

Renewable Heat using the gas grid

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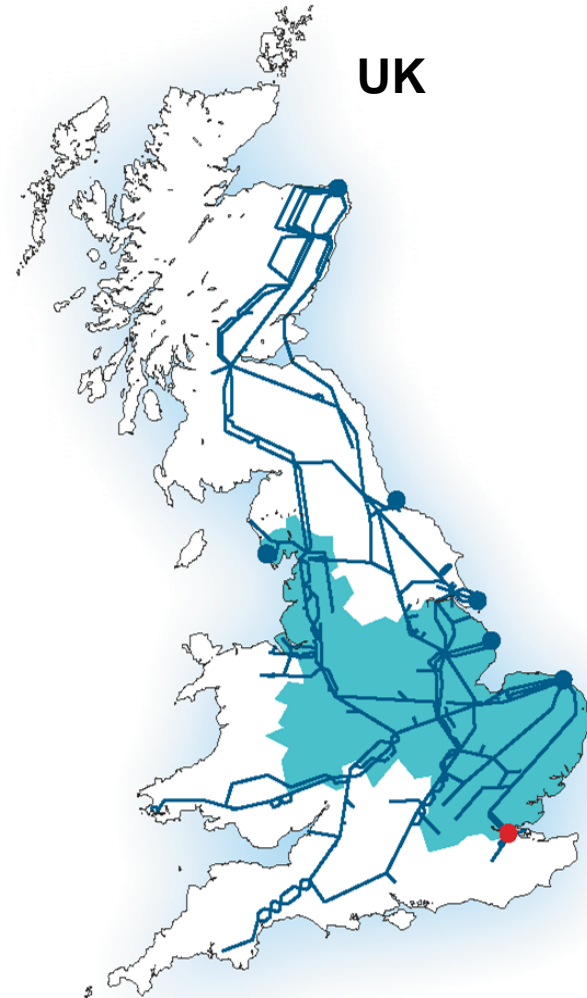
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An international electricity and gas company

- ◆ Pivotal role in delivering gas and electricity to millions of people in a safe, efficient and reliable manner in the UK and US
- ◆ One of largest investor-owned utilities in the world
- ◆ Committed to reducing own greenhouse gas emissions by 80% by 2050
- ◆ Our Vision: “... We are committed to being an innovative leader in energy management and safeguarding our global environment for future generations”



Northeast US

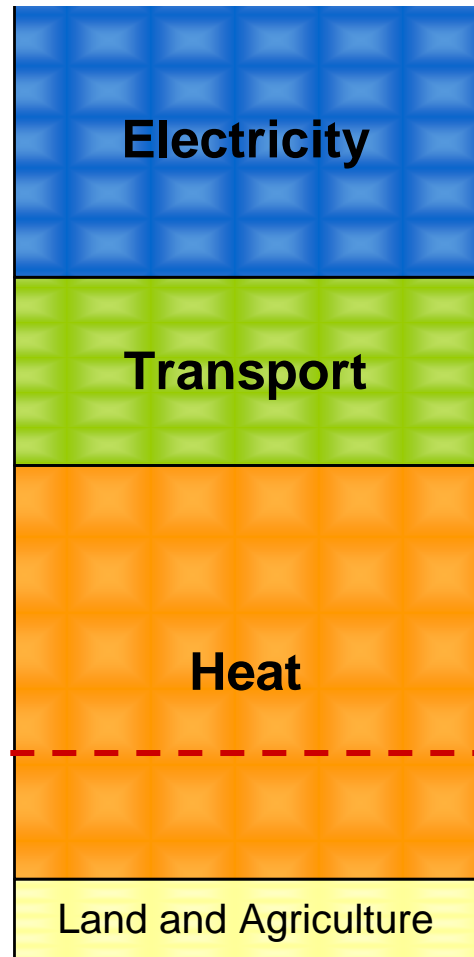


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UK CO₂ Climate Change Targets and require action in all sectors

Total UK 2007 CO₂ Emissions (Mt CO₂e)



Total: 617Mt CO₂e

- ◆ By 2020 15% of energy to be from renewable sources
- ◆ By 2020 10% of transport fuels to be from renewables
- ◆ By 2020 waste to landfill to be reduced to 35% of 1995 level
- ◆ By 2050 Green House Gas emissions to be reduced by 80%

Renewable Gas has a key role in our low carbon energy future...



