

GASIFICATION ACI 2026



WtEnergy HYIELD PROJECT: **GREEN HYDROGEN**

from Biowaste Demonstration Plant





About Us

Founded in 2017, **WtEnergy Advanced Solutions** is a technological company who implements advanced thermochemical conversion technologies to energy from biomass and waste fuels.

WtEnergy proprietary cleantech reduces the greenhouse gases emissions, guarantees the safe management of wastes, allows the recovery of valuable materials, and generate large economic savings for the companies.

Our Shareholders



Suma Capital

COPISA



**Shell
Ventures**

CEMEX
ventures



3 MAIN DRIVING CHALLENGES



DESCARBONIZATION



ENERGY SAVINGS



CIRCULAR ECONOMY

OUR TECHNOLOGY ADDRESSES THESE CHALLENGES DIRECTLY





Industry **Decarbonized** by 2050



-55% CO₂ Emissions



Landfill Reduction below **10%**



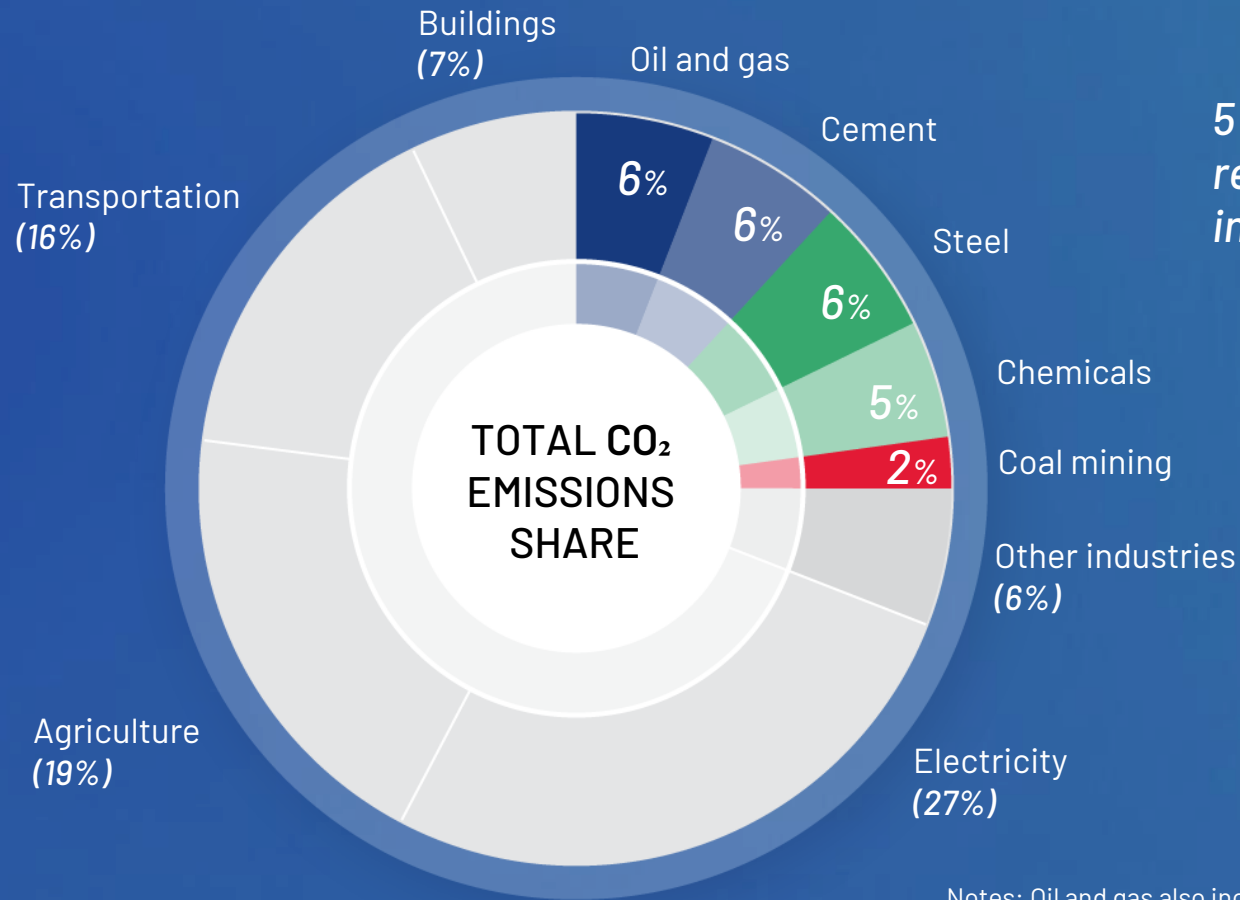
Non-Recyclable Waste for
Energy and Fuels



SYNGAS



WHAT HAPPEN WITH **THE INDUSTRY?**



*5 heavy industries
represent 80% of
industrial emissions*

~~ELECTRIFICATION~~

ADVANCED & AFFORDABLE
CLEANTECH SOLUTIONS

Notes: Oil and gas also includes refining; Steel includes iron; Cement includes concrete.
Source: Breakthrough Energy, Sectoral Analysis, "Emissions breakdown for Manufacturing , by subsector"



