



Potential of biogas in EU BioLNG for transport in NL

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- EU Project: ‘Optimal use of biogas from waste streams’
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 - Potentials biogas production 2020 and 2030
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- Potential of bioLNG for transport in The Netherlands
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CE Delft

- Independent research and consultancy since 1978
- Transport, energy and resources
- Know-how on economics, technology and policy issues
- 60 employees, based in Delft, the Netherlands
- Not-for-profit



Clients



Industries
(Small and medium
size enterprises,
trade associations)



Governments
(European Commission,
European Parliament, National,
regional and local governments)



NGOs

Project 'Optimal use of biogas from waste streams'

Client: EC/DG Energy

Main aims: to provide input and technical assistance to:

1. Review 2020 renewable energy directive (RED)
2. Proposals follow-up policy for 2030

Main deliverables (report in March 2017):

- **Up-to-date overview** of biogas en biomethane production and use, and potentials for 2020 and 2030
- Estimate **potential contribution** of biogas/biomethane to EU goals for climate and renewable energy **until 2030**
- Overview of **barriers for biogas and biomethane growth**
- Analyses of **policy options**
- Projectteam: CE Delft, eclareon, Wageningen University

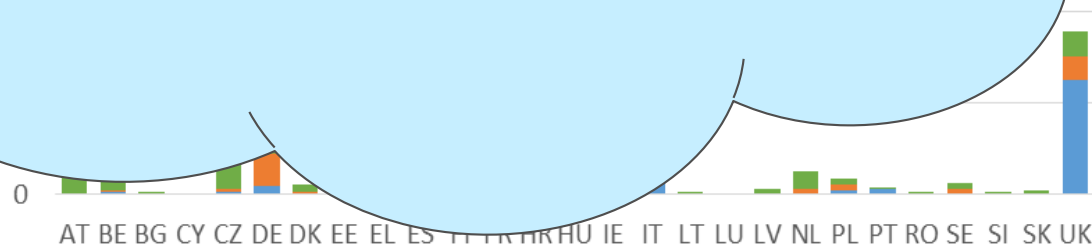
http://www.cedelft.eu/publicatie/optimal_use_of_biogas_from_waste_streams/1925

Status biogas (data used in the study: year 2014)

- 7,6% of total renewable energy in the EU
- Total production of Germany, UK and Italy = 57% of the total
- Mostly from agricultural

