



# Circular Refining™

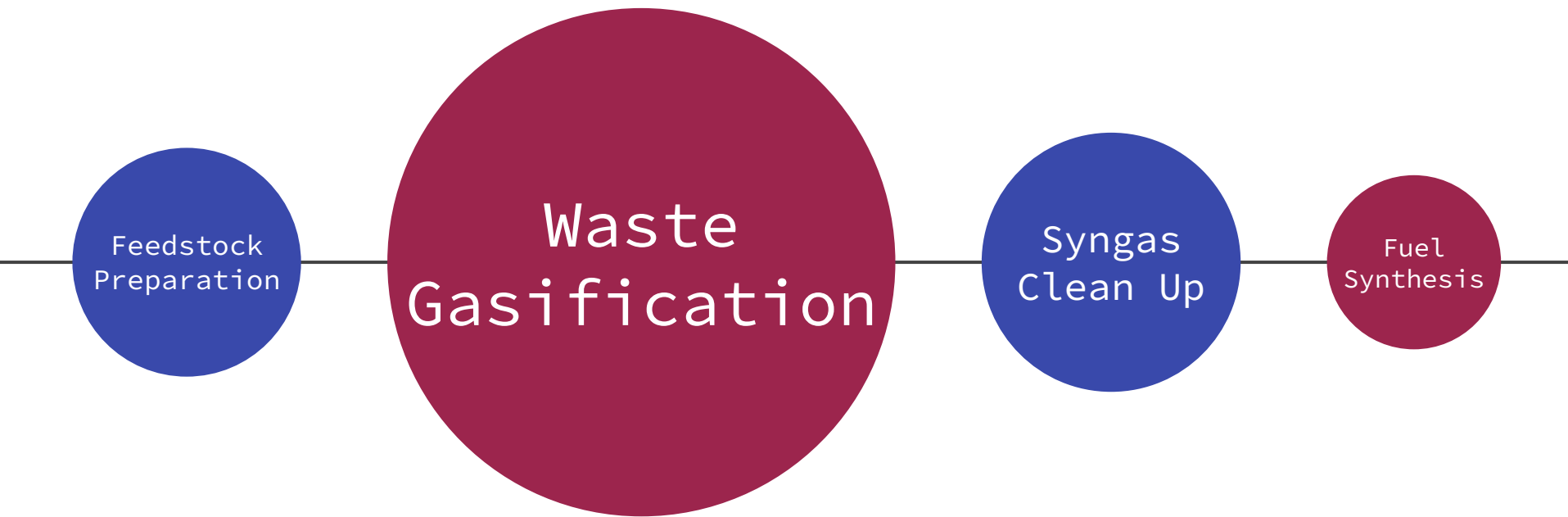
Renewable Fuels From Waste

# Our Process

Our innovative automated system converts municipal and medical waste into renewable diesel, hydrogen and carbon dioxide products.



