



Accelerating production of SAF with Oil Plus decanters

– Recover every drop of value

Matteo Betti

Business Developer, Alfa Laval

Lee Dobinson

CFO, Bisviridi

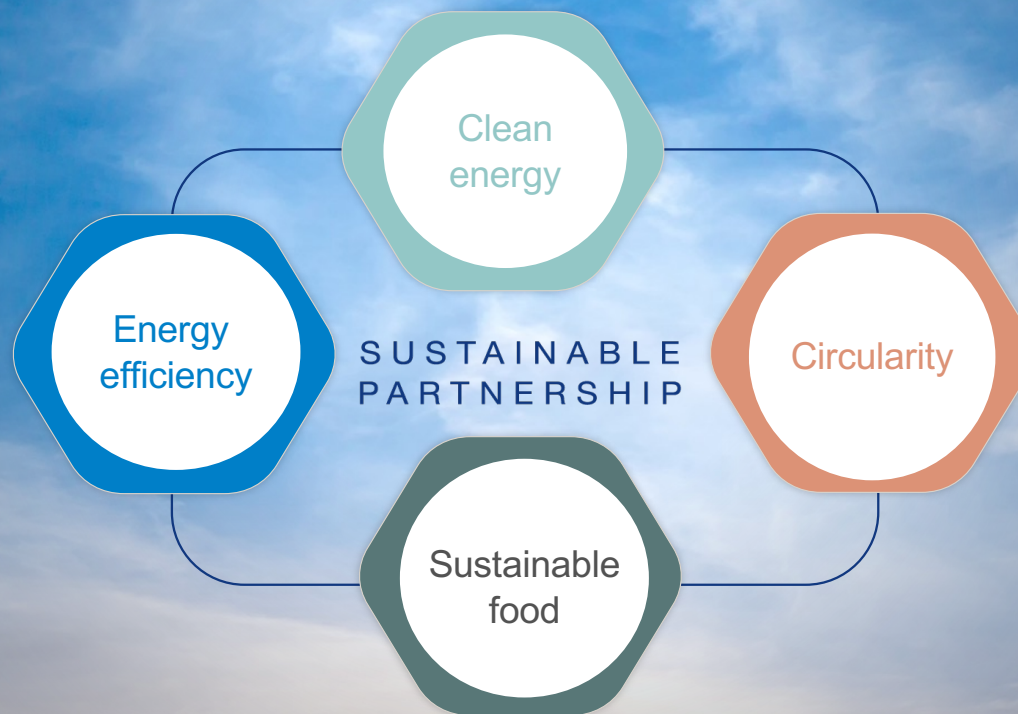
Harry Hunter

Technical Manager, Bisviridi



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
- Decanters
- Food Systems