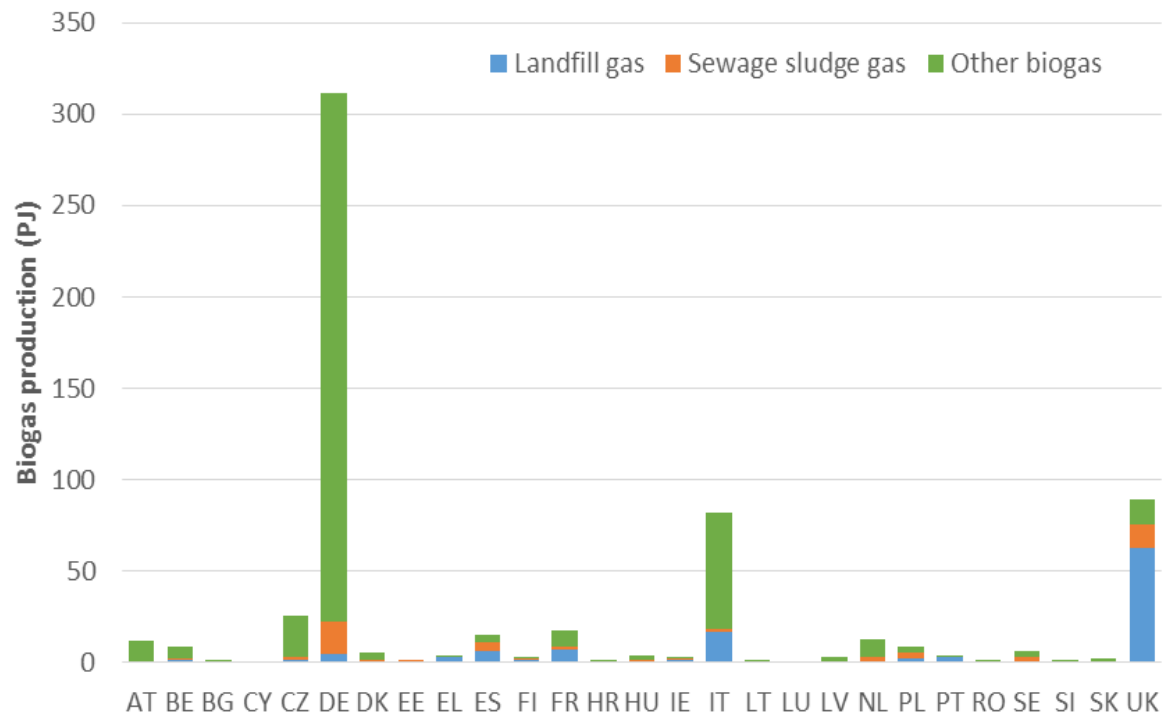
Data in the study: year 2014

Data later years (EBA Statistical Reports): slightly different numbers, but same general picture



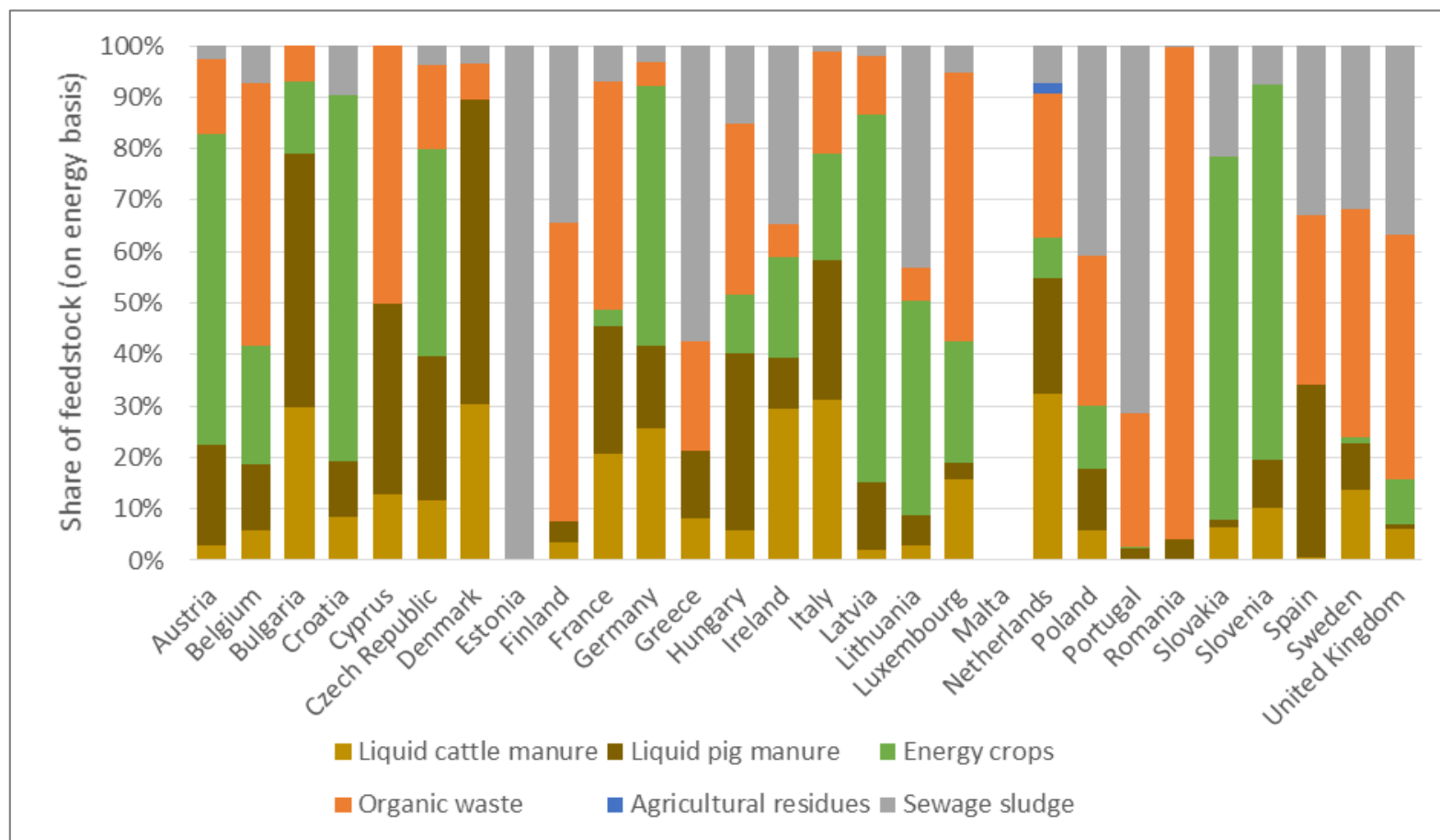
Status biogas (data used in the study, year 2014)