Electricity



Heat



Transport

Simple efficiency measures across all sectors



Appliance efficiency

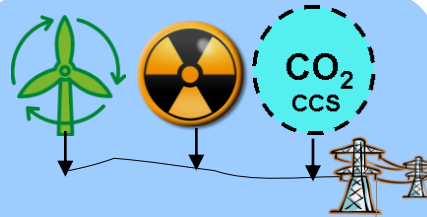


Insulate homes



Efficient engines and integrated transport

Decarbonised electricity fuels zero emission vehicles



Decarbonised electricity...



Heat pump

heats new homes only...



and decarbonise transport

Decarbonise gas using renewable gas

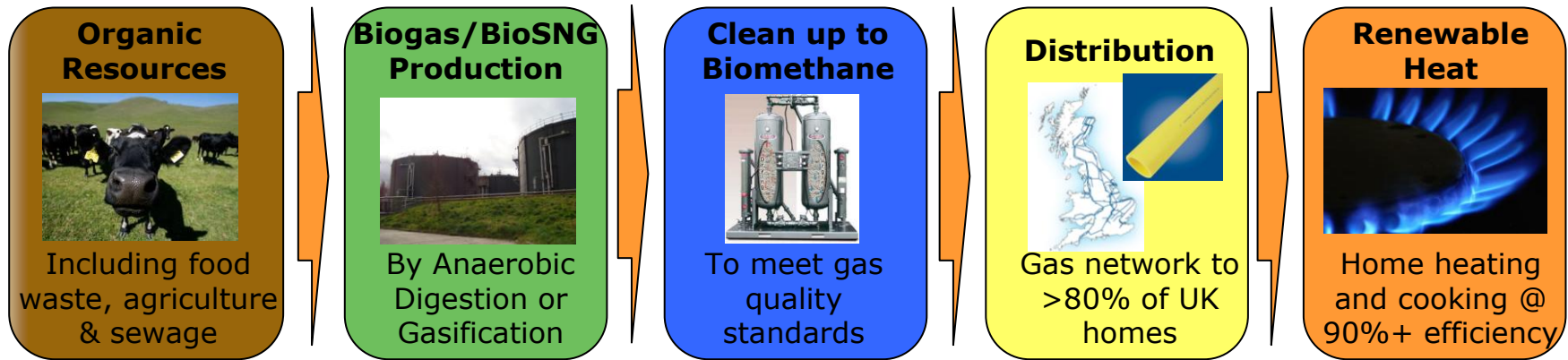


Renewable Gas

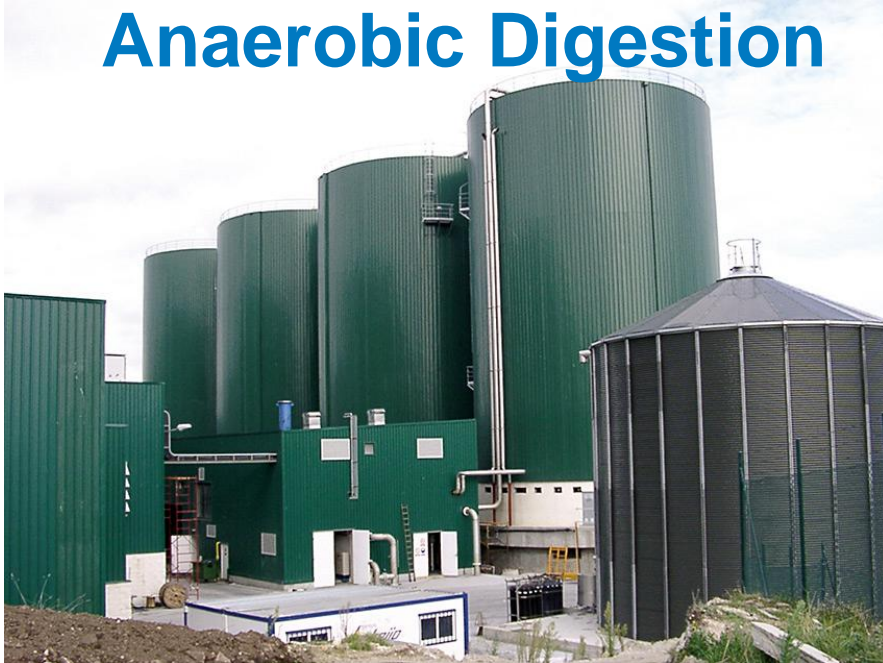


CNG

What is renewable gas?



