

# Biomethane for Transport

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# What we do - Red Kite Management Ltd

- Key personnel have built 20+ on-farm AD plants since 2009
- Technical and operational support service provider to biogas industry.
- Biogas plant optimisation surveys
- Integration of biogas upgrade with AD plants
- Owned fleet of gas powered light commercial vehicles  $\leq 3500\text{kg}$
- Gas vehicle rental, sale and purchase specialist
- High pressure gas system installation work undertaken
- Gas vehicle trials
- Gas fleet feasibility studies



# Background - Transport Fuel

- Substantial increase in demand for biomethane as transport fuel
- HGV, Bus, Municipal vehicles, light commercials available in OEM gas variants
- **CNG - 200/250bar compressed: Buses, lighter trucks and smaller vans**
- **LNG - Cryogenic gas at -164 degrees: Heavy Trucks, Maritime applications**
- CNG has built a bridge to using biomethane for transport
- 1kg biomethane = 1litre of diesel (at the wheels)
- 1kg biomethane = 15kWh
- Support for vehicle fuel production under RTFO available until 2032
- RHI accredited plants may now opt for RTFC's - worth looking at if you are a tier 2 or 3 biomethane producer.
- Direct compression on site for use as transport fuel or injection to grid or virtual pipeline
- Higher emissions savings from biomethane (70%) and lower costs than diesel ( up to 30-40%) for transport operators under “normal” market conditions
- Low emission zones in cities pushing operators towards clean fuels
- Fuel duty differential on biomethane held to 2032



# Biomethane powered vehicles - OEM Variants



## All bases covered!



# Gas Filling Station - Fast Fill

## Compress



## Store



## Dispense



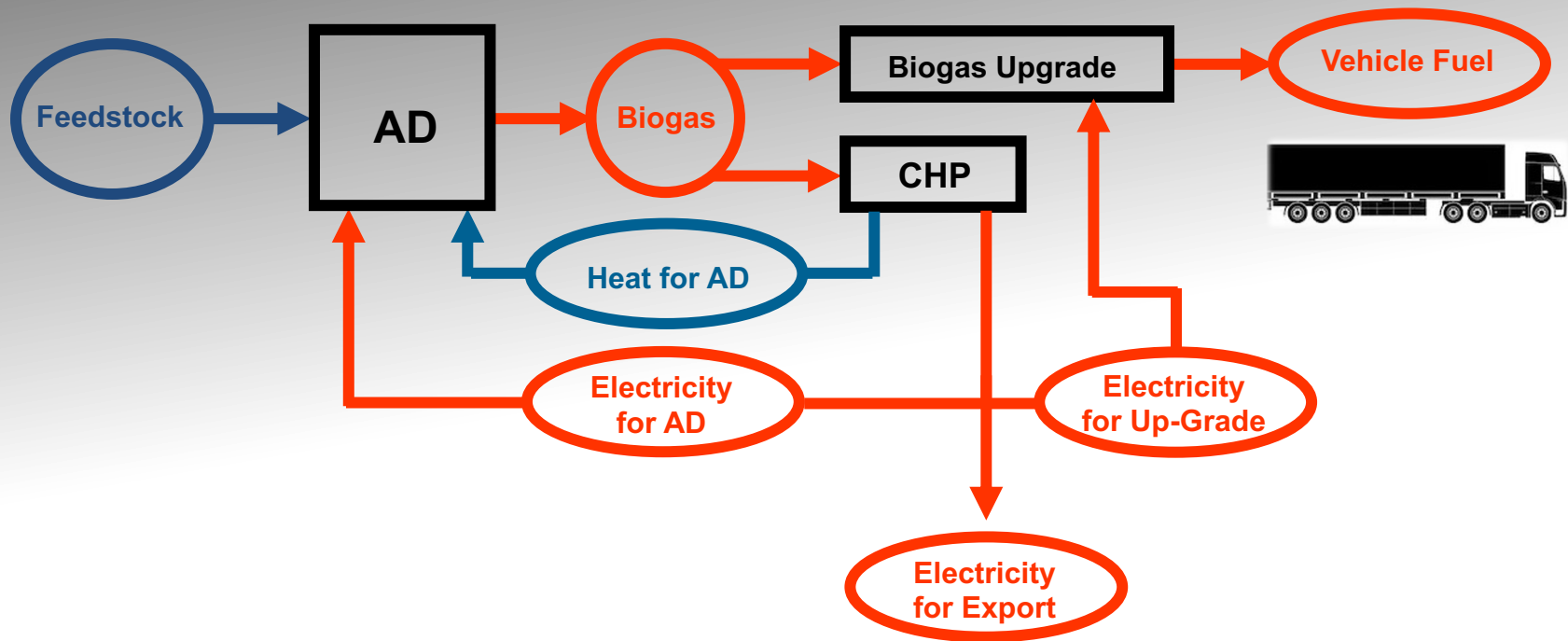
Biomethane is typically compressed directly from the upgrader or from the gas network to a pressure of 250 or 300 bar using piston compressors.

