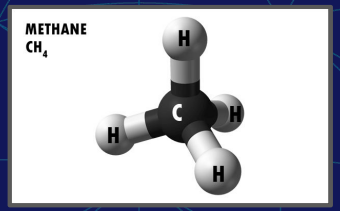


Avfall Norge

Biogas - fueling the future

Biogas production and use in Norway - benefits and potential

Jens Måge, Technical Advisor Avfall Norge,
Avfallsforum Rogaland
March 10, 2022

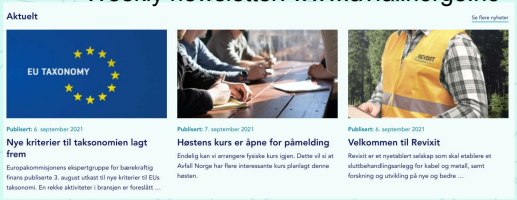
@jensmaage
jens.maage@avfallnorge.no

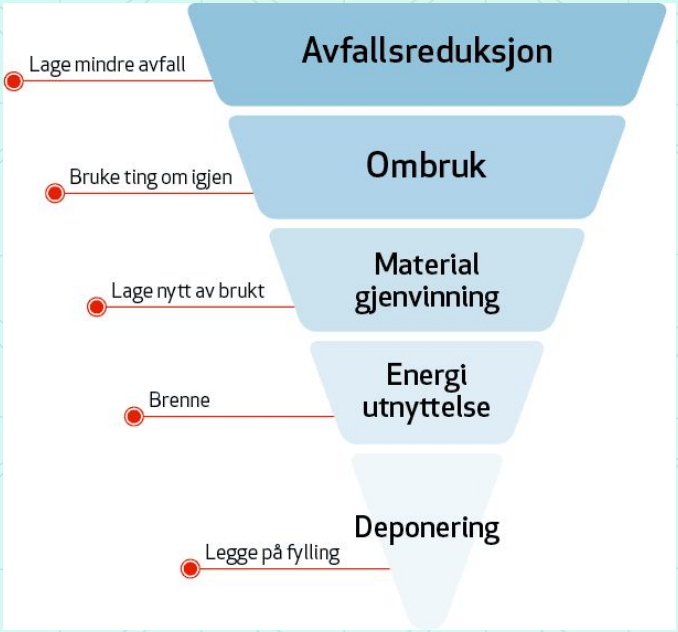
S.O.S. SOIL
SAVE ORGANICS IN SOIL

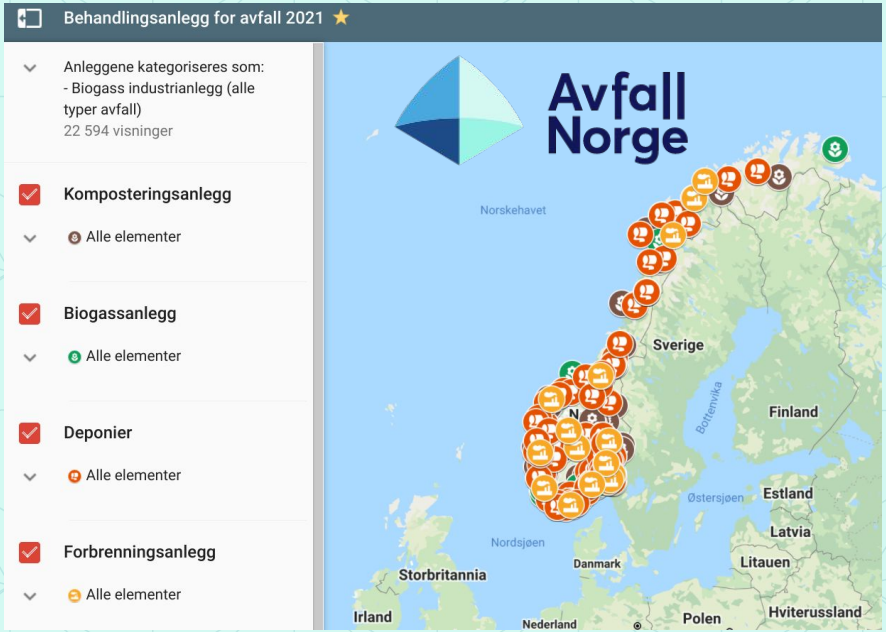
ECN

Avfall Norge and the Norwegian waste & recycling sector

Weekly newsletter: www.avfallnorge.no







Climate change

Social inequalities / migration

EARTH OVERSHOOT DAY

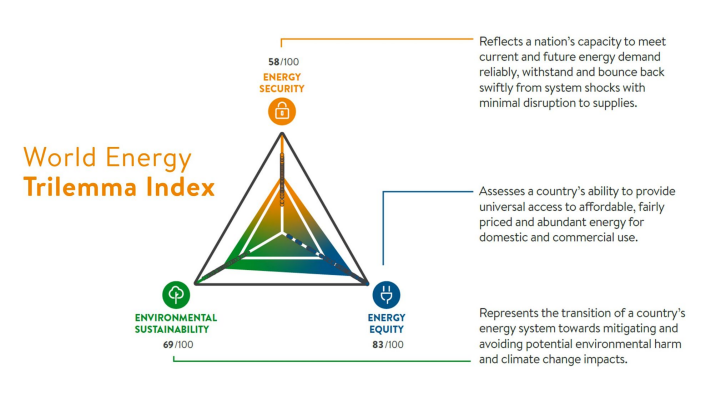
12. April 2021

Biodiversity

Resources / over consumption

Energy security:

Norway 44th place in the world
We need all energy we can produce!