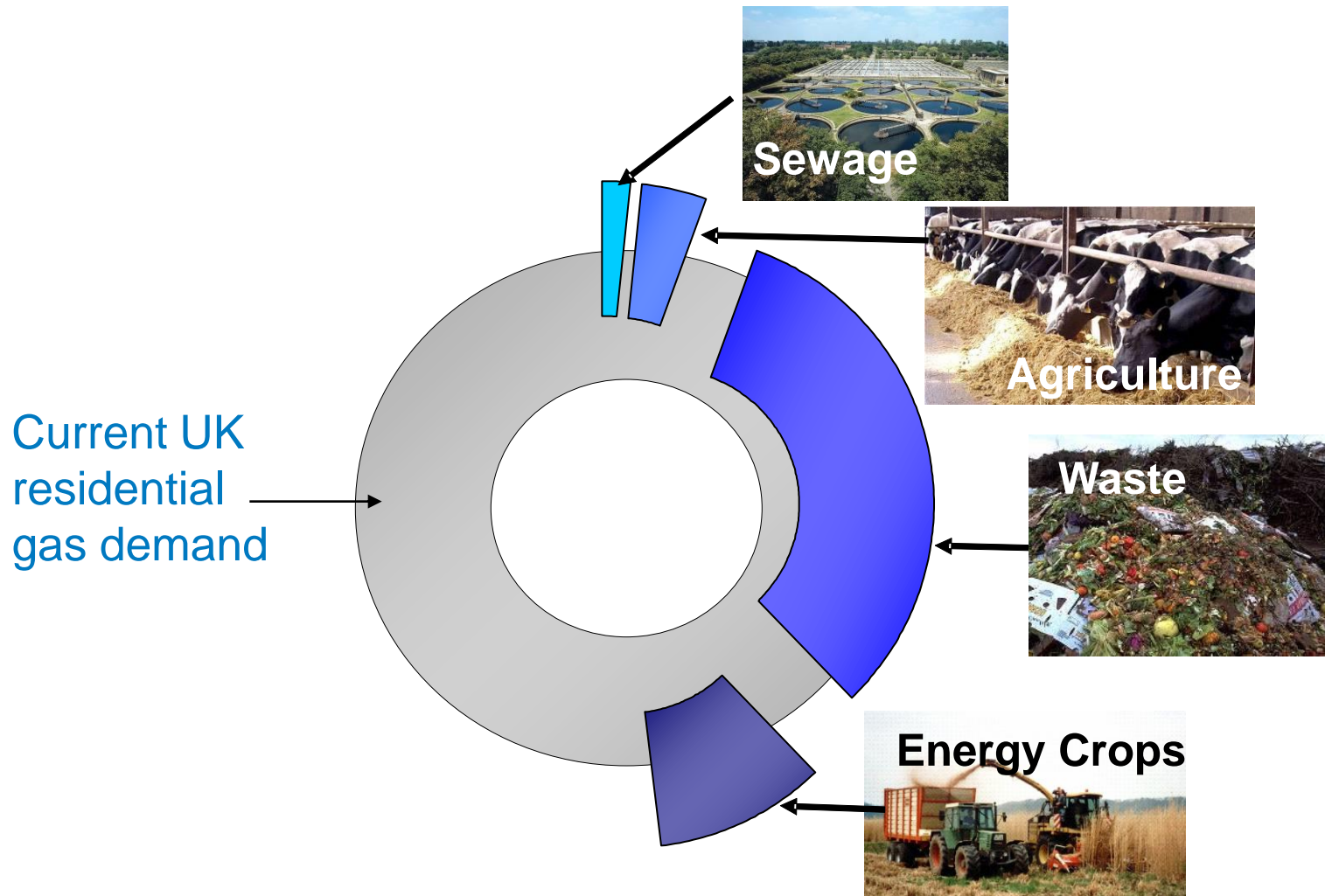
Anaerobic Digestion



Gasification