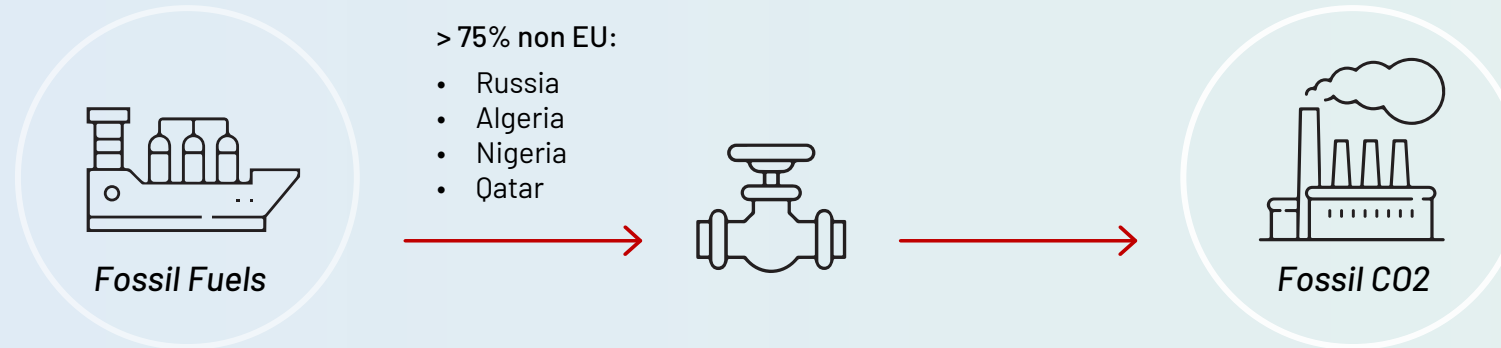


OUR MISSION:

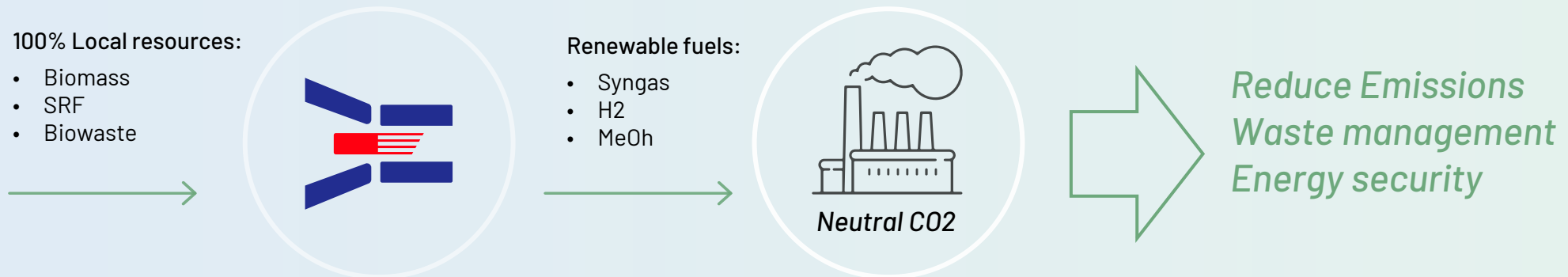
*Substitute Fossil Fuels with Alternative **Renewables Fuels**,
Using Advanced Cleantech Solutions*



CURRENT SITUATION - High intensity energy consumers



FUTURE SITUATION - High intensity energy consumers with **WtEnergy Cleantech**



WtEnergy Cleantech Gasification (patented)

Bubbling Fluidized Bed Gasifier

Waste (SRF)



Biowaste



Biomass

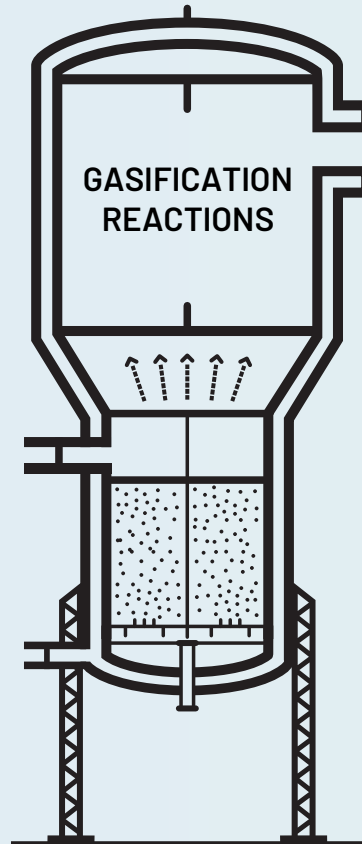


$C_xH_yO_z$

SOLID FUEL

O_2+XX

AIR or STEAM + O_2



SYNGAS

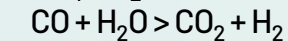
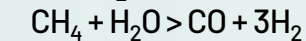
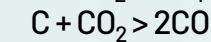
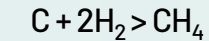
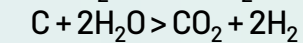
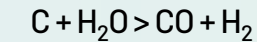
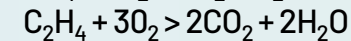
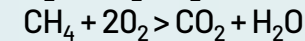
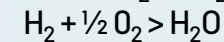
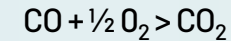
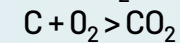
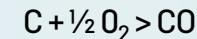
$H_2 + CO + CH_4 + C_2H_4 + CO_2 + N_2 + H_2O + C_xH_y$

GASIFICATION REACTIONS

Oxidation Reactions

+

Reduction Reactions



- In the Gasification Process, only a 20 to 30% of the stoichiometric air is used.
- Reduction and Oxidation reactions occurs simultaneously.