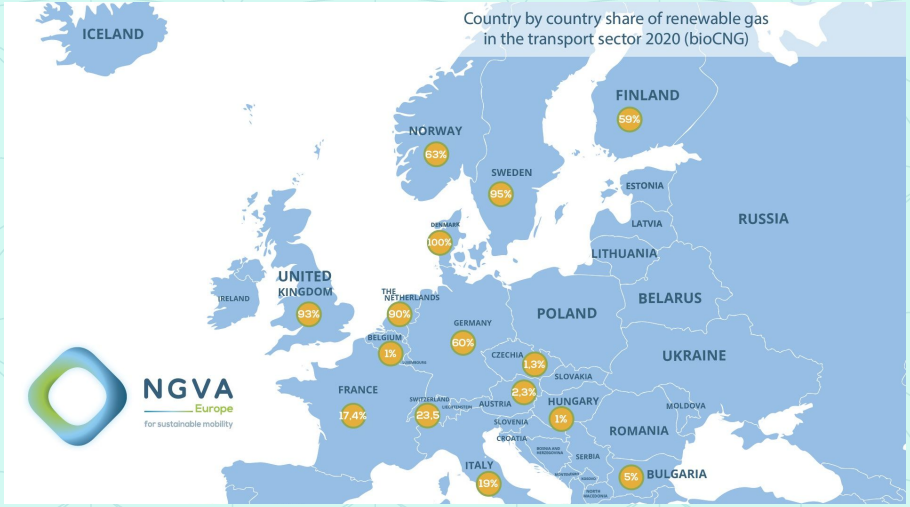
Avfall Norge

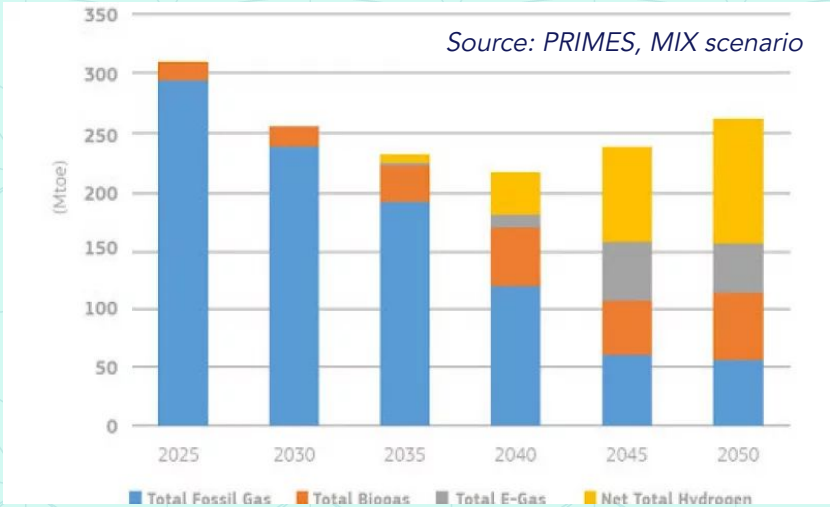
Food security:

100% of phosphorus for fossil fertiliser is imported from unstable regimes (Morocco, Russia and China)

March 2022: EU bans all imports of potassium potash or potassium chloride from Belarus. One of the three main chemical nutrients used in commercial fertilisers, the other being phosphate and nitrogen.

EU policy: Decarbonise gas markets



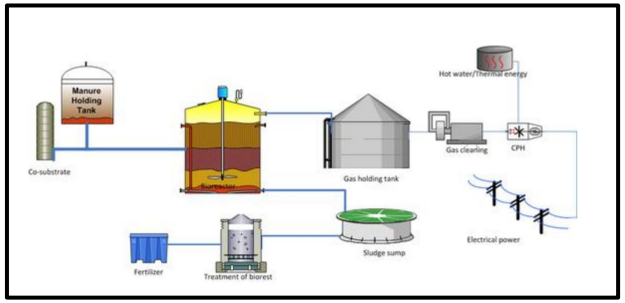


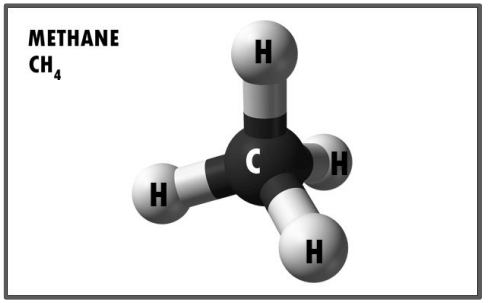
About biogas

Production of biogas

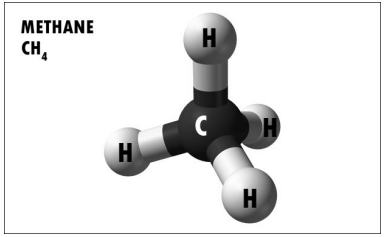
As long as we have agriculture, aquaculture, forestry, food waste, and go to the bathroom, nature will produce biogas ON ITS OWN!