Storage modules consisting of multiple cylinders are used and these are arranged in banks.

A dispenser controls the flow of biomethane from the storage into the vehicle when refuelling and measures gas dispensed, very similar to a regular diesel / petrol pump.

Refuelling a gas vehicle takes no more than about 5 minutes depending on its size.

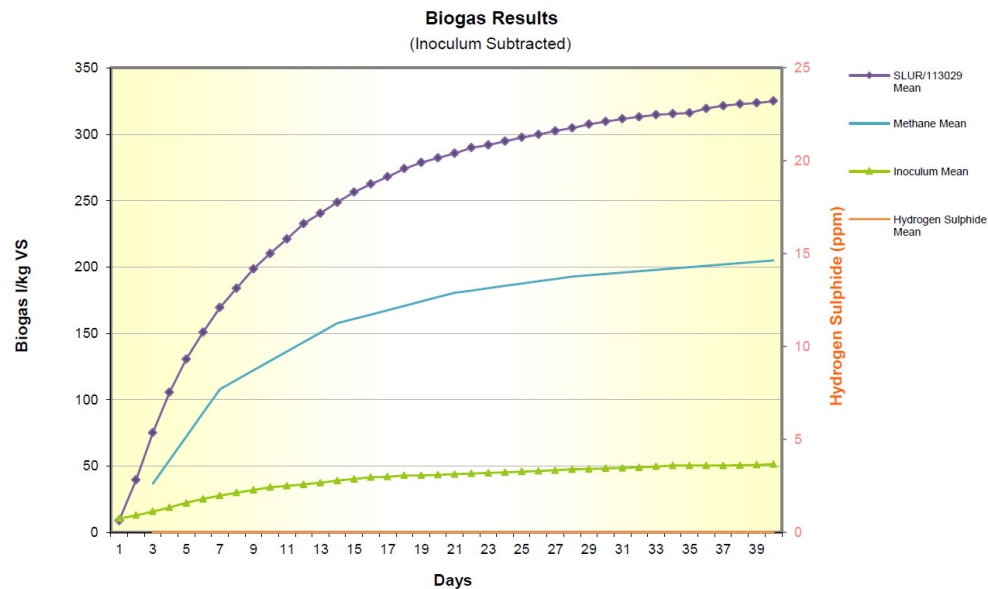
# Integrating upgrade with CHP AD plant



How much gas is in your digestate??

# Evaluation of Biogas potential in digestate

- Sometimes there may be substantial volumes of biogas recoverable by extending retention time.
- Digestate audit will evaluate residual biogas potential
- AD Optimisation and/or additional storage tank with gas collection can deliver additional biogas production WITHOUT additional feedstocks.
- Example below is from AD plant feeding producing appx 20tonnes per day of digestate.
- If biogas is collected then additional 25m<sup>3</sup>/hr is available or 310kg of biomethane per day: Not bad!



# Upgrading biogas at smaller scale

Manufacturer: Metener - [www.metener.fi](http://www.metener.fi)

