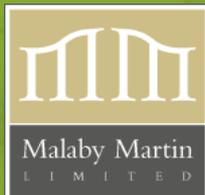


15TH OCTOBER 2020

CLIMATE EMERGENCY: A PRACTICAL SOLUTION FOR LOCAL AUTHORITIES

Helping the public sector deliver a cleaner, GREENER, more cost effective world

FOOD WASTE TO BIOGAS: A NEW COLLABORATIVE MODEL TO DE-RISK LOCAL AUTHORITIES



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CENTRAL GOV'T POLICY DRIVERS

■ UK Waste & Resources Strategy

- “We will... reduce GHG emissions by ensuring that every householder & business has a weekly separate food waste collection” (source:Waste & Resources Strategy Dec. 2018)
- “AD is the best environmental outcome for food waste. ...provides BOTH low carbon renewable energy & fertiliser” (source:Waste & Resources Strategy Dec. 2018)
- “... food waste should be treated through recycling by anaerobic digestion (source:Waste & Resources Strategy Dec. 2018)

■ UK Climate Emergency declaration

- CCC's Carbon Reduction Commitment (CRC)/5th - 6th Carbon Budgets
- Paris commitments/ COP 26 in London

■ EU/UK Circular Economy Package & Action Plan

- UK “... will ensure that by 31st December 2023 bio-waste [inc. food waste] is either collected separately or recycled at source”. (source: letsrecycle.com)



THE TRIPLE FIX: Energy, Waste & Resource Efficiency

■ A Renewable Energy Mix

- Reliable & stable base load energy 24/7/365
- Best use of organic waste
- Best renewable annual generation

■ Organic Waste Recycling

- The heaviest, muckiest fraction of waste
- Meets the Waste & Resources Strategy

■ Best Use of Resources

- Preserves nutrients, offsets fertilisers, improves soils - quality & productivity
- Green energy from waste - efficient & economic
- High Social Value - Resources for Public Good & improves public engagement in local activities



