

**SUSTAINABLE BIOMASS SUBSTRATES:
POTENTIALS AND PERSPECTIVES IN EUROPE**

**THE POTENTIAL OF ANIMAL MANURE, STRAW AND GRASS
FOR EUROPEAN BIOGAS PRODUCTION IN 2030**

IBBA - AUGUST 25TH 2016 - ESBJERG

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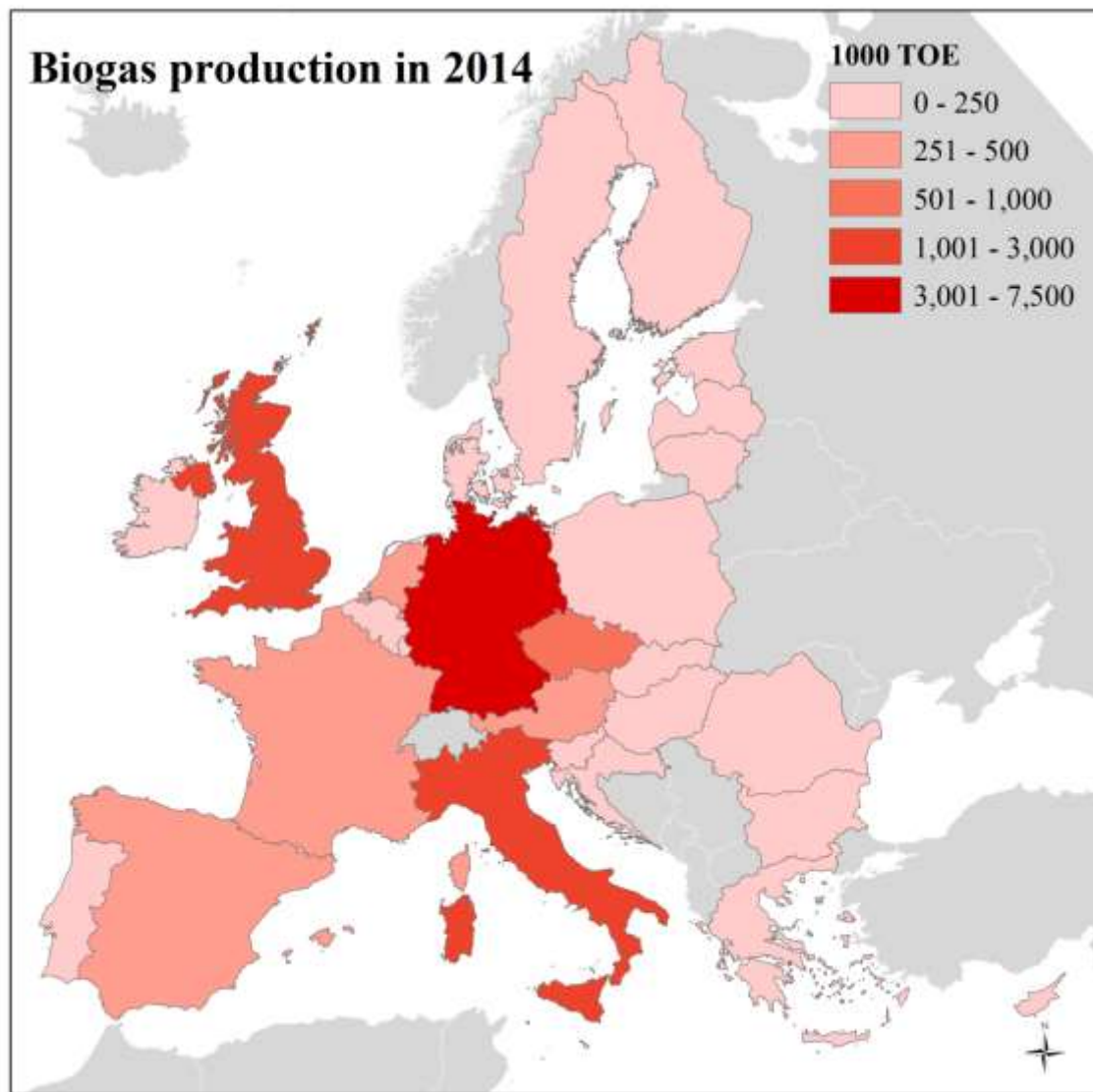
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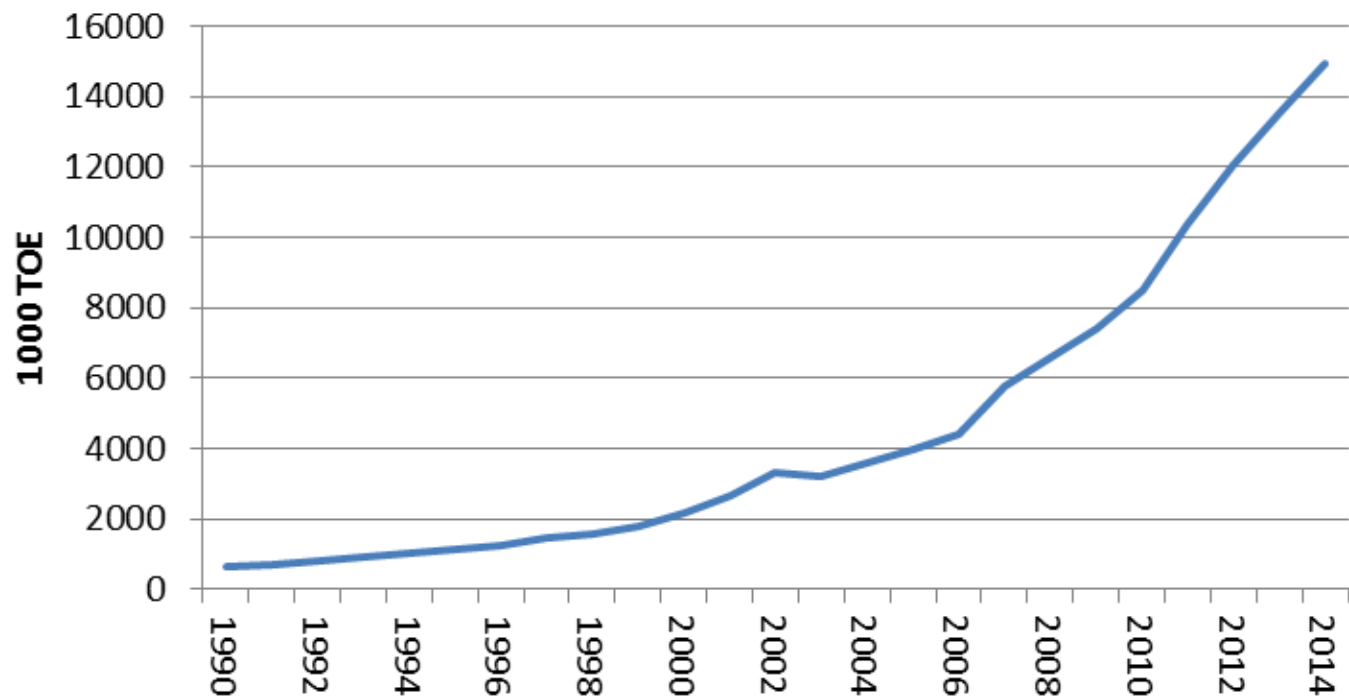