MARINE DIVISION

- Marine Separation & Heat Transfer Equipment



FLUID HANDLING

FOOD & WATER DIVISION

- Food Systems
- Hygienic Fluid Handling

MARINE DIVISION

- Pumping Systems

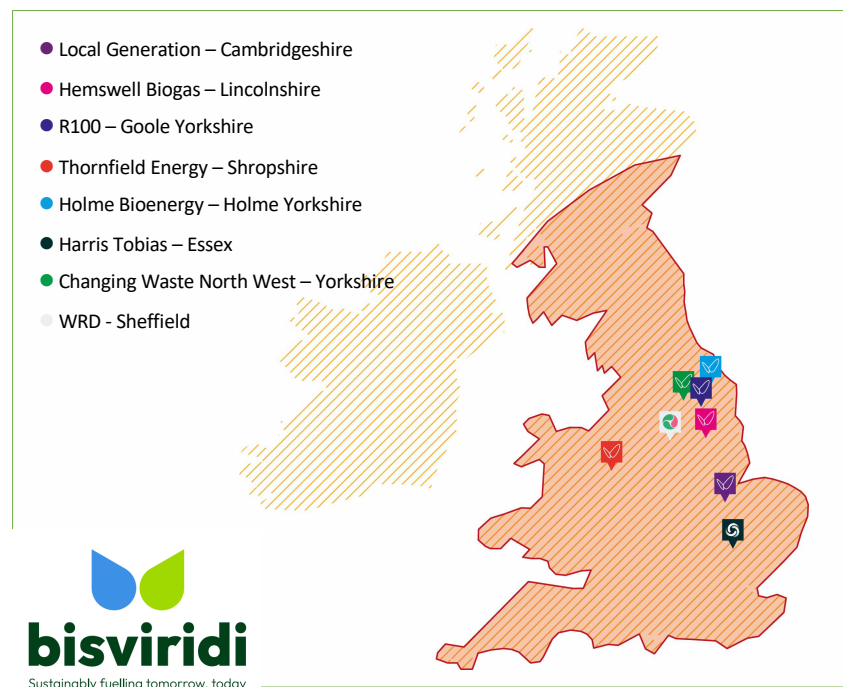


About Bisviridi

– 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

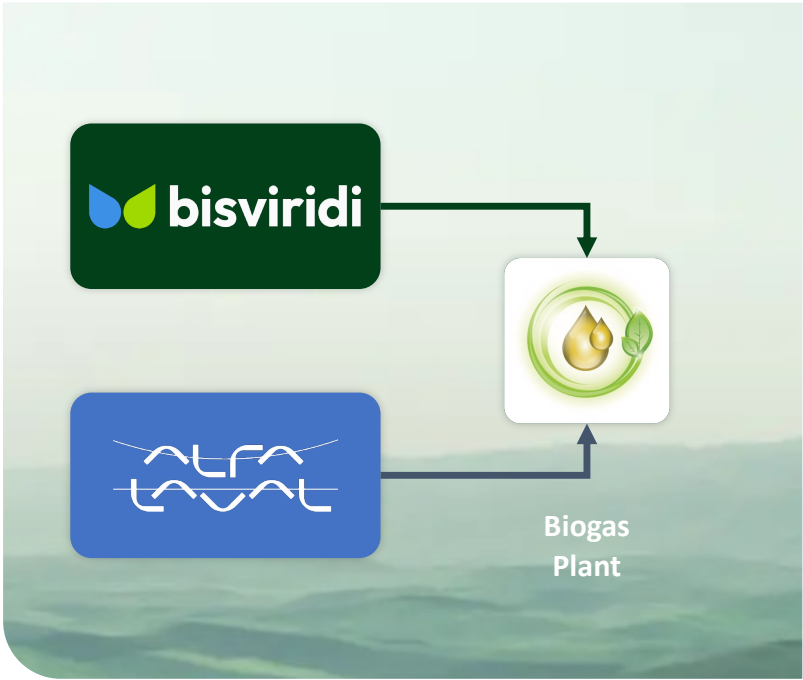


