

# Biomass & Non recyclable waste Gasification for SAF Production

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**GIDARA**<sup>®</sup>  
ENERGY

## Who We Are

**GIDARA**<sup>®</sup>  
ENERGY

Investment partner



Ara Partners

Technology Investment

600 Million Euro

## Our Technology

HTW<sup>®</sup> Gasification Technology

## What We Do

Licensing & BEDP Packages

HTW<sup>®</sup> Syngas Islands

Advanced Biofuels and  
Biochemical Facilities

# Unlock Potential Of Waste To High Value Products

## Feedstock

Wood  
Waste



Sewage  
Sludge



Municipal  
Solid Waste



Non-Recyclable  
Plastics



Waste  
Paper



Agricultural  
Residue



Construction &  
Demolition Waste

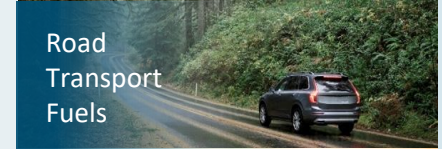


## HTW<sup>®</sup> Gasification



## Sustainable fuels and chemicals

Road  
Transport  
Fuels



Sustainable  
Aviation Fuels



Sustainable  
Maritime Fuels

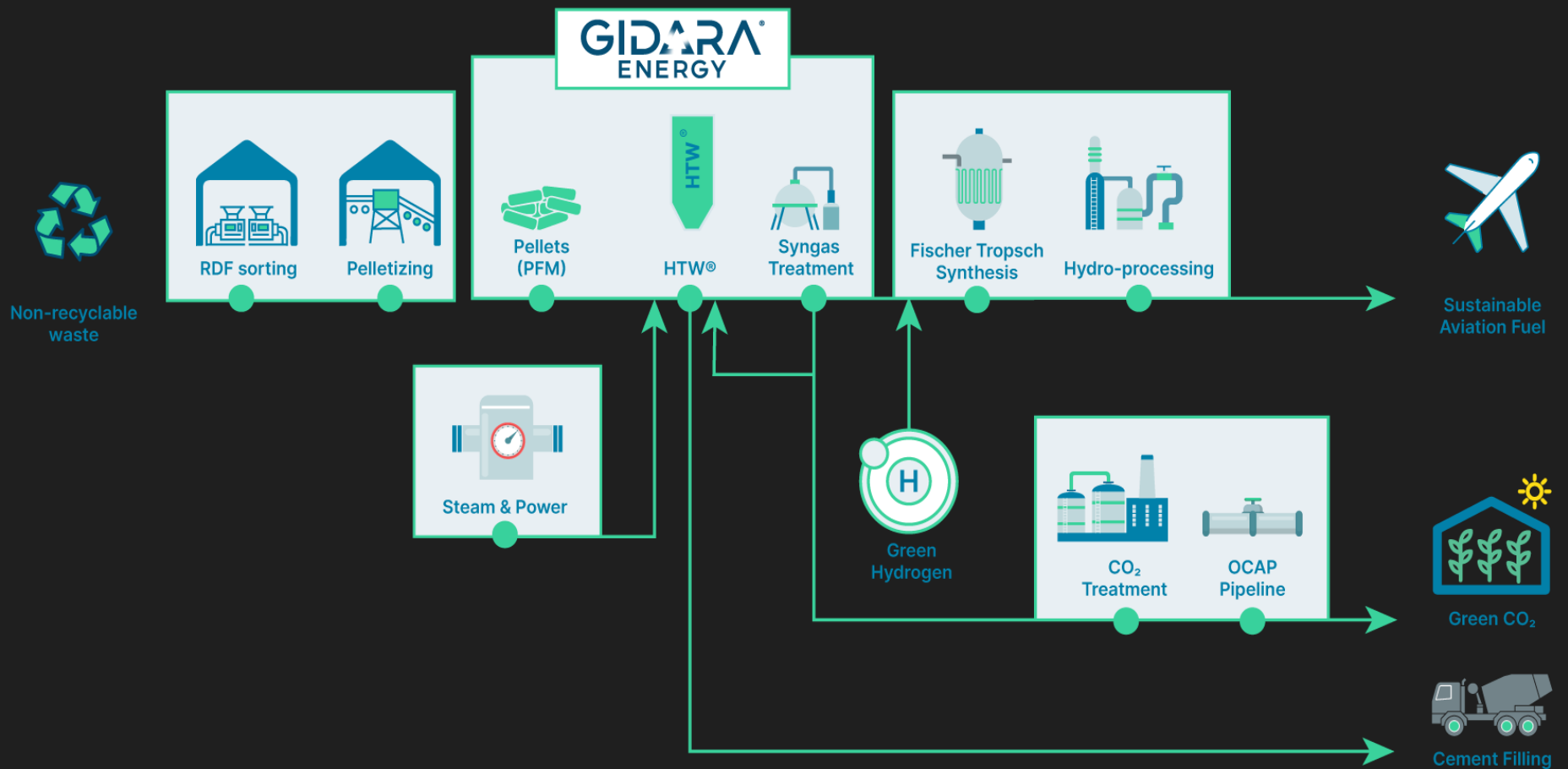


Renewable  
Chemicals

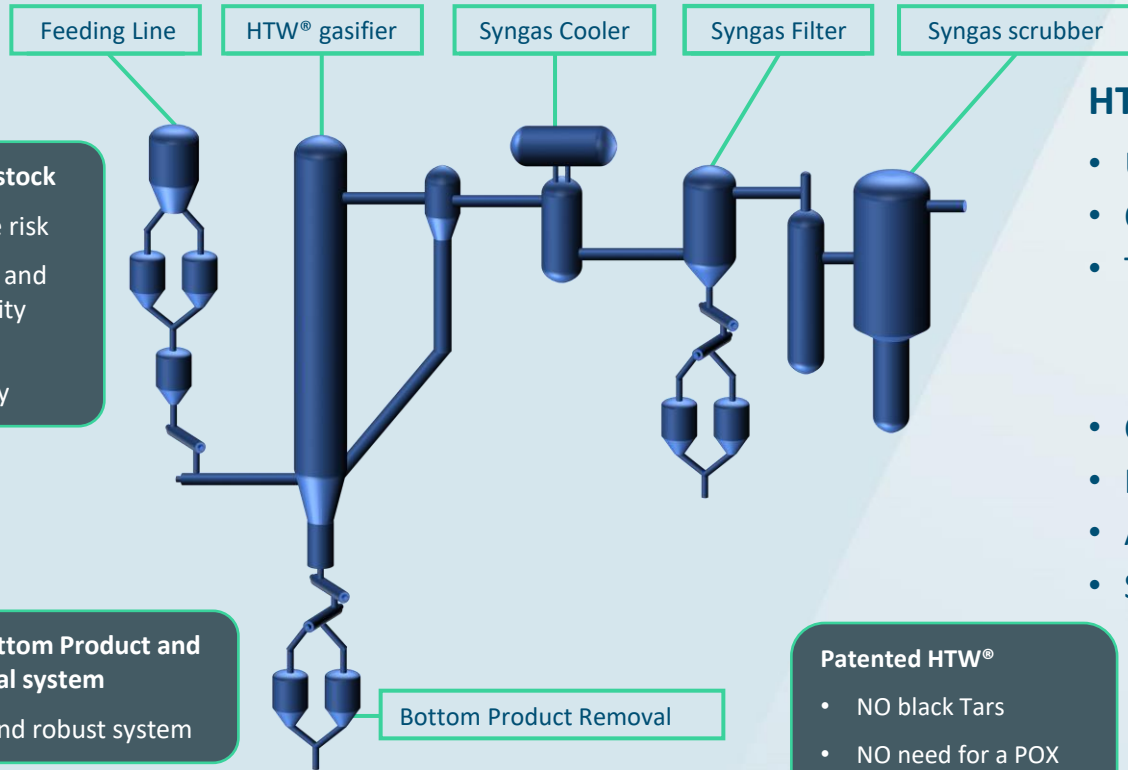


Renewable  
Steel  
Production





# HTW<sup>®</sup> technology: Solves classic gasification challenges



## Pelletized feedstock

- NO blockage risk
- Higher mass and energy density
- Enhance homogeneity

## Feeding, Bottom Product and Dust removal system

- Proven and robust system

Bottom Product Removal

## Patented HTW<sup>®</sup>

- NO black Tars
- NO need for a POX unit

## HTW<sup>®</sup> Fluidized Bed Gasifier

- Up to 30 bar
- Oxy-blown
- Thermal zones:
  - Fluidized Bed: 750 - 1000°C
  - Freeboard: 900 - 1200°C
- Carbon Conversion: over 95%
- High Cold Gas Efficiency: over 85%
- Availability >91%
- Single train capacity up to 1000 TPD