Biogas production in 2014



Eurostat, 2015.

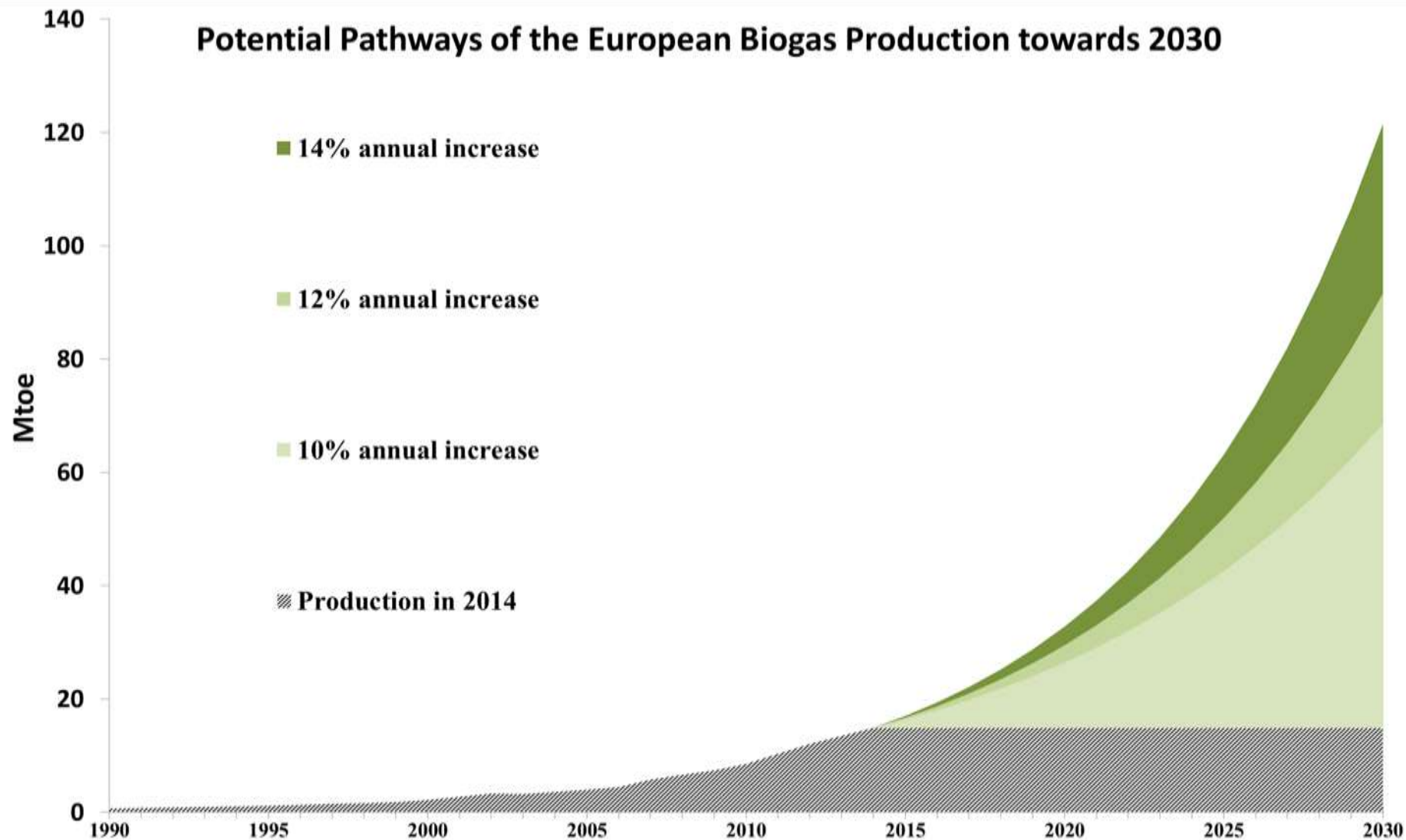
EU28 - Primary Biogas Production



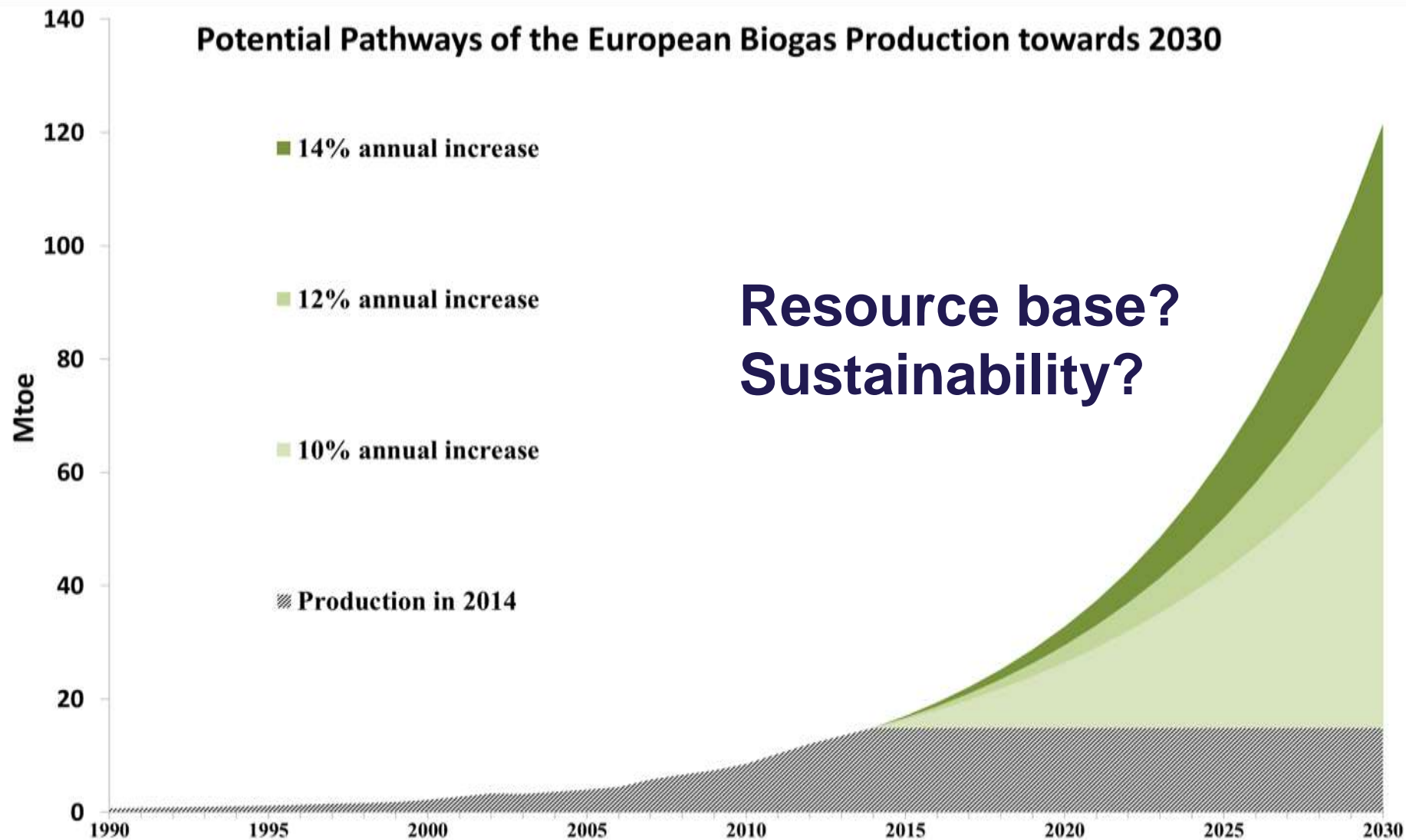
Eurostat, 2015.



Potential Pathways of the European Biogas Production towards 2030



