

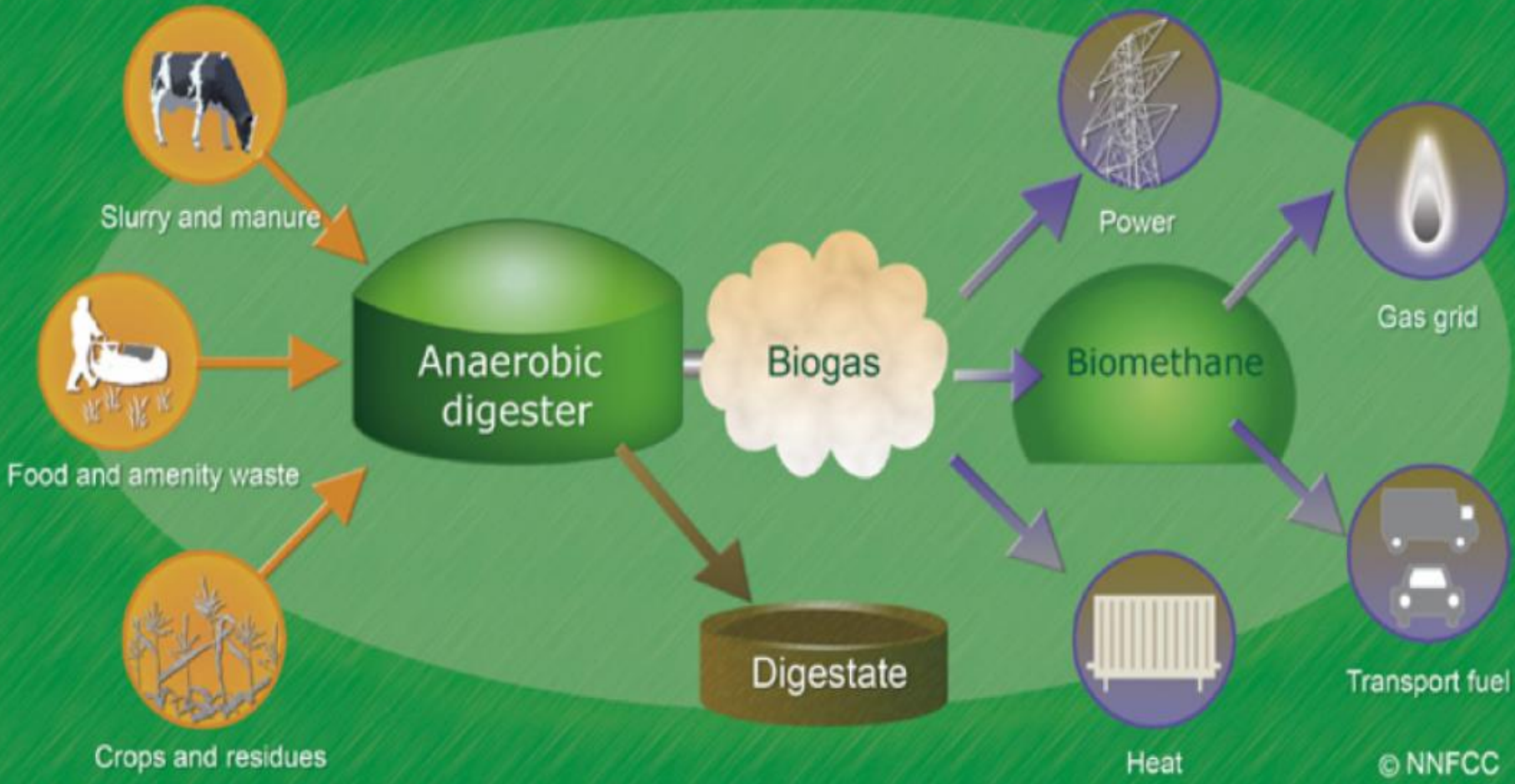
Greening the gas grid.

