



Transforming food waste into sustainable oil-based fuels – case study

- Recover every drop of value

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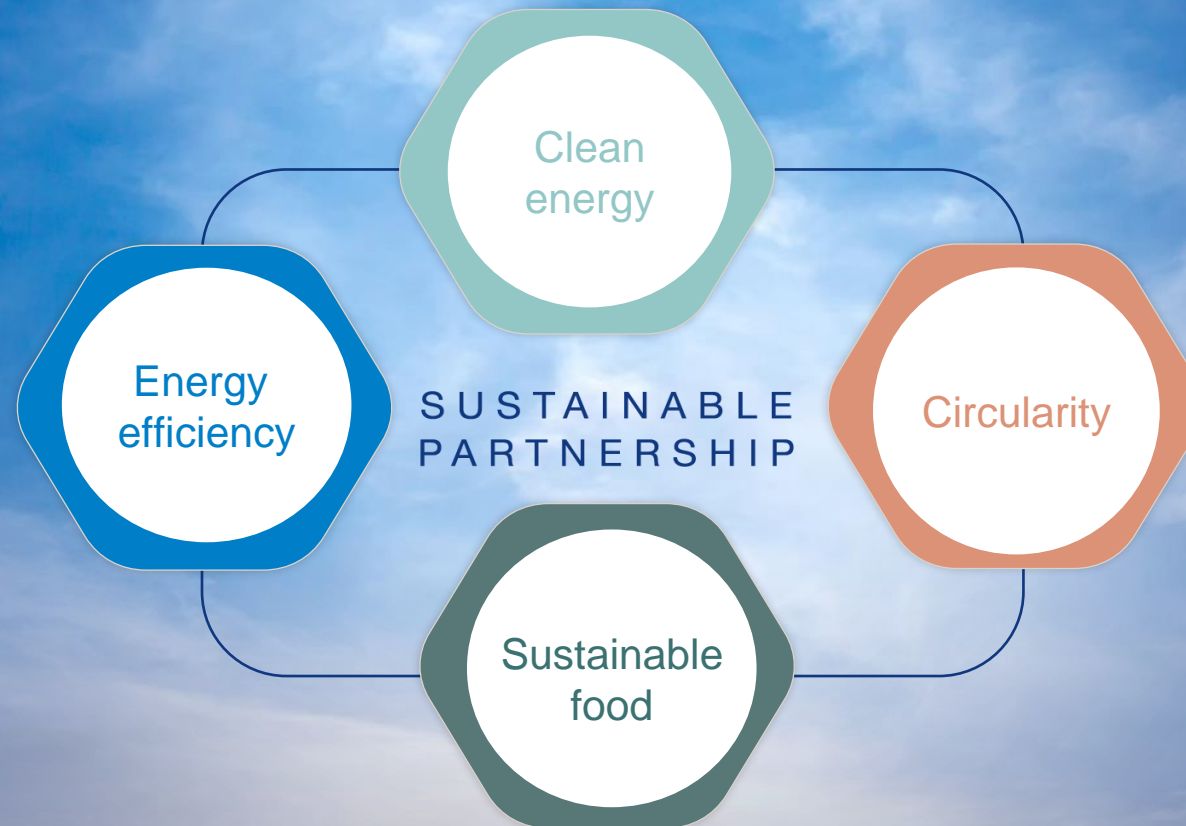
CCO, Bisviridi

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Sustainability focus areas in Alfa Laval

with customers



About Alfa Laval

– Key technologies



Our key technologies are adapted to each business unit and offered separately or combined into optimized solutions.