BIOGAS (60% CH4, 40% CO2) and BIO-FERTILISER

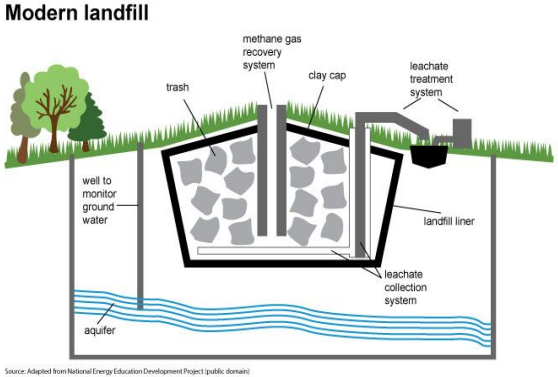


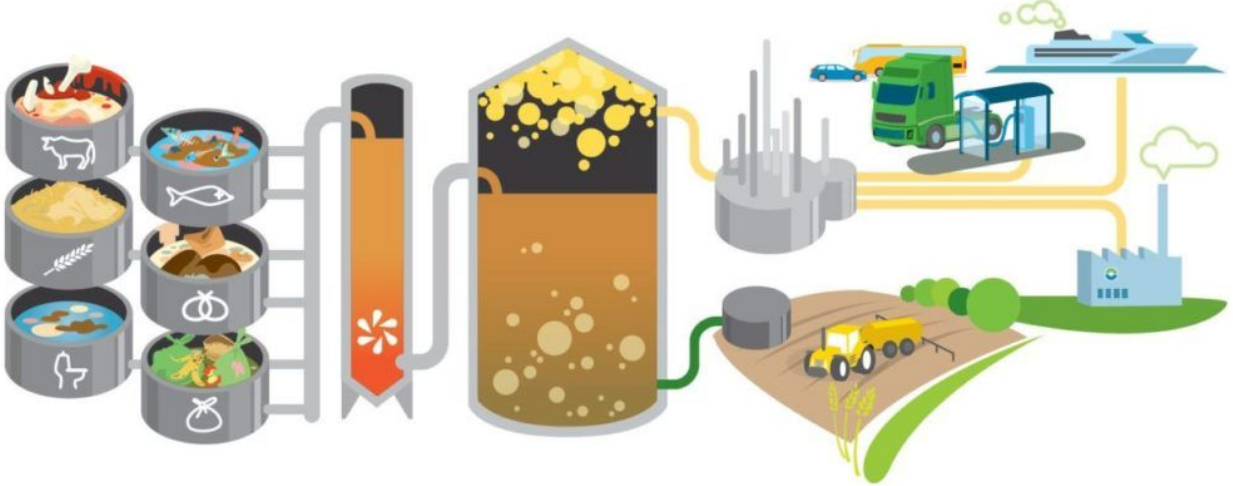


The methane molecule CH4

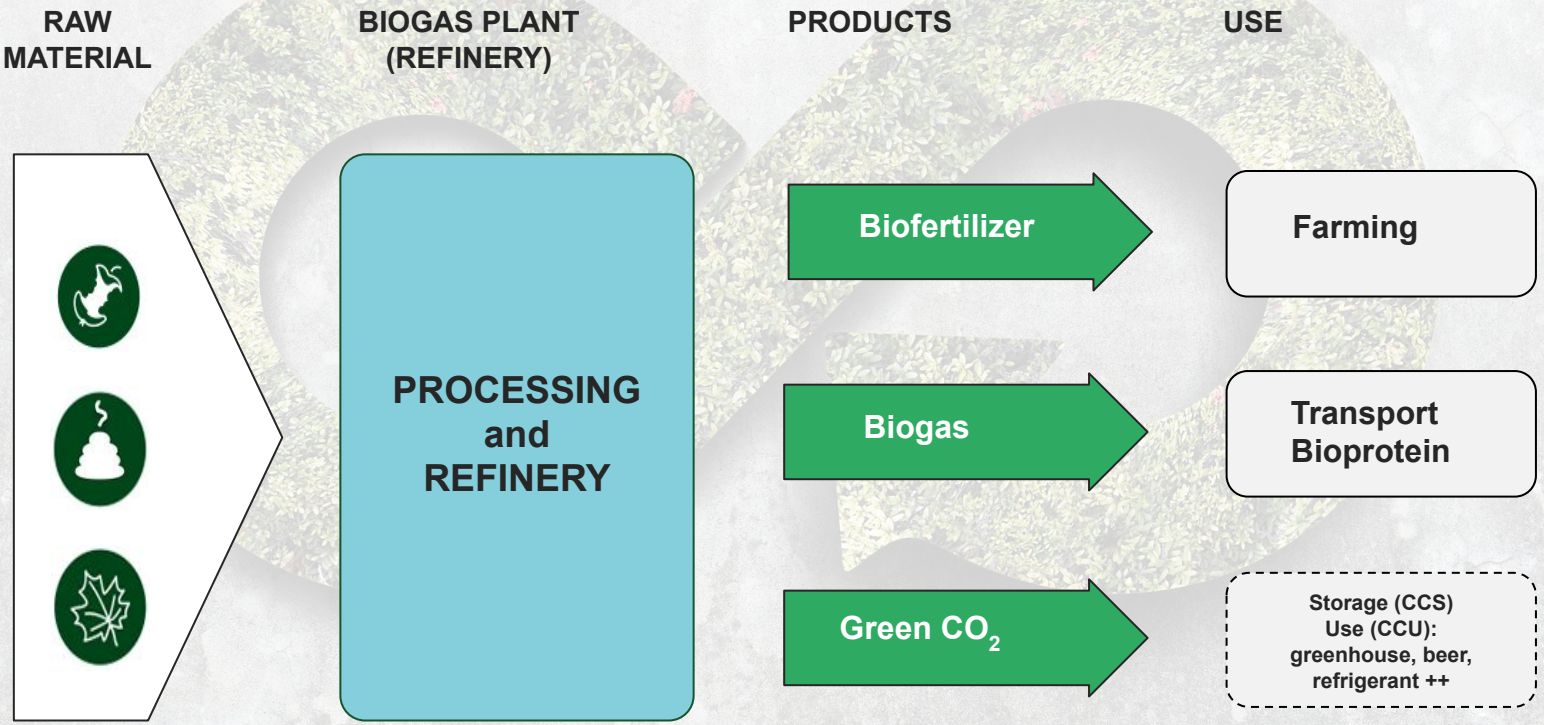


- Natural and universal
- Versatile - converts to “everything”
- **Potent as a climate gas (86X CO2 in the short term)**
- Different origins



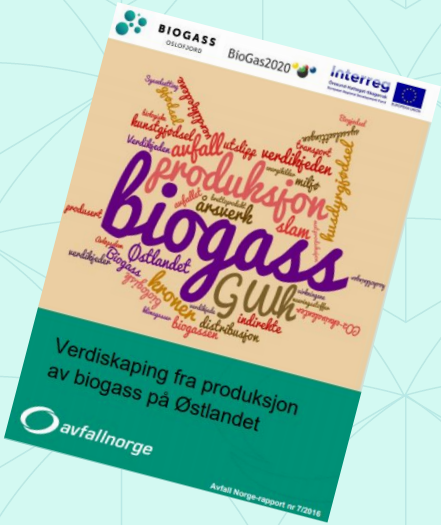


Many value chains can provide several products



In summary: Why is biogas so important?