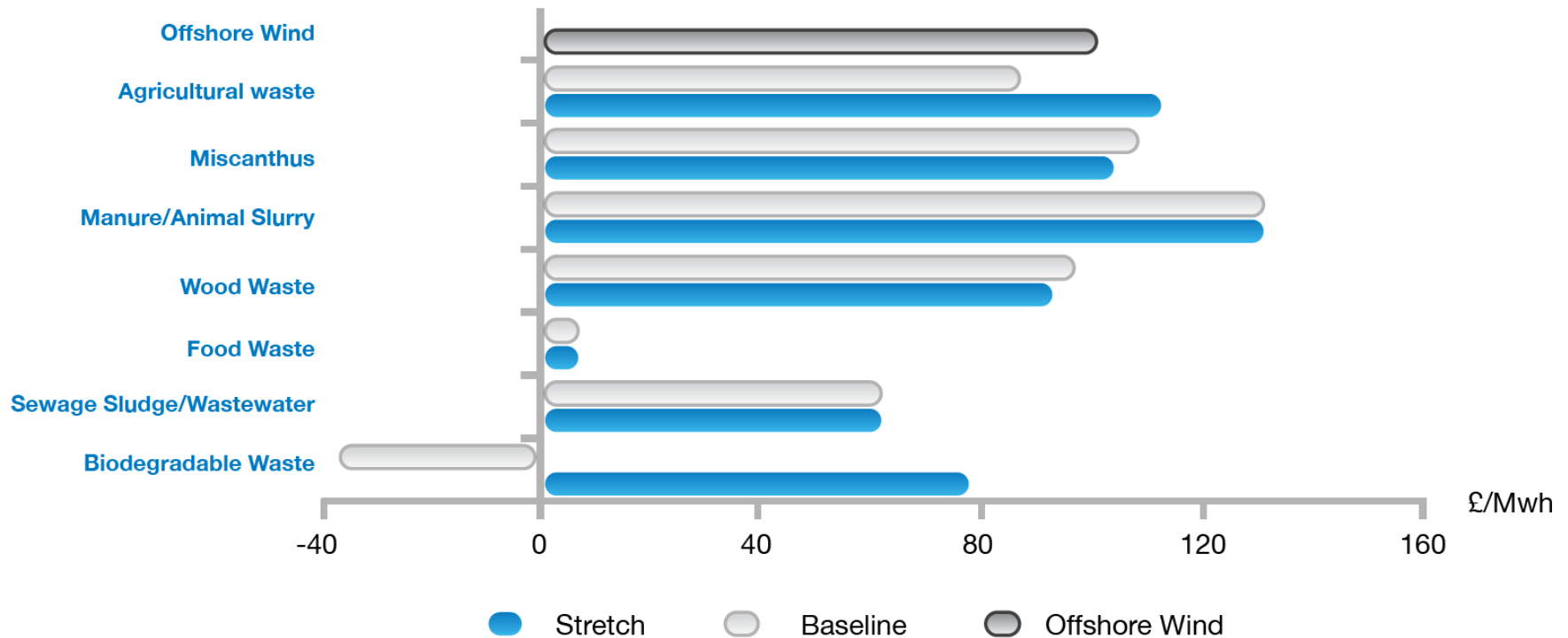


Significant Technical Potential...



