

Decarbonising Distillation: Options, Opportunities and Risks

10th May 2023
Jack Byres



What will I be talking about?



Who are Locogen and what do we do?



What is the problem we are trying to solve?



What are some of the solutions?

- Technologies
- Opportunities & barriers
- Risks
- Case Study: Arbikie



Consultancy

OA / Feasibility

Consenting

Due Diligence

Project Management

Engineering

Procurement

Construction

Asset Management

Operation &
Maintenance

Investments

Design &
Development

Shared investment

Clients



Technologies

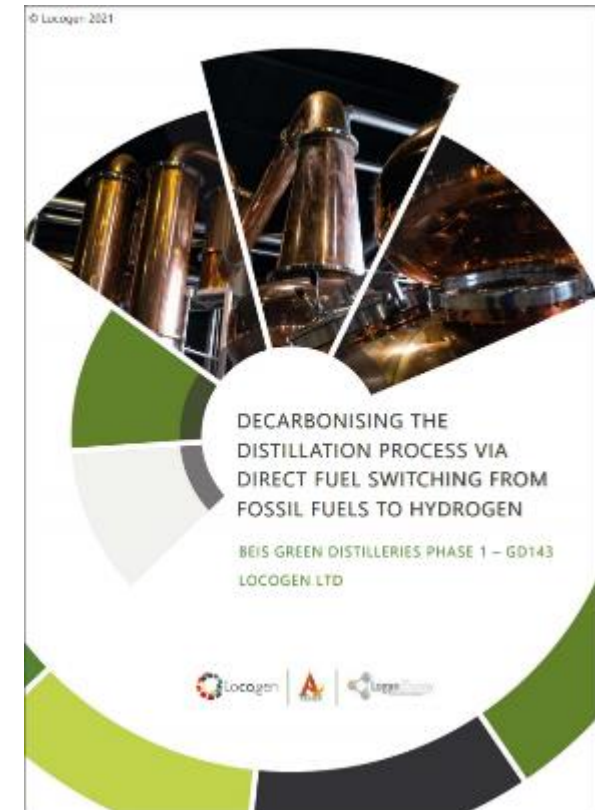
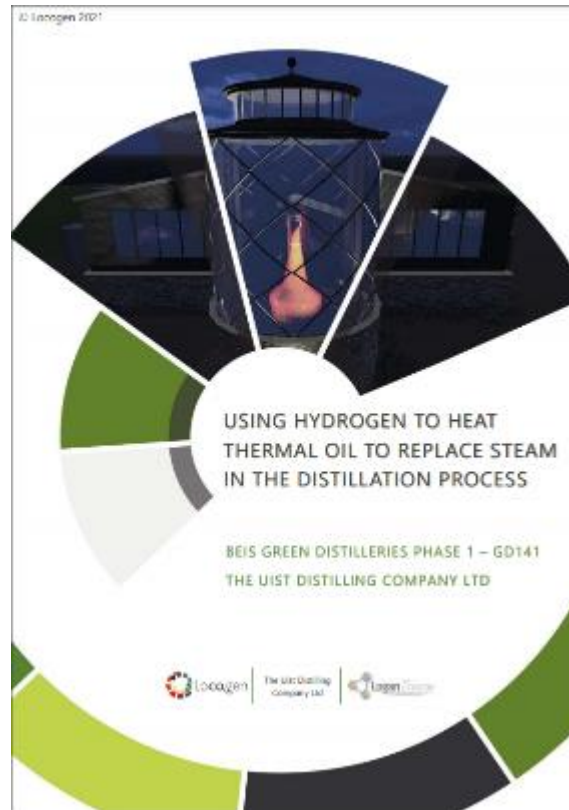
- Wind
- Solar
- Renewable Heat
- Storage
- Hydrogen
- Smart Networks
- Green Transport

Locogen's Distillery Projects



Geography	million LOA/a	Business as usual fuel	Status
Rural	3.2	Biomass and LPG	Operational
Rural	6.0	Gas	Operational
Semi-rural	4.0	Gas	Operational
Semi-rural	3.0	Gas	Operational
Rural	4.0	Biomass and LPG	Operational
Semi-rural	19.0	Biomass and gas	Operational
Semi-rural	10.2	Gas	Operational
Rural	1.8	Oil	Operational
Rural	0.2	Oil	Operational
Urban	2.1	Gas	Operational
Rural	0.5	Oil	Operational
Rural	0.3	Oil	Pre-construction
Rural	0.6	Oil	Pre-construction
Urban	0.4	Gas	Pre-construction
Urban	0.1	Gas	Pre-construction
Urban	1.0	Gas	Pre-construction
Rural	0.5	Oil	Pre-construction

Locogen's Distillery Projects



<https://www.gov.uk/government/publications/green-distilleries-competition/green-distilleries-competition-projects-selected-for-phase-1>