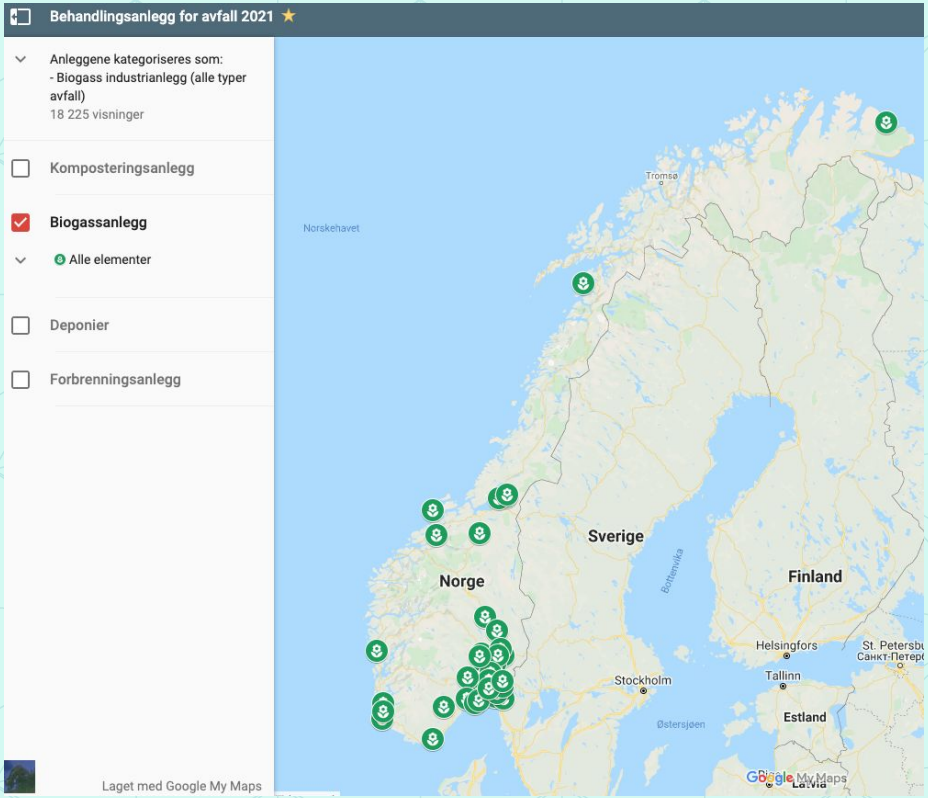
- Turn waste from a problem into as a resource
- Circular bioeconomy - recycling targets (60% 2030)
- Reduce climate emissions
- Part of a holistic sustainable energy system
- Food supply security - more sustainable farming
- Biogas digestate, compost and biochar saves organics in soils (carbon farming)
- Sustainable jobs and “green value creation”



Market development

A - Production

Biogas plants in Norway 2022



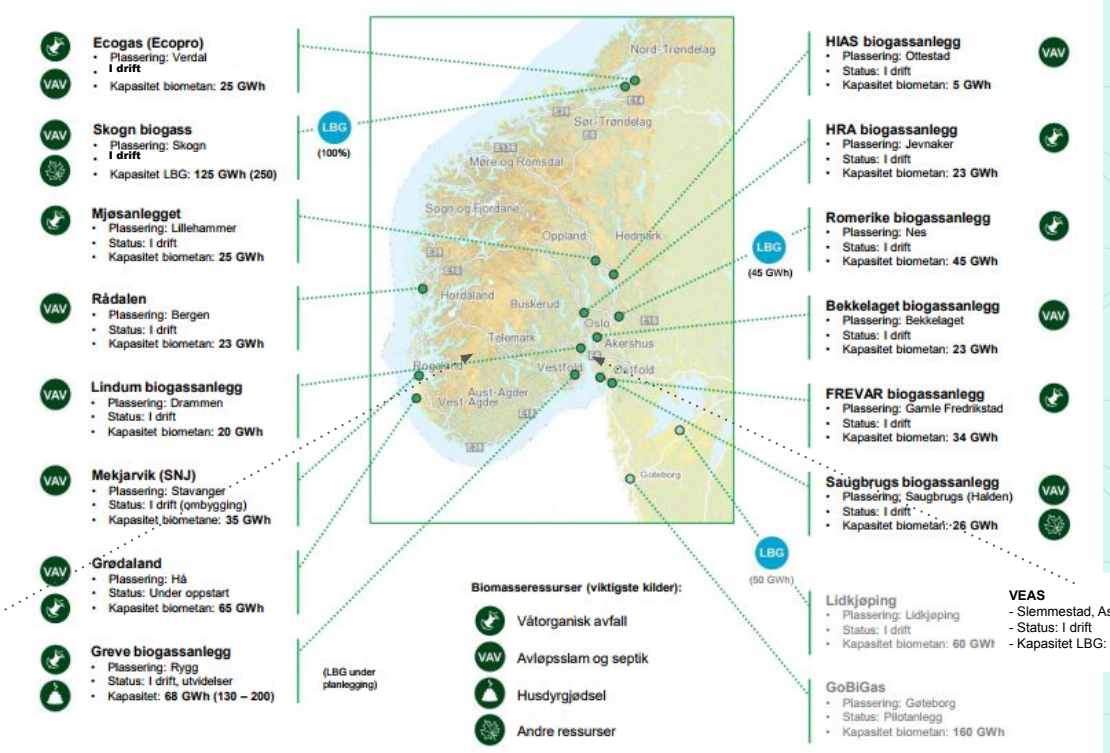
[Map](#) over treatment plants and landfills in Norway at www.avfallnorge.no