Potential Pathways of the European Biogas Production towards 2030



European biogas production in 2030?

What is the potential from straw, animal manure and unexploited grass?

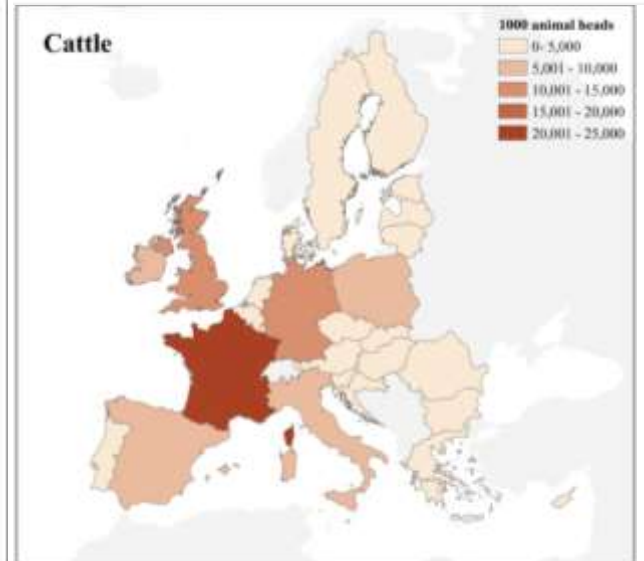
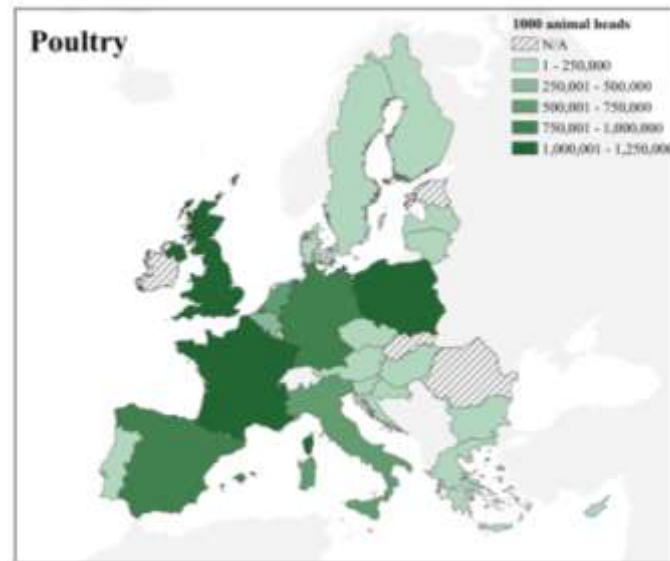
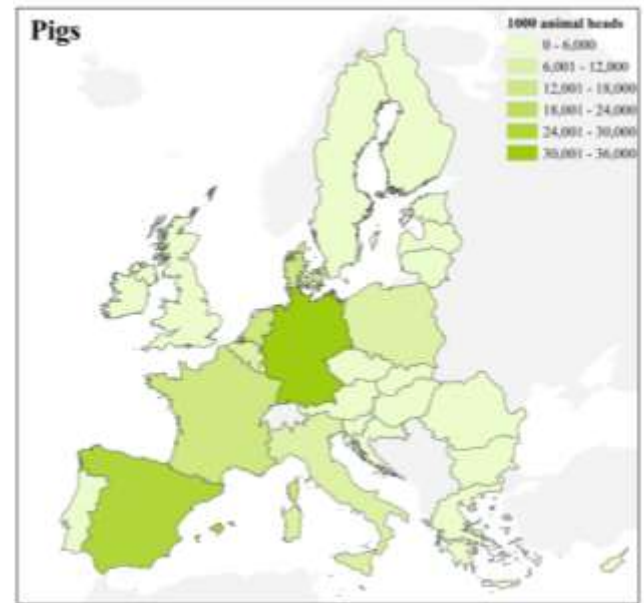