Decarbonising distillation – the challenge



We need **steam!**

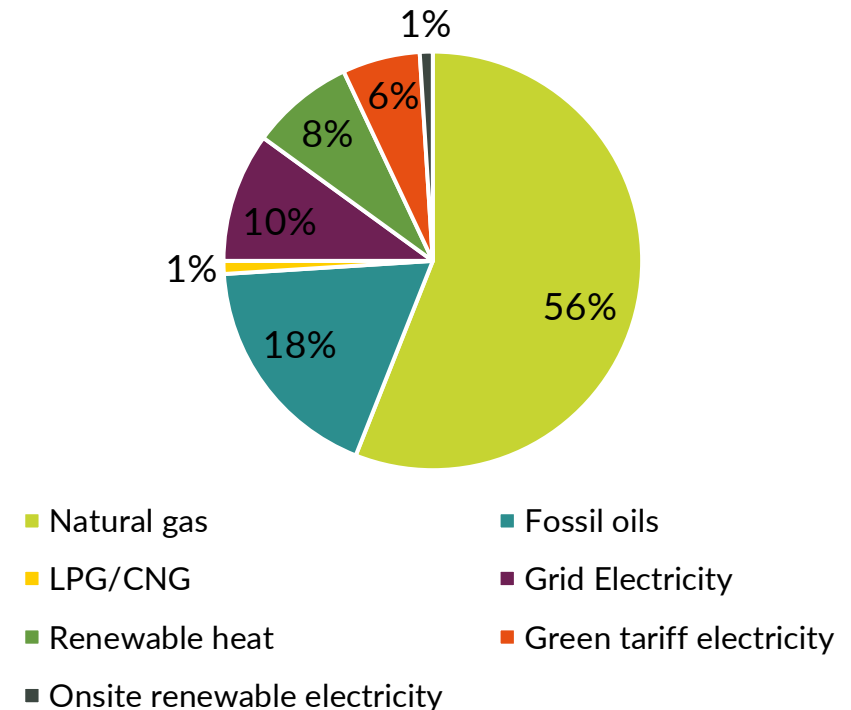


We need an **energy source**. This is predominantly fossil fuels



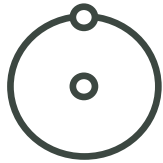
SWA has set a 2040 target for Net Zero

Distillery energy consumption



Source: Ricardo EE, 2020

MANY OPTIONS EXIST TO DECARBONISE DISTILLING



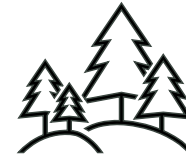
Hydrogen

Hydrogen Boilers



Electric

High Temperature
Heat Pumps
Electric Steam
Boiler
High Temperature
Thermal Storage



Bioenergy

Biomass Boilers
Anaerobic Digestion
Biofuels

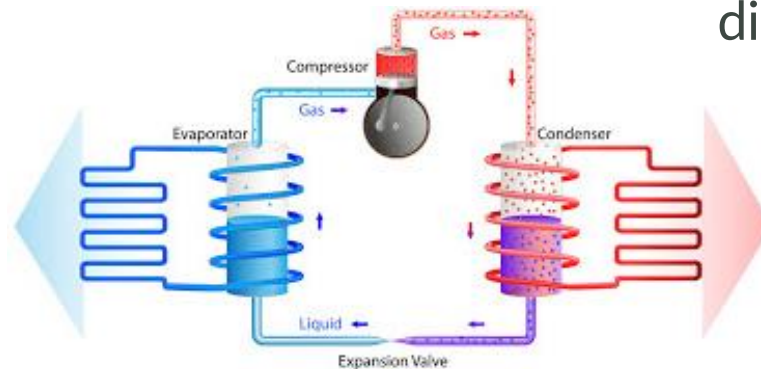
HIGH TEMPERATURE HEAT PUMPS

Technology Benefits

- High efficiencies
- Reduces energy demand
- Can be integrated with renewable generation
- Can be integrated with heat recovery

Considerations

- Retrofitting required of existing distilleries
- Cannot be used as primary source
- Additional grid import capacity required
- Not been implemented in working distillery setting



HYDROGEN BOILER



Technology Benefits

- Commercially available components
- High temperature and ramp rates
- Simplicity in retrofit
- No alteration to spirit making process
- Zero carbon emissions at combustion

Considerations

- Supply of green hydrogen
- Price point
- Storage requirements
- Safety considerations