... against current UK residential gas demand

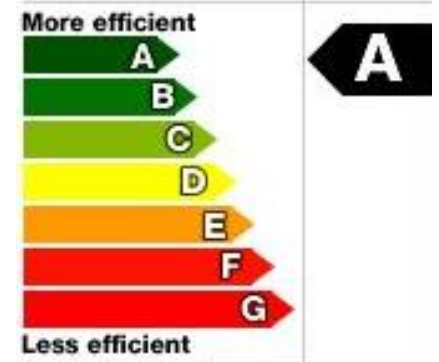
the economics look competitive...



- ◆ On a par with other supported sources of renewables
- ◆ Will need a subsidy to be competitive

Renewable ticks all the boxes

- ✓ Renewable
- ✓ Transportable... using existing infrastructure
- ✓ Used in existing appliances...
- ✓ ... at very high efficiencies
- ✓ Increases diversity and security of supply
- ✓ Reduces waste to landfill
- ✓ Produces valuable by-products
- ✓ Flexibility for heat, transport & power
- ✓ At a similar cost to other renewable sources

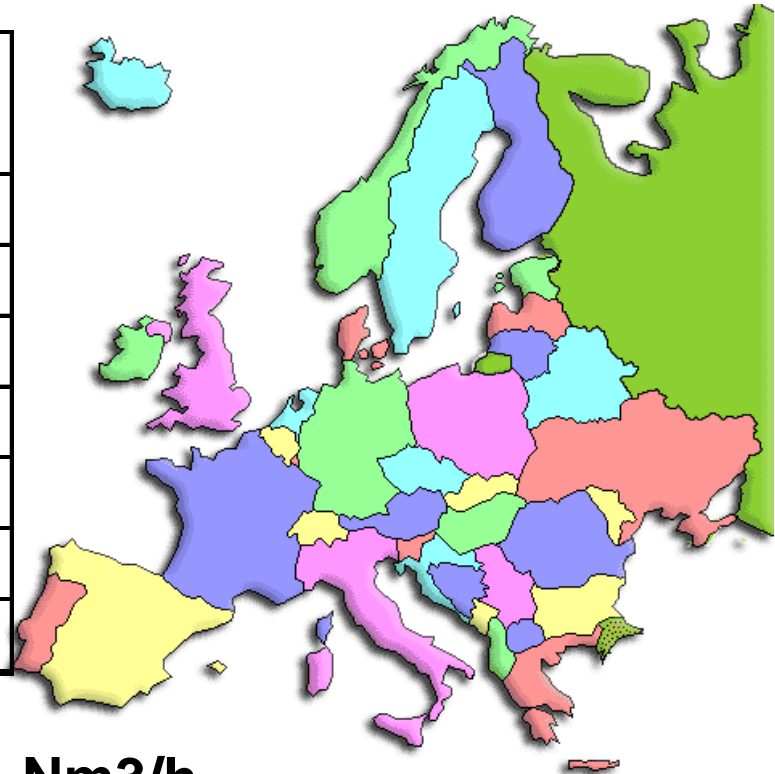


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Grid Injection is happening across Europe ...

Country	Number of Installations	Total Size (Nm ³ /hr)
Austria	3	340
Germany	31	23,226
Holland	5	5,125
Luxemburg	1	600
Sweden	8	5,150
Switzerland	10	680
UK	0	-