Manure from cattle, pigs and poultry

Registrations of animals (Eurostat, 2015)

Forecasts for the agricultural production of meat, milk and dairy in Europe and Central Asia (Bruinsma, 2012).

Manure production (American Society of Agricultural Engineers, 2005)



Unutilised grass from rotational and permanent grasslands

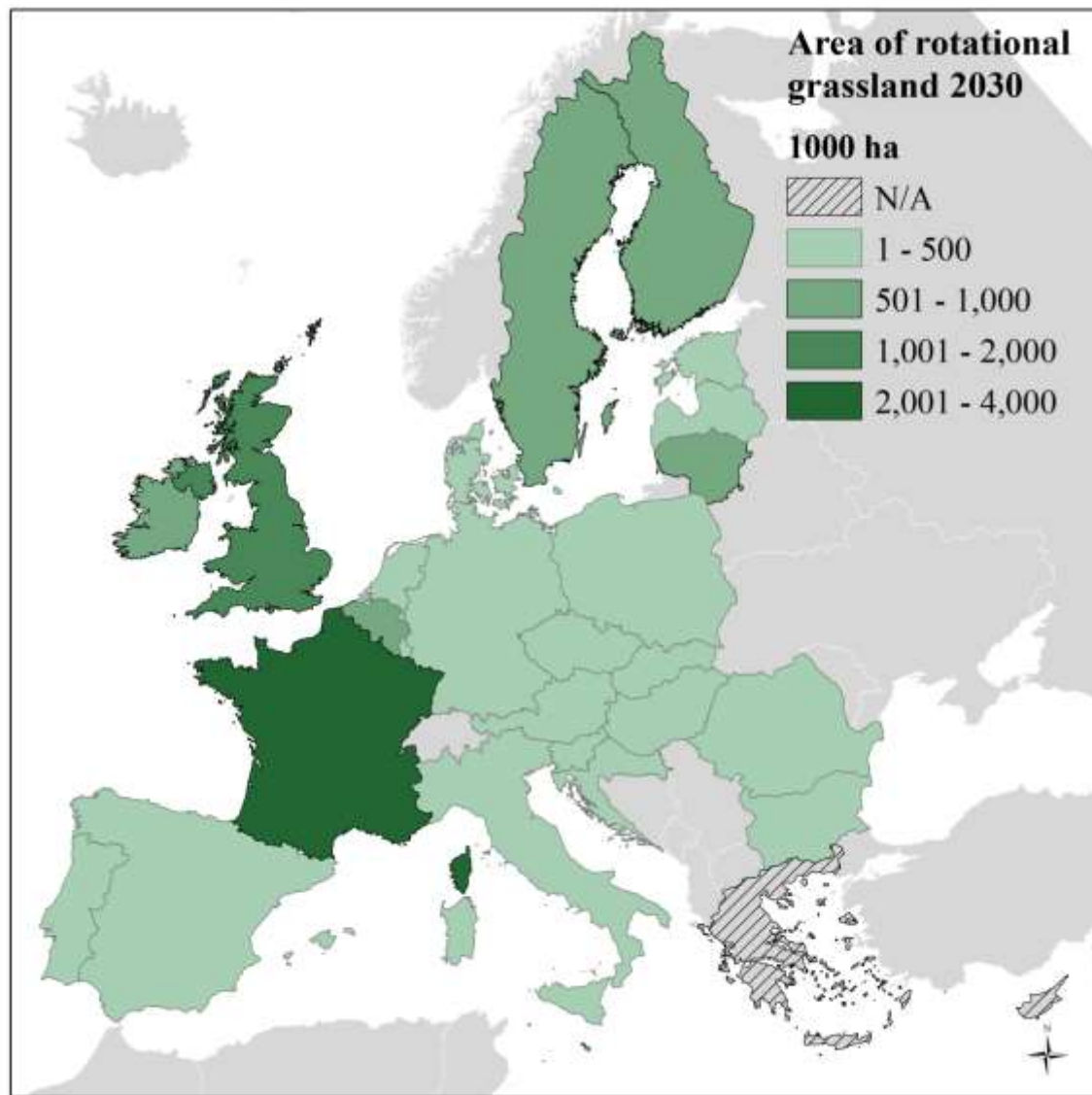
Rotational grassland (Eurostat, 2015)