What AD can do for you

Deliver cheaper services

Help meet waste reduction targets

Build community goodwill

Boost local economy

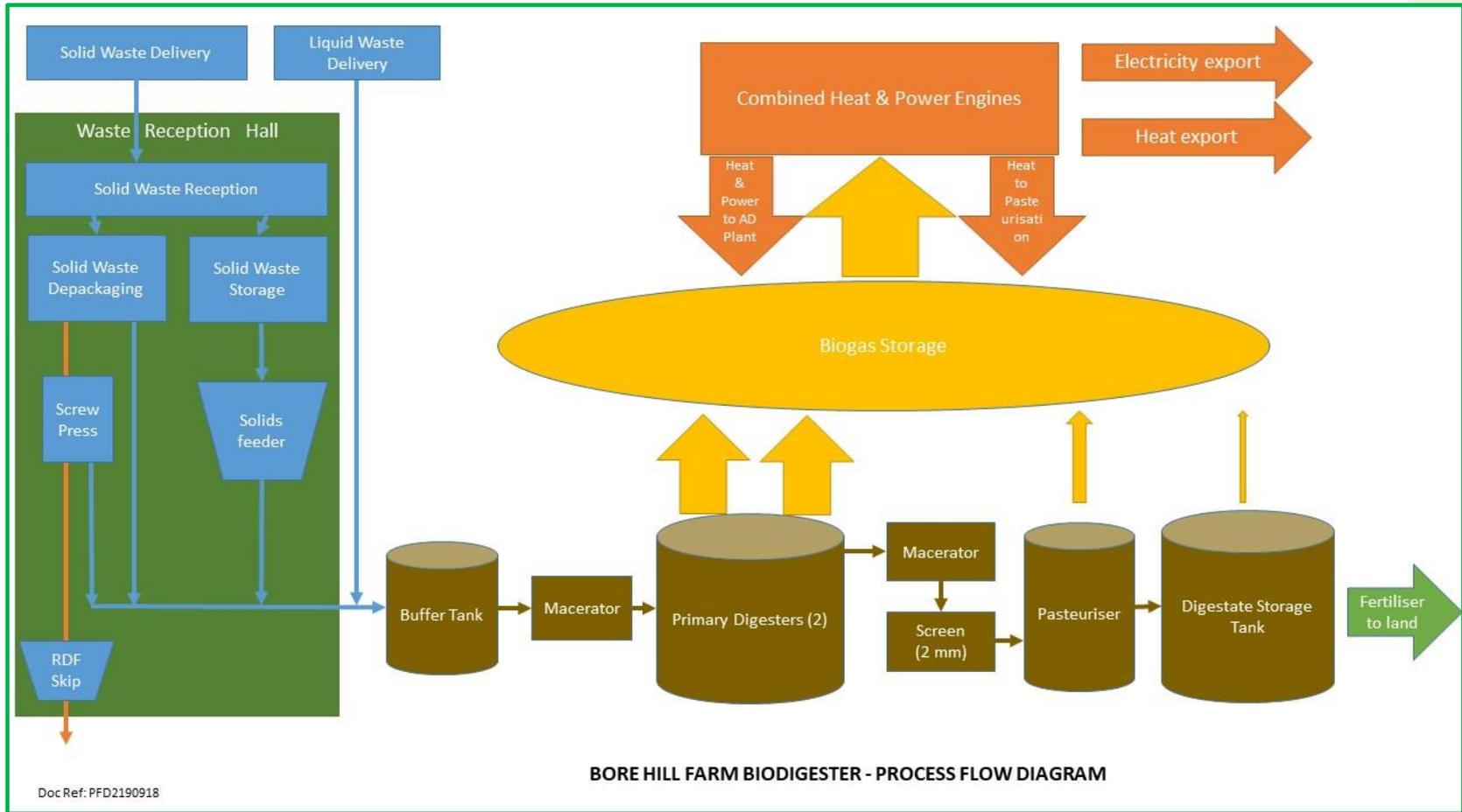
Cut greenhouse gas emissions

Improve air quality

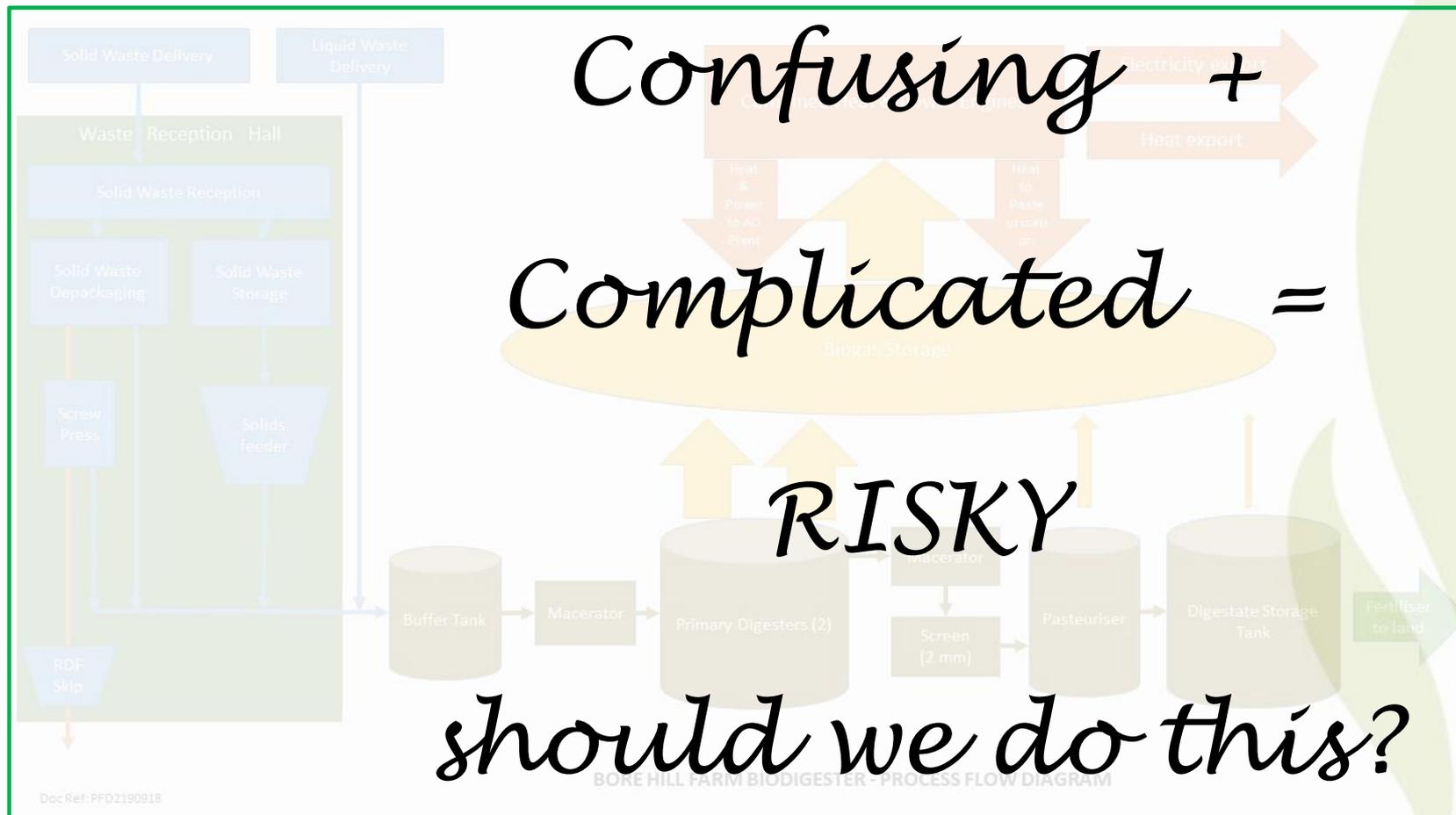
Guidance & advice:ADBA – www.adbioresources.org