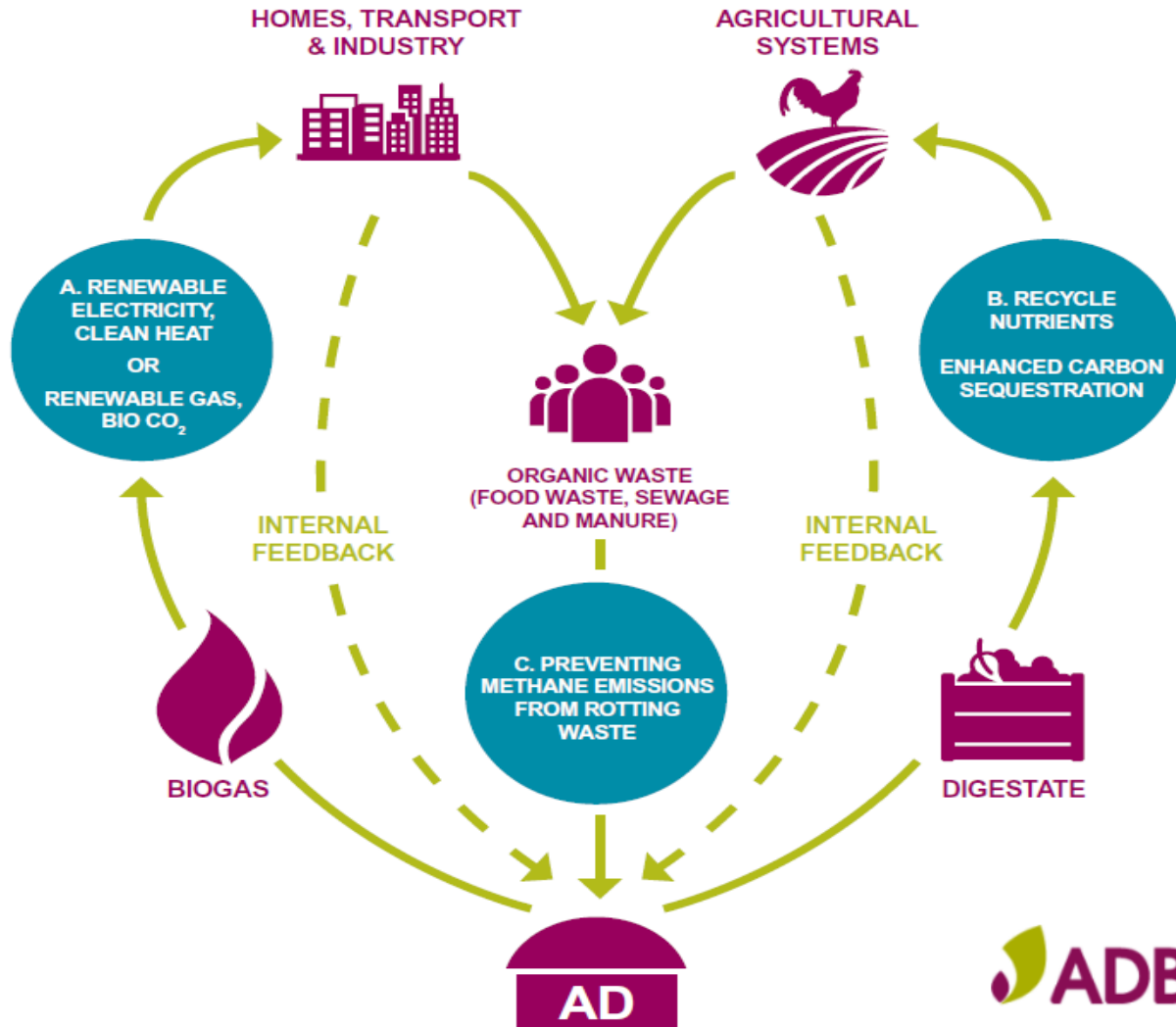
How far can AD take us?



Aims for today.









But how far can AD
take us?





ENERGÍAS RENOVABLES

El periodismo de las energías limpias

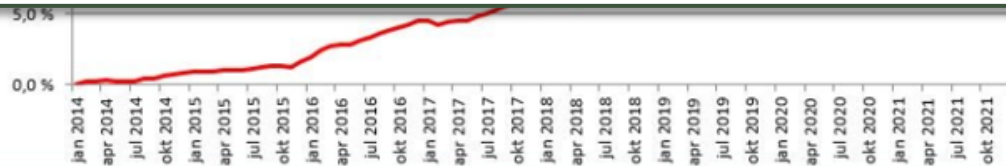


RENEWABLE
ENERGY MAGAZINE

Celia Garcia-Ceca

Spanish biomethane could cover 43% of the demand for natural gas in Spain, that is, 100% of households and 48% of industry. The potential of Spain is 163 terawatt hours per year and 2,326 plants (currently there are only five). Castilla y León is the region with the highest production and number of plants (37.78 TWh and 520 plants). But this renewable gas also faces a slow and complex administrative process.

