

Introduction to Clarke Energy



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Development and
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- US

Agenda

- Clarke Energy
- Need for flexibility
- Flexible building blocks
- New projects

13 June 2022



Global

Operates in 27 countries



Supporting net-zero

Our projects seek to support the transition to a zero-carbon economy



Experience

Over 7.4 GW_e of Jenbacher Installed, 1.4GW on biogas



Lower costs and carbon

Lower costs and carbon emissions through fuel efficient power



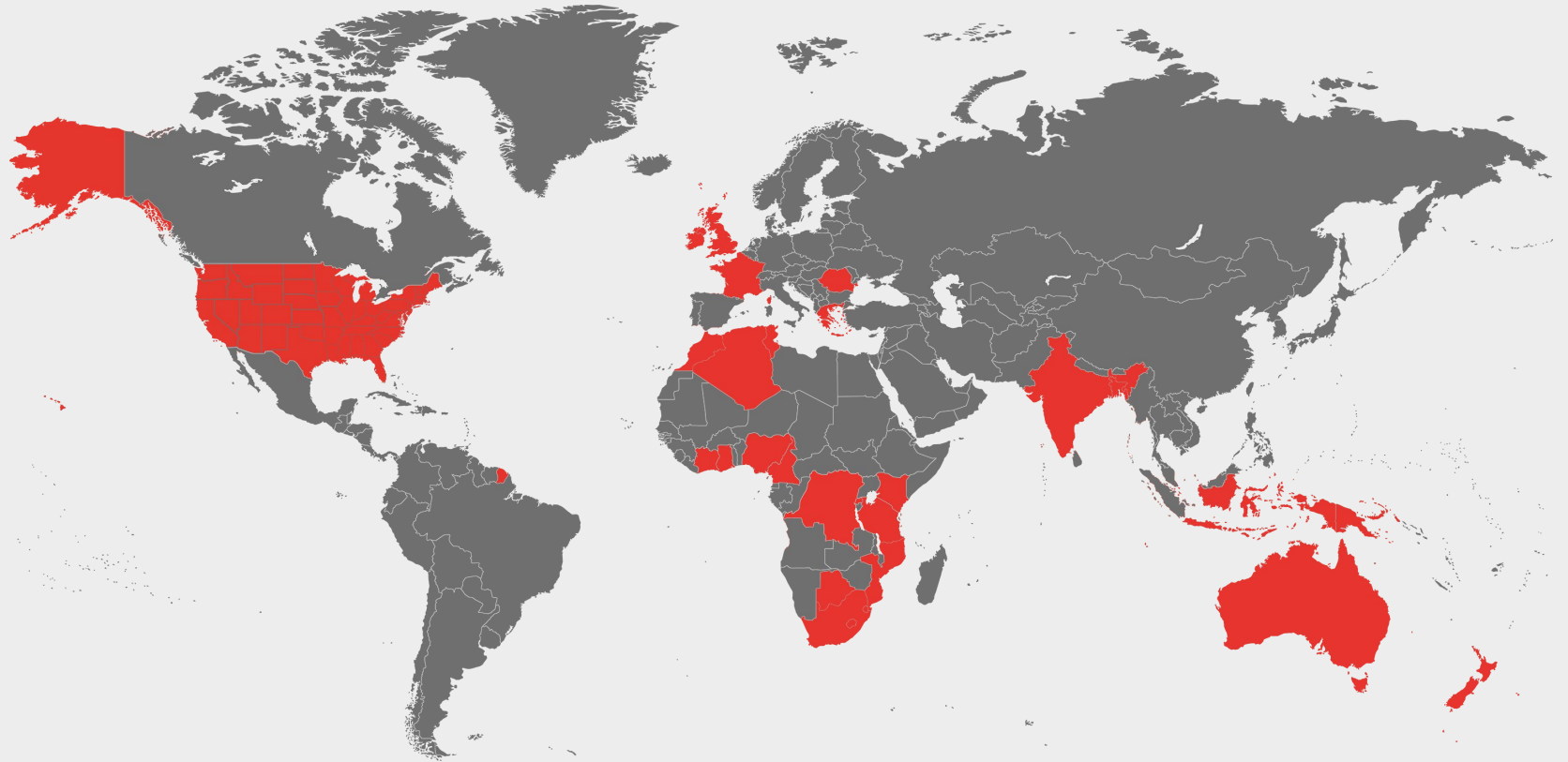
Turnkey

Turnkey EPC contractor with civil engineering capabilities



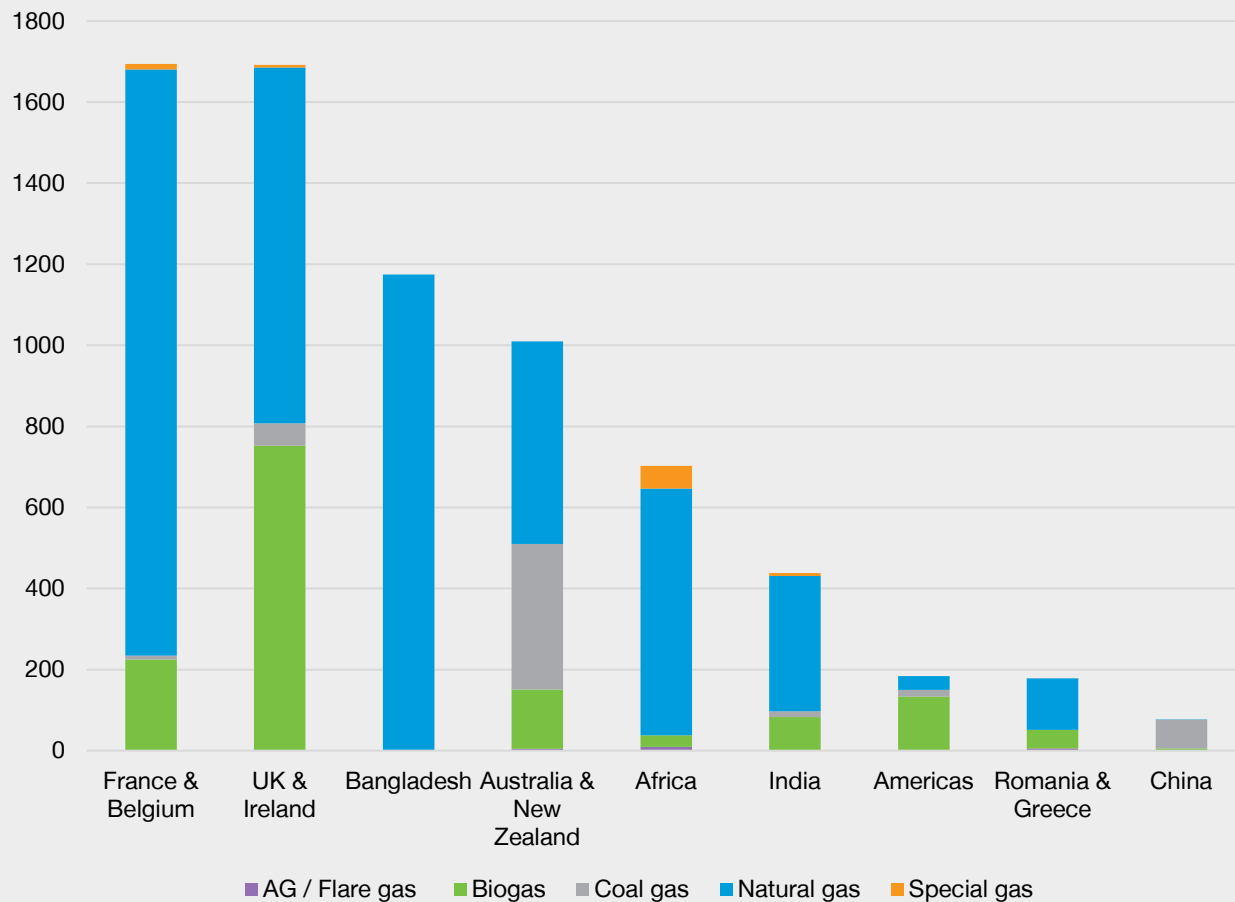
Maintenance

Full maintenance, operation and overhaul services maximising equipment availability



MW sold/installed

4



7.4GW

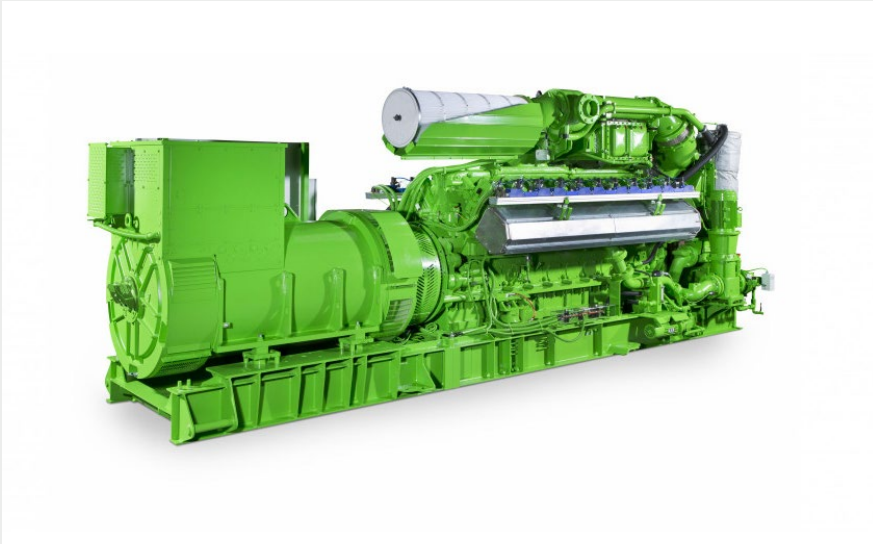
Sold and installed over 7.4GW of power globally, enough to power 17 million homes