- 7,6% of total renewable energy in the EU
- Total production of Germany, UK and Italy: > 77% of the EU total
- Mostly from anaerobic digestion of manure and maize





Feedstock for biogas production (2014)

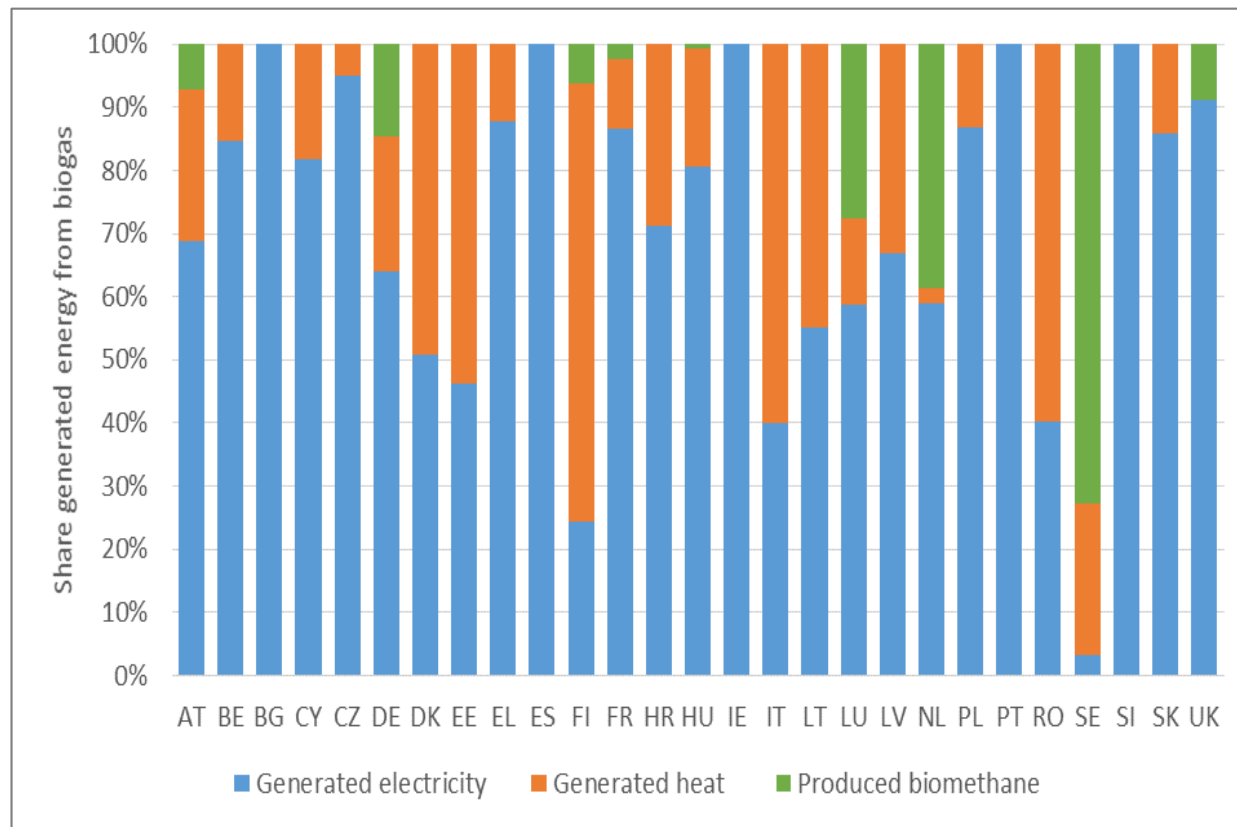


- Percentage on basis of energy content, not on weight or volume
- Excl. landfill gas

Biogas use EU (2014)