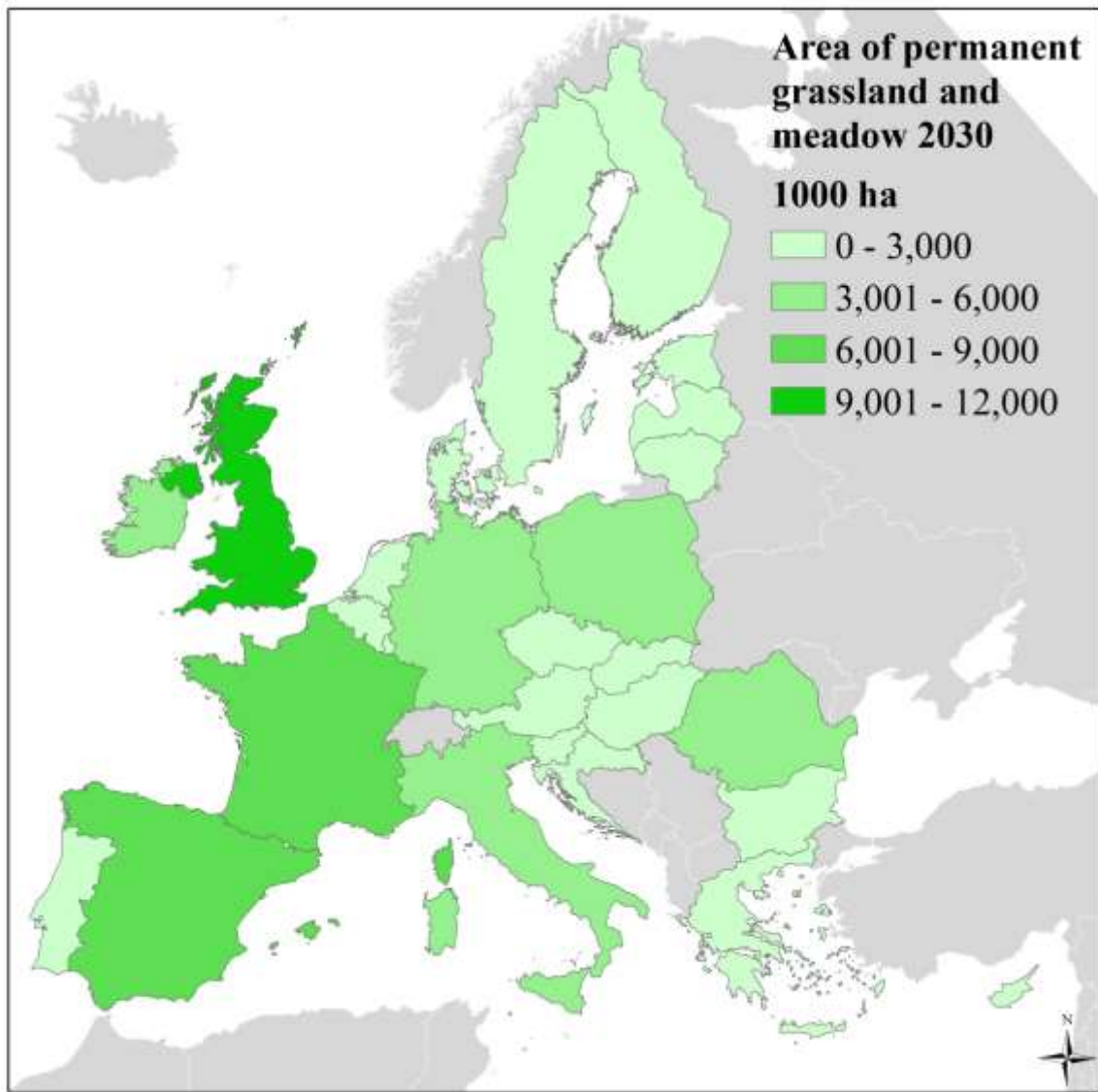
Forecast based on expected increase in livestock production (Bruinsma, 2012)

Scenario	t DM/ha	Share allocated for energy production
High availability	14	20%
Moderate availability	12	10%
Low availability	10	5%

Permanent grassland (Eurostat, 2015)

Scenario	t DM/ha	Share of unutilized grassland and meadow allocated for energy production	Share of utilized grassland and meadow allocated for energy production
High availability	4	100%	50%
Moderate availability	3	100%	30%
Low availability	2	100%	20%