HEAT TRANSFER

ENERGY DIVISION

- Brazed & Fusion Bonded Heat Exchangers
- Gasketed Plate Heat Exchangers
- Welded Heat Exchangers

FOOD & WATER DIVISION

- Food Heat Transfer
- Food Systems

MARINE DIVISION

- Marine Separation & Heat Transfer Equipment
- Boiler Systems
- Gas Systems

SEPARATION

ENERGY DIVISION

- Energy Separation

FOOD & WATER DIVISION

- High Speed Separators
- Decaners
- Food Systems

MARINE DIVISION

- Marine Separation & Heat Transfer Equipment

FLUID HANDLING

FOOD & WATER DIVISION

- Food Systems
- Hygienic Fluid Handling

MARINE DIVISION

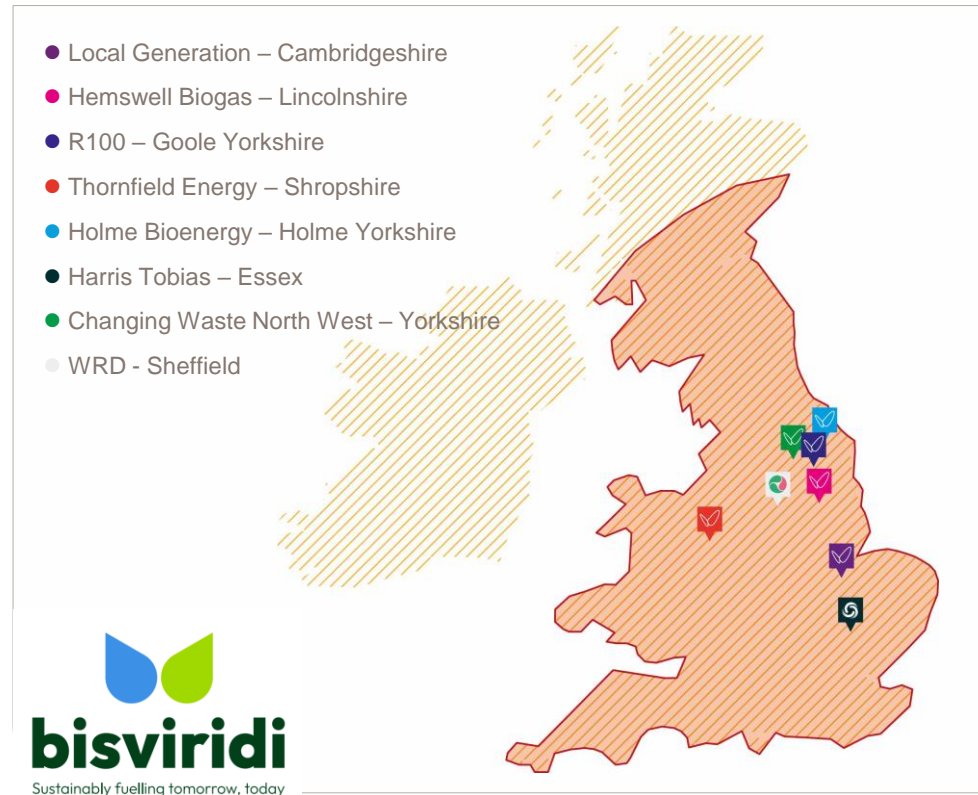
- Pumping Systems

About Bisviridi

– Sustainable fueling tomorrow, today



- We own and operate 7 food waste recycling facilities
- We process more food waste than any other Anaerobic Digestion (AD) business in the UK*. C.550kt per annum
- Together with Alfa Laval we have harnessed the ability to reliably separate oil from food waste at scalable volumes
- Successfully separated c. 3kt. of oil and installed 4 decanters during 2023
- Regulated by EA and Defra
- ISCC and PAS110 certified