KOHLER®

Product Offering

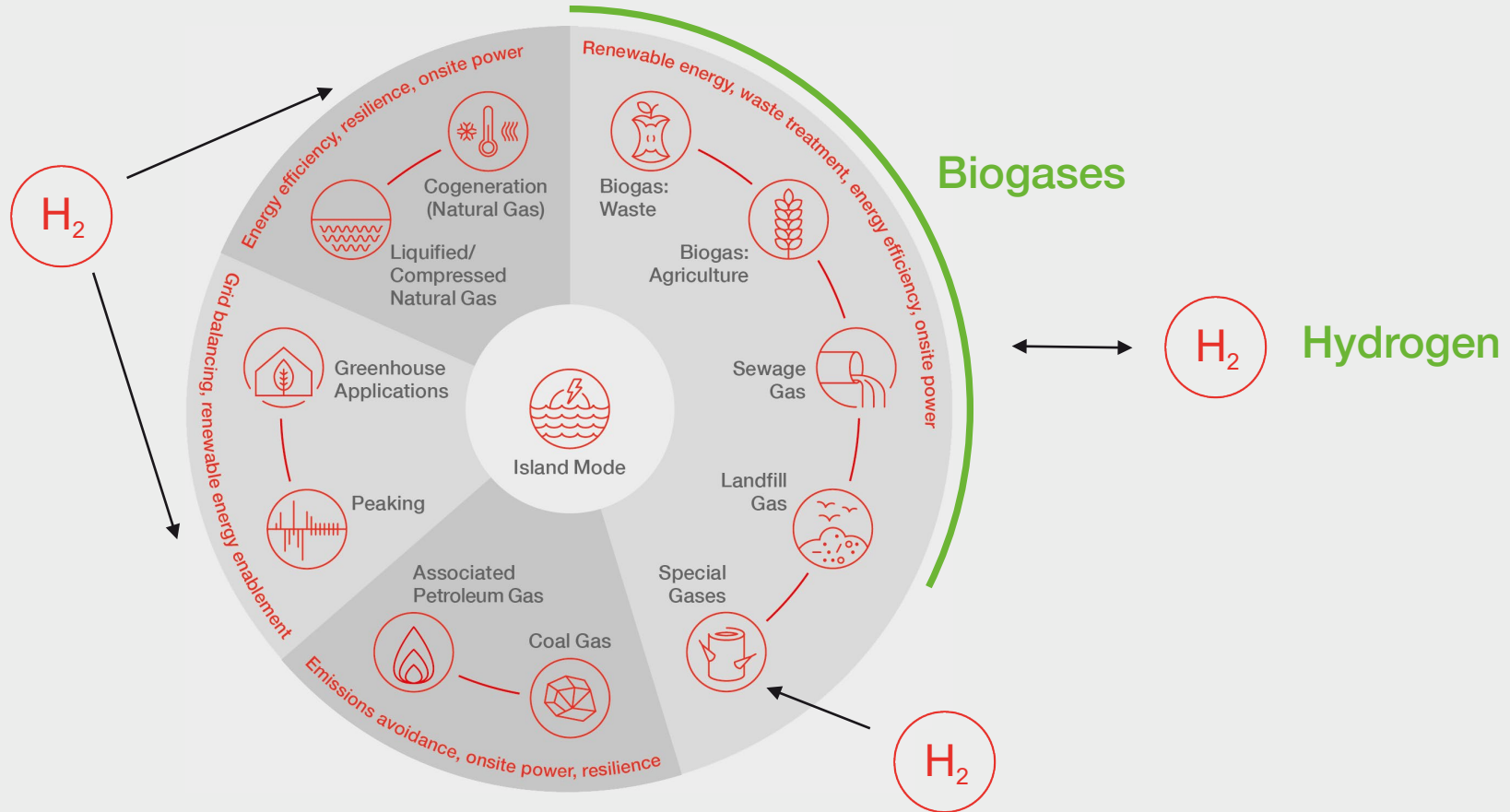
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INNIO's Jenbacher biogas engines (0.25-3.3MW)



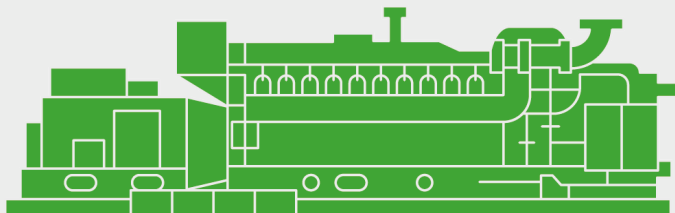
TPI's Biogas Upgrading Systems (Membrane and selective solvent)