Biomass & Waste Fuels: Low Cost + Circular Economy

With the WtEnergy-AS BFB Gasification Technology, a wide range of solid materials can be valorized:



CLEAN WOODCHIPS • AGRICULTURAL WASTE • DEMOLITION WOOD

REFUSE DERIVED FUEL (RDF) • SOLID RECOVERED FUEL (SRF)

DRY SEWAGE SLUDGE (DSS) • MEAT & BONE MEAL (MBM)

POULTRY LITTER (PL) • PLASTICS



SYNGAS: APLICACIONES

Industrial fuel substitution & Stand Alone Power Generation

Syngas for Steam Generation and Kilns are the main applications

- Clean WoodChips
- Agricultural Waste
- Demolition Wood
- Refuse Derived Fuel (RDF)

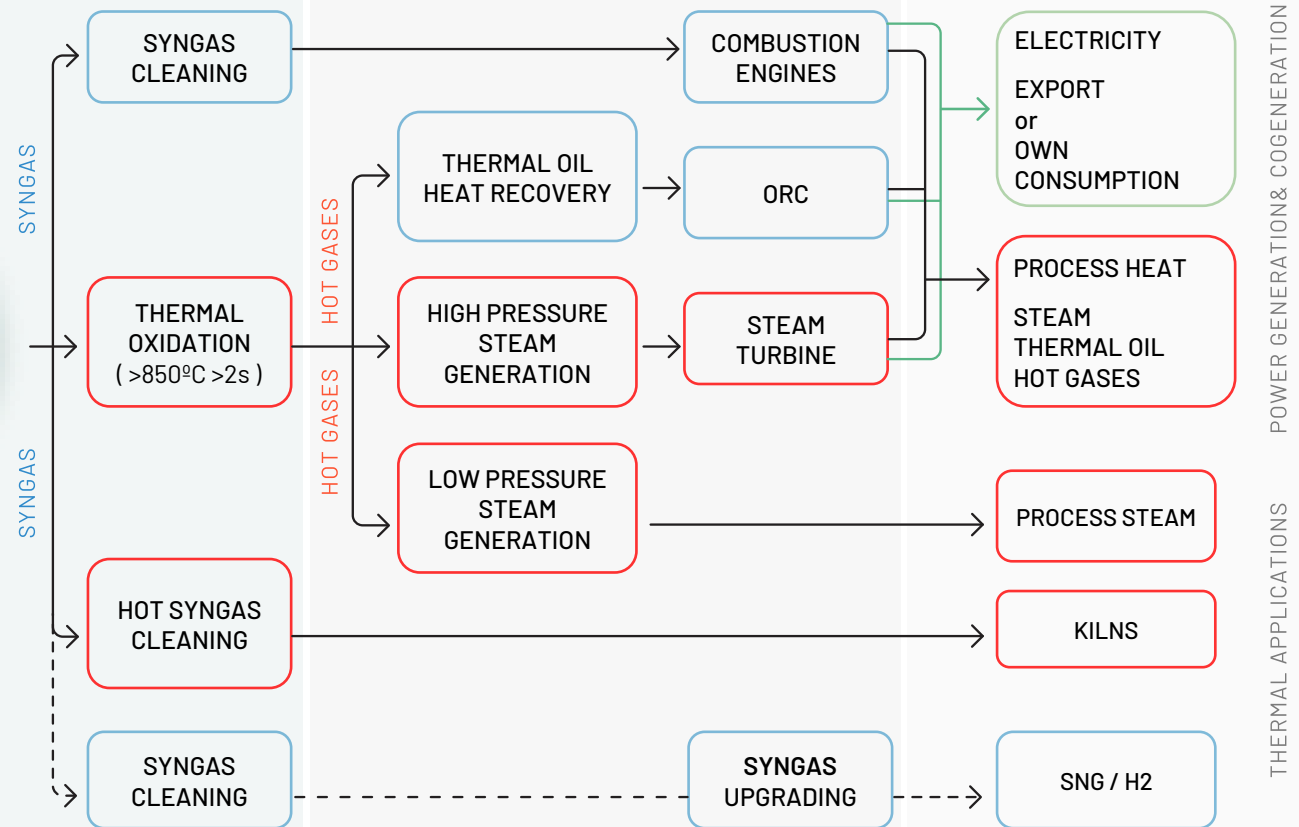
SOLID FUEL



- Solid Recovered Fuel (SRF)
- Dry Sewage Sludge (DSS)
- Meat & Bone Meal (MBM)
- Poultry Litter (PL)
- Plastics

Solid Fuel

WtEnergy Cleantech



Reference Plants with *Wtenergy Gasification Technology*



SRF Gasifier Plant
30 MWth SYNGAS to Cement kiln. Spain.
Startup March 2026



SRF/Biomass Gasifier Plant
12 MWth SYNGAS to Steam. Spain.
Startup March 2026



MBM Gasifier Plant
25 MWth Steam + 2MWe.
St Langis lès Mortagne France



MBM Gasifier Plant
18 MWth Steam + 2 MWe.
Lyss, Switzerland



MBM Gasifier Plant
16 MWth Steam.
Oporto, Portugal



MBM Gasifier Plant
10 MWth Steam.
Salamanca, España



Wood chips Gasifier Plant
2 MWe CHP.
Zaragoza, España



Wood chips Gasifier Plant
1.6 MWe CHP.
Valencia, España



3 SOLUTIONS GASIFICATION TECHNOLOGY





INDUSTRIAL HEAT

Heat generation for industrial thermal applications and energy production: steam, thermal fluid, hot air, etc.