41 plants registered

2021: Total 700 GWh production

Production of biogas for transportation

- 12 CBG / 4 LBG plants *
- 7 (8) food waste + manure
- 7 (8) wastewater sludge and other industrial waste
- Capacity before expansion: 652 GWh
- Production 2021:
  - CBG 157 GWh
  - LBG 125 GWh
  - **Sum 282 GWh**

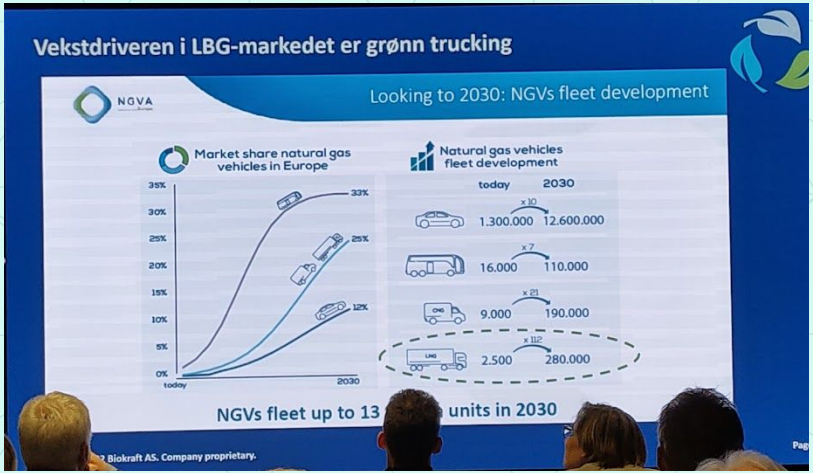


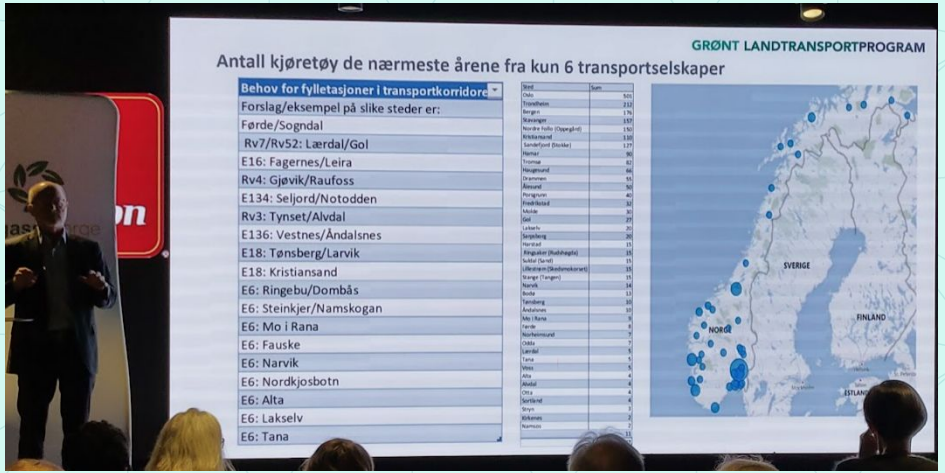
* Incl 50 GWh from Renevo, Stord, from 2022/23..

Market development

B - Demand and use

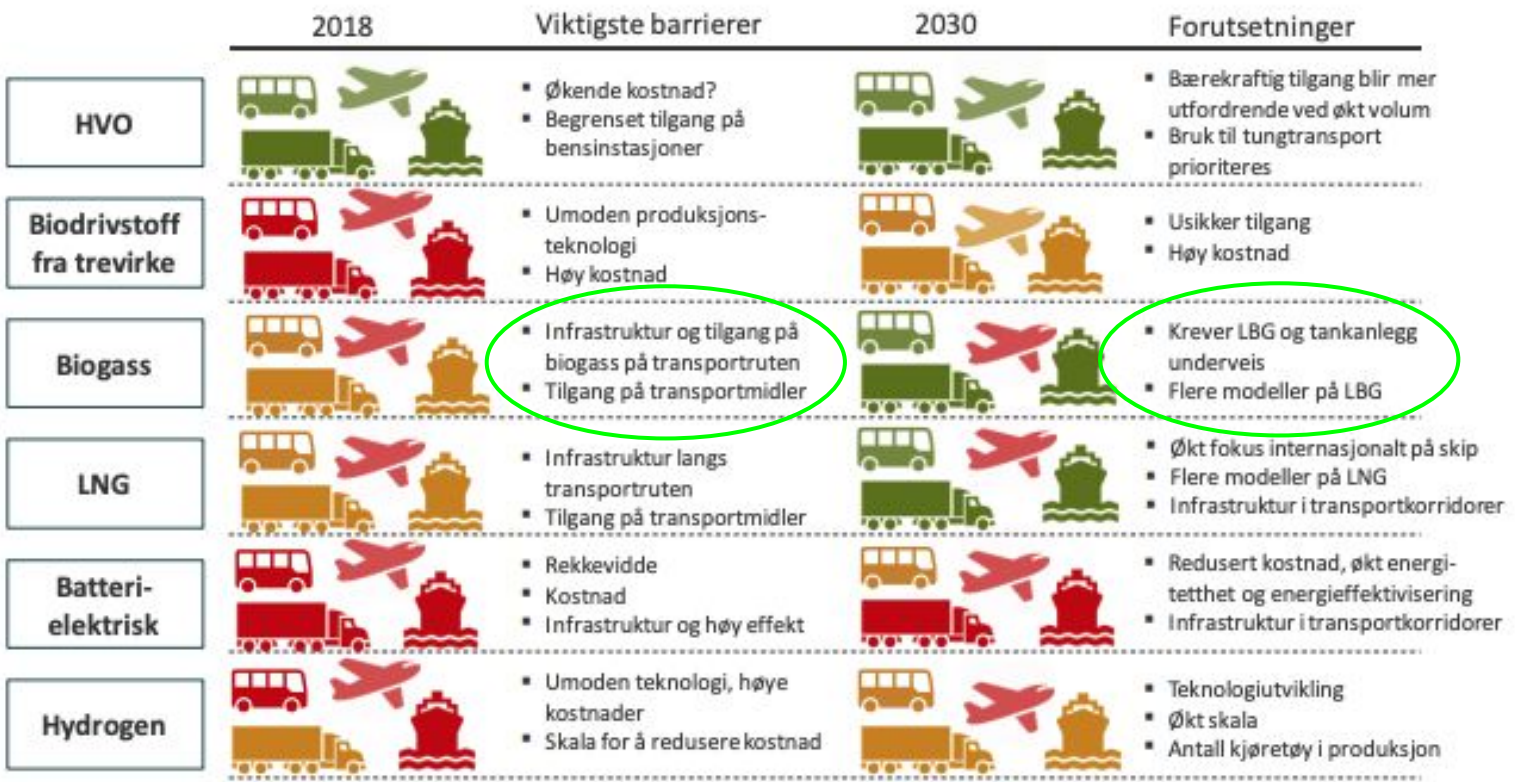
Still bus and renovation (70-80%), but expected strong growth in other transportation + industry and maritime