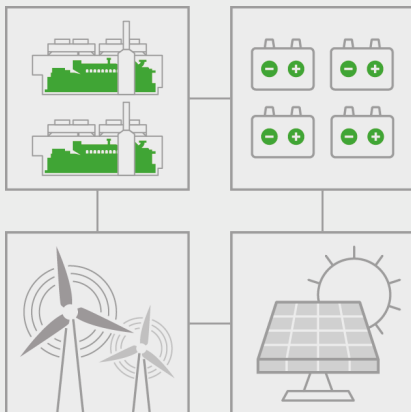
Gas genset

A Jenbacher genset is configured to produce electrical power only



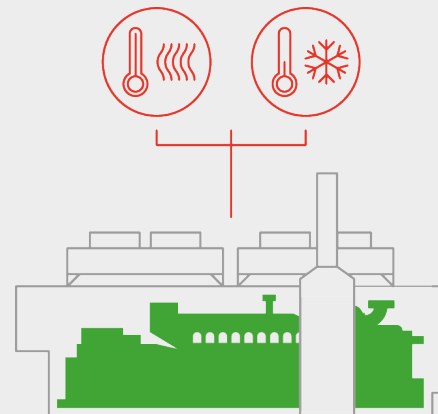
Hybrid solutions

Clarke Energy can take on a greater scope of project supply and incorporate different power generation technologies



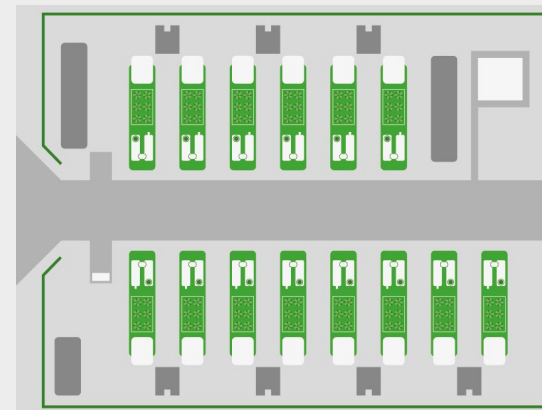
Power module

A Jenbacher gas engine module is configured for the recovery of both electricity and heat