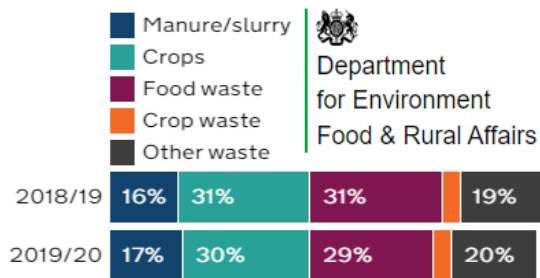
By Berna
Biogas could replace nearly
generation, a new study by the Ger...



Analysis assumptions prepared in 2021 expect this growth to continue so that biogas will be able to cover 75% of Danish gas consumption in 2030. In 2034, biogas production is expected to be able to fully meet Danish gas demand on an annual basis.



Four Scenarios.



Business As Usual

BAU + Food Waste

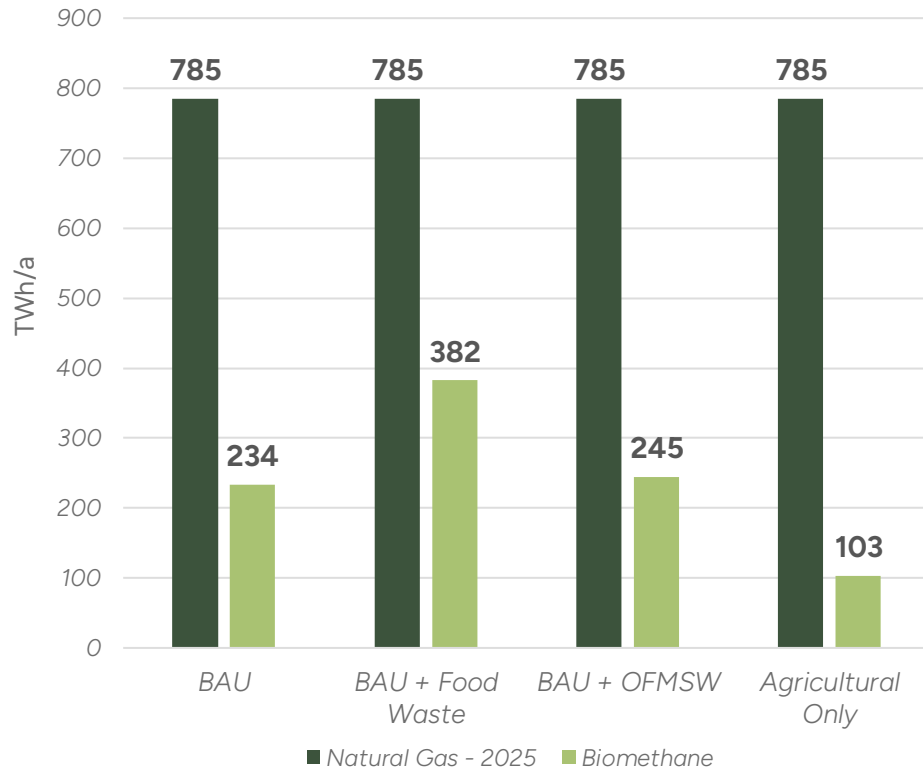
BAU + OFMSW

Agricultural Only





Four Scenarios – 2025 Gas Demand





Four Scenarios – 2050 Gas Demand



DESNZ MacKay Calculator

Example Pathways



reset levers

Lever settings:



Level of ambition

> Transport

> Buildings

> Industry

> CO2 Removal & Gases

Hydrogen Gas Grid Share

Biomethane Gas Grid Share

Hydrogen - Biomass CCS

Hydrogen - Methane CCS

Hydrogen - Imports

Greenhouse Gas Removal

Bio-Conversion with CCS

CCS Capture Rate

> Electricity Supply

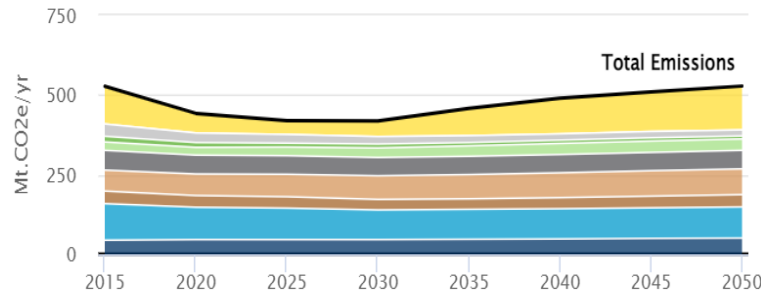
Conditions of Use

switch to 2100 mode

Emissions / Primary Energy

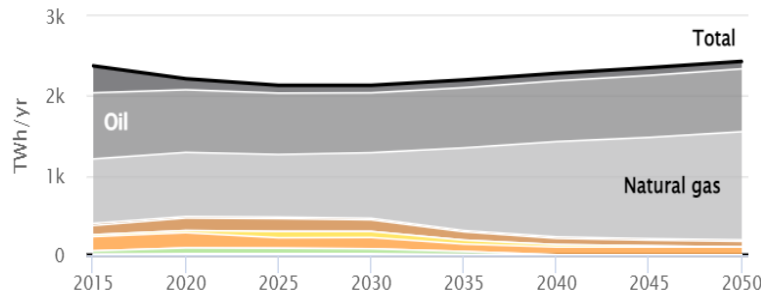
Cumulative Emissions / Final Energy

Greenhouse Gas Emissions



- Dedicated GHG Removal
- Electricity Generation
- Hydrogen Production
- Other Energy Supply
- Waste Management
- Agriculture & Land Use
- Industry
- Buildings-Residential
- Buildings-Non-Resident...
- Transport-Domestic
- Transport-International
- Total Emissions

Primary Energy Consumption



- Coal
 - Oil
 - Natural gas
 - Waste
 - Bioenergy
 - Hydrogen imports
 - Electricity imports
 - Nuclear
 - Environmental heat
 - Wind
 - Solar
- 1/2

1990

-35%

4



DESNZ MacKay Calculator

Example Pathways



reset levers

Lever settings:



Level of
ambition

> Transport



> Buildings



> Industry



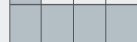
> CO2 Removal & Gases



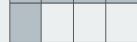
Hydrogen Gas Grid Share



Biomethane Gas Grid Share



Hydrogen - Biomass CCS



Savings of 82
million tonnes
of CO₂.

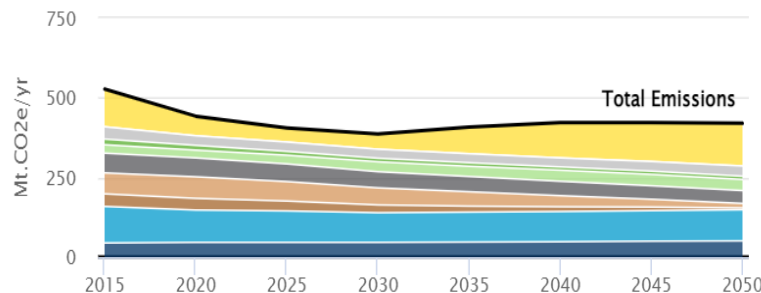
Conditions of Use

Switch to Z100 mode

Emissions / Primary Energy

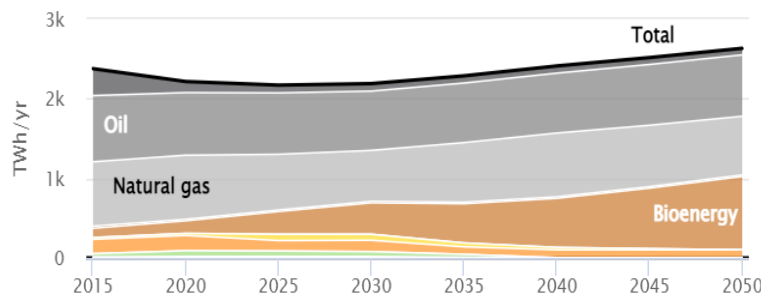
Cumulative Emissions / Final Energy

Greenhouse Gas Emissions



- Dedicated GHG Removal
- Electricity Generation
- Hydrogen Production
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- Buildings-Residential
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Primary Energy Consumption



- Coal
- Oil
- Natural gas
- Waste
- Bioenergy
- Hydrogen imports
- Electricity imports
- Nuclear
- Environmental heat
- Wind
- Solar

1990

-49%

4



1/2



How can we achieve this?



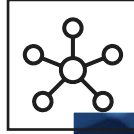
- Awareness
- Economies of Scale
- Hub & Spoke Models
- Regulatory Support
- ?



Challenges to overcome.



