WtEnergy
advanced solutions
CleanTech Company

European Commission
Horizon 2020
European Union funding
for Research & Innovation
SEAL OF EXCELLENCE



SYNGAS TO DECARBONIZE THE INDUSTRY

NET ZERO TECH
Foro de la descarbonización mediante eficiencia energética, electrificación con renovables, hidrógeno y biometano

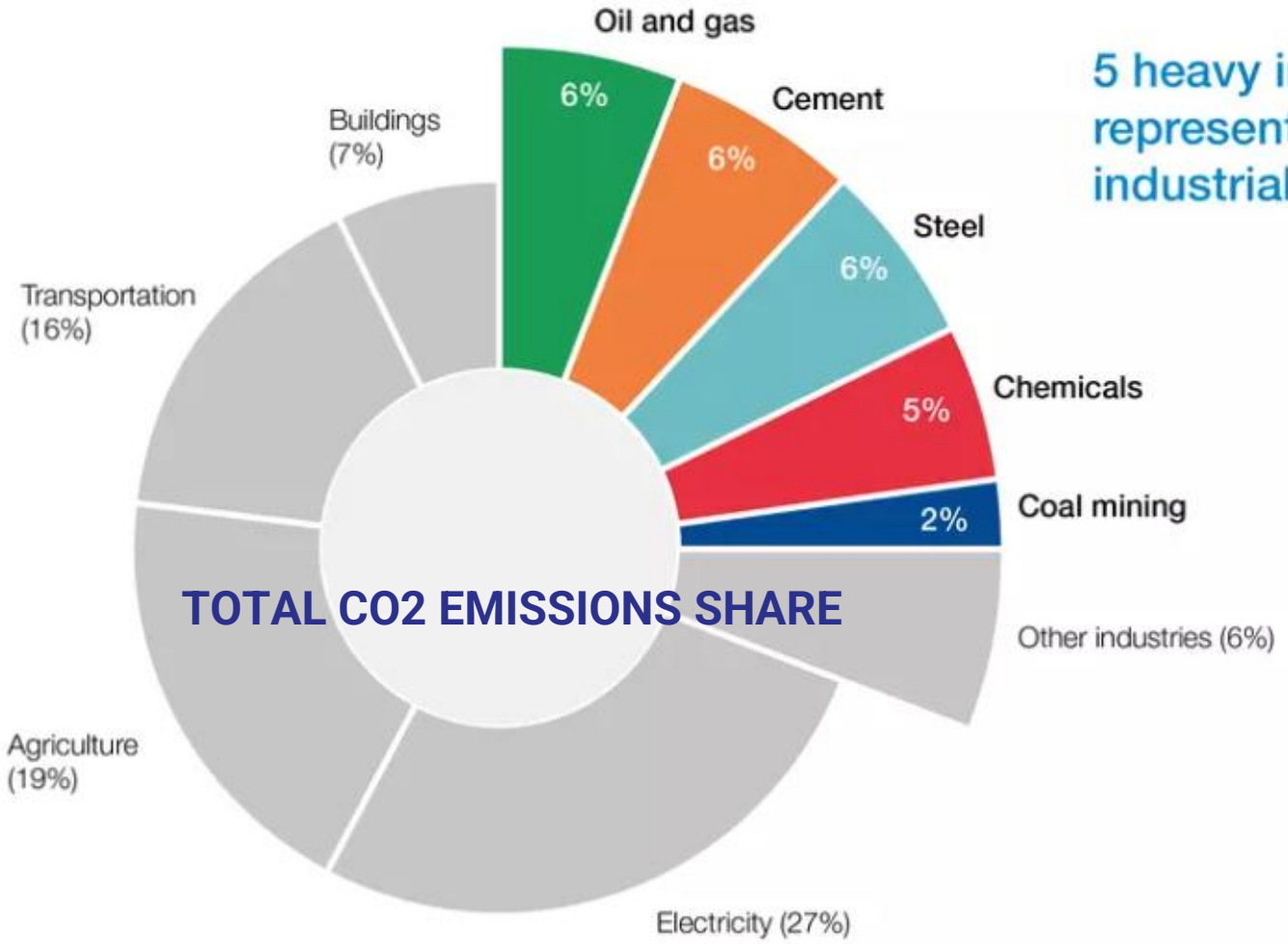
3 MAIN DRIVING CHALLENGES

GLOBAL WARMING

WASTE MANAGEMENT

ENERGY SECURITY

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"

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OUR MISSION: SUBSTITUTE FOSSIL FUELS WITH ALTERNATIVE RENEWABLES FUELS, USING ADVANCED CLEANTECH SOLUTIONS

WtEnergy Cleantech Gasification (patented)

Waste (SRF)