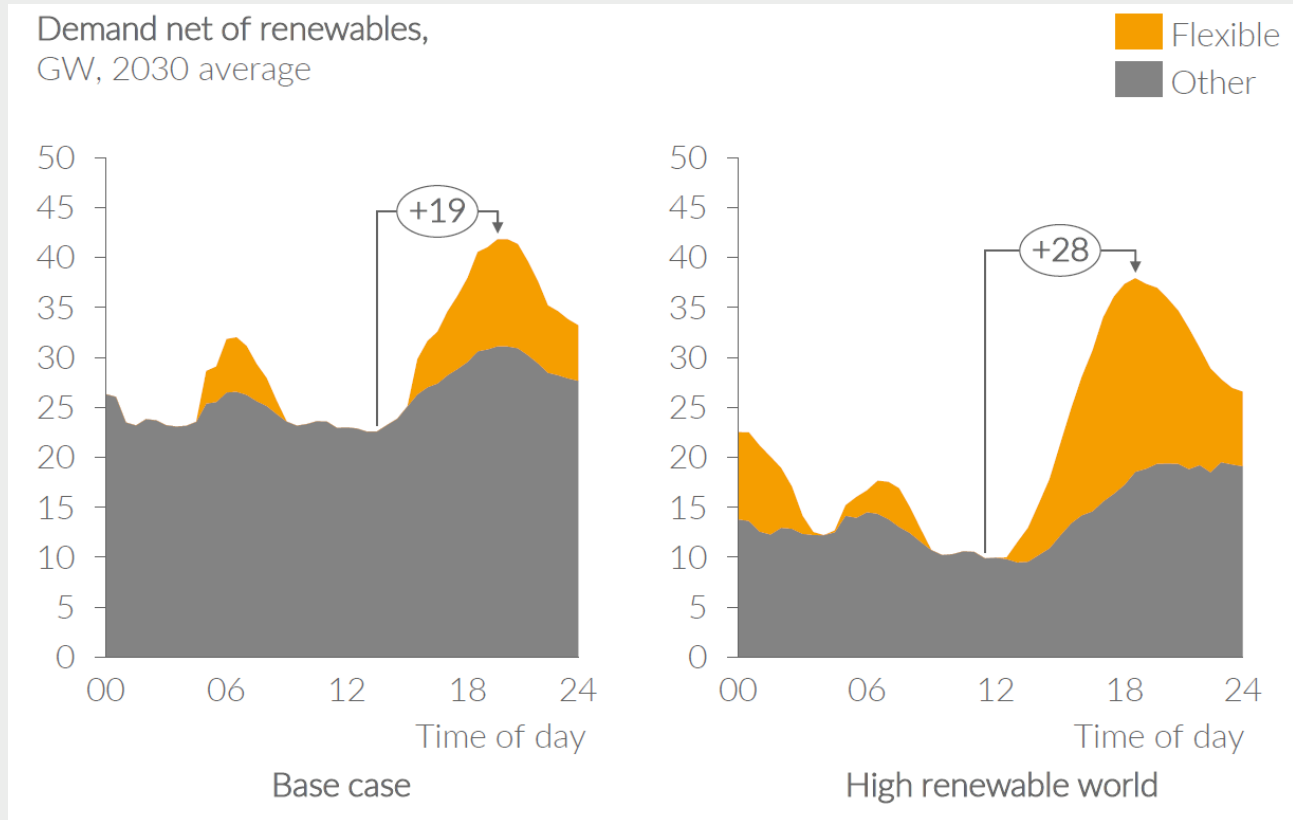
Power plant

Clarke Energy can supply a turn-key installation of a multi-engine power plants



Increasing Need for Grid Flexibility - UK

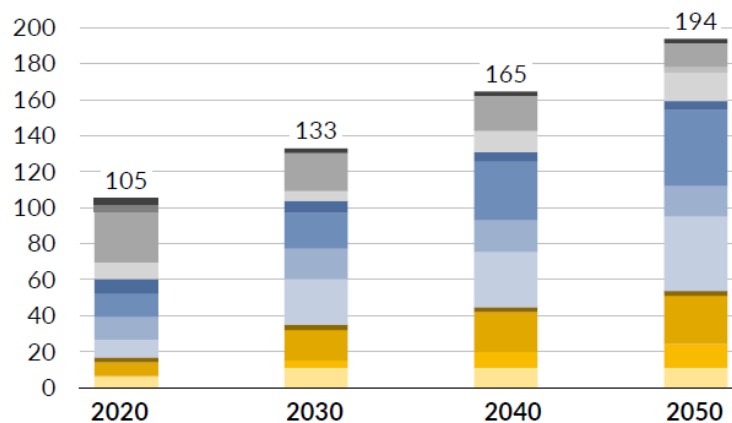
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Increase in Intermittent Capacities in a Growing Incidence of Top and Bottom Prices. Projections by Aurora ER

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Total installed capacity,
GW



Baseload

- CHP
- Coal¹
- CCGT
- Gas CCS
- Nuclear

Renewables

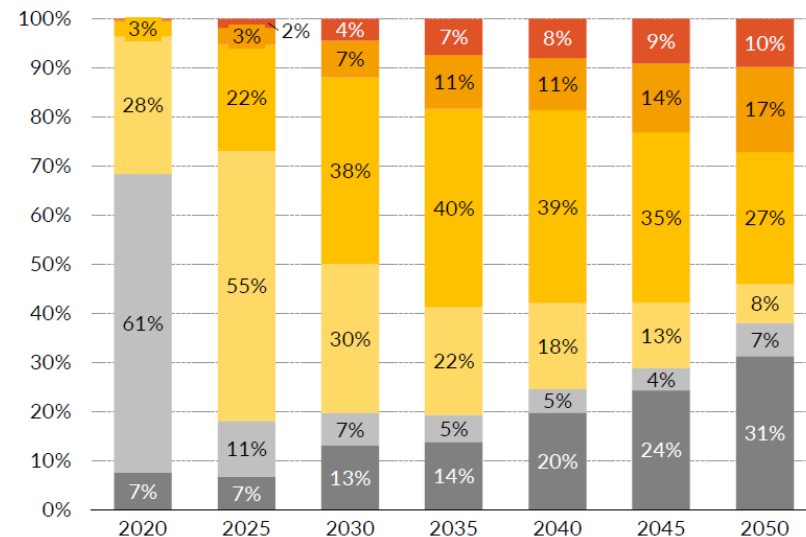
- Other renewables²
- Solar
- Onshore wind
- Offshore wind