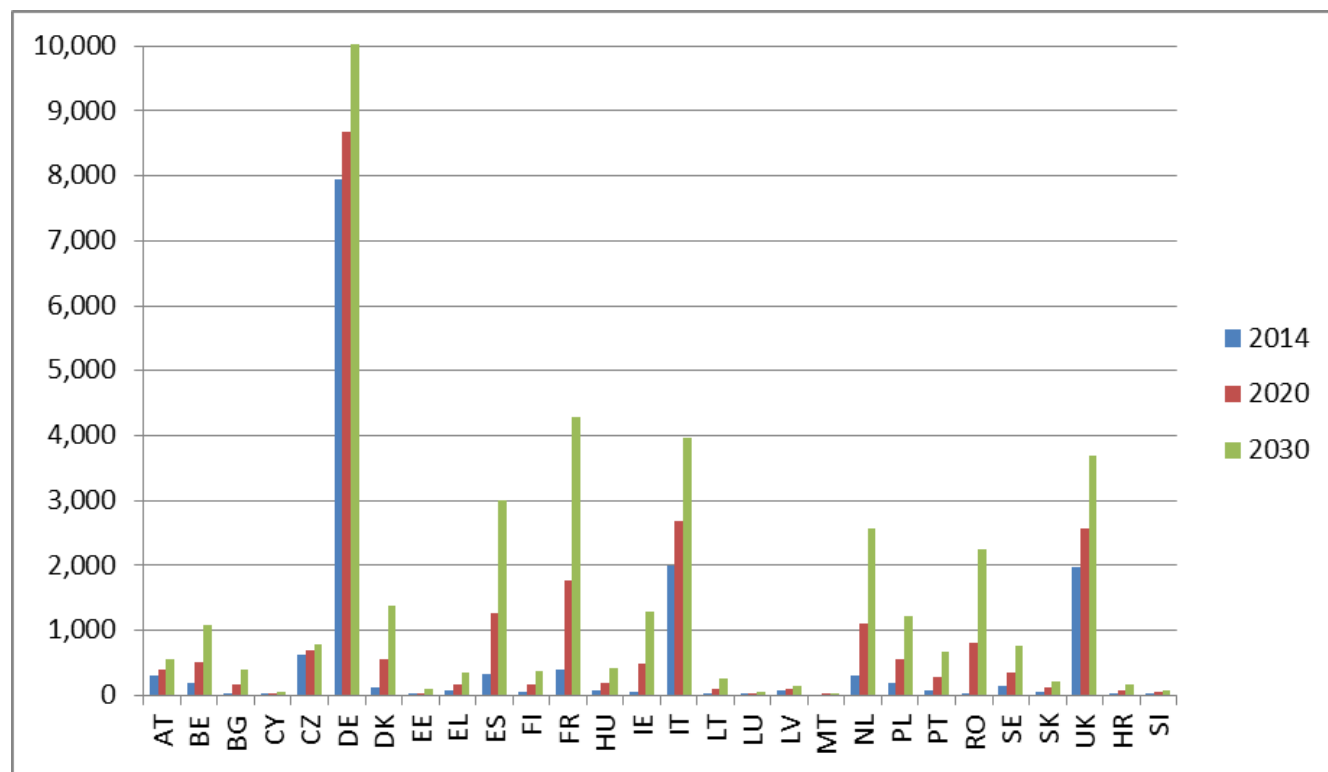


Mainly for electricity production, also for heat and transport.





Potential biogas growth - Innovation scenarios (ktoe) using CE Delft biogas-EU-model (results per Member State)