**1970s**  
Rheinbraun & ThyssenKrupp developed the pressurized version of the gasifier known as the High Temperature Winkler (HTW®) process

**Key reference plant**

**1986 - 1997**

**Commercial plant**  
at Berrenrath, Germany

**Input** **Output**  
Methanol

**Purpose/learnings of the plant**

- ✓ Methanol production from syngas
- ✓ Long-term use of RDF + plastic sources, feedstock flexibility
- ✓ Pressure range 10 bar

**1988 - 1994**

**Commercial plant**  
at Oulu, Finland

**Input** **Output**  
Ammonia

**Purpose/learnings of the plant**

- ✓ Produce ammonia from syngas
- ✓ Utilisation of peat and waste wood as feedstock, feedstock flexibility
- ✓ Pressure range 10 bar

**1989 - 1992**

**High pressure plant**  
at Wesseling, Germany

**Input** **Output**  
Syngas

**Purpose/learnings of the plant**

- ✓ Sustainable HTW® gasification operations under 25 bar

**1999 - 2002**

**Demonstration plant**  
at Niihama, Japan

**Input** **Output**  
Syngas

**Purpose/learnings of the plant**

- ✓ Utilizing direct municipal solid waste as feedstock to produce syngas

**Key reference plant**

**2015 - current**

**Demonstration plant**  
at TU Darmstadt, Germany

**Input** **Output**  
Syngas

**Purpose/learnings of the plant**

- ✓ Feedstock testing and continuous research and development on HTW® technology
- ✓ Full production including methanol

- Fossil fuels (coal, lignite)
- Biomass (incl. waste wood)
- Waste

**Today**

Improved to current technological and environmental standards

Implemented advanced design for feeding line, BOP, dust removal system & raw gas cooling system

Higher operational efficiency, optimum heat integration and reduced emissions

Adapted with 100% non-recyclables as feedstock

# Demonstration Plant: Feedstock Testing & Validation



## Long term operation feedstocks:

### Mono gasification:

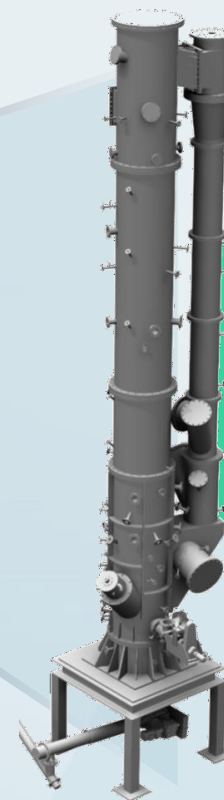
- Waste wood
- RDF
- Sewage sludge

### Co gasification:

- RDF + waste Wood
- Lignite + RDF



HTW® facility at TU Darmstadt  
(Energy Systems and Technology)