# Key Processes





# Feedstock Preparation



European Union  
European Regional  
Development Fund



University of  
**Salford**  
MANCHESTER

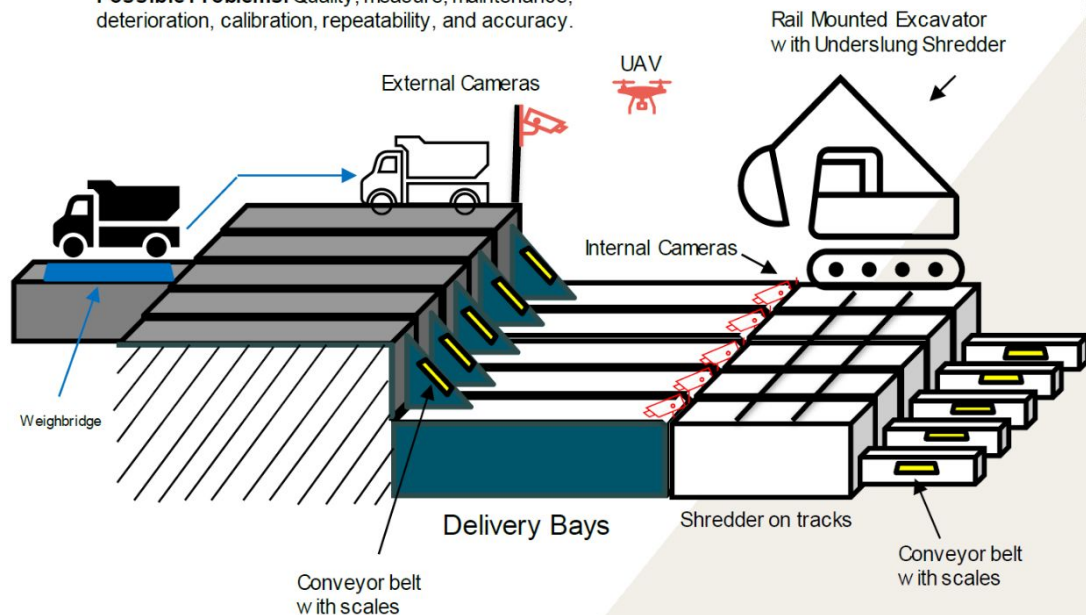


Research  
England

# Measuring Units Suggested

Due to the amount of material processed, it would not be recommended to use load cells to constantly measure the Waste In bay and Shredded bay.

**Possible Problems:** Quality, measure, maintenance, deterioration, calibration, repeatability, and accuracy.



## Weighbridge

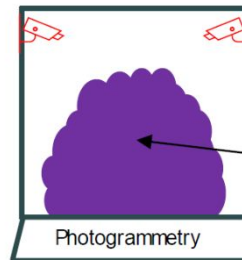
Measuring delivering trucks with waste.

## Load cells on conveyors

Measuring moving waste on conveyors - Waste IN bay and Shredded bay.

## Photogrammetry

Measuring waste in piles.