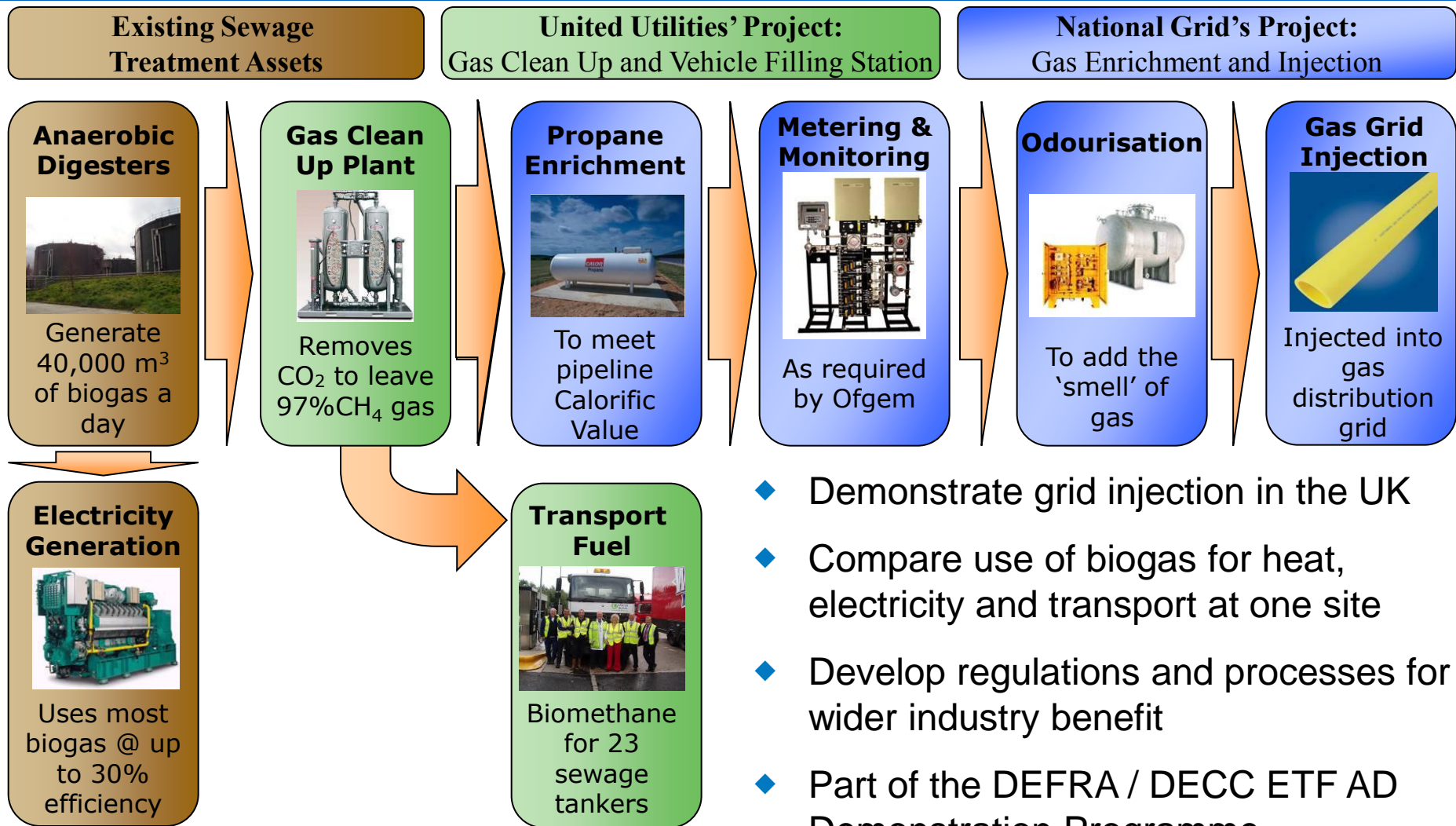


Total **58** **35,121 Nm³/h**

Equivalent to 2.89 TWh/annum*

*assuming 8,000 hours a year @ CV of 37MJ/m³

Turning theory into reality..



- ◆ Demonstrate grid injection in the UK
- ◆ Compare use of biogas for heat, electricity and transport at one site
- ◆ Develop regulations and processes for wider industry benefit
- ◆ Part of the DEFRA / DECC ETF AD Demonstration Programme