System Configuration for **Low Pressure Steam** using Waste Fuels

*Biomass Feeding
System*



Gasification System



*Particle Separation
System*



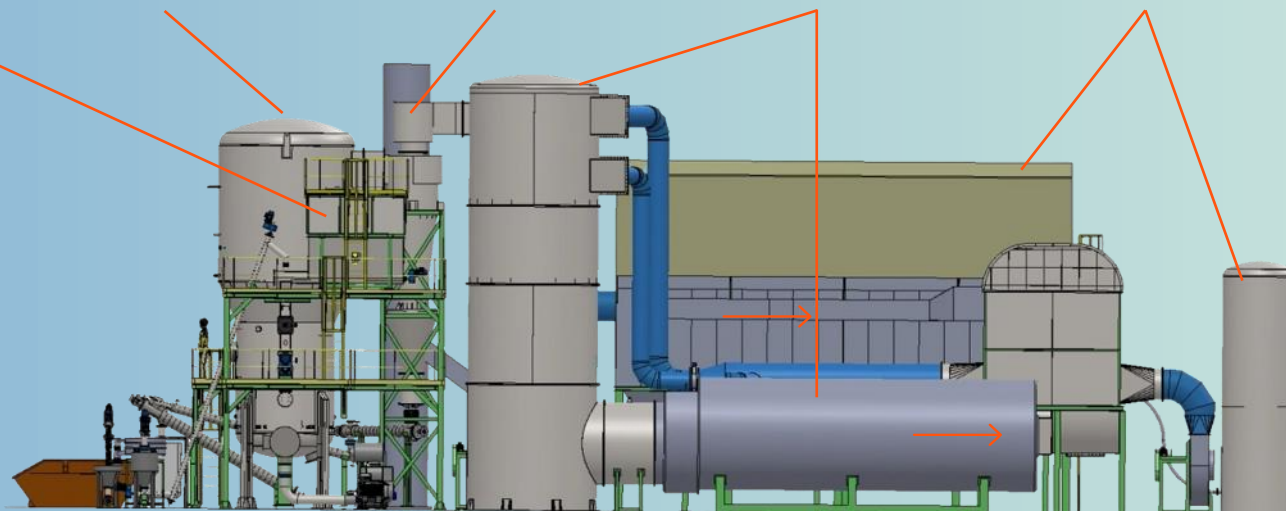
*Thermal Oxidation &
Steam Generation System*