Constant  
Monitoring

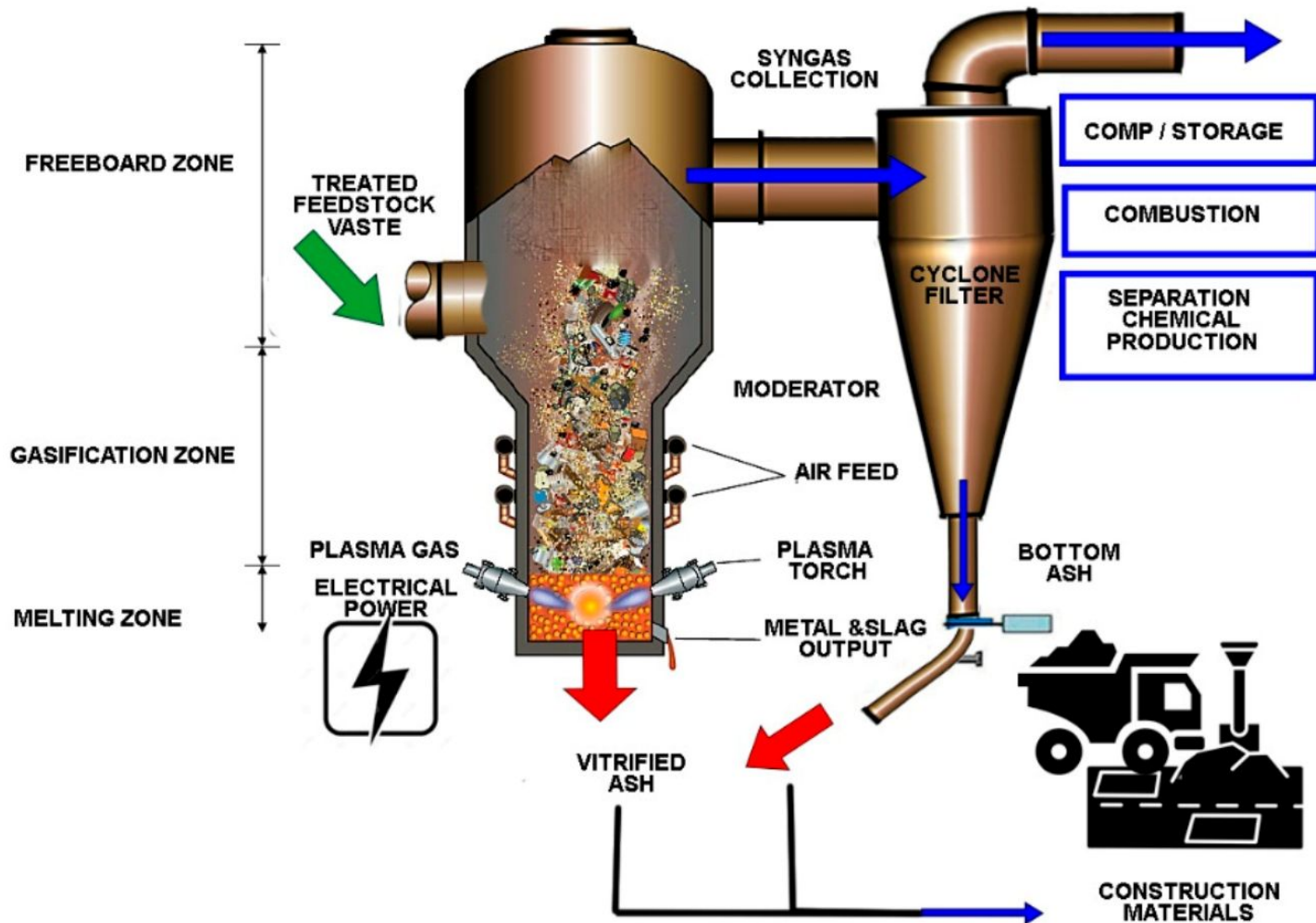
Pile of waste  
or shredded  
waste.