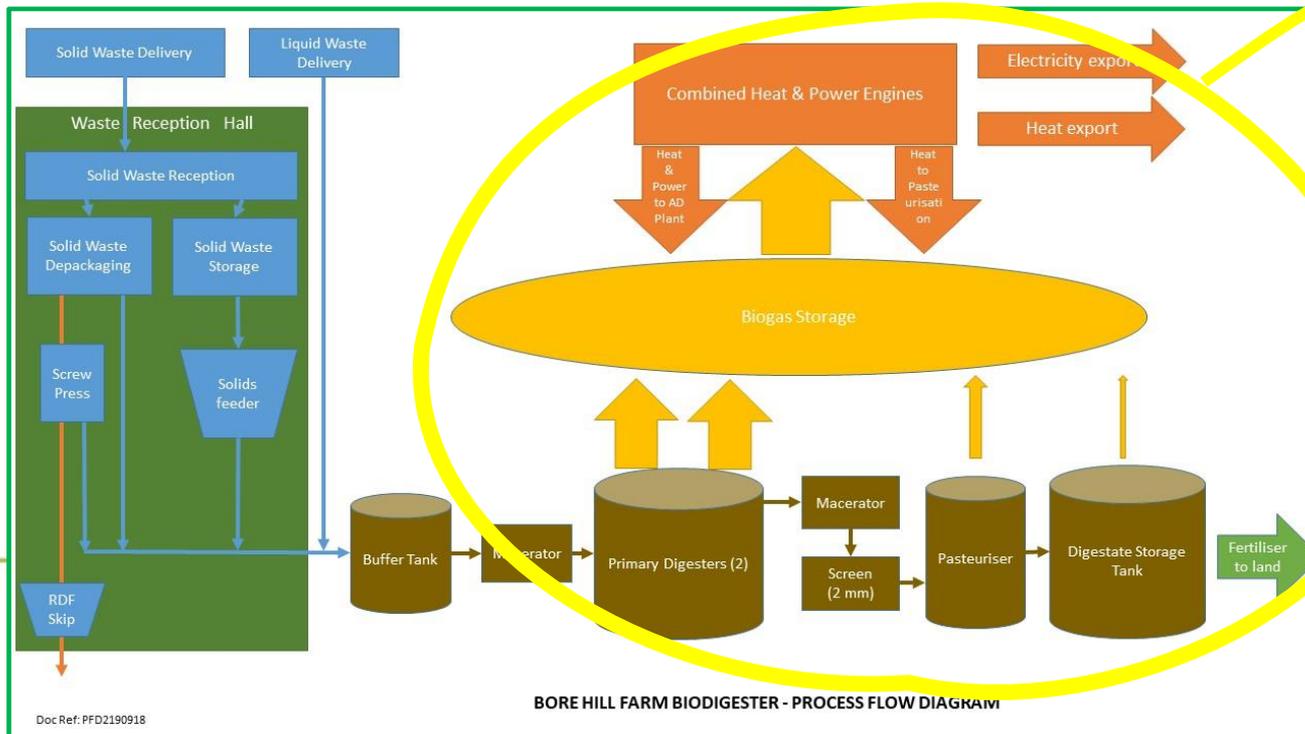
CURRENT FOOD WASTE AD MODEL: Complex Engineering, Integrated Processes