*Gas Cleaning
System*



Control System

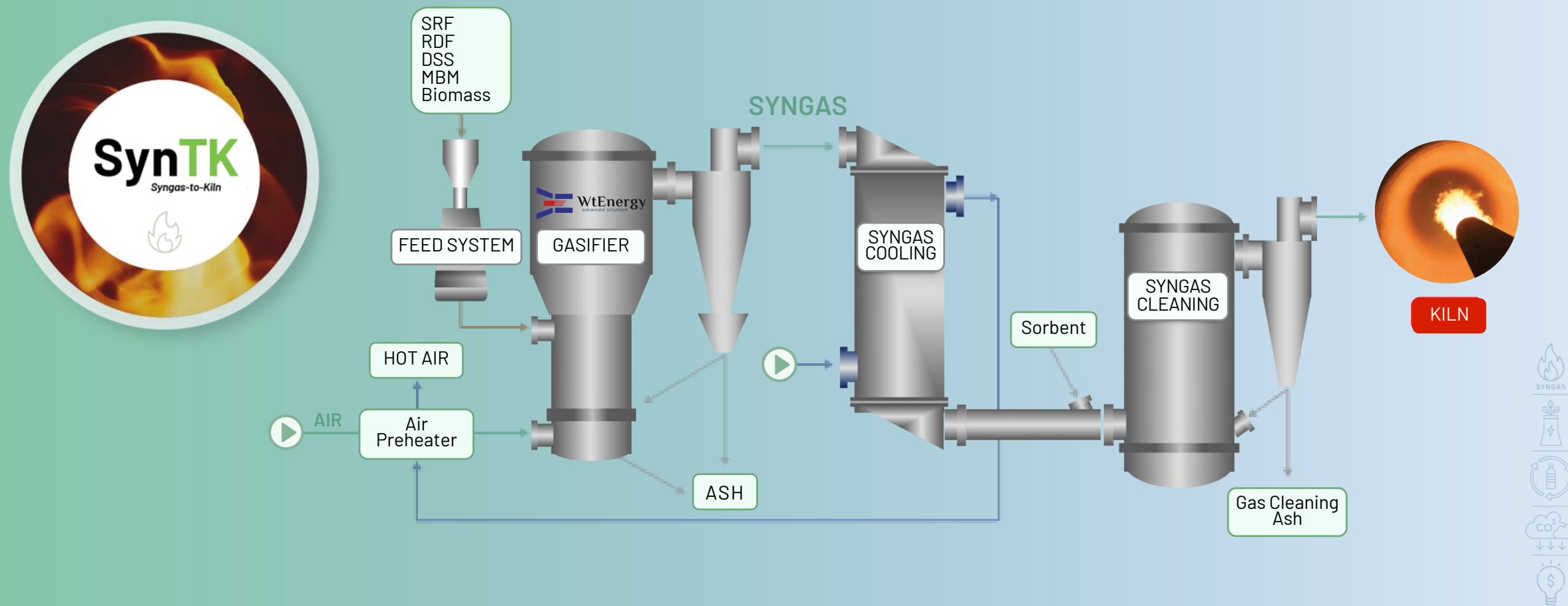




KILNS

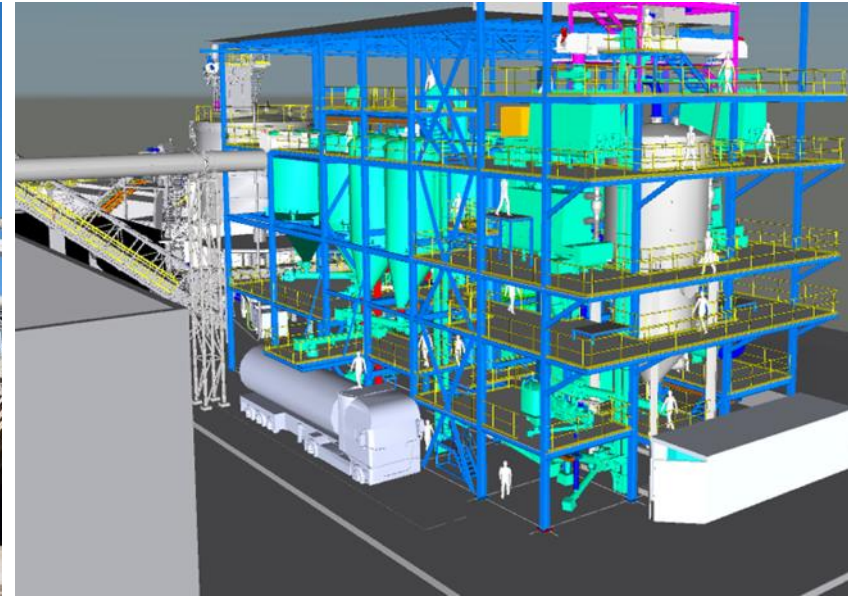
SYNGAS generation, fuel gas for direct application in thermal processes.

Syngas to Kiln





30 MWth FOK SynTK for Cement Industry





SYNGAS FOR H2 AND SYNTHETIC FUELS

Hydrogen and synthetic fuel generation:
After purification, **SYNGAS**, can be
converted into hydrogen, methanol,
ammonia and SAF (Sustainable
Aviation Fuels).

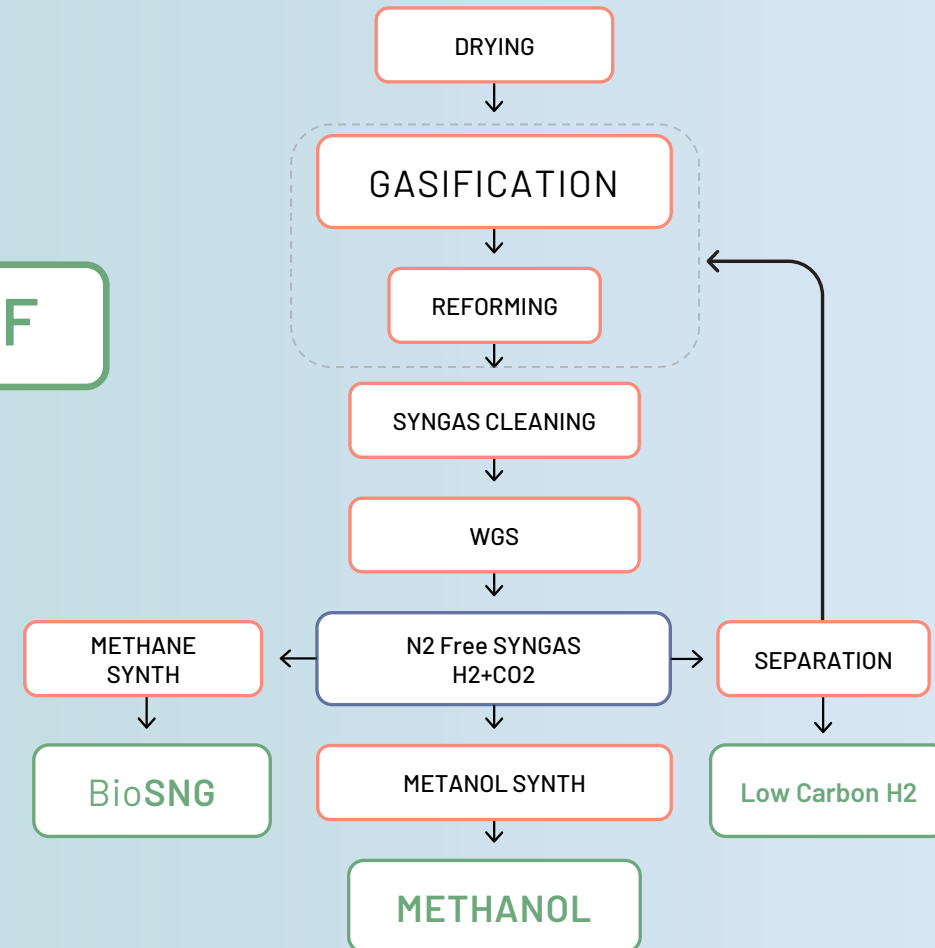


N₂ Free SYNGAS – the Next Applications



Steam multistage gasification of Biomass&waste is one of the most promising options for renewable and low carbon fuels.

The heat can be supplied by either burning part of the fuel (i.e., autothermal steam reforming) or providing external heat at high temperature in allothermal configurations.