**Thermal Input:**  
0,5 MWth

**Operation mood:**  
Oxy-blown

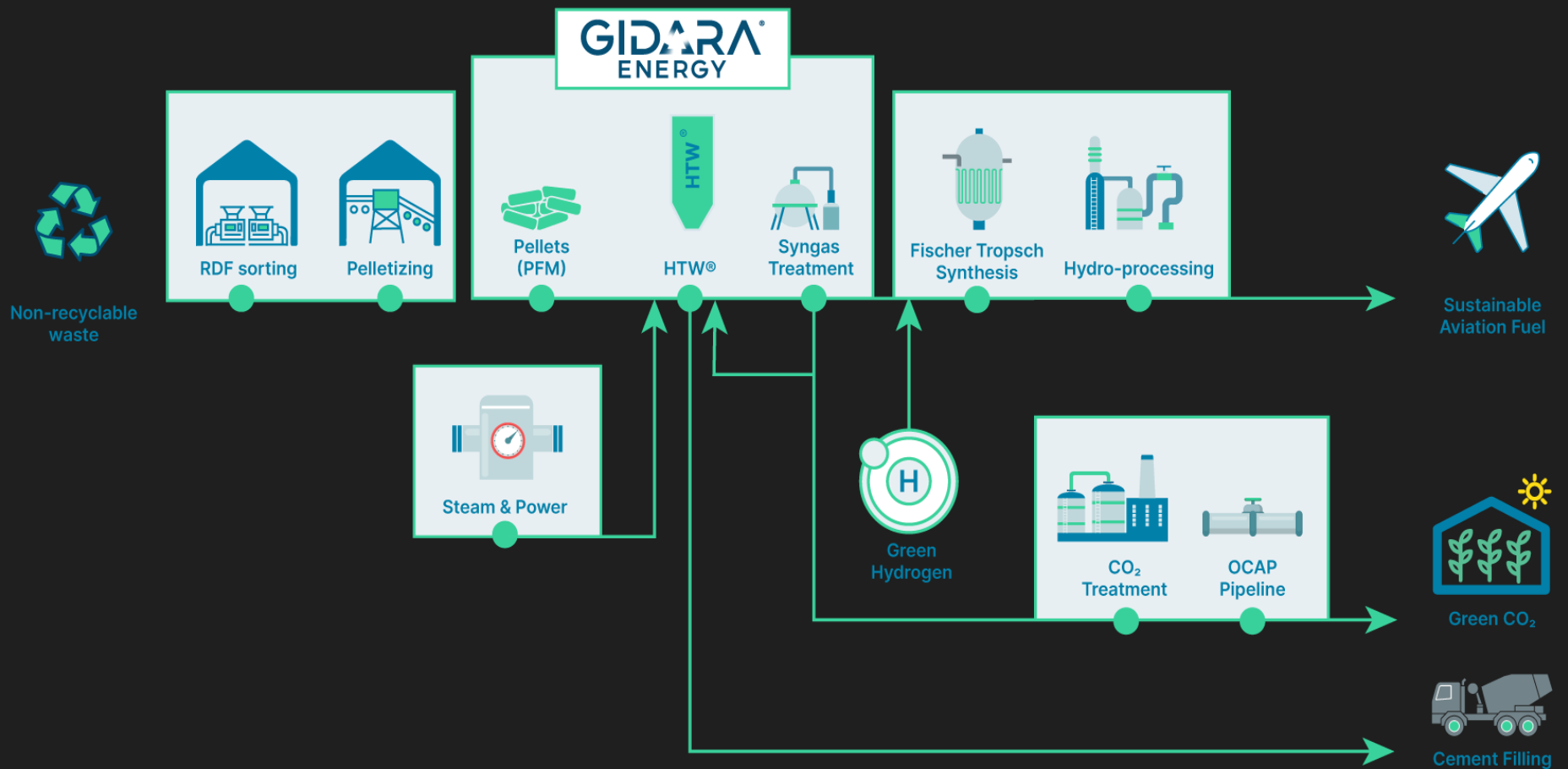
**Operational hours:**  
>2000 hrs

# Advanced Methanol Amsterdam



| # | Interface   |
|---|---|
| 1 | PARO supplying waste wood and RDF                   |
| 2 | Pelletizing Company with conveying line to Gasifier |
| 3 | Methanol  |
| 4 | Blended fuel – RED II requirement for bp            |
| 5 | Dust and bottom product to cement industry          |
| 6 | Linde/OCAP to export CO2                            |





# Key Takeaways



✓ High Feedstock Flexibility  
with Waste Streams

✓ Experience with RDF &  
Biomass feeds



✓ Proven 10 + years of Operation  
at Commercial Scale

✓ Reliable HTW® Technology  
with Operational Availability >  
91%



✓ Cost Advantaged Pathway To  
Sustainable Chemicals And  
Fuels

**Gidara Core knowledge is Syngas from waste streams – Looking for technology & Delivery partners for SAF**

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