CURRENT FOOD WASTE AD MODEL: Complex Engineering, Integrated Processes



NEW MODEL: Identify Expertise



1. **PROBLEM** Specialist Operations are **COMPLEX**

- Biological & Mechanical Processes
- Process flow & equipment
- Compliance

NEW MODEL: Remove Complexity, Reduce Risk

2. LA ASSETS

Waste Management Services

- Self Contained – small footprint
- Local Treatment
- Lower RCV miles

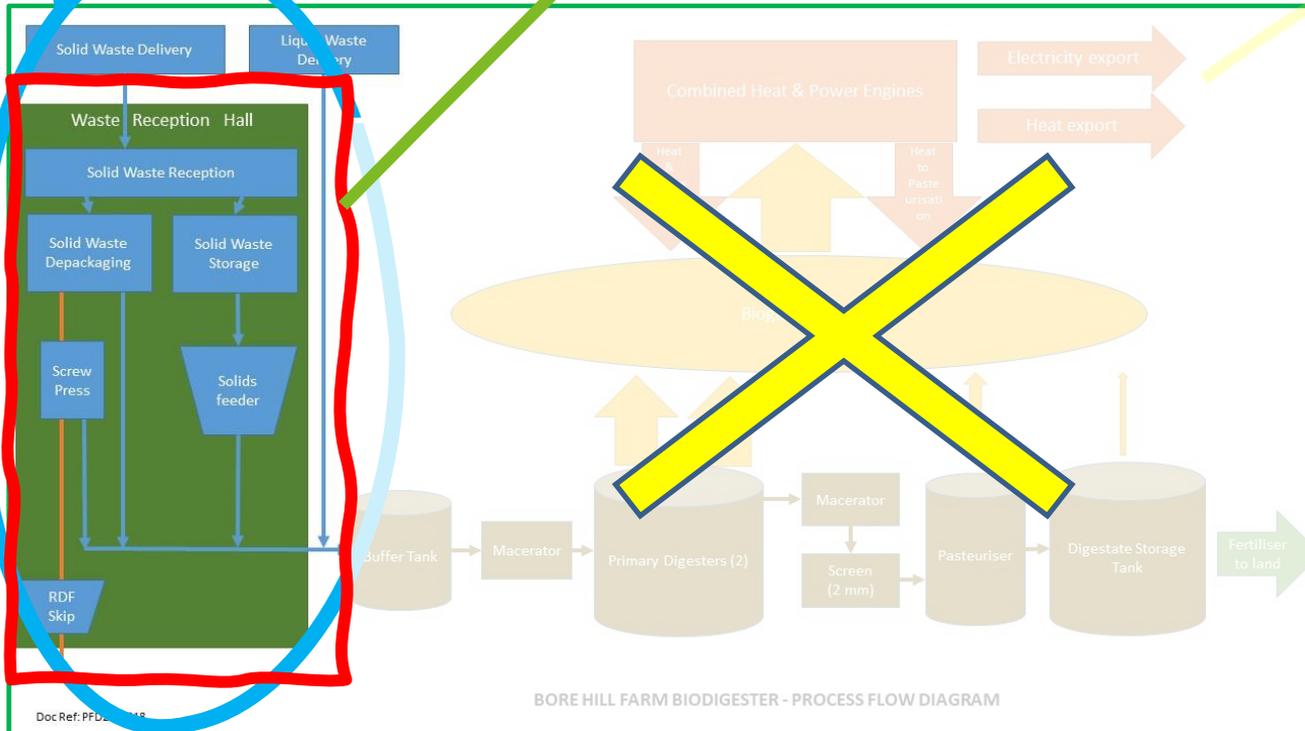
3. SOLUTION

A Single Packaged Process

- Scaled to LA requirements
- Scalable plug-and-play
- Flexible ownership
- Fits on existing waste site
- Customisable