NO ONE SIZE FITS ALL



Technical

Grid connection
Planning
Location
Land
Spatial requirements
Integration



Financial

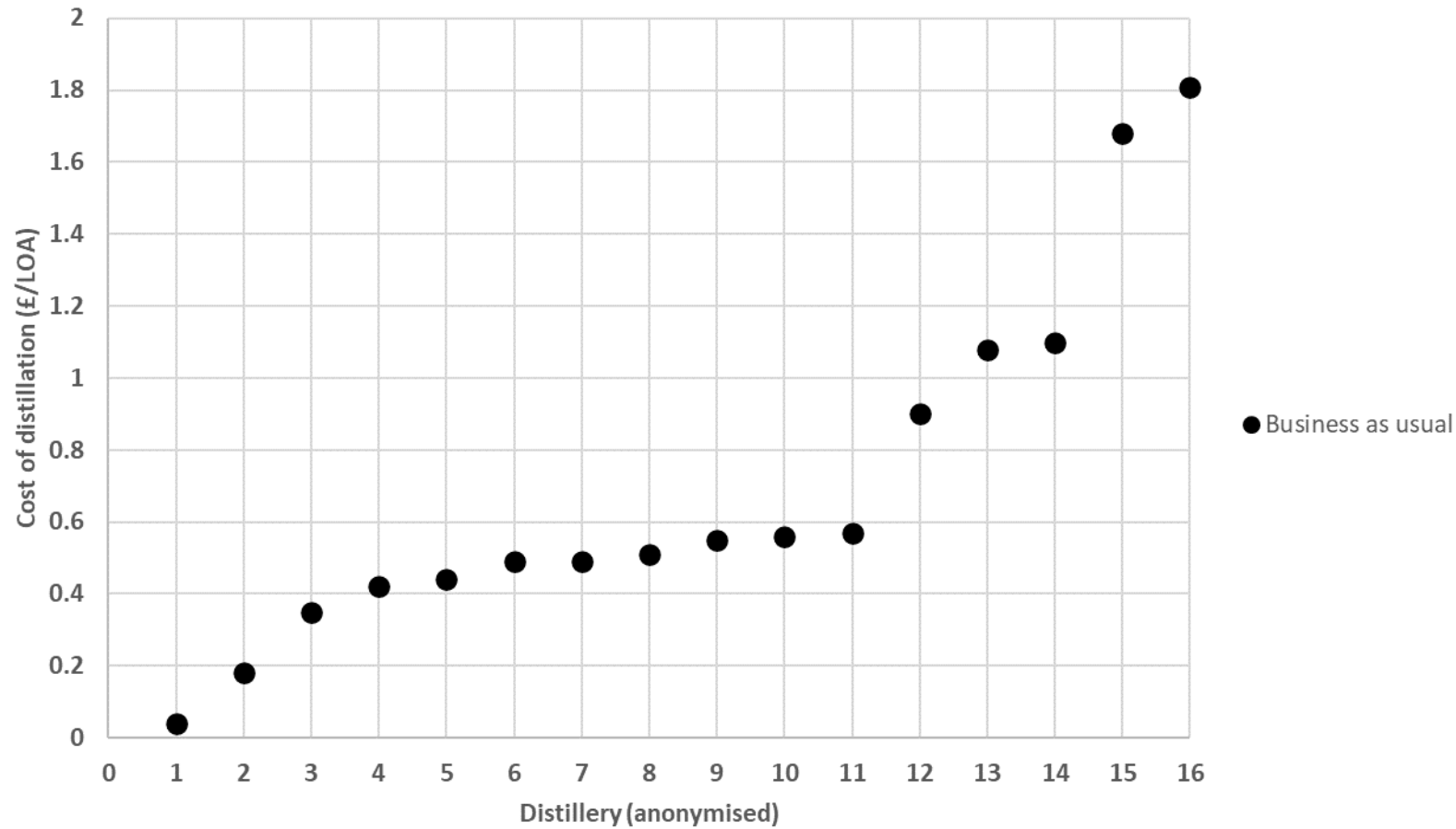
DEVEX
CAPEX
OPEX
Funding



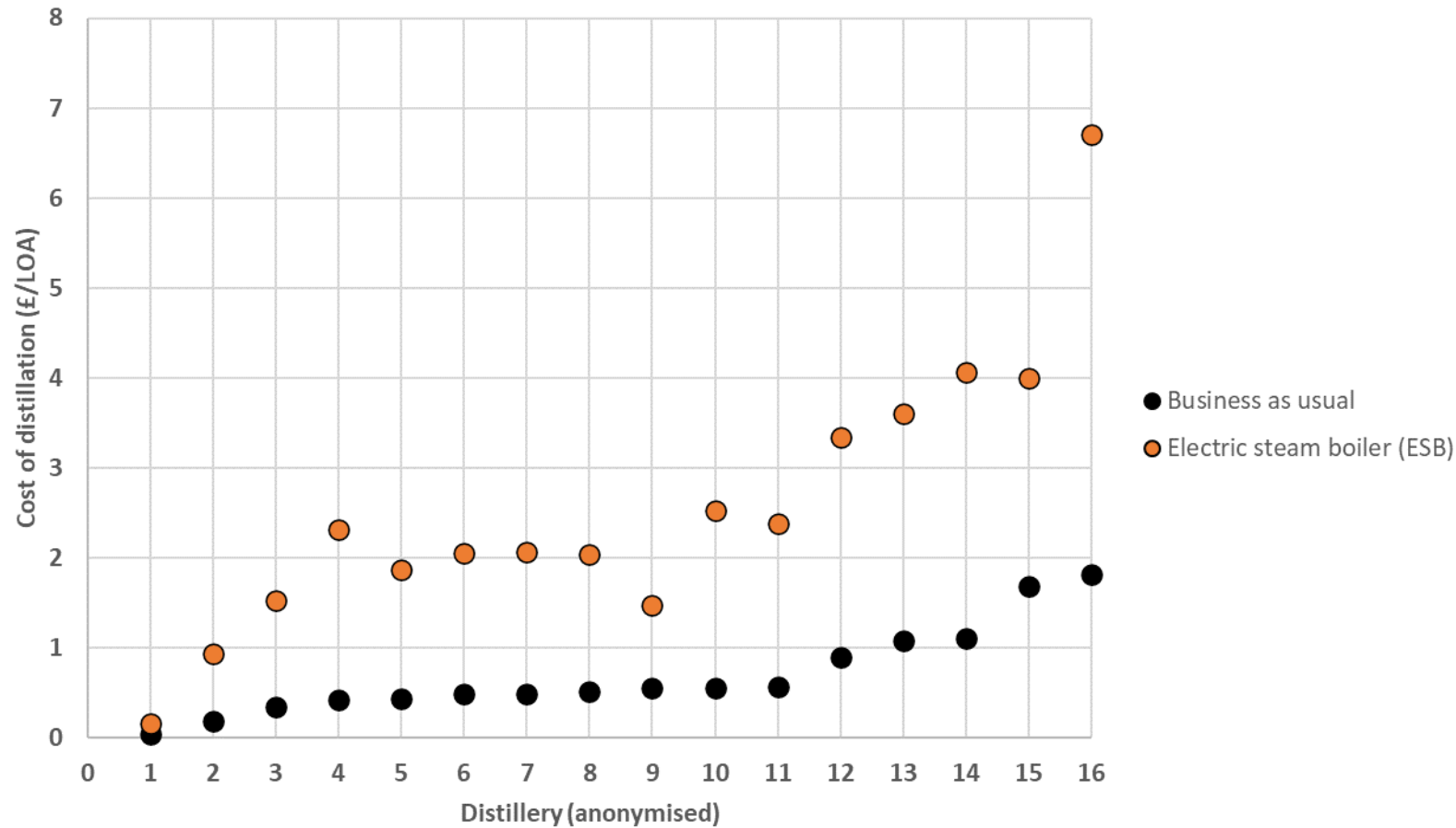
Product

Product quality
Product price
Future proofing
Branding