Biogas Inlet: 10-150m<sup>3</sup>/hr

Biomethane Production: 90-600kg/day

Process description: Biogas upgrade and compression to 270bar

Biomethane utilisation: Vehicle Fuel

Scope: Upgrade, compression, storage & dispenser

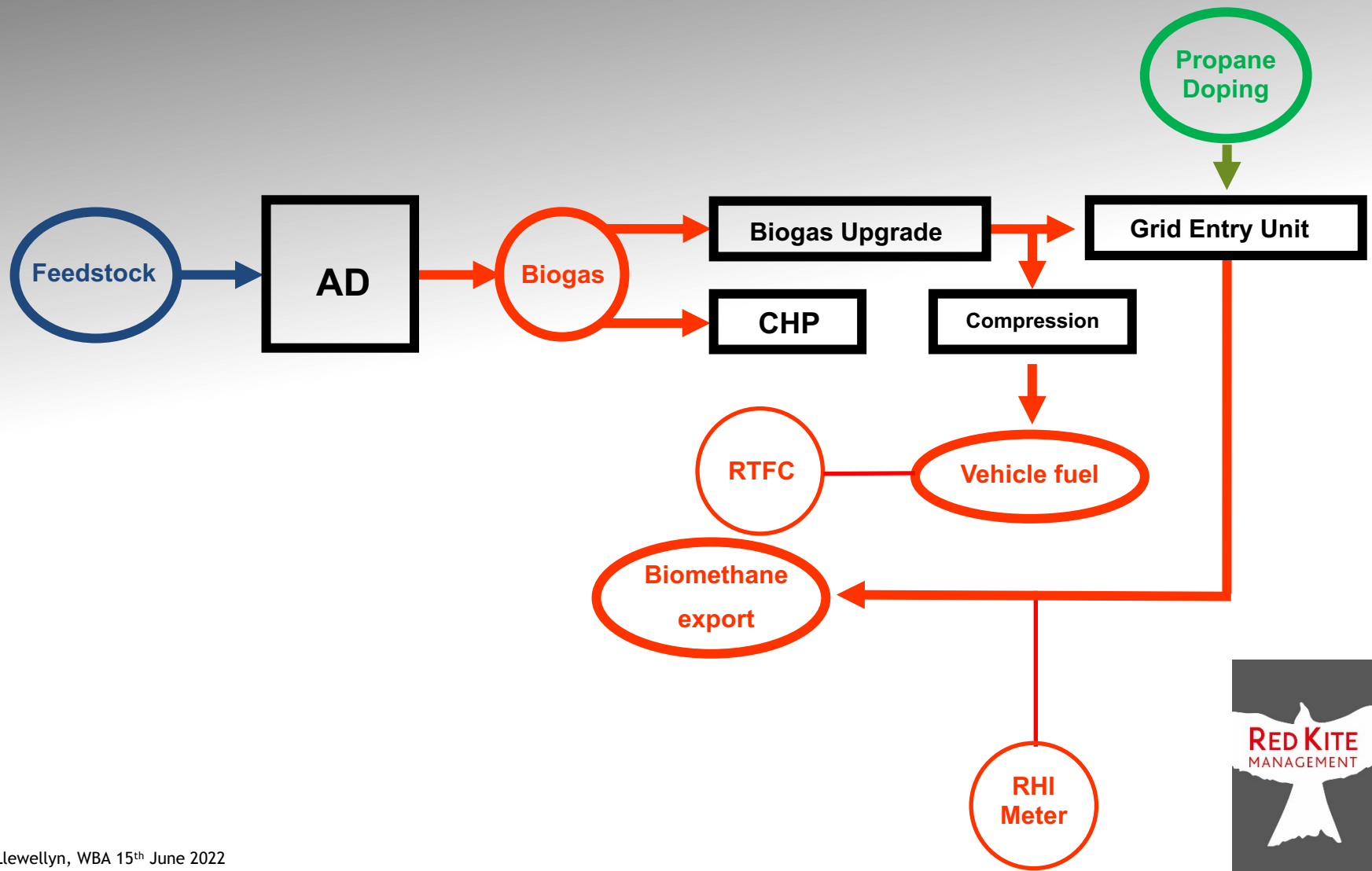
Costs: £120k - 650k

METENER





# Vehicle fuel from BtG plant



# Onsite Biomethane: Emerald Biogas



Equipment Supplier: Safegas (Italy)

Process description: Biomethane compression to 250bar

Biomethane utilisation: Vehicle Fuel

Scope: Upgrade, compression, storage & dispenser

# Temporary refuelling: Gas vehicle trials



- Gas storage modules and refuelling post
- Well suited to trials
- Fast refuel
- Storage replenished from larger trailer
- Can be connected to small compressor



# Summary

- Biomethane a clean, sustainable transport fuel
- 1kg biomethane = 1 litre of diesel (at the wheels)
- CNG technology has built a “bridge” to biomethane as a vehicle fuel.
- Biogas must be upgraded before it can be used in vehicles
- Upgrading biogas at small scale is feasible depending on technology used.
- Sites already producing biomethane well-placed to move into vehicle fuel production in addition to grid injection





**Thank you**  
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