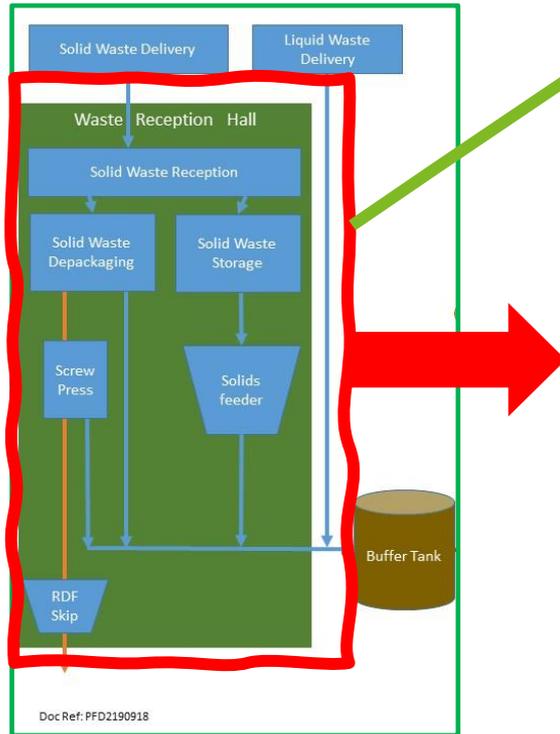
1. SOLUTION

Bio specialists manage biological complexity;
LA waste managers manage waste & logistics managers to move the waste!



BORE HILL FARM BIODIGESTER - PROCESS FLOW DIAGRAM

NEW MODEL: Reduces Operational & Investment Risk



3. SOLUTION

A Single Packaged Process

- Scaled to LA requirements
- Scalable plug-and-play
- Flexible ownership
- Fits on existing waste site
- Customisable



2 year working model with a UK local authority (c. 6,000 tpa with design, install & logistics advice, simple performance metrics, collaborative long term contract & quality rebate. No PPP or PFI)



- **No biological process management in experienced hands**
- **Focus on maximising waste management time, front line services & RCV up times**
- **Use existing waste transfer assets facilities**
- **Flexible investment profiles: own & operate waste management assets / contract out / 'pay as you go' contracts**
- **Maximise climate mitigation, investment & risk management**
- **Quick & simple deployment to set up waste processing plant**
- **Proven model (2 years operational experience) can be adapted to site specifications, specific volumes, desired plant size and investment needs**



WORK WITH EXPERIENCED PARTNERS

- **28 -35ktpa food waste**
- **Good road connections**
- **8.5 years operation**
- **High profile:**
Industry Leader
Expertise & Skills
Innovation & Excellence
- **We always make space**
- **Flexible Inputs, flexible operations**
- **High annual energy generation for small footprint (7.8GW_e / acre / yr)**



Bore Hill Farm Biodigester



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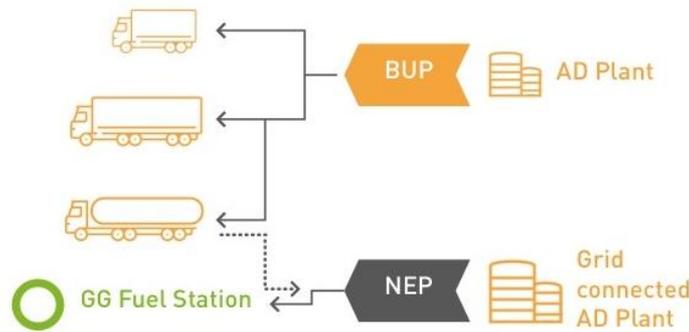
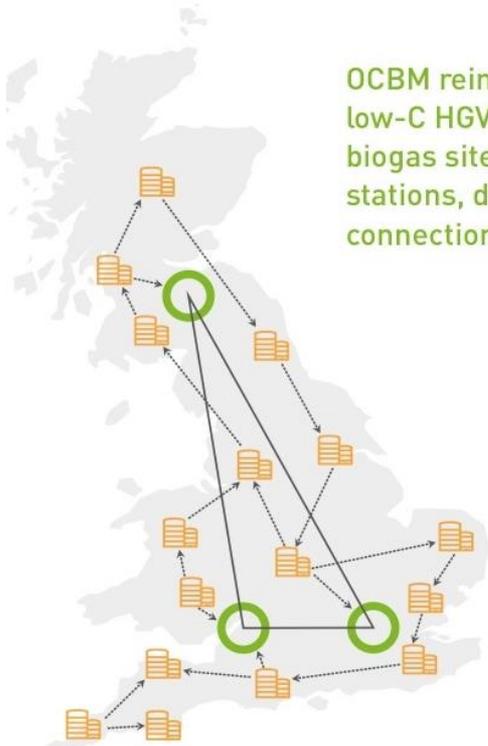
OTHER PROJECTS 1: DOMESTIC - UK