Long and regional transportation

Development for long-distance transport



Thema consulting, juni 2018

Industry initiatives

NHOs Grønt landtransportprogram (GLP)

Avfall Norge

NHO
NLF
NORGES LASTEBILEIER-FORBUND
NHO Mat og Drikke
NORGES BONDELAG
Sjømat Norge
Norsk Industri
bnl
Byggenæringens Landsforening
NHO Transport
DRIVKRAFT NORGE
Energi Norge
Treindustrien
EGN
ENERGIGASS NORGE
hydrogen.no
biL
BILIMPORTØRENES LANDSFORENING
NHO Service og Handel
BYGGEVARE INDUSTRIEN
Tilsluttet NHO
MEF
MASKIN-ENTREPRENØRENES FORBUND
Biogass Norge
Norges Skogeierforbund
VIRKE
Avfall Norge
LO Norge
NHO Logistikk og Transport
nelfo
EBA
NBF
ZERO

What to expect?

2030: 10% of all new trucks = 1.450 trucks - 300 GWh (Klimakur 2030, Mdir 2020)

or...

2025: 2.000 new heavy duty vehicles (GLP market inquiry among 6 large transporters, 2021) - 400 GWh

GRØNT LANDTRANSPORT-PROGRAM

Goal: 4.000 vehicles in total in 2025 (indicates a mature market)


BIOGASS BRANSJEN

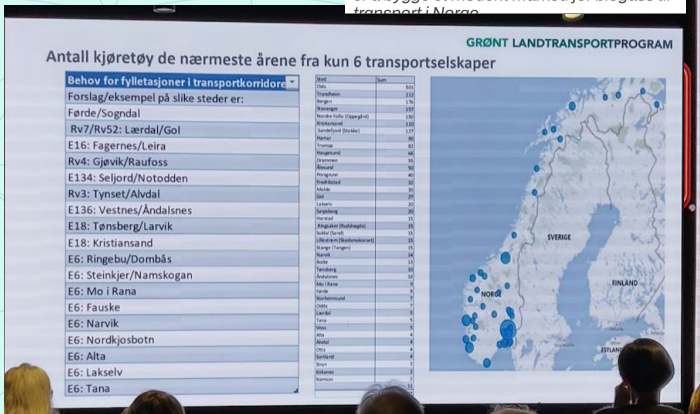
NYHETER PUBLISERT 2. MARS 2022

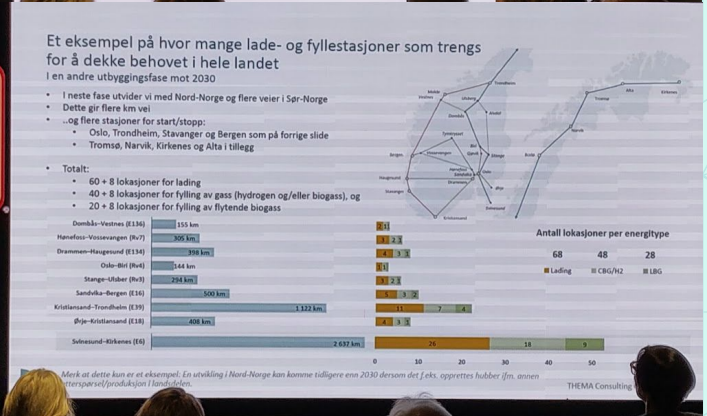
Erling Sæther fra Grønt landtransportprogram holdt innlegg under Biogasskonferansen 2022. Foto: Ole Peder Giæver/Biogassbransjen.no.