BIOWASTE-TO-HYDROGEN: *Demonstration Plant (3MWt)*



400 t
Clean H₂
production
target



>50%
Energy
conversion
Efficiency KPI



<3 €/kg
Levelized
Cost of H₂ KPI



99.97%
H₂ purity
KPI



HYIELD in numbers



48
Months



16
Partners



6
Countries

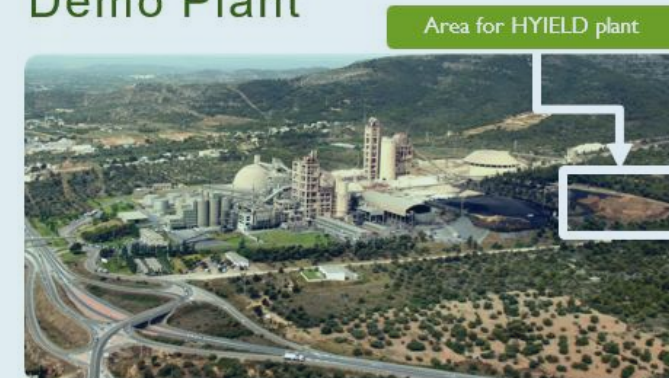


10M€
EU Funding



5,5M€
Private Contribution

Demo Plant



HYIELD consortium has extensive experience in innovation and development in fields including:

- **Researchers' institutions & technology centers**
(EUT, CSIC, SIN)
- **Technology developers**
(WTE, H2S, MAG, MIN)
- **Industrial corporations**
(CMX, ENG, FAR, ARC, SYN)
- **Waste managers as feedstock suppliers**
(VEOLIA, CET)
- **Engineering and strategy consultancies**
(ARIS, INV)

SPAIN



GERMANY



LUXENBURG



FRANCE



NORWAY



The HYIELD project will deploy a robust multi-stage steam gasification and gas separation process



Feedstock flexibility: Variety of feedstocks may be used, including waste materials and agricultural residues with complex ash with LHV ranging from **2 to 5 kWh/kg**.



Waste heat exploitation and internal heat recover: Capable of exploiting low and medium **temperature (150-600°C) residual heat** to raise energy conversion efficiency and hydrogen yield.



Low cost: HYIELD has a target LCOH of **< 3 €/kg**, which is around half that achieved by the best electrolyser technology in the market today.



Improved efficiency of energy conversion compared to conventional state-of-the-art gasification processes: Enhanced H₂ yield of over **0.16kgH₂/kg** dry biomass. This is achieved by **maximizing the H₂/C ratio**.



Scalable design: The plant will be designed to be highly scalable, **commercially** viable from **10,000t/year**.



H₂ purity output: The plant will be designed to produce H₂ at **>99.97%** purity via novel membrane reactor that will be used for cement production.