OCBM – Onsite Compressed Biomethane Providing Green Gas for Transport Fleets



The Virtual Gas Network

OCBM reinforces access to low-C HGV fuel, enabling biogas sites to become fuelling stations, despite no pipeline connection



2020 - SEEKING debt/equity INVESTMENT (£5m)

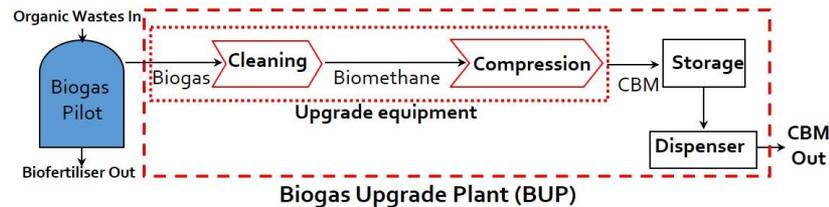
OTHER PROJECTS 2: INTERNATIONAL

The Ghana Biogas Consortium. 3GW: Ghana Green Gas from Waste. Phase 1 (2021-2023)

Building a Biogas Ecosystem for Ghana & SSA

Using biogas from waste to replace wood cooking in Ghana & Sub-Saharan Africa

Ghana Green Gas from Waste (3GW)
Industrial Research Programme
Ghana Biogas Consortium



Ref	Group	Task	Information	Budget (£'000)	2020				2021				2022				2023				2024				
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
A	ADMIN	Concept & Planning	building the consortium	£ -	0%	[Bar]																			
B		Administration	legals, appointments, set up, etc	£ 51	3%	[Bar]																			
C		Funding & Finance	EC8/co-funding/PE	£ 25	2%	[Bar]																			
WP1	EQUIPMENT	Pilot Site	design on committed inputs from WP6	£ 694	45%					DDP	S&I	C&C	TTO	[Bar]				Latestage/OPS							
WP2		Biogas Upgrade Plant (BUP)	UK technology supply	£ 114	7%					DDP	S&I	C&C	TTO	[Bar]				Latestage/OPS							
WP3		Modular Field - Lab Unit	on-site testing & analysis workshop	£ 96	6%					DDP	S&I	C&C	TTO	[Bar]				OPS							
WP4		Modular Field - Training Unit	onsite facility for tutorials & classroom	£ 76	5%					DDP	S&I	C&C	TTO	[Bar]				OPS							
WP5	DELIVERY & PROGRAMMES	CBM Supply Chain	from BUP to End User	£ 74	5%					DDP	S&I	C&C	TTO	[Bar]				Latestage/OPS							
WP6		Waste Supply Chain	full feedstock management process	£ 50	3%					DDP	S&I	C&C	TTO	[Bar]				Latestage/OPS							
WP7		Digestate Supply Chain	farms, remediation & forestry	£ 50	3%					DDP	S&I	C&C	TTO	[Bar]				Latestage/OPS							
WP8		Programmes & Stakeholders	set up links: community & institutions	£ 196	13%					DDP	S&I	C&C	TTO	[Bar]				OPS							
WP9		Soluble Plastic Bag Trials	early link with WP6 & Programme	£ 53	3%					DDP	S&I	C&C	TTO	[Bar]				OPS							
E	ADMIN	R&D Project Close	Reporting & initiate Late-Stage Project	£ 50	3%									[Bar]											
F	SCALE UP	Late-stage Scale Up	Expand pilot activity													[Bar]									
G		Late-stage Demonstration	Set up full scale demonstration site													[Bar]									
H		Start late-stage business	commercial business planning													[Bar]									
J	INNOVATION TRANSITION	Moving Through Technology Readiness Levels (TRLs)																							
1		R&D Industrial Research Phase		3	3	3	3	3	3	3	4	4	5	5	5	6	6								
2		Business-led Demonstration Phase														6	6	7	7	8	8	9	9		
Total Budget £				1,529,000	100%																				

