliers
- Financing
  - 20 % construction subsidy (in total 300 mill. DKK from 2010 to 2012)
  - loans guaranteed by municipalities
  - Capital from investors

Energy policy negotiations

- Government proposal from Nov. 25 2011:
  - Keep up with current system for CHP
  - Improved economy for manure based biogas
  - Feed in tarif for upgraded biogas injected to the grid as for CHP
  - New subsidies for biogas for transportation
- Waiting for a political agreement
  - Moves into right direction – though still not enough
  - Opening up for biogas for transportation

Promotors for biogas in transportation

- Denmark has a widespread (natural)gas infrastructure
- Biogas is the most efficient and chepest tool to reduce GHG emissions (double counting and double function)
- Natural gas is a corporate and socio-economic preferable alternative to gasoline and diesel – biogas will be too
- Biogas much more energy efficient than bioethanol and biodiesel
- Electricity is not an option for heavy duty vehicles
- Reduction in health hazardous emissions
- Less noise from transportation
- Biogas production potential higher than local demand for CHP

Obstacles for biogas in transportation

- Denmark has a widespread (natural)gas infrastructure for CHP
- It is cheaper and more efficient to reduce emissions in CHP sector
- Subsidies for renewable energy is directed to power and heat sectors
- We do not have a gas infrastructure for transportation
  - Filling stations
  - Vehicles
- Bioethanol and biodiesel fits into existing infrastructure
- Public focus on electricity for transportation
- Biogas loose subsidies and becomes taxed when injected into gas grid
- Higher tax on gas vehicles due to higher price
- Public transportation is driven by reduced cost on short term

30 years of incentives in Denmark

Society

- Decrease dependency on imported fossil fuel
- Protection of drinking and surface waters
- Decrease emission of greenhouse gases

Agriculture

- Improved utilisation and storage capacity
- Relations to neighbours
- Redistribution of manure
- Extraction of surplus of nutrients

Development promoted by

- Legislation regarding handling of manure and energy
- Subsidies for research, demonstration, documentation, etc.
- Framework conditions:
  - construction subsidy and premium price for electricity

Conclusion

- Biogas is on the political agenda in Denmark
  - Primarily for use in CHP sectors and to stabilize power system
  - Increased focus on biogas for transportation – the first renewable fuel to be directly subsidised
- Biogas fits into both decentralised structure and whole grids
  - Gas grid and CHP infrastructure preferred utilisation of biogas
  - Gas grid can promote use of biogas in transportation
  - Green gas certificates - a new driver
- Need a targeted development of infrastructure and market
  - Demonstration/infrastructure programme
    - filling stations
    - pioneers in biogas fleets (public transport)
  - Next energy act may promote (feed in)

Thank you for your attention

Nordic Biogas Conference

Copenhagen, 23-25 April 2012

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