Straw from cereal production

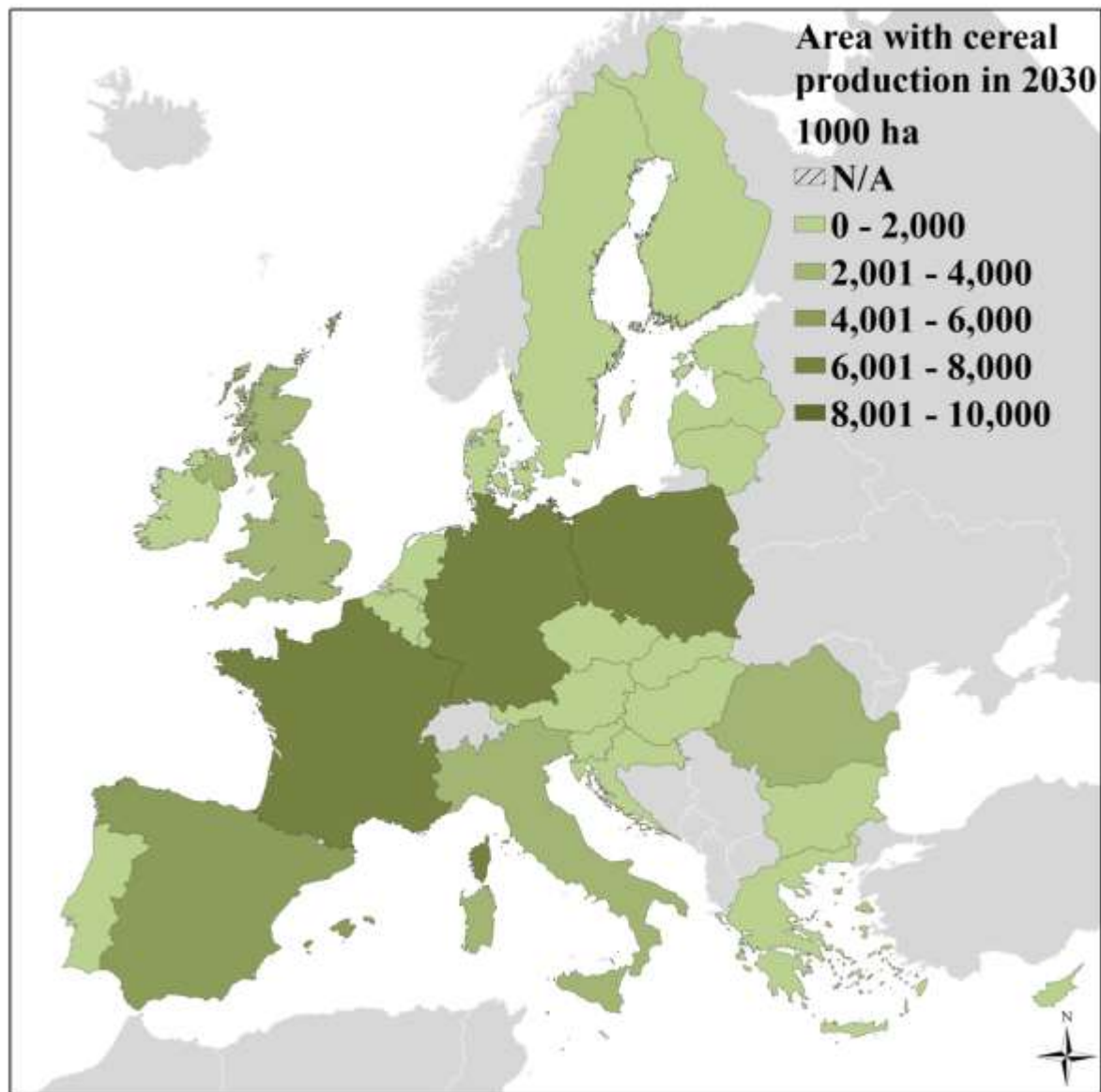
Cereal production (Eurostat 2015)

Straw-Grain ratios matter (Höhn et al., 2014; Weiser et al., 2014; Edwards et al., 2006)

Forecasts for the agricultural production of cereal in Europe and Central Asia (Bruinsma, 2012).

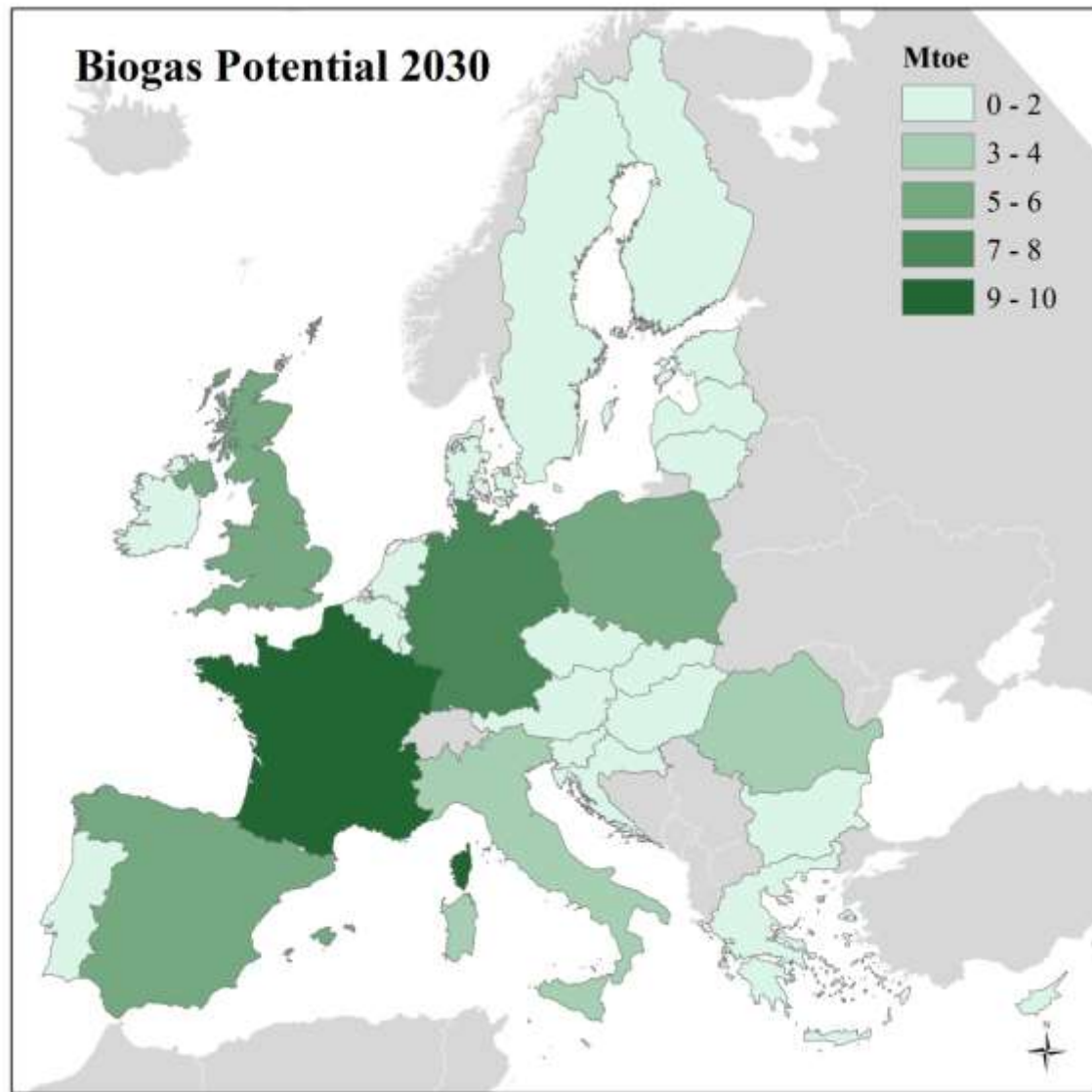
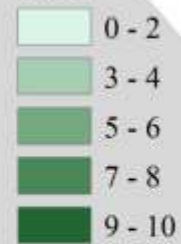
Scenario	Grain – straw ratio	Share utilized for other purposes
High availability	0.62	10%
Moderate availability	0.52	20%
Low availability	0.42	30%