Biowaste

Biomass

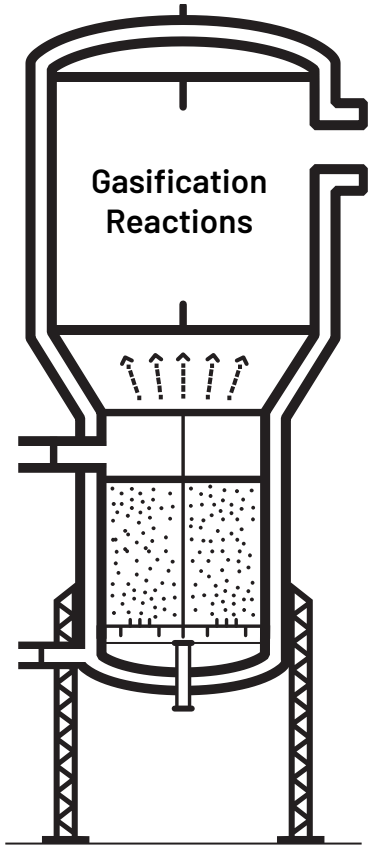
$C_7H_{1.0}O_4$

SOLID FUEL

O_2+3,76 N_2

AIR

Bubbling Fluidized Bed Gasifier



SYNGAS

$H_2 + CO + CH_4 + C_2H4 + CO_2 + N_2 + H_2O + C_xH_y$

GASIFICATION REACTIONS

Oxidation Reactions	Reduction Reactions
$C + ½\ O_2 > CO$	$C + H_2O > CO + H_2$
$C + O_2 > CO_2$	$C + 2H_2O > CO_2 + 2H_2$
$CO + ½\ O_2 > CO_2$	$C + 2H_2 > CH_4$
$H_2 + ½\ O_2 > H_2O$	$C + CO_2 > 2CO$
$CH_4 + 2O_2 > CO_2 + H_2O$	$CH_4 + H_2O > CO + 3H_2$
$C_2H_4 + 3O_2 > 2CO_2 + 2H_2O$	$CO + H_2O > CO_2 + H_2$

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

SOLID FUELS:

- 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)

Syngas Applications

Industrial fuel substitution & Stand Alone Power Generation

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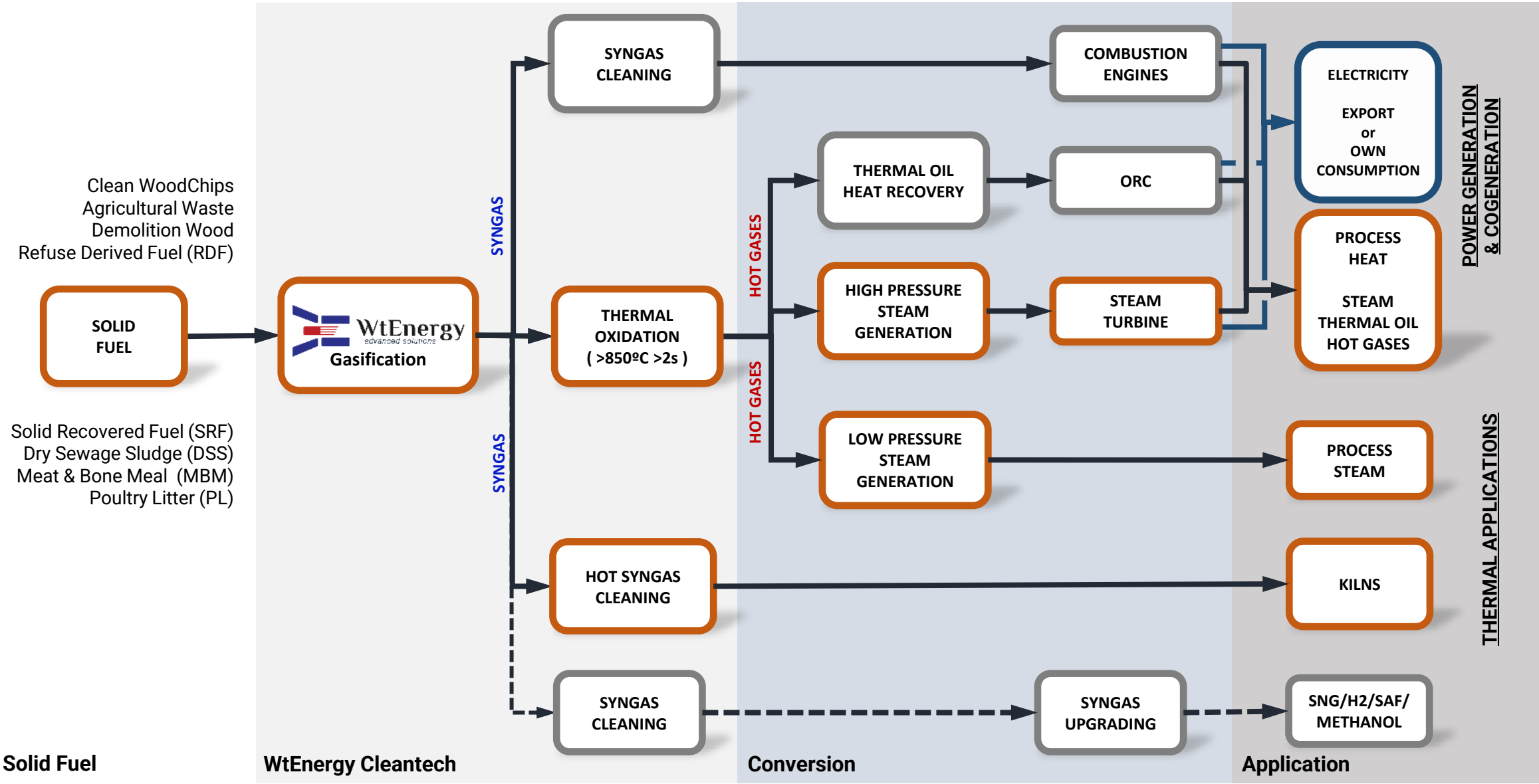
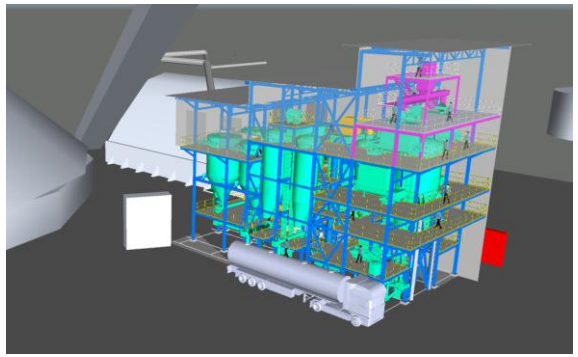