Flexible capacity

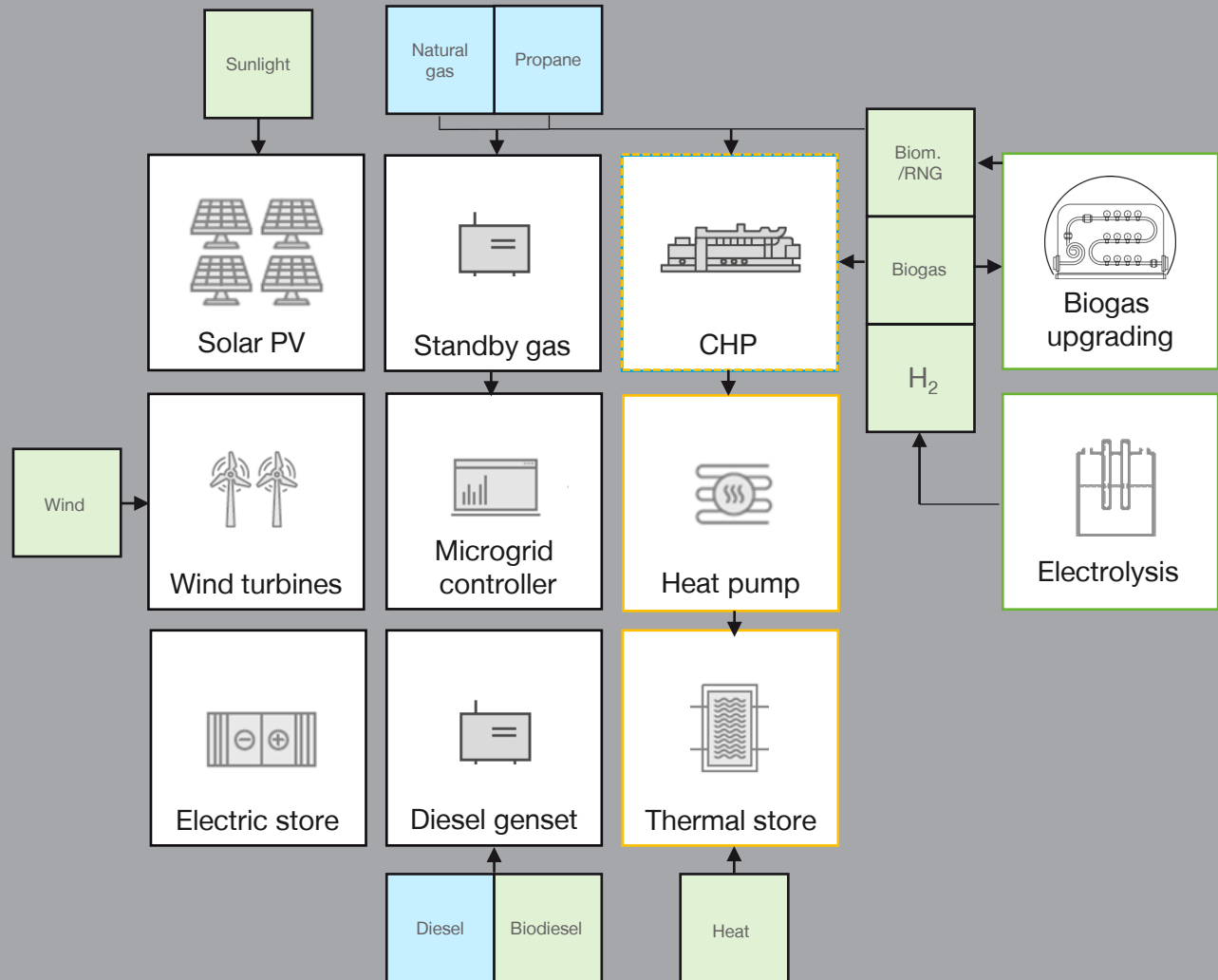
- Pumped Storage
- Peaking³
- Battery storage
- Interconnectors

Frequency distribution of the
electricity price, %

- >£100
- £80-100
- £60-80
- £40-60
- £20-40 £/MWh
- <£20 (real 2019)



Key Flexible Building Blocks



Clarke Energy[®]
A KOHLER COMPANY

Engineer - Install - Maintain

Engineering, procurement,
construction, maintenance
coordination



Plessis Gassot, Véolia Propreté and Dalkia, near Paris, France

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Largest landfill gas
power plant in France



Waste heat recovered for
district energy scheme

17.3MW_e

4x J620, 5x J416, 1x J320



Chear Farm Glasshouse, AGR Renewables and Greencoat Capital

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Hybrid gas engine CHP plus
water source heat pump



CHP, watersource heat pumps, carbon
dioxide recovery at 217,000m³
glasshouse

9MW_e +
33MW_{th}

1 x JMS624

1 x JMS620

1 x JMS416

+

6,000m³ thermal stores



BioTown Biogas, Indiana, U.S.

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Sustainable farm waste treatment
600,000 gallons slurry from 25k cows
 $\frac{3}{4}$ s of biogas upgraded to RNG /
injected
 $\frac{1}{4}$ of biogas for renewable electricity
and heat