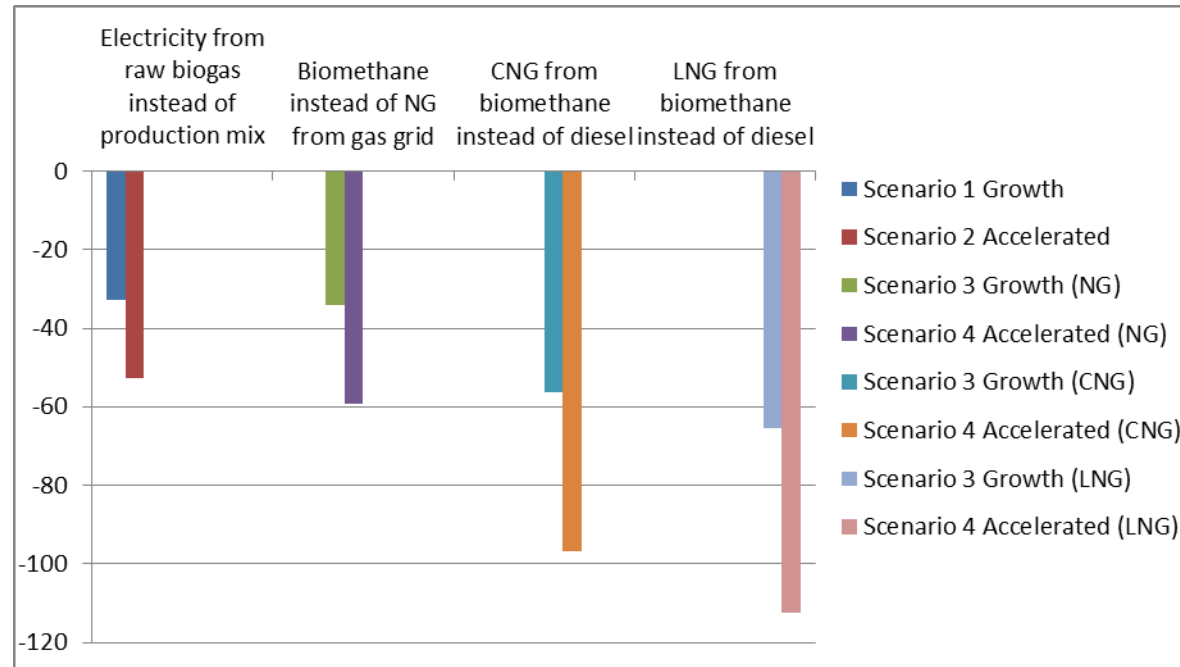


Potential growth EU up to 2.7 times 2014 values (digestion of waste streams only; i.e. without gassification and without e.g. aquatic biomass)



Greenhouse gas reduction depends on use

GHG reduction EU in 2030, in MtCO_2_{eq}



GHG reduction of Combined Heat and Power limited because assumption:

- The average electricity mix is replaced
- Only 25% of the heat is used (which is current practice EU-wide)

Main policy recommendations - for EU



- Realisation biogas potential requires stable and effective policies, and a favourable long term outlook.
 - Climate and renewable energy goals
 - Sustainability criteria for biogas and biomethane
 - Harmonisation of co-generation regulations
- Enforce waste regulations (collection of organic waste, avoid land fill)
- Promote use of heat produced in Cogeneration of Heat and Power
- To increase biomethane volumes:
 - Ensure access to gas grid, incl. standards and data transfer, infrastructure
 - Facilitate trade
- Let Member States decide where the biogas is used



Policy recommendations - for Member States

- Develop a national strategy and future outlook for biogas and biomethane
 - Map feedstock availability
 - Assess and compare the different end-use options
- Convert the strategy into concrete targets for 2030 and beyond, and implement stable and effective policies to meet these targets
 - Focus on use of existing waste streams
 - Long term policies/financial support needed for an attractive business case
- Implement adequate flanking policies, such as
 - Support for Combined Heat and Power, and heat utilisation
 - Valuation of electricity production in times of low wind and solar
 - Support for CNG/LNG fuelling infrastructure and vehicles,
 - etc.



bioLNG for transport in the Netherlands

Client: Dutch LNG platform & Port of Rotterdam

Main deliverables (report in March 2018):

