Delivering a Clean Energy Revolution
‘Ensure that United Nations premises and fleet do not contribute to or exacerbate local air quality issues, in both urban and remote community settings’

WHAT BENNAMANN DO

“We want to turn every farm, parkland & community into a green power station”
TYPICAL AGRICULTURAL APPLICATION (UK)

150 cow farm example

- 62,000 kg of fugitive methane pa captured
- 5,400 tonnes of CO2e pa captured

- Farmers saves money on bedding
- Use of pasteurised bedding from Hydrolysis process
- Feedstock waste & manure solids

- Farmers saves money on fertiliser
- Use of digestate on fields to replace fertiliser
- Farmers takes a share of gas sales

- Covered slurry Lagoon
- Farmers helps protect the environment
- Farmers energy costs are reduced
- Optional local heat and electricity from fugitive methane CHP module

- Mobile or fixed BioCycle
- Liquid Fugitive Methane in Inventor Tanks
- Farmers fuel costs are reduced

- Option to power CNG Tractor

- £21k of fertiliser saving to farmer
- £15k on-site energy cost savings
- £17k gas fuel / EV charging revenues share pa
- £25k RTFC and Carbon Credit subsidy share pa

This is 115% more income than from milk at £0.04 per litre pa.
I.e the farmer will more than double their income.

Proprietary – Commercial in Confidence
BENNAMANN’S “ENERGY IN A BOX” VISION

1. De-carbonise aid operations
2. Help protect the local environment in terms of fugitive methane & Ammonia
3. Improve public health
4. Support self-sufficiency
5. Help combat fuel poverty
HIGH LEVEL ROADMAP

UK Farms (direct) Closed loop
OEM Partnership
Gas sales network development

G2G UK Franchise network
European farm scaleup
ROW Farm scaleup

NOW

Domestic solution delivery

“Energy in a box” solution

BENEFITS FOR ALL

Capture Fugitive methane

CO2e Emissions reduction

Food waste
Crop waste
Cow slurry
Human waste

Bennamann “Energy in a box” solution

Benefits for all

Fleet Benefits

EV Charging
NGV Vehicle Fuel
Bio-gas generators

Farm / Community / Programmatic Benefits

Electricity
Cooking / Heating gas
Clean water

Dry Ice for cooling
Digestate fertiliser
Income

Food waste
Crop waste
Cow slurry
Human waste

Bennamann “Energy in a box” solution

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Income
FLEET MANAGEMENT BENEFITS

De-carbonise fleet operations

When combusted 1 kg of diesel emits 2.7 kg CO2

When combusted 1 kg of fugitive / bio-methane is carbon neutral

60% NOx emission reduction as well as other pollutants (Sulphur, Ammonia etc)

Capturing 1 kilo of fugitive methane removes a further 86 kg of CO2e from the atmosphere

What about boil off? Do we need to flare?

By burning Fugitive methane in NGV vehicles or to generate electricity & heat you will be CLEANING the planet

Inventor tank storage means ZERO venting of the Liquid Fugitive Methane, non-polluting, easy storage & distribution

Proprietary – Commercial in Confidence
FLEET MANAGEMENT BENEFITS

*De-carbonise fleet operations by supporting Natural Gas Vehicle fuelling*

LFM can be used as CNG or LNG equivalent

Even with current methane engine slip levels, the carbon negative value of fugitive methane means a less than zero CO2e impact. (20% methane slip through engine still means a 69kg CO2e benefit per kg of liquid fugitive methane

The Inventor tank on vehicles (ie not just for storage) will improve range as and when incorporated into vehicles (working with some OEMs now)

- 30 cows worth of slurry (50% collected plus feedstock waste and manure solids)
- 8 Tonnes of Liquid Fugitive Methane pa
- Equivalent to approx 11,000 litres of diesel
- Removing 7,900 Tonnes of CO2

Cost benefit – based upon local supply contracts with community

This will fuel around 68,000 km (based upon 16 l / 100 km*)

*Fleet Forum*
FLEET MANAGEMENT BENEFITS

Providing local heat and power (including for EV charging)

30 cows worth of slurry (50% collected plus feedstock waste and manure solids)

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Cost benefit – based upon local supply contracts with community

8 Tonnes of Liquid Fugitive Methane pa

Removing 720 Tonnes of CO2

49400 kWh of electricity

67100 kWh of heat

550 full charges of 90kWh EV

*Chatham house 2018
THE INNOVATE UK FUNDING OPPORTUNITY

It’s a feasibility study right now:

- **The problem**
- **Potential solutions**
- **Cost, Benefits, Risks**
- **Day to day practicalities etc**

https://apply-for-innovation-funding.service.gov.uk/competition/612/overview#scope
NEXT STEPS

1. Expression of interest /

2. Letter of support for our bid

If we are successful in our IUK bid in September...

Help to answer key questions around environment, supplychain, costs, politics, culture, security, support & maintenance etc etc

Typically, two follow up phases we can then bid for...

1. Field trial of prototypes

2. Production-ready solution
Thank you
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