1,500scfm

Raw biogas to 1,000scfm RNG

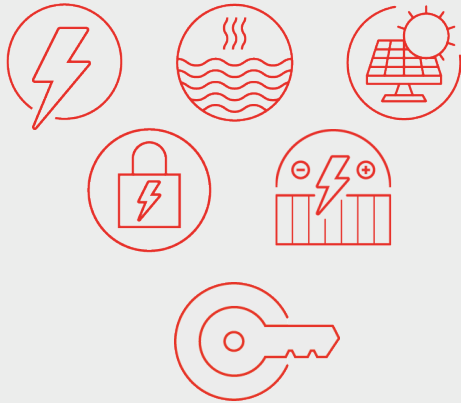
1.4MW_e



Middletown Recreation Center, Connecticut, United States

Full Turnkey Microgrid

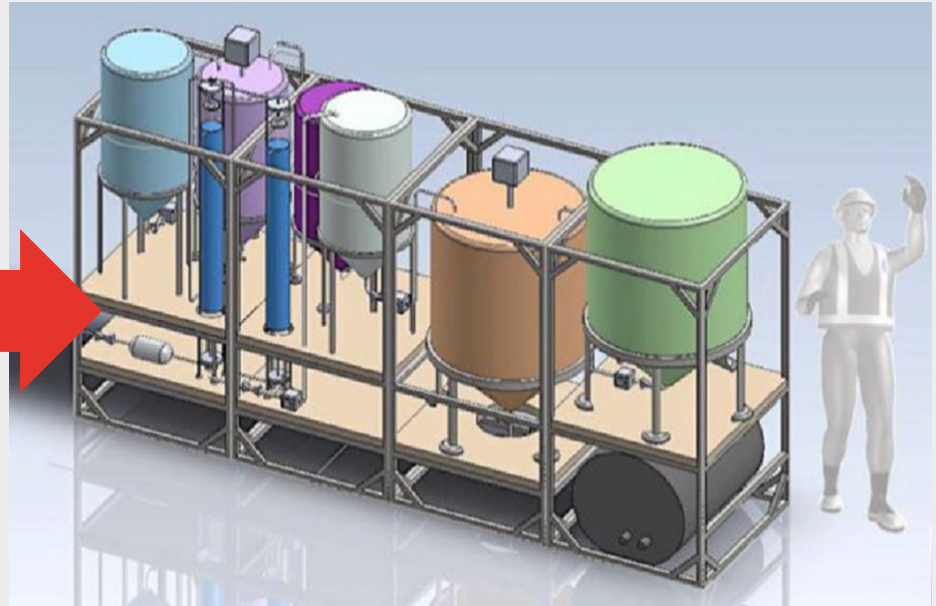
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35kW Natural Gas CHP (blackstart)
204.1kBTU/hr hot water
10kWh Battery Energy Storage System
100kW Kohler KG100 Back-up Gas
Fueled Generator
Microgrid Control System
83.3kW Solar PV array