Biogasskonferansen 2022:

– Må sikte mot 4000 gasslastebiler før 2025

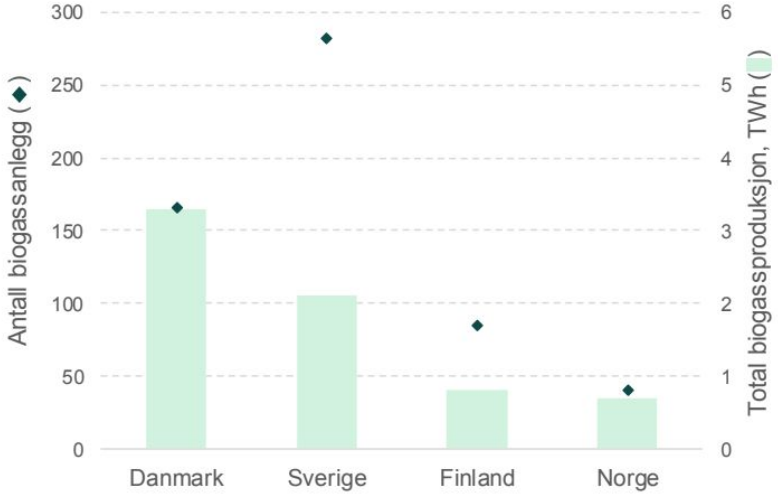
Målet for Ahlsell og Grønt landtransportprograms forseringsprosjekt er å bygge et modent marked for biogass til transport i Norge

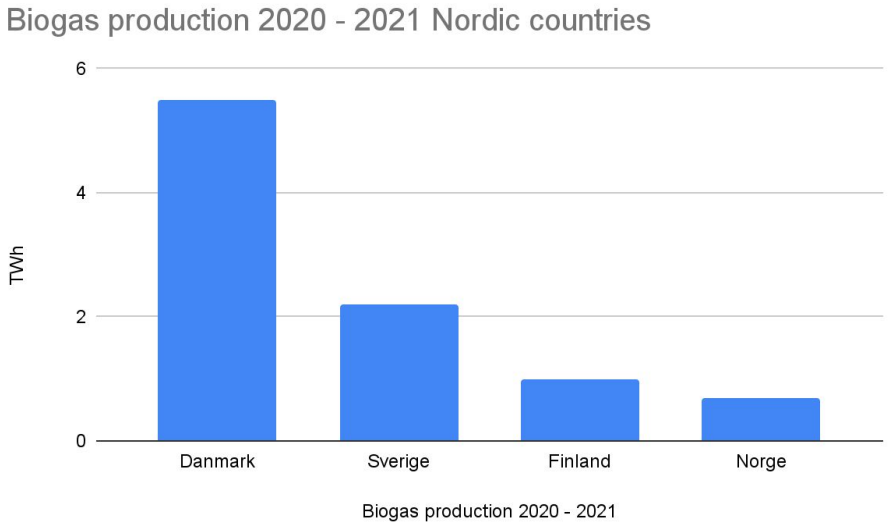




Energy potential

Production in 2017 vs 2021 Nordic countries





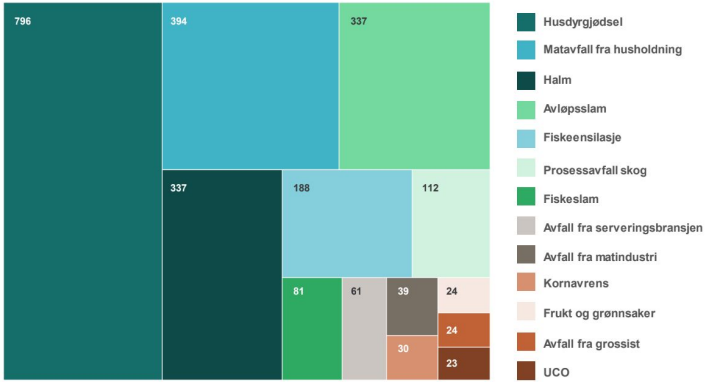
Denmark: 70% growth!

Potential Norway: 2,5 - 33 TWh

Many potential studies - different assumptions:

- Enova / Østfoldforskning 2008: 6 TWh
- The industry 2016: 10 - 12 TWh *
- NVE 2017: 5 - 33 TWh ***
- Miljødirektoratet 2019: 2,5 TWh **

* provided better framework conditions
** business as usual
*** incl macro algeas



Carbon Limits / Miljødirektoratet 2019


SYSLA GRONN

USD: 7.96
EUR: 9.33

Busser i Bergen sentrum. Foto: Rune Sævig

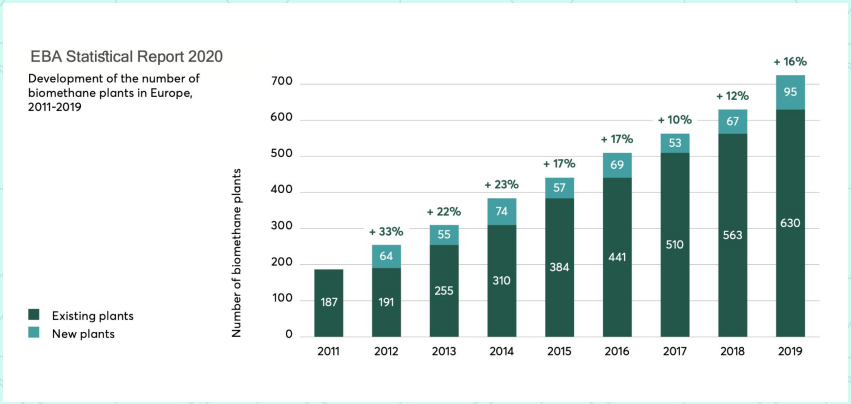
Biogass fra avfall og gjødsel kan dekke behovet til alle bussene i Norge