Partnership Alfa Laval-Bisviridi



– 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.>

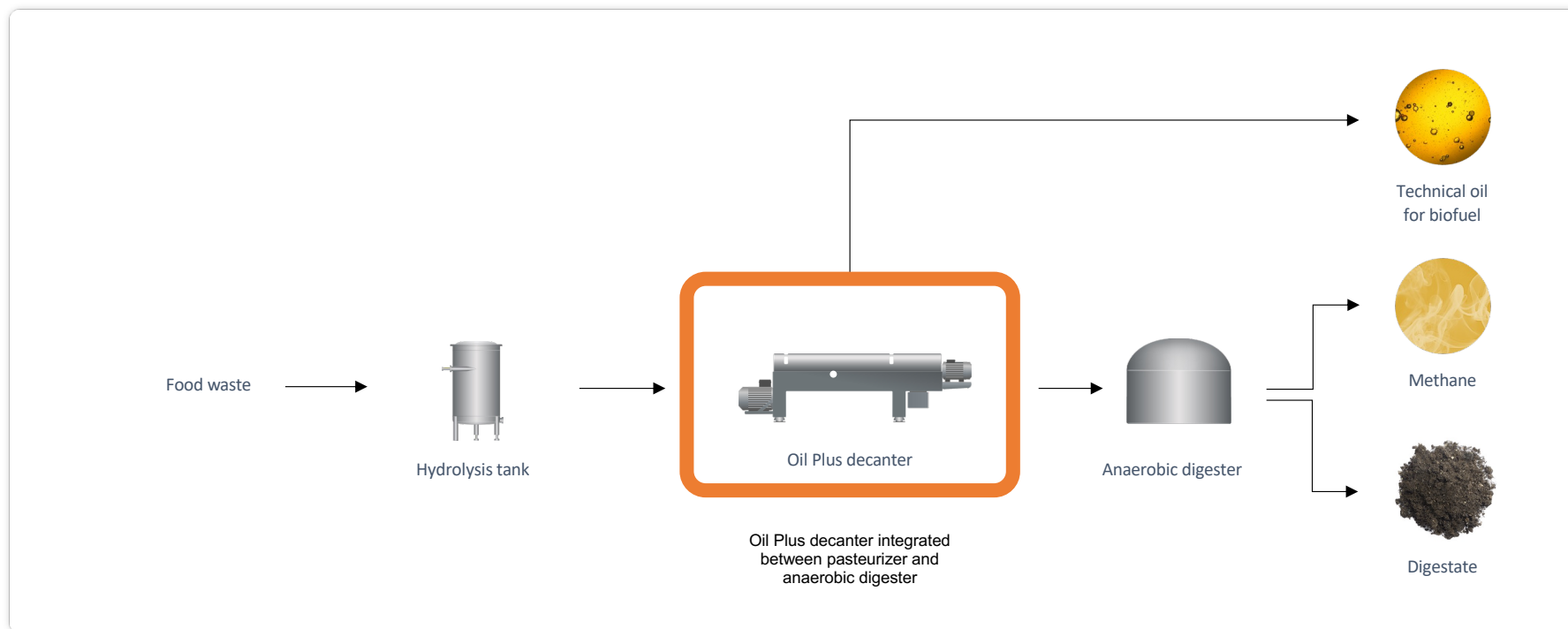
What is a Oil Plus decanter?



- 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**



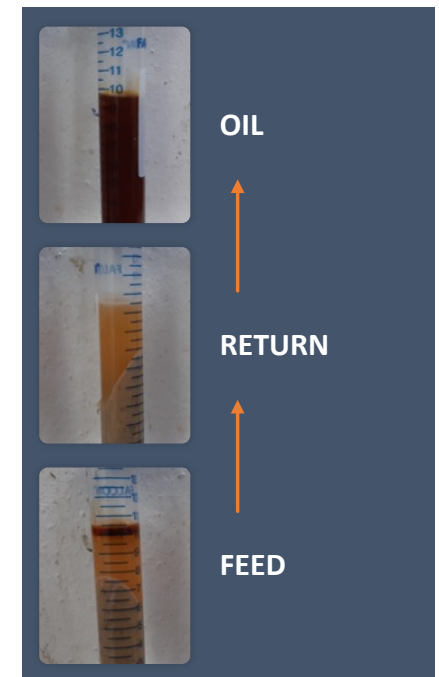
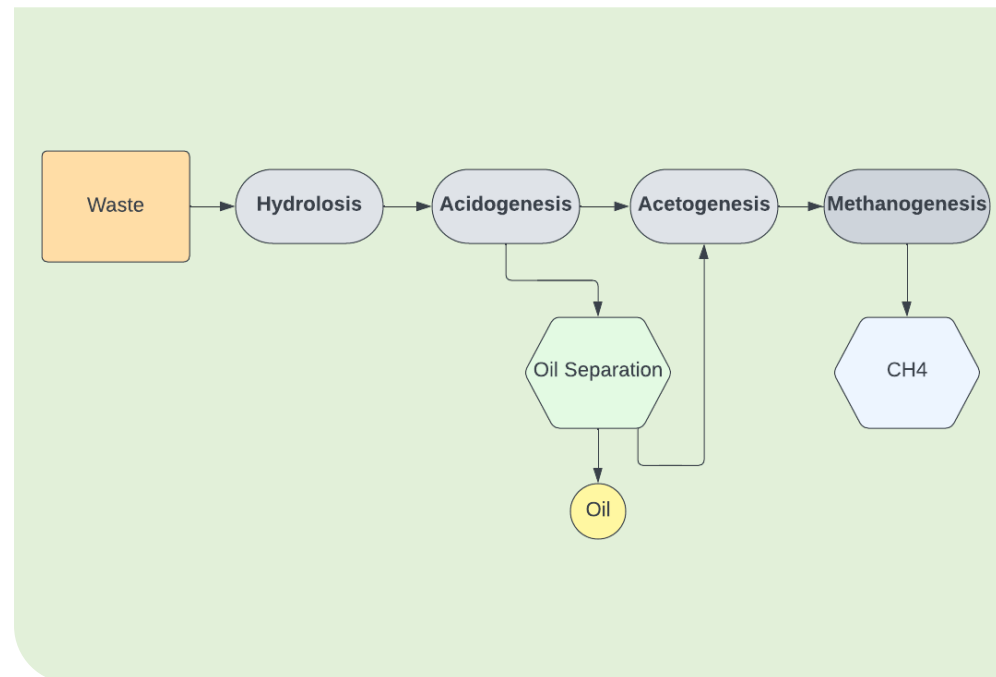
Oil Plus in AD Plant