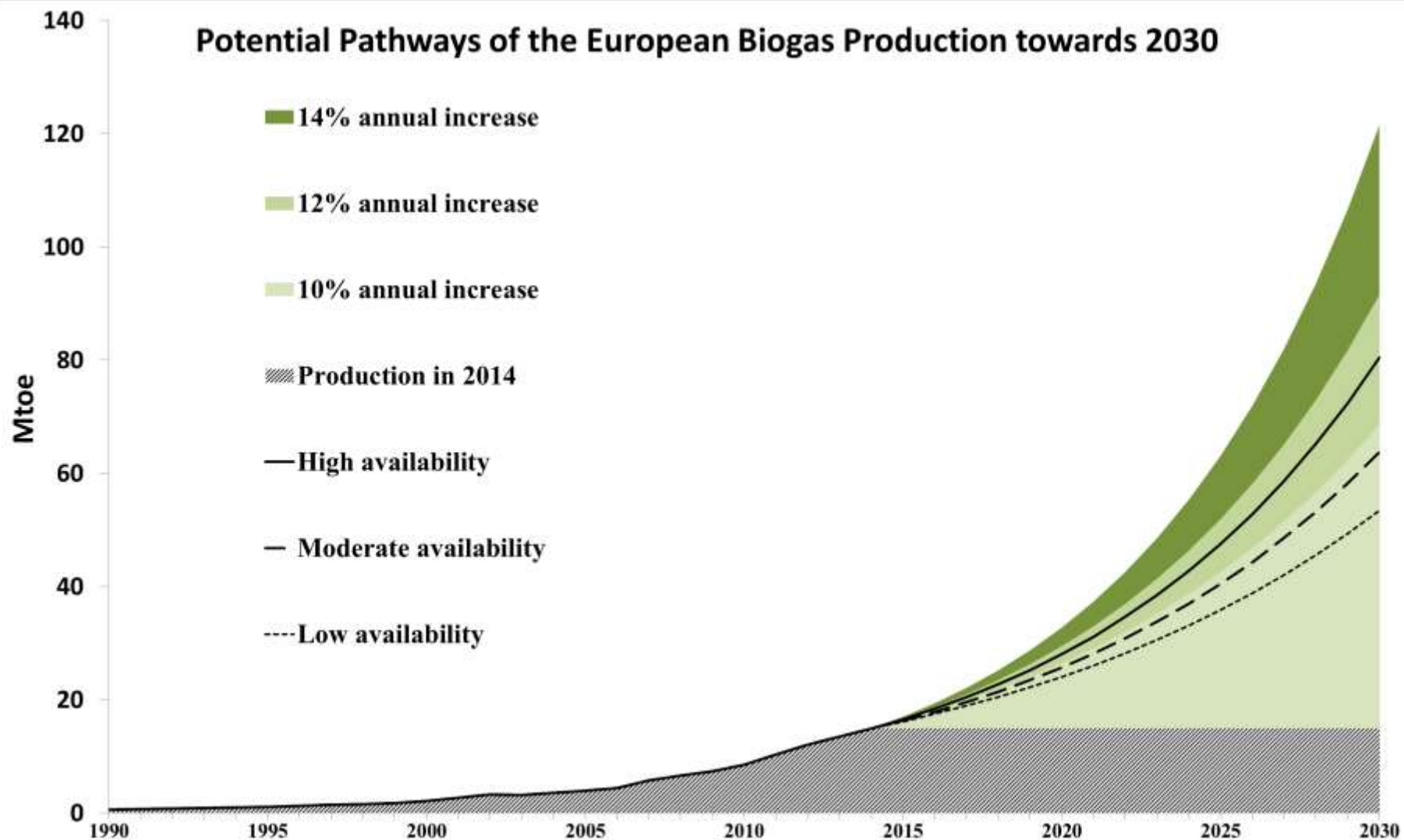


Biogas Potential 2030

Mtoe



Potential Pathways of the European Biogas Production towards 2030



The potential contribution to EU28

39- 68 Mtoe from manure, straw and excess grass

8.4-14.3% of the total supply of renewables targeted for 2030

Adding the current production (2014 level):

11.3-17.2% of the total supply of renewables targeted for 2030

≈9-16% of the current total consumption of natural gas.