Norges vassdrags- og energidirektorat
NVE

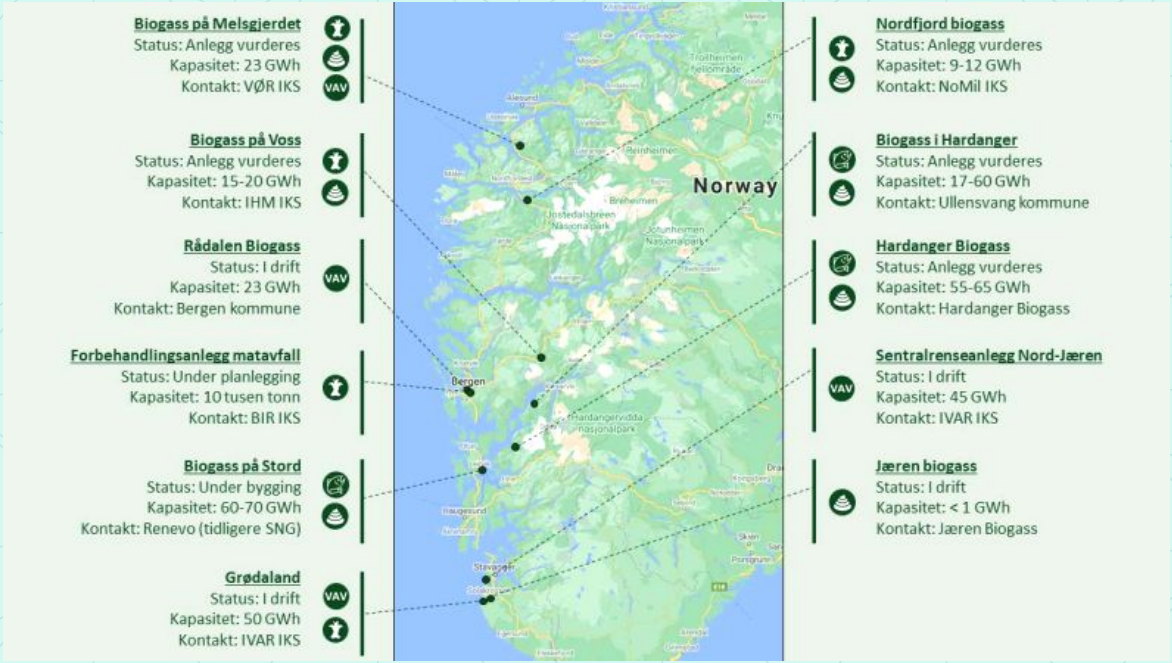
NVE 2017

Large growth potential

- Norway: 10 - 12 TWh, incl waste from forestry (pyrolysis), agri- and aquaculture
- Denmark: 30-40 TWh incl Power-2-X



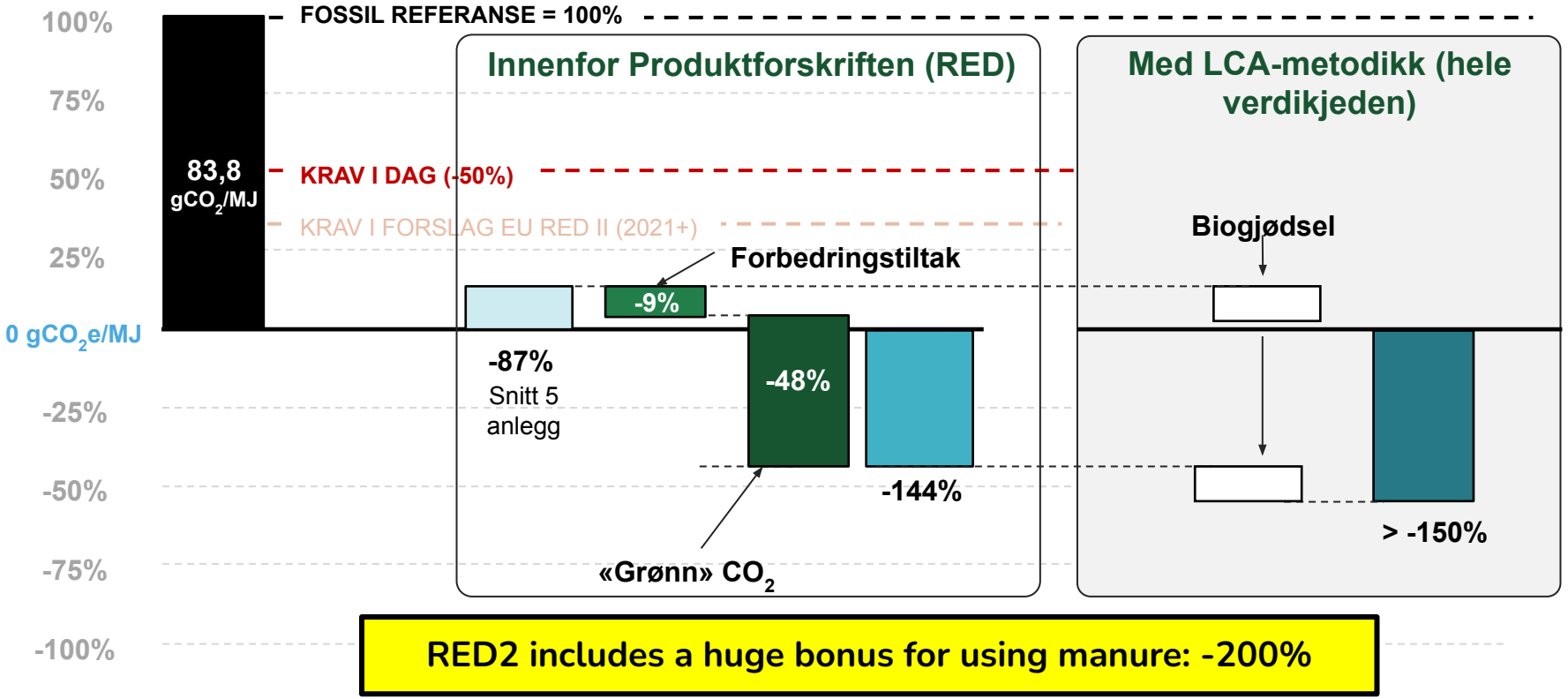
19 new projects on the table in Norway



Map: Biogass Vestland, presented at Avfall Norges bioseminar 2020

Climate potential

Biogas can give large emission reductions - more than «zero emissions» (CCUS)



Potential - incl CCUS (Carbon Capture Usage and Storage)

3,2 mill tons CO2 equivalents

= 6,9 % of Norway's total

(preliminary estimates)

www.nordicbiogasconference.com

Thank you for your attention! See you here?

Bli med på studietur til Milano