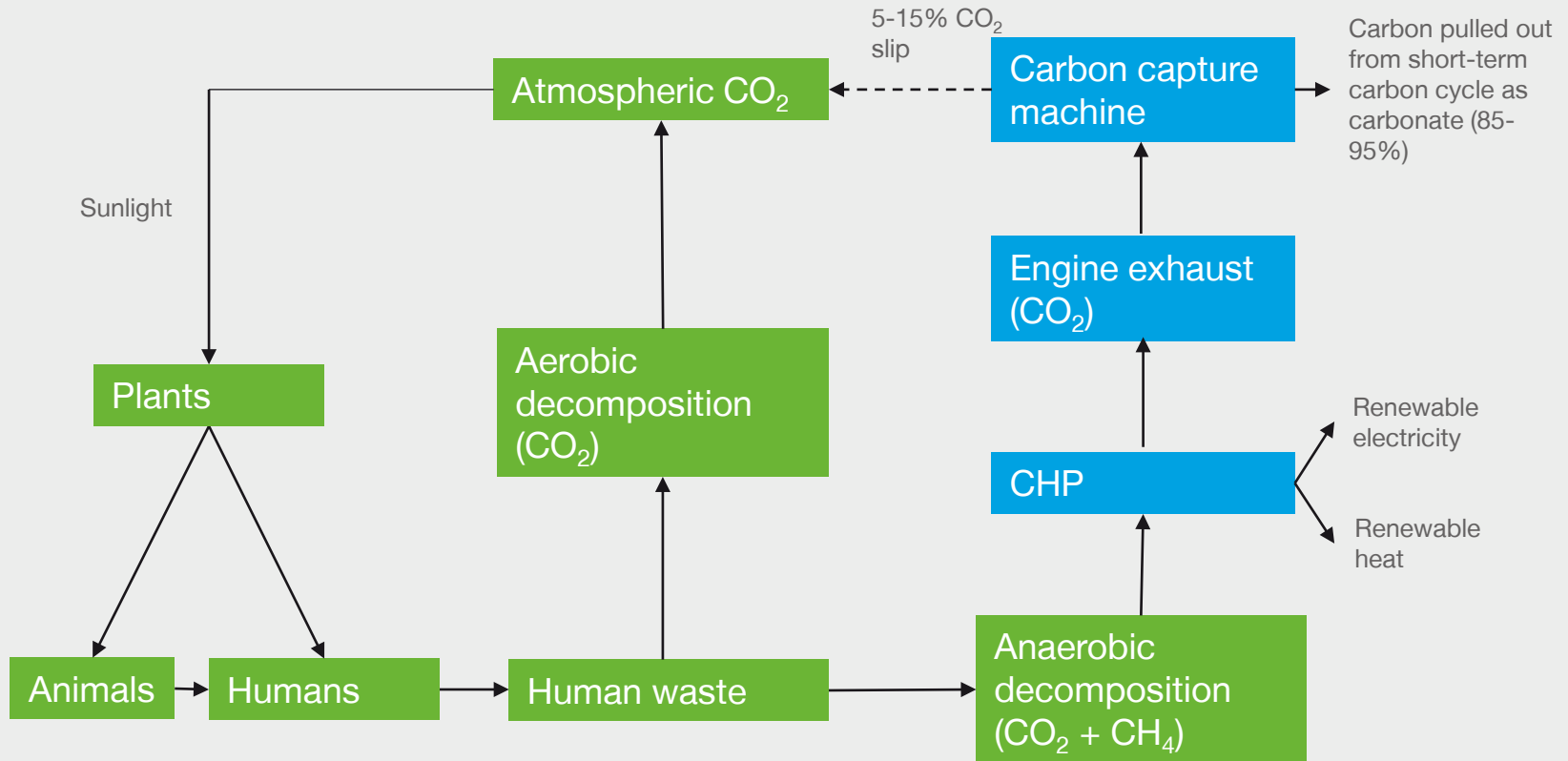






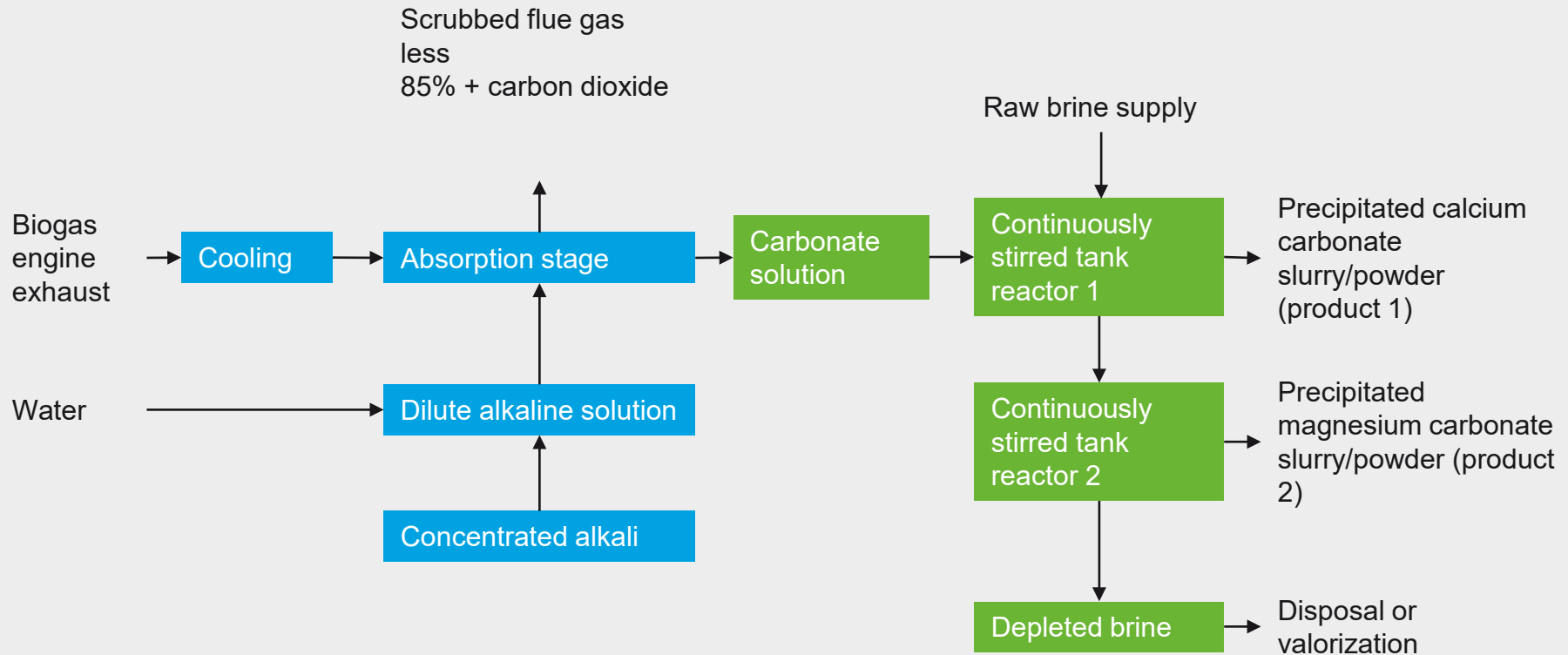
Why is the Process Net Carbon Dioxide Negative for Biogas Applications?

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Carbon Capture Machine Process Summary

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Iron and Steel

Precipitated calcium carbonate



Agriculture

Precipitated calcium carbonate



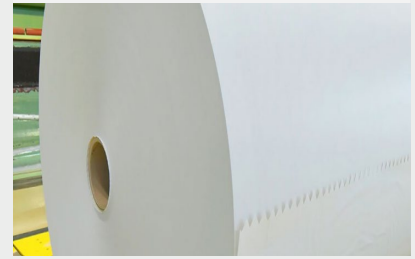
Paints and Inks

Precipitated calcium carbonate



Paper

Precipitated calcium carbonate



Plastics

Precipitated calcium carbonate



Adhesives, Sealants

Precipitated calcium carbonate



Food, Cosmetics

Precipitated calcium carbonate



Pharmaceuticals

Precipitated calcium carbonate



Thank you