Photogrammetry

Frontal View



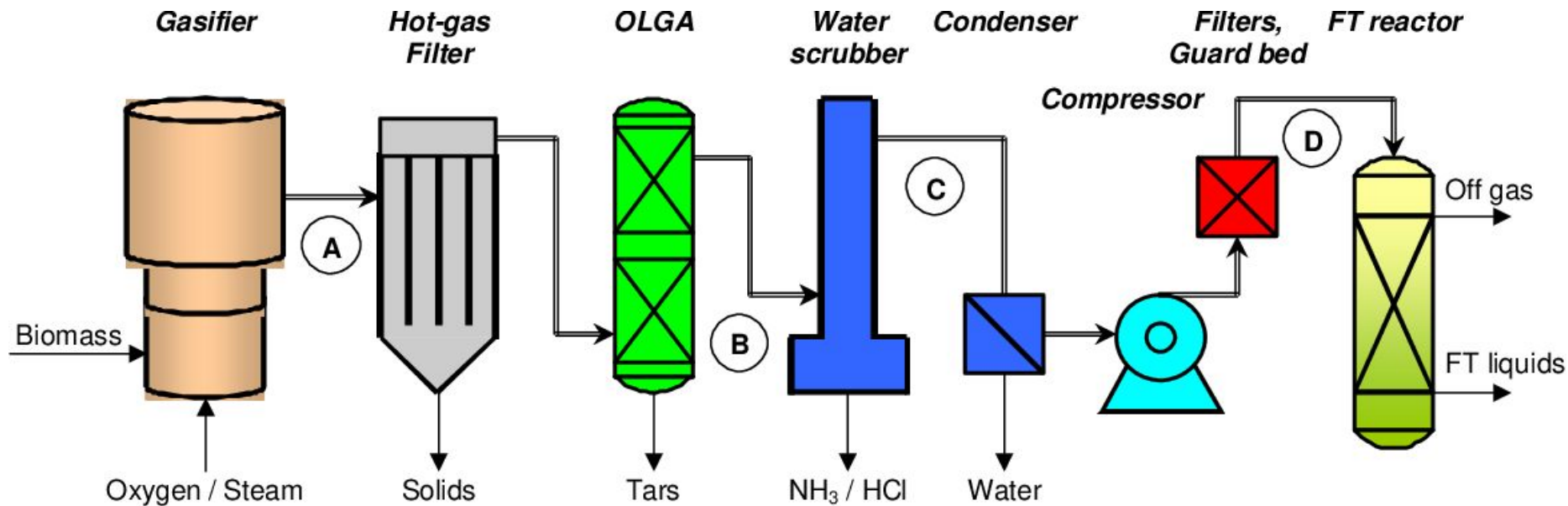
# Feedstock Gasification





# Syngas Clean Up

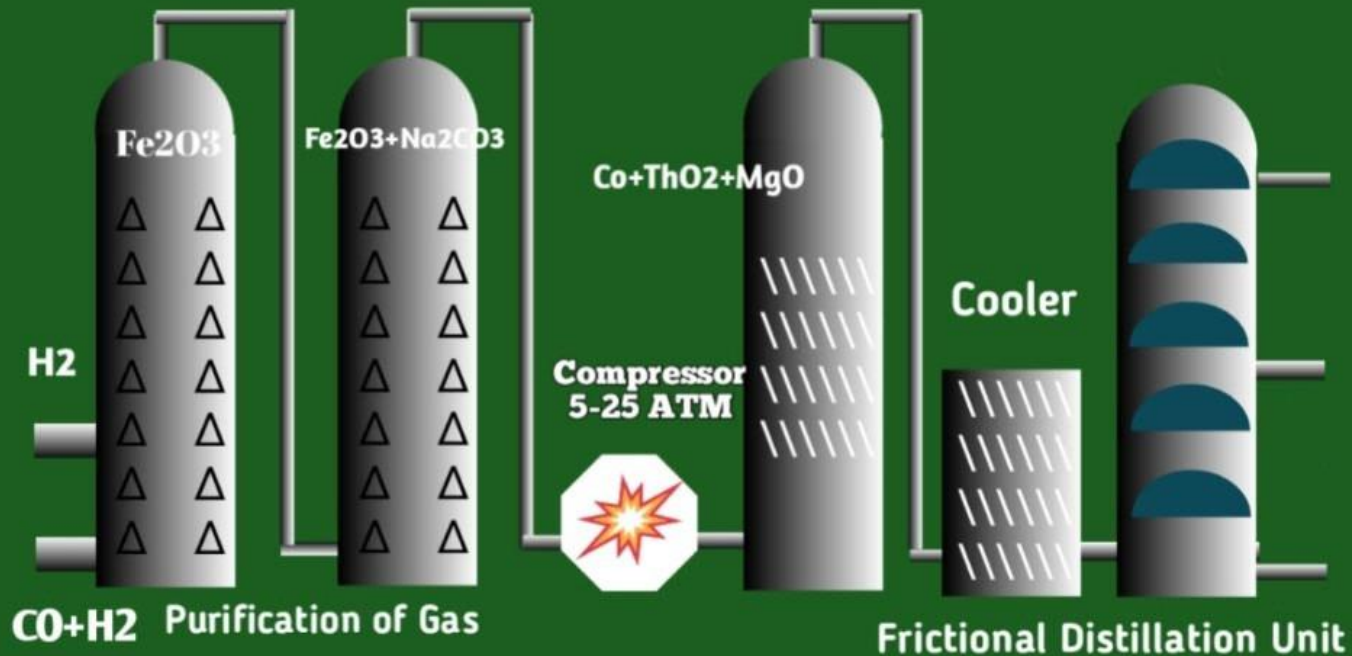




Our raw syngas is passed through a number of particulate and chemical separation processes to be safely passed into our Fischer-Tropsch reactor for hydrocarbon synthesis