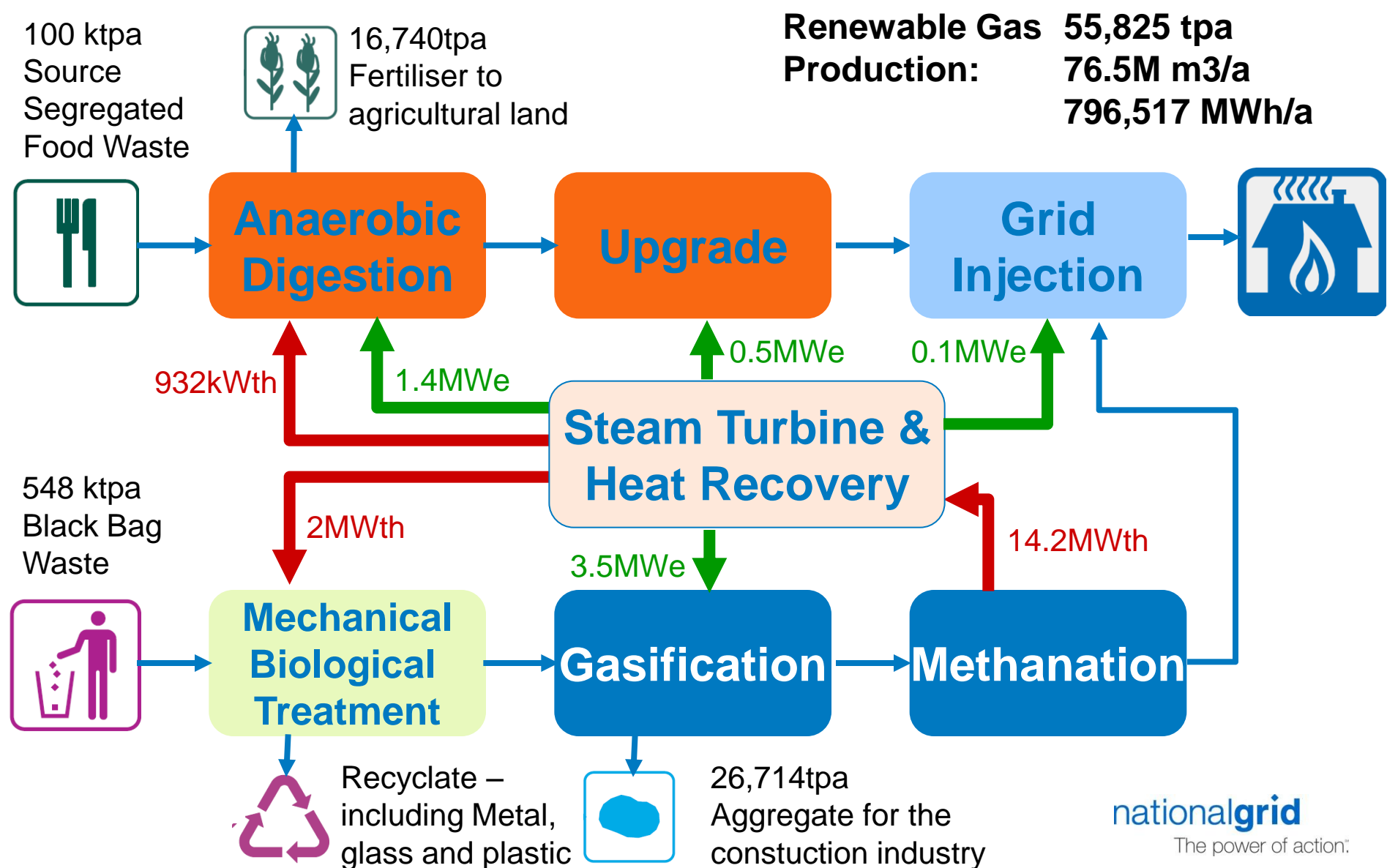
A future concept... Urban Energy Centres

- ◆ Combining waste to energy technologies to maximise efficiency



- ◆ Plant would divert 600k tonnes of waste per annum from landfill
- ◆ This would produce enough gas to heat around 50,000 homes
- ◆ Plant efficiency > 80%
- ◆ Capex investment of ~£400m; ~£62/MWh renewable gas

Matching technologies to maximise efficiency



What needs to happen to make this a reality

- ◆ Ensuring there is an appropriate incentive for the injection of renewable gas - Renewable Heat Incentive
- ◆ Seeking government support to develop commercial scale gasification plants in UK
- ◆ Encouraging the review of waste policy to ensure that energy recovery from waste is maximised at all plants in UK
- ◆ Co-ordination and co-operation between government departments to remove policy barriers which stifle opportunity to decarbonise gas



Thank You

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