DDP: Design, Development & Production

OPS: Normal Operations

A LOCAL AUTHORITY GREEN AUDIT: Route Map to Climate Emergency Progress

LA's should act as leaders within their communities building a sustainability culture across the organisation. Elected officials should ensure officers are tasked to become sustainable as quickly as possible - How Green is your Council? Officers provide continuity beyond the election cycle. To evaluate progress towards sustainability a simple internal audit process can be implemented focussing on delivery of ambition – Our Sustainability Audit – Steps to Delivery.

FOR ELECTED OFFICIALS

- Declare Climate Emergency ... & Deliver
- Building Green Transport Systems
- Low Carbon Working
- Council Life without Plastic
- Waste & Resources Strategy: beat targets
- Our Energy: Power, Heat & Transport
- Sustainable Front Line Services
- Investing Responsibly & Sustainably
- Supporting People: Staff & Constituents
- Better Places to Live: Air, Land & Water
- Etc

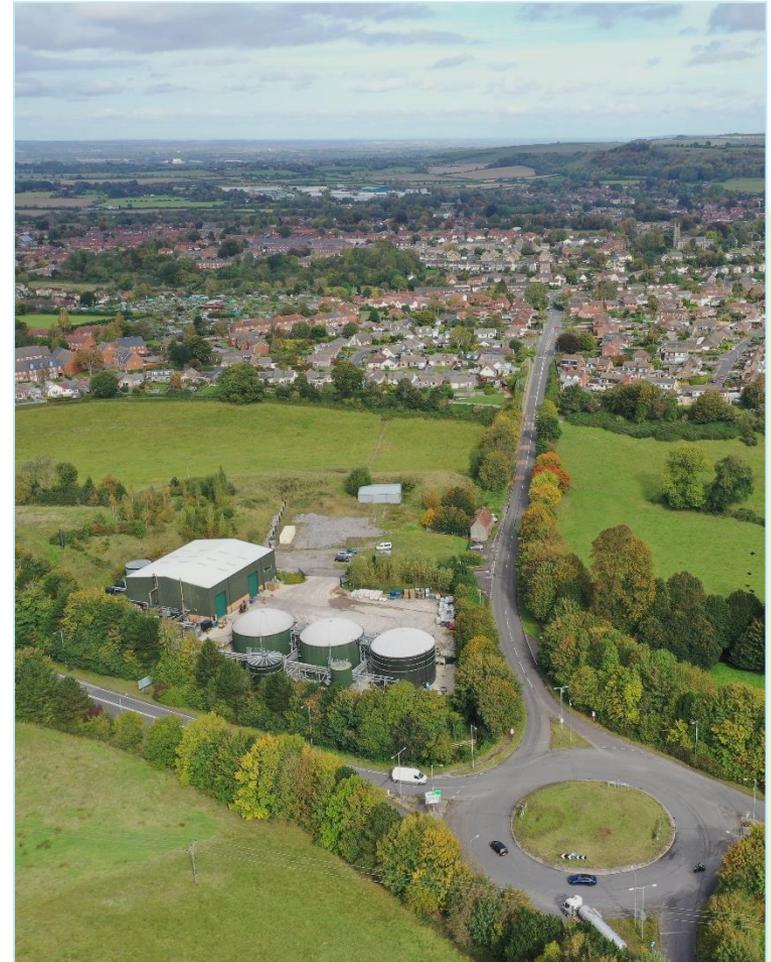
FOR COUNCIL OFFICERS

- Reduce waste & waste disposal costs
- Sustainable/Green Investments for Local Good
- Improve Services/Resources for Local Good
- Delivering the Triple Bottom Line
- Reduce carbon emissions by ?50%? by ?2030?
- Zero Carbon Housing Strategies
- Low Impact Working
- Improve Education on Climate Change
- World Changing Vision – supporting innovation
- Decarbonise Energy (power, heat & fuel)
- Etc



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