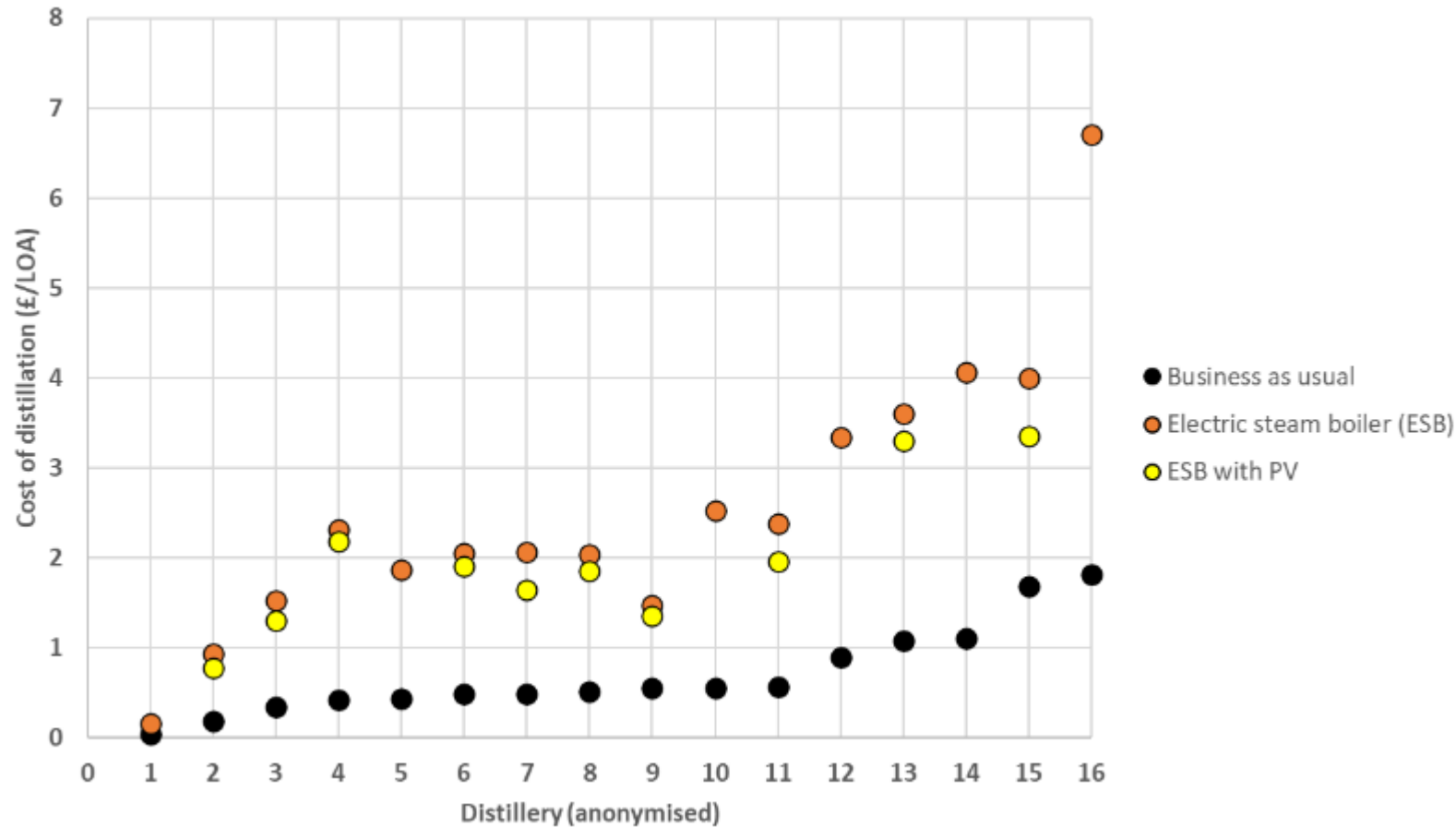
Analysis – running costs



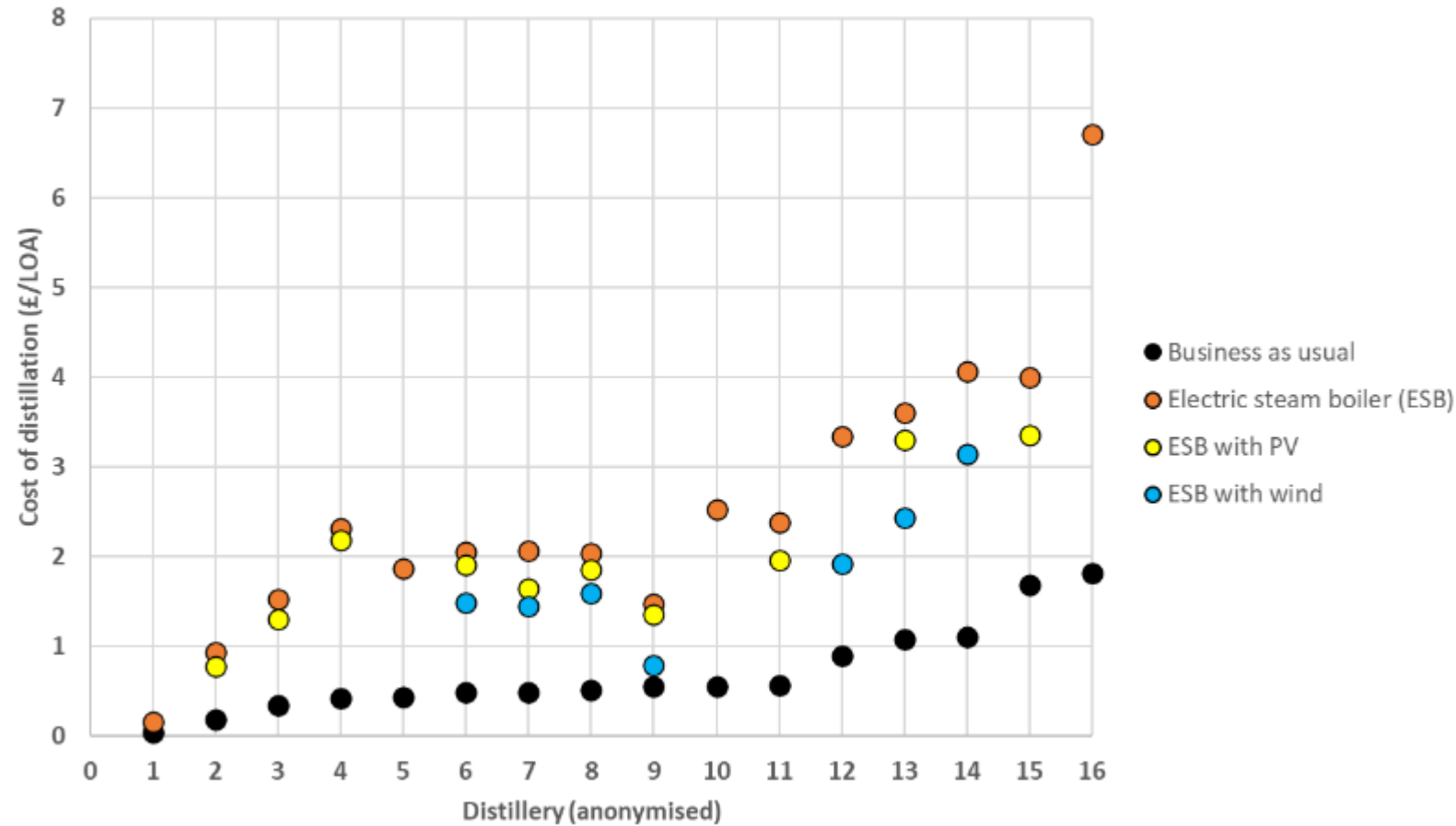
Analysis – running costs



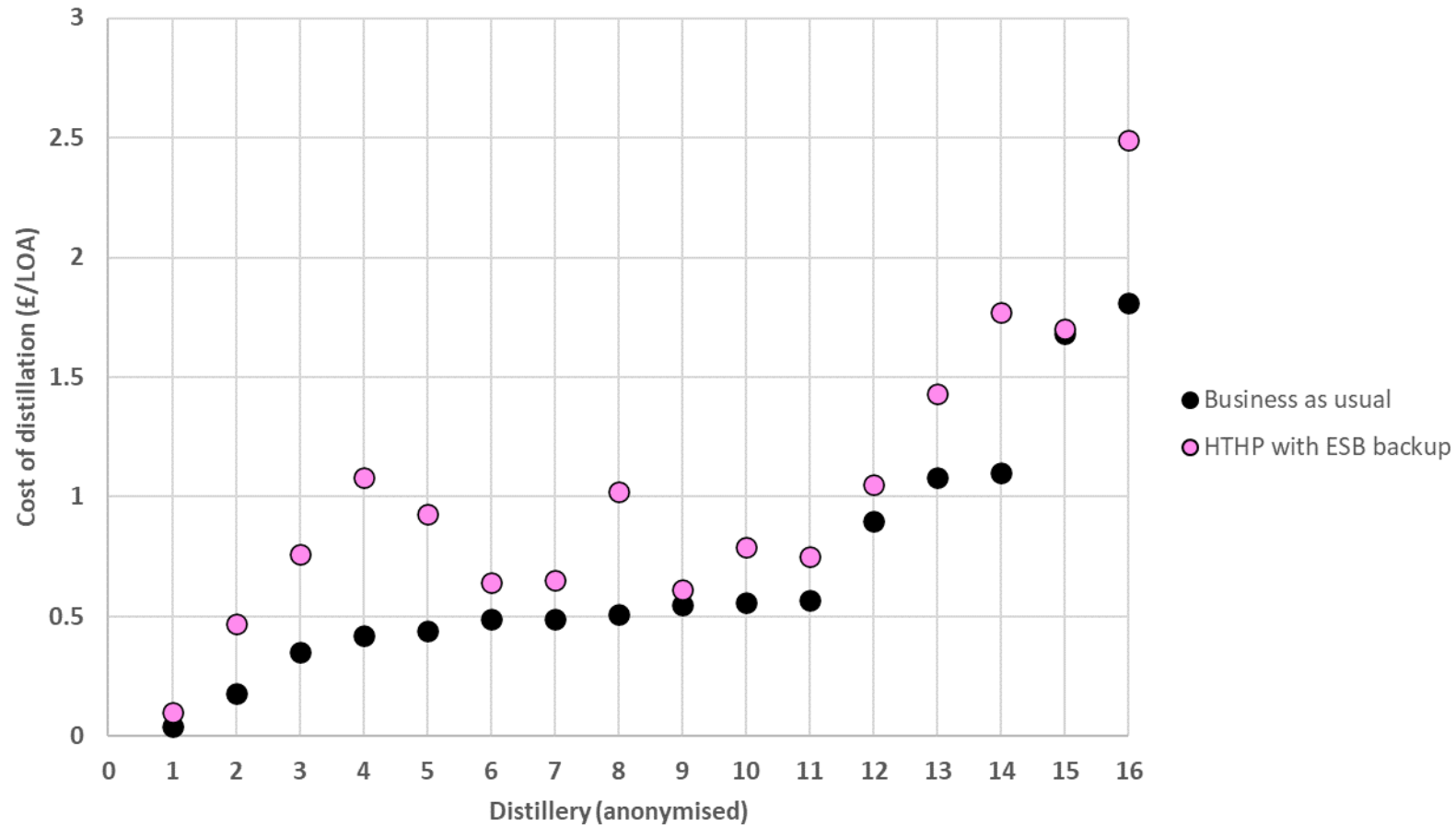
Analysis – running costs



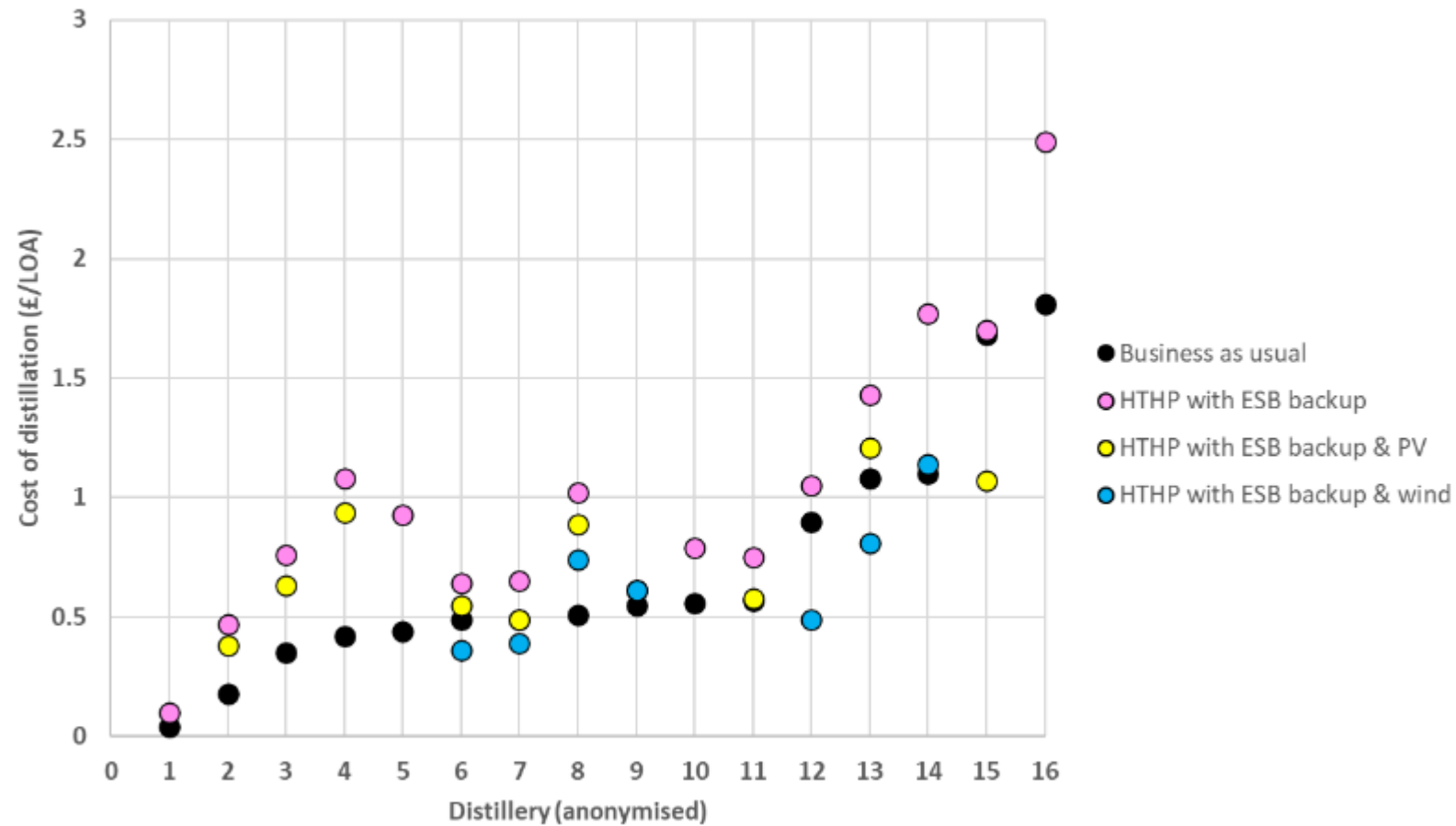
Analysis – running costs