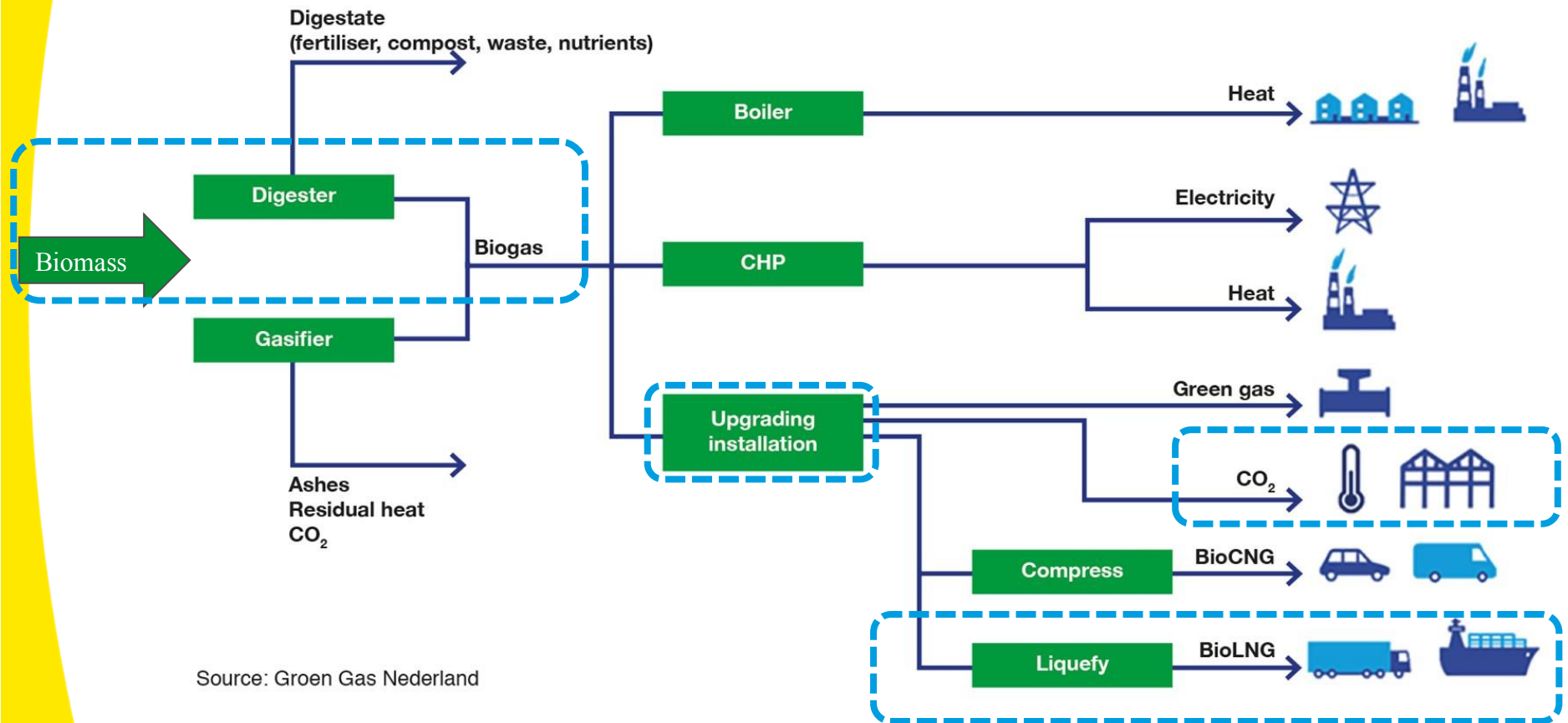
- Fact finding technology and feedstocks
- Fact finding policy and regulations (national and EU)
- Market survey demand side (trucks, inland shipping, maritime shipping)
- Market survey supply side
- Business cases

Scope: biogas (and subsequent bioLNG-) production by digestion

<https://www.cedelft.eu/en/publications/2107/exploratory-study-on-transport-biolng>

From biomass to bioLNG

Means: in scope






Source: Groen Gas Nederland

Demand for LNG in transport in the Netherlands

LNG-demand in 2030 in kton LNG/yr (scenario's Dutch LNG-platform)

low - **Medium** - high

Market share LNG
(2030; medium)

Trucks	55 - 212 - 290		≈10%
Inland shipping	32 - 260 - 378		≈15%
Maritime	1.125 - 2.250 - 3.375		≈10%

NB: Trucks and inland shipping are national LNG demand, maritime shipping is LNG-bunkering in Port of Rotterdam

Conclusions bioLNG for transport in the Netherlands

- Full national demand in 2030 for LNG by trucks and inland shipping can be supplied by bioLNG, produced by digestion of available waste streams
- Feedstock scope for bioLNG bunkering in Rotterdam for maritime shipping should be global (NB: Rotterdam is 2nd largest in the world)
- CE Delft calculation model: business cases for bioLNG are positive, though very dependent on stable policy regimes for renewable energy in transport

See for example our publications:

http://www.cedelft.eu/publicatie/optimal_use_of_biogas_from_waste_streams/1925

http://www.cedelft.eu/publicatie/supporting_mechanisms_for_the_development_of_biomethane_in_transport/1946

<https://www.cedelft.eu/en/publications/2107/exploratory-study-on-transport-biolng>

<https://www.cedelft.eu/en/publications/2135/business-with-biomass-and-biobased-gas>



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Thank you!

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