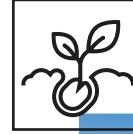
Seasonal Demand



Network access



Sourcing Food Waste



Fertiliser Management





Benefits.



Energy
Security



Organic
fertiliser



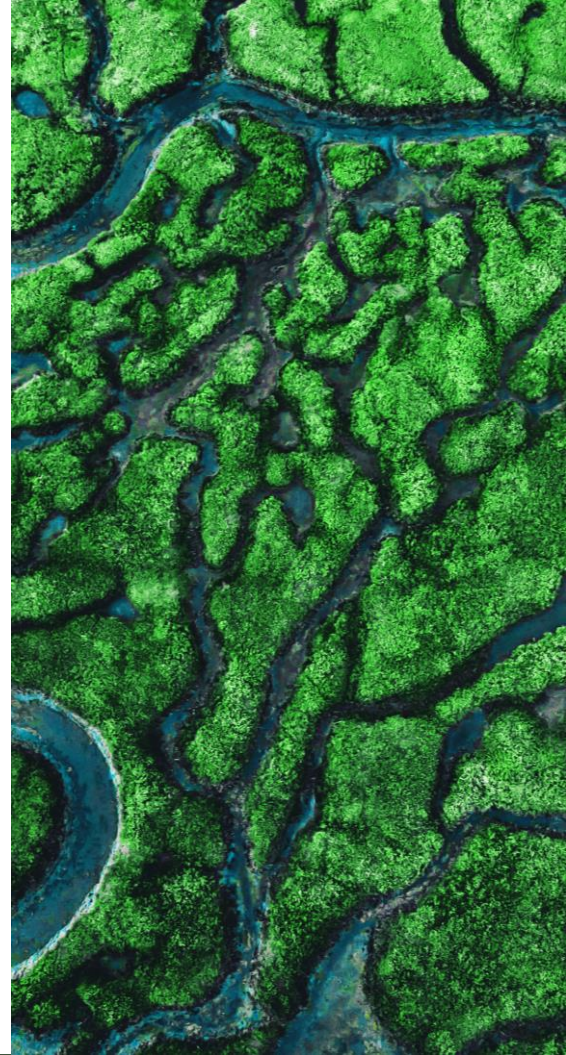
Green
Credentials



UK
reputation



Environment



The end
results?



Technical Support



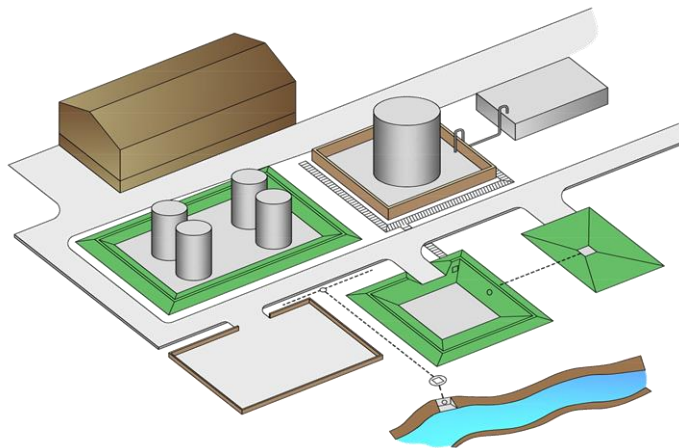
Services: Process Engineering and, Civils Engineering, as well as:

Permitting & Planning, ESIA, Hydrology, Land Quality & Remediation, and Sustainable Waste Management

Location: UK and International

- The Crofthead AD site processes 99 ktpa of agricultural wastes.
- It exports 500 m³/hr of biomethane (7.5 MW heat).
- Over years of design, construction and commissioning, SLR has fulfilled the role of Owner's Engineer, including:
 - **Process design reviews.**
 - **Safety support (HAZOPs).**
 - **Civil engineering support.**
 - **Commissioning and Performance Test management.**
 - **Contractual management.**

Regulatory Support



Services: Process Engineering and, Permitting & Planning, ESIA, as well as:

Civils Engineering, Hydrology, Land Quality & Remediation, and Sustainable Waste Management

Location: UK and International

SLR have expertise in giving various regulatory, planning and permitting support, including:

- **Ciria 376 Bund assessments**, for sites falling under Waste Permits.
- Drafting full **planning applications** for new developments.
- Support with **permit applications** and responses, including CAR and Reg-61 (B.A.T) responses.



Making
Sustainability
Happen

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