# Fuel Synthesis



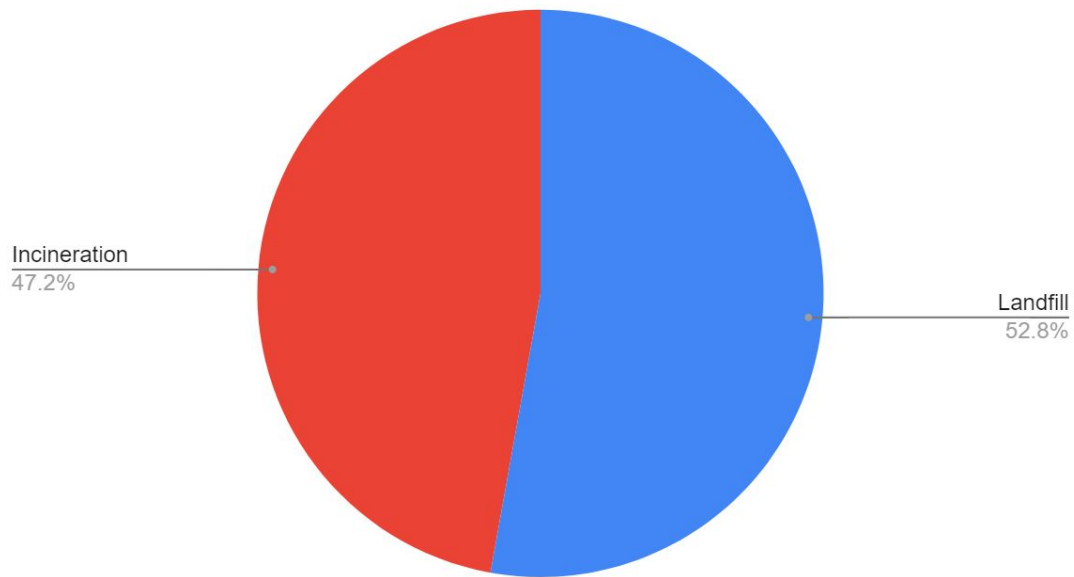
The clean syngas is then passed through a Fischer-Tropsch reactor where catalysts allow the carbon monoxide and hydrogen rich syngas to form long hydrocarbon chains creating synthetic crude. This is then cooled and fractionally distilled into renewable diesel and naphtha.



# Problem Statement

*Reducing landfill and incineration reduces greenhouse gas emissions, whilst creating renewable fuels*

## Non Recycled Waste 2022, 26.5m tonnes



Half a billion litres of renewable diesel



2.1 Mega tonnes of renewable hydrogen



# Progress

*Waste gasification and Fischer-Tropsch synthesis are commercially active technologies, but our goal of making fully circular processes and products is a new frontier*



# Customers

*Many stakeholders and future waste processing customers we speak to have carbon pledges in place and are looking for innovative ways to become nil to landfill organisations.*



# Climate Impact

*By diverting waste from landfills and incineration we are able to support the climate agenda twofold.*





# 1000 kg CO<sub>2</sub>e per tonne

Reducing waste to landfill reduces greenhouse methane emissions produced by  
in-ground anaerobic digestion



# 900 kg CO<sub>2</sub>e per tonne

By reducing waste to incineration, we are able to limit the amount of waste burnt  
for energy

# Sustainable Fuels & Fuel Security

- By making waste circular we can repurpose carbon chains from waste which have already been extracted from fossil fuel deposits and make it into fuel reducing emissions in the refining of fossil fuels and hydrogen
- Renewable diesel such as ours, HVO and FAME are reported to reduce fleet emissions by up to 90% against their mineral diesel equivalents