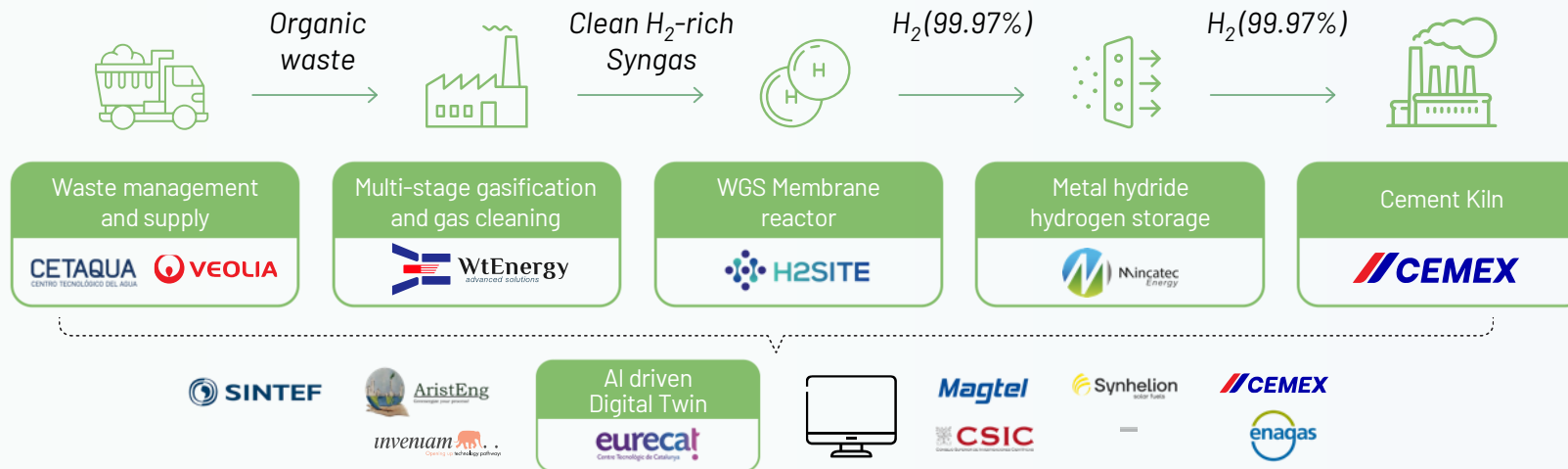


HYIELD Demonstration

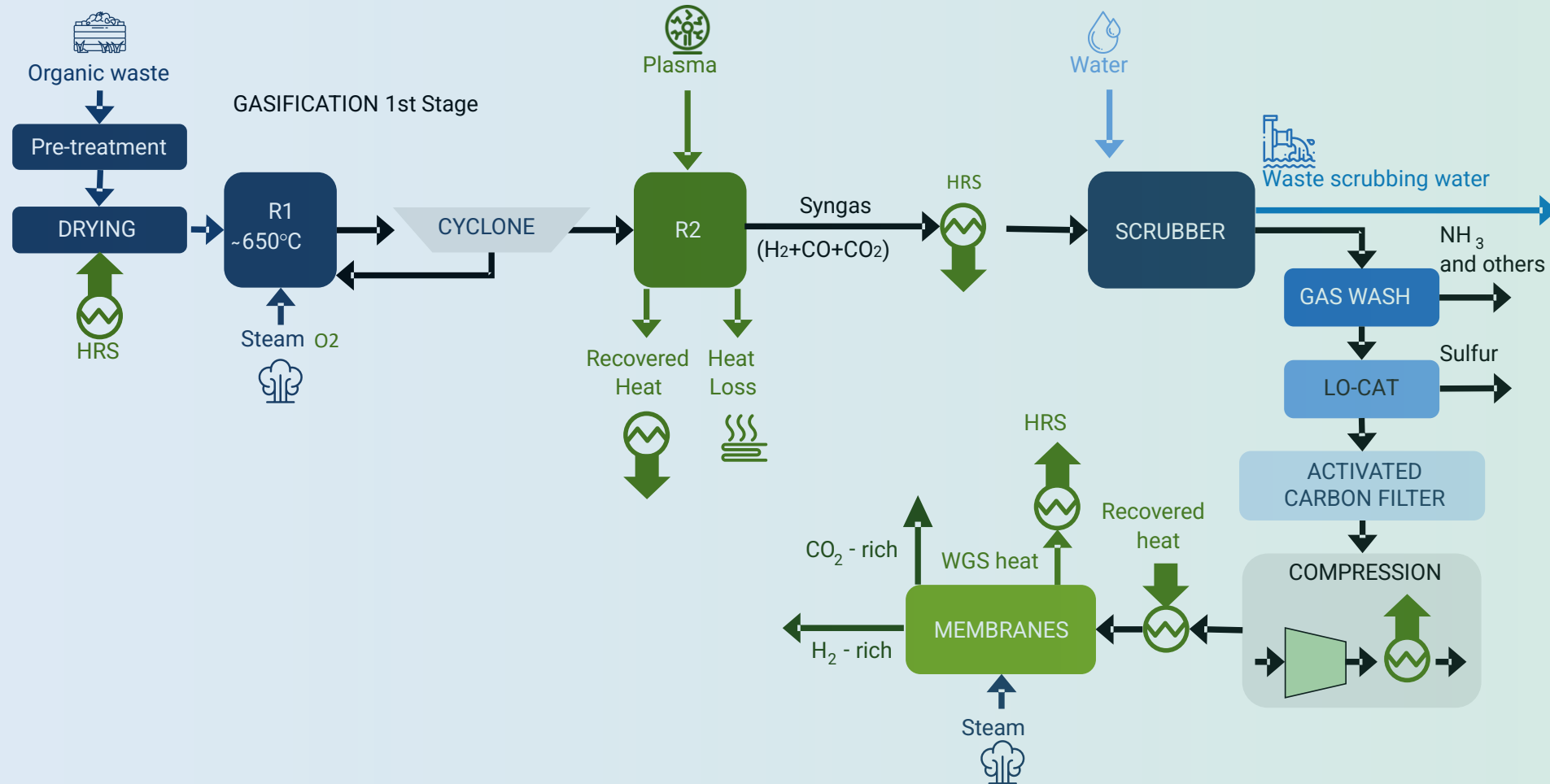
CMX's Alcanar plant located in the south of Tarragona, is the selected location for a demonstration plant. It is well connected by road and operates a port under concession.

The plant has integrated:

- Environmental authorization which includes the use of waste and is ISO 9001, 14001, 45001 and 50001 certified and EMAS registered.
- Various sources of waste heat.
- Industrially kilns with hydrogen injection.
- Possibility of reintegrate ashes in raw materials.



HYIELD Simplified Proces Diagram



HYIELD Expected impacts and yields

DESCRIPTION	WEIGHT	HYIELD	CLEAN HYDROGEN EUROPE (2030)
KPI 1: System carbon yield	kg H ₂ / kg C	0,32	0,32
KPI 2: System capital cost	€/(kg/d)	1,20	1,26
KPI 3: System operational cost	€/kg	0,00512	0,009

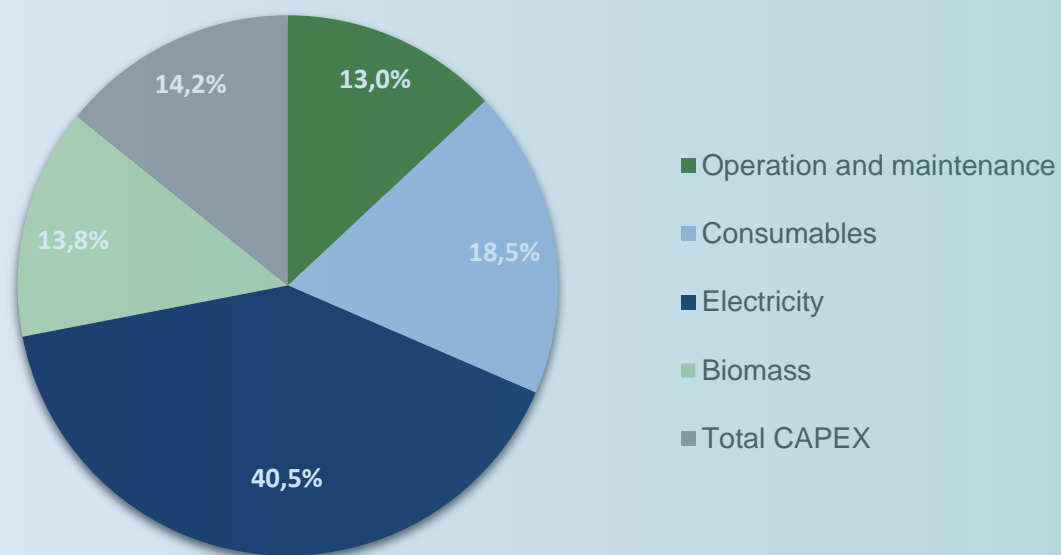
100 kg_{dm} → 14,67 kg of H₂
 160 kg of CO₂