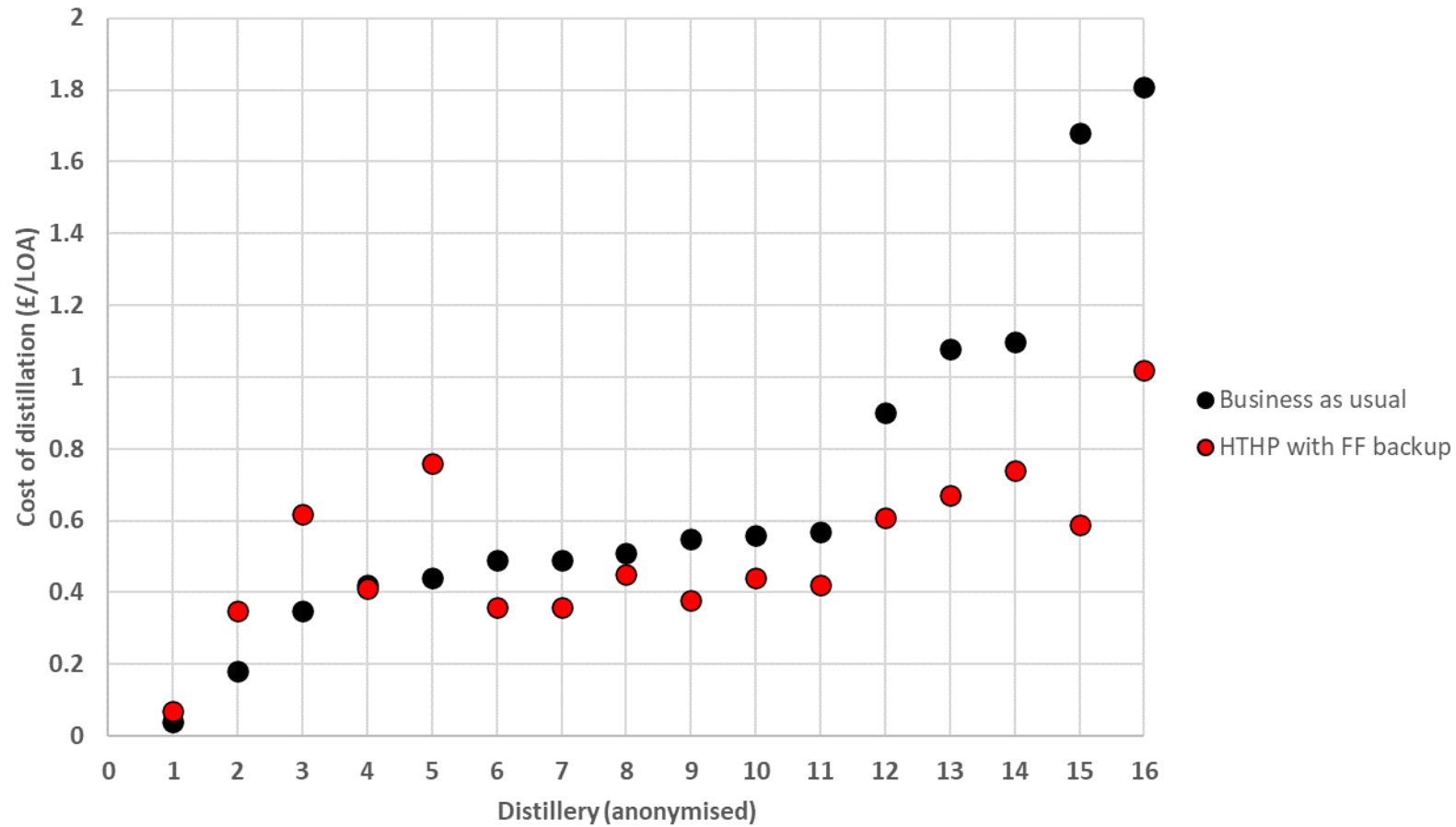
Analysis – running costs



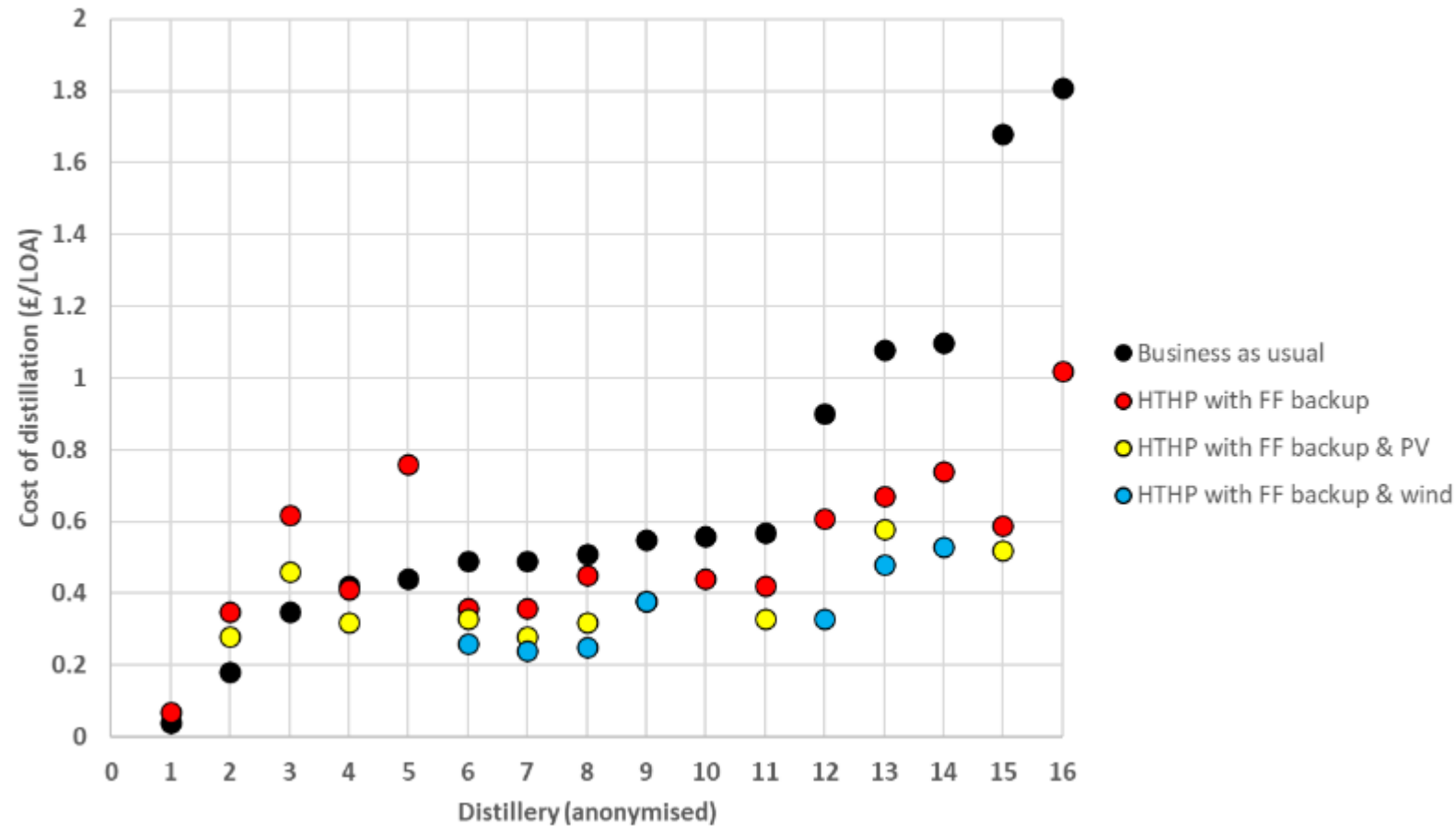
Analysis – running costs



Analysis – running costs



Analysis – running costs



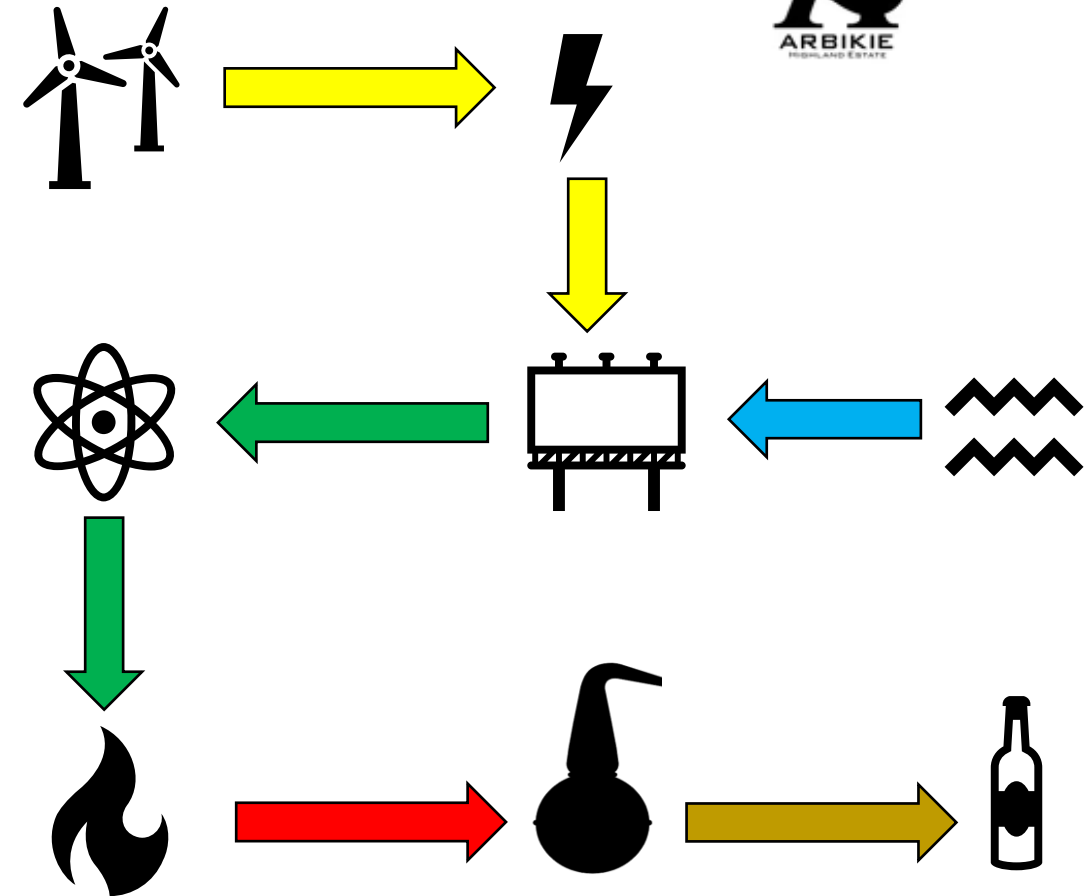
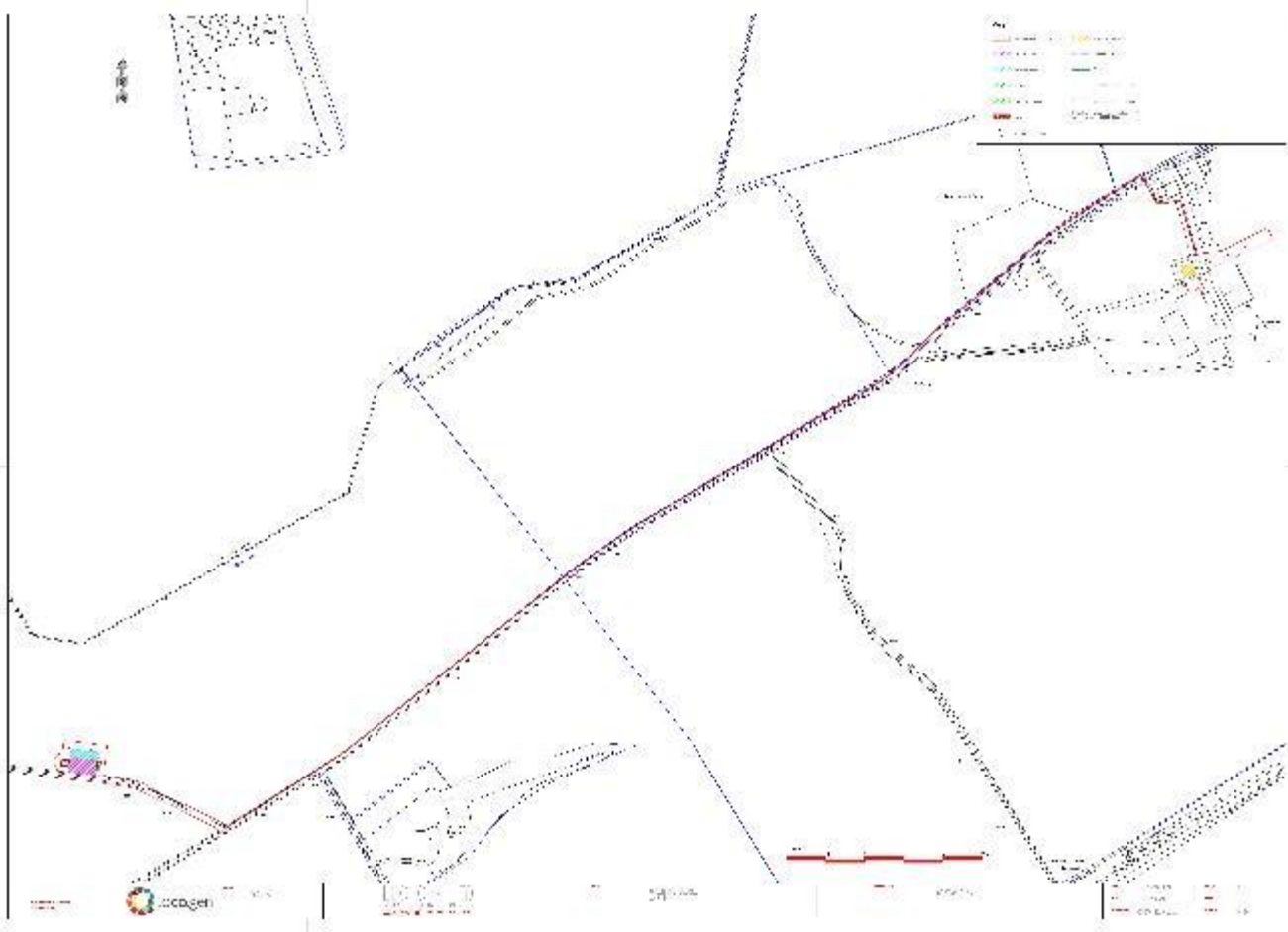
Case Study – Arbikie Highland Estate Distillery

The world's first green hydrogen fueled distillery



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1MW wind turbine installed

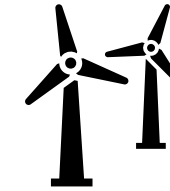


Arbikie Wind Turbine Construction Sneak Peek



Case Study – Arbikie Highland Estate Distillery

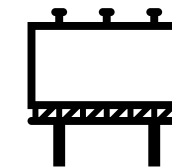
The world's first green hydrogen fueled distillery



1MW wind turbine installed



Hydrogen-ready dual fuel burner and boiler installed



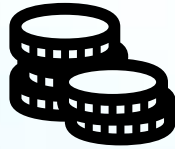
Hydrogen plant due for installation in August. Full operation in September

Case Study – Arbikie Highland Estate Distillery

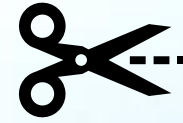
The world's first green hydrogen fueled distillery



Approx. 50%
demand fueled by
hydrogen



Save money on fuel



Halving carbon emissions



Thank you for listening!

Jack.byres@locogen.com

+44 (0)131 555 4745