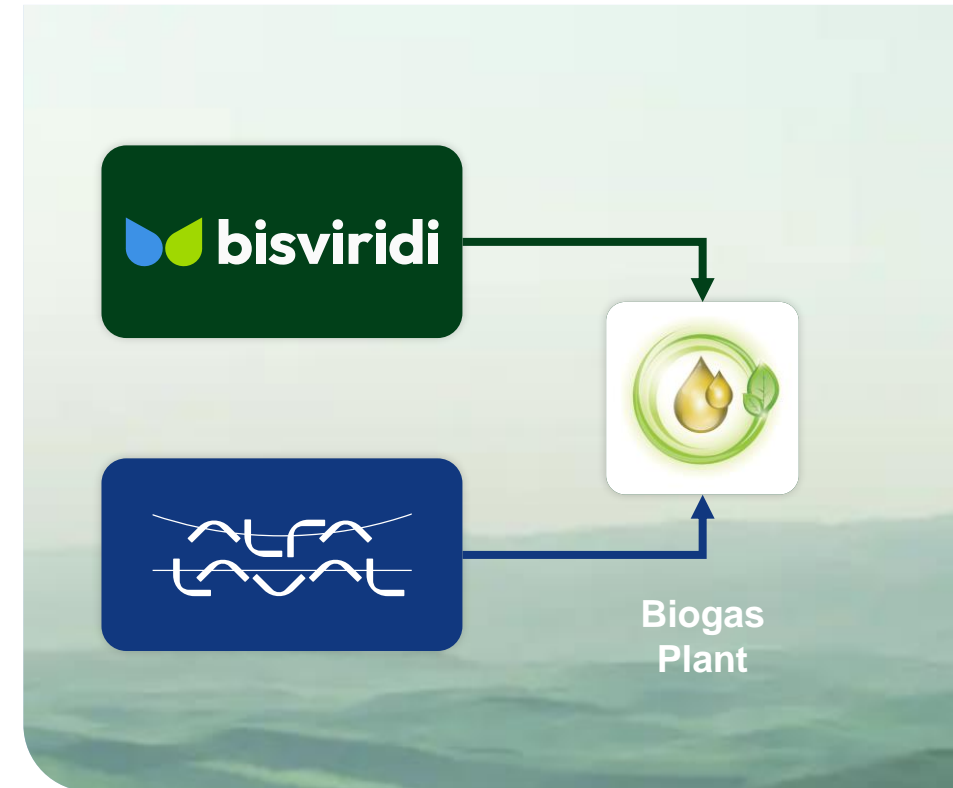


Partnership Alfa Laval-Bisviridi

– Recover every drop of value



- Bisviridi has wide experience in food waste and filed a worldwide Patent which relates to improvements in anaerobic treatment of food waste
- Alfa Laval has wide experience in centrifuge separation technology and filed a patent on the use of Oil Plus decanter centrifuge technology in oil extraction (including food waste)
- We decided to combine our knowledge to promote and offer a turnkey **solution** to be installed in line before AD to extract oil for biofuel production
- Alfa Laval will offer the **decanter** solution
- Bisviridi will offer a **licence agreement** on the process
- Plant visits in the UK can be arranged by Bisviridi to allow potential customers to witness the solution/installation





Background

– Recover every drop of value



- 2.5 billion tons of food waste globally per year (Jackman, 2023)
- Assuming just 4% of this is fats, oils and greases, this source alone is potentially 100 million tons of refinable sustainable oil-based fuels
- Need of diversification for AD plants
- This does not include the potential from the wastewater industries
- Large potential to contribute to global SAF supply
- Sustainability Certification Schemes are achievable for sustainable oil-based fuels



(1) Jackman, J. (2023) Food Waste Facts and Statistics, The Eco Experts. Available at: <https://www.theecoexperts.co.uk/home-hub/food-waste-facts-and-statistics#:~:text=We%20produce%20enough%20food%20across,tonnes%20thrown%20away%20each%20year.>

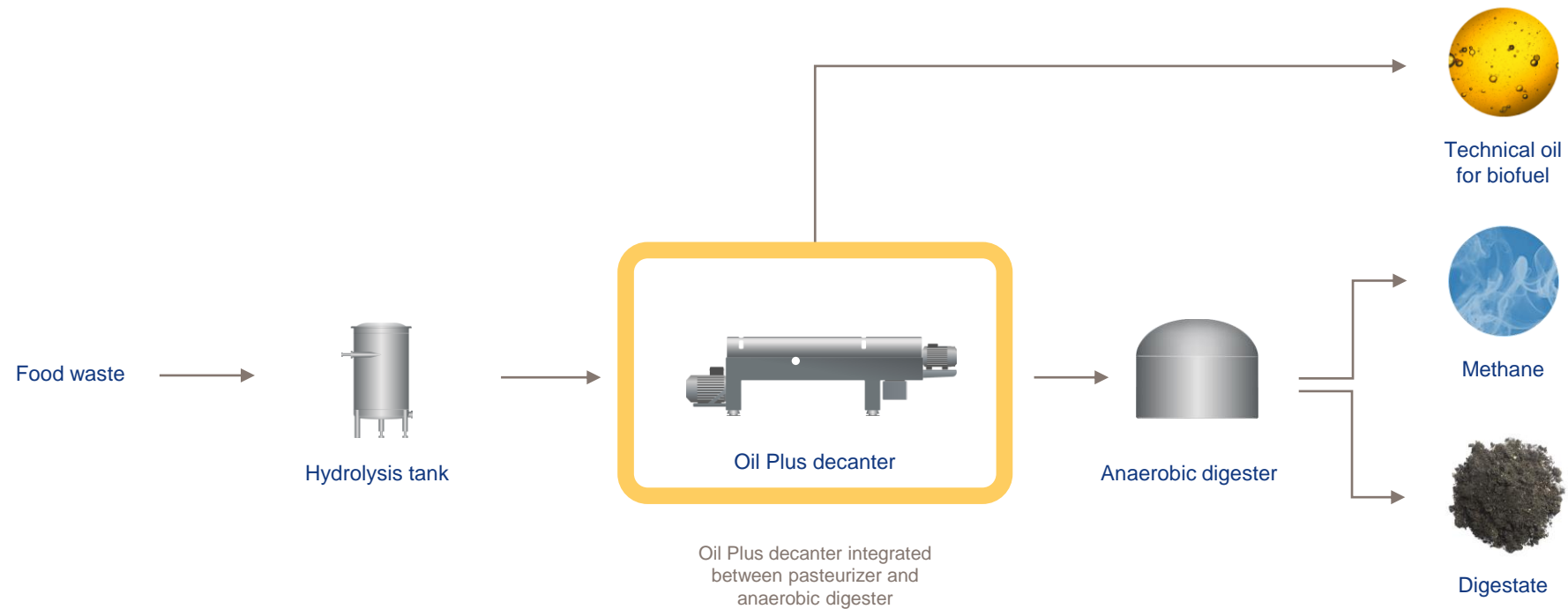
What is a Oil Plus decanter?



- Oil Plus decanters have been developed to recover **oil and fat from oily feed and can be used in several applications**
- Oil Plus works like a **fat/oil skimmer**. Oil or fat is discharged from large end hub and solids and water together are discharged as a second phase in the conical end
- **Up to 100% of free oil extraction and up to 99,5% of oil/fat purity**

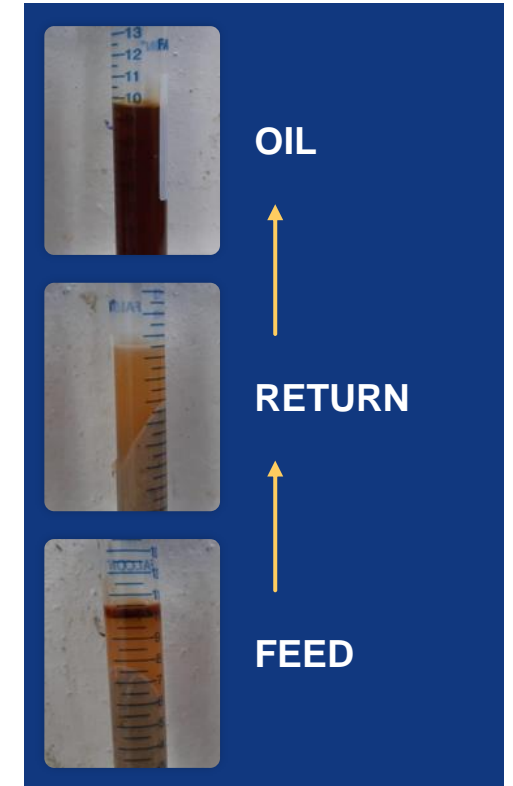
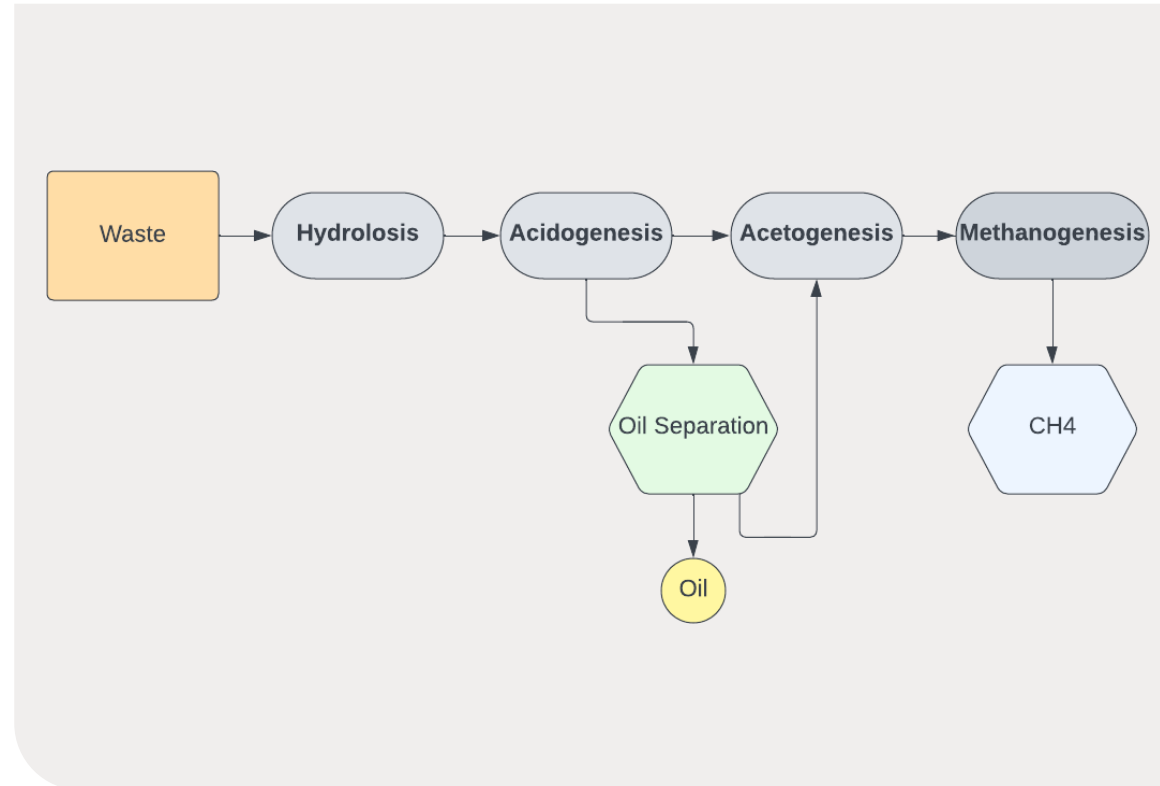


Oil Plus in AD Plant



Oil separation in AD process

- Runs in parallel to process
- Installed prior to methanogenesis
- Does not impact existing process
- Diversifies revenue streams
- Self-contained process
- 99.5% pure oil separated
- Works with any AD process where oils, fats and greases (FOGs) are present

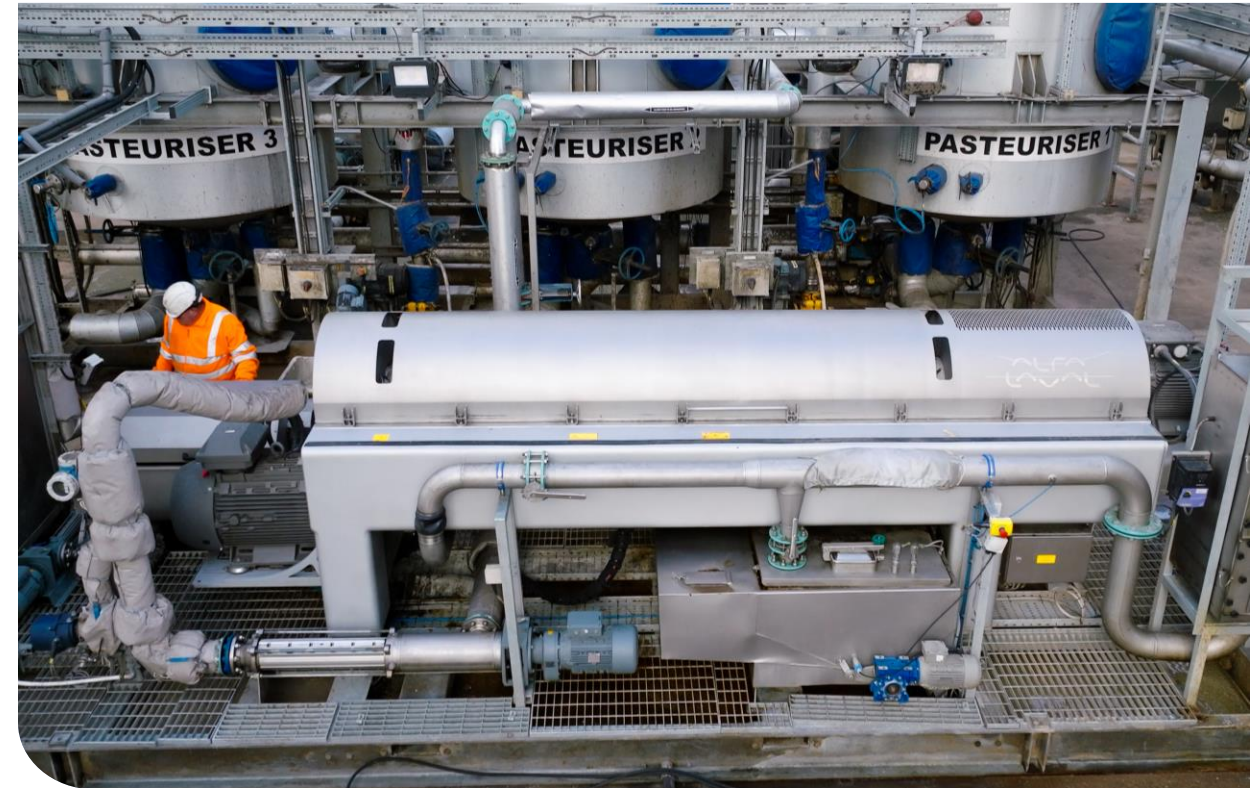


Oil Plus decanter skid

– Alfa Laval solution for Food Waste de-oiling



- Decanter and ancillaries on a steel base
- Pre-assembled in an off-site build
- Transported and lifted as one
- Suitable for outdoor use



Product properties



- *Using case study data*
- M&I – 99.5%
- FFA – 15-20%
- Sulphur – 75-100ppm
- Energy density of sustainable oil-based fuels – 32 GJ/m³



Value creation



Key assumptions

- *AD plant processing 80kt pa*
- *7% available oil in feedstock*
- *High gas price (2022 av.)*
- *Low oil sale price*
- *All operational costs accounted for*

Key results

- If you **do not** replace feedstock used for oil EBITDA -+ £640k pa
 - If you **do** replace feedstock used for oil EBITDA -+ £1.3m pa'
- Payback period less than 1 year.

Evidence

- BioteCH₄ Case Study is convincing evidence of success.
- Diversifies revenue streams and adds value to feedstock.
- Acts independently to core process.
- Successfully separated c. 3kt. of oil and installed 4 decanters during 2022.

All sites are available for visits.

Conclusions



- Proven solution at four separate food waste facilities across the UK.
- Integrated solution without interrupting biogas production
- Direct increase of AD plant EBITDA and differentiate outputs
- Applicable in any AD facility with fats, oils and greases presence in the feedstock
- Available to explore tailor made solutions in collaboration with our partner Bisviridi
- The separated oil is potentially ISCC accredited making it highly sustainable.



Questions?



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