100 kW_t → 91,5 kW of H₂
 40,4 kW_e



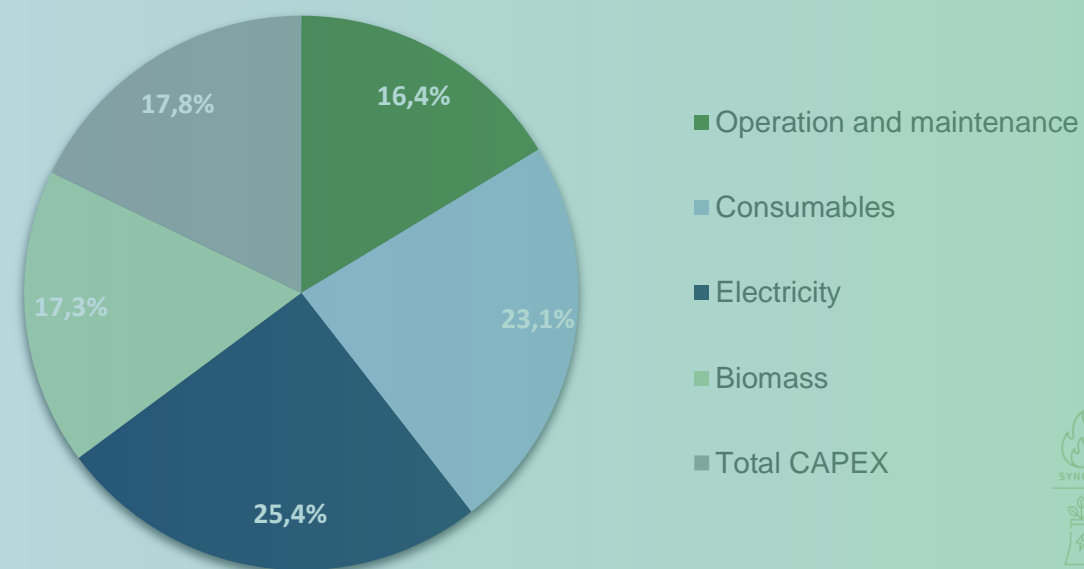
Costs of H2

COST OF ELECTRICITY: 120 €/MWh



The levelized Cost of hydrogen
(LCOH) < 2,9 €/kgH₂

COST OF ELECTRICITY: 60 €/MWh

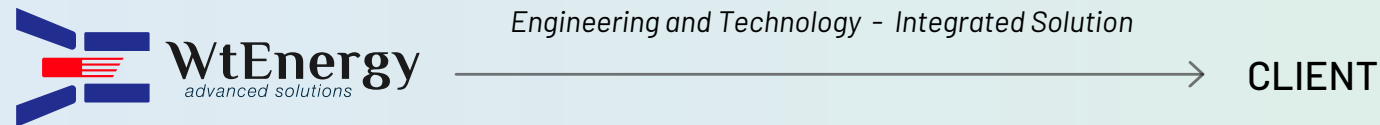


The levelized Cost of hydrogen
(LCOH) < 2,3 €/kgH₂

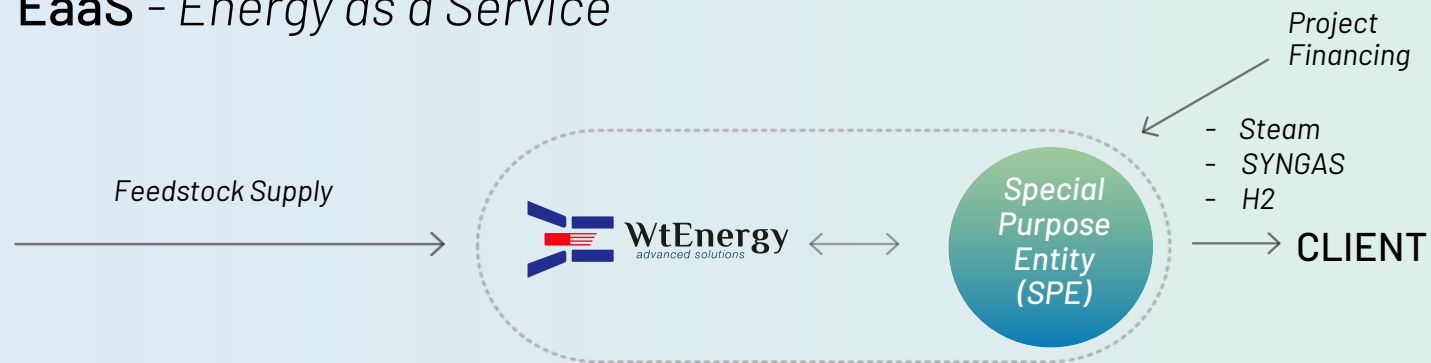


WtEnergy Cleantech – Delivery Options

EPC – Turn Key Project



EaaS – Energy as a Service





TOGETHER TOWARDS ENERGY SAVINGS, DECARBONIZATION, AND CIRCULAR ENERGY





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