Conclusions

The investigated residuals represents a significant potential for the future European biogas production, but utilization requires:

- Changing the management practices
 - Supply chains
 - Partnerships
- Technologies enhancing the CH₄ yields
 - Pretreatment of lignocellulose
- Stable framework conditions
 - Subsidies

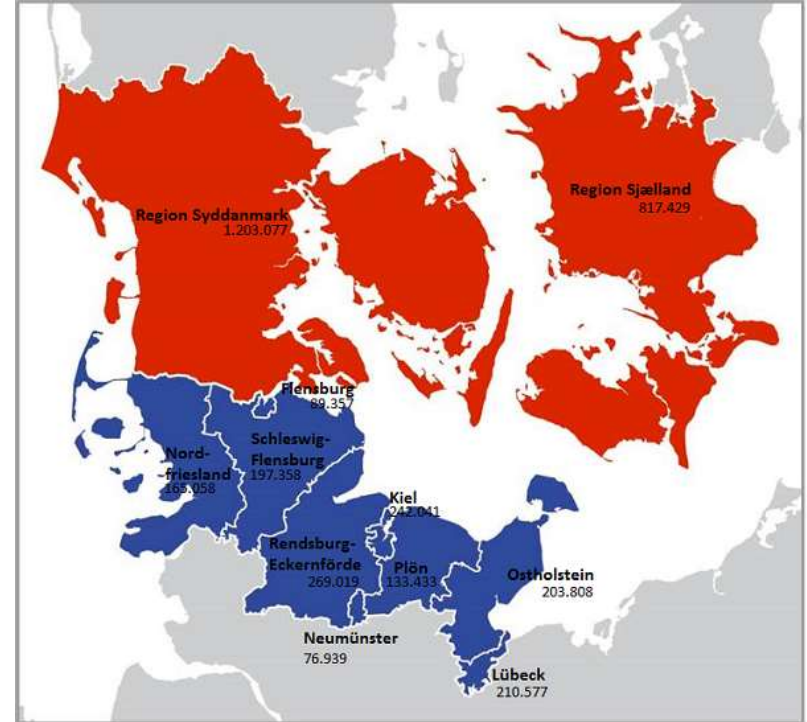


Large Scale Bioenergy Lab 2

2016-2019



Innovation



Universities:



Hochschule
Flensburg
University of
Applied Sciences



Companies:



**NORTH
TEC
BIOGAS**



AL²

SolrødBiogas
- helt naturligt.

Network partners:

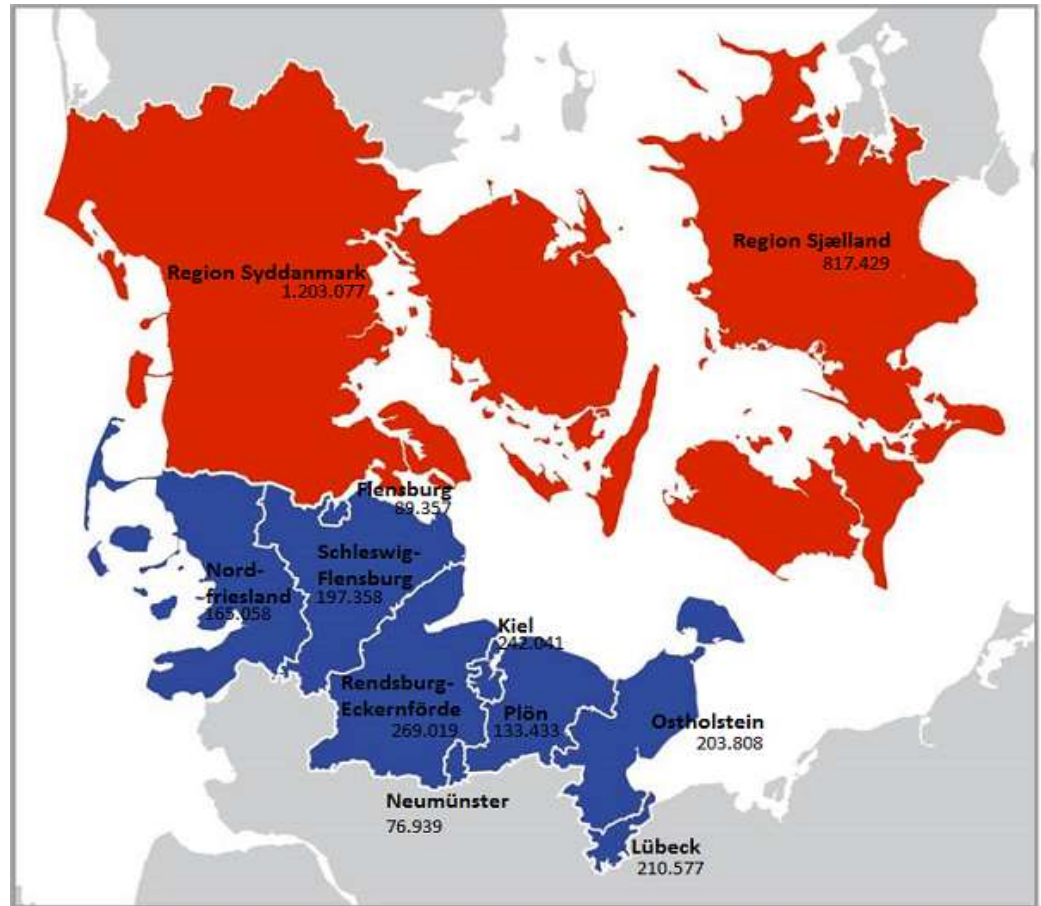


AgroTech



**Vejen
KOMMUNE**

Køng-Lundby Biogas



Thank you for your attention

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