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

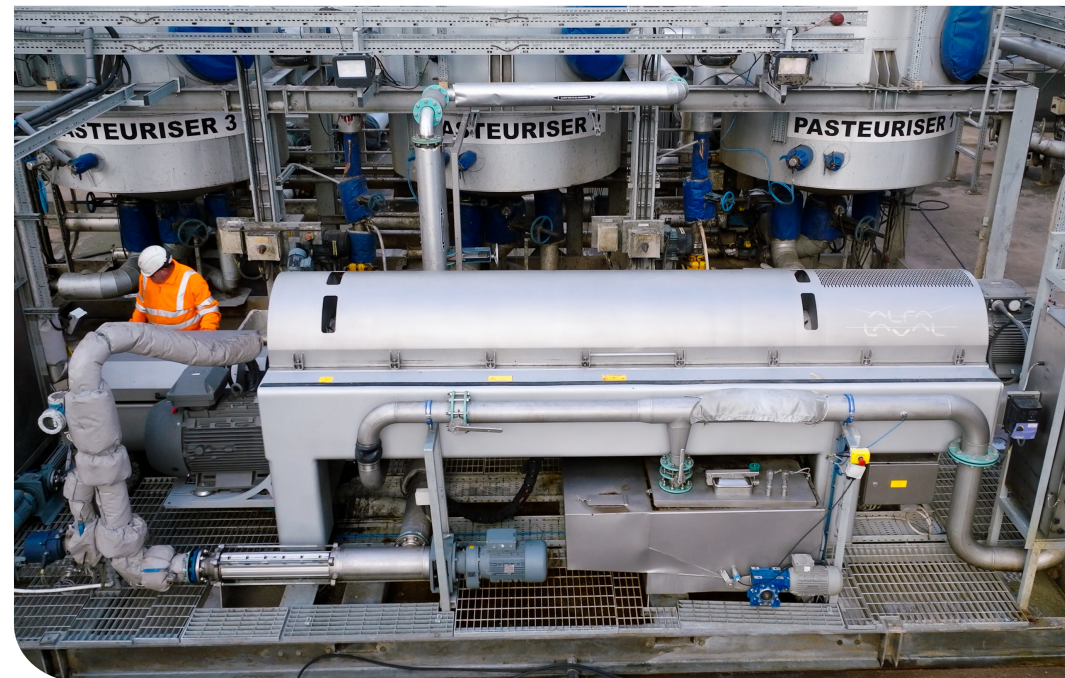


Oil Plus decanter skid

– 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	Key results	Evidence
<ul style="list-style-type: none">• <i>AD plant processing 80kt pa</i>• <i>7% available oil in feedstock</i>• <i>High gas price (2022 av.)</i>• <i>Low oil sale price</i>• <i>All operational costs accounted for</i>	<ul style="list-style-type: none">• If you do not replace feedstock used for oil EBITDA -+ £640k pa• If you do replace feedstock used for oil EBITDA -+ £1.3m pa' <p>Payback period less than 1 year.</p>	<ul style="list-style-type: none">• 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. <p>All sites are available for visits.</p>

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?



Matteo Betti

Business Developer, Alfa Laval
matteo.betti@alfalaval.com



Lee Dobinson

CFO, Bisviridi
lee.Dobinson@ch4mail.com



Harry Hunter

Technical Manager, Bisviridi
harry.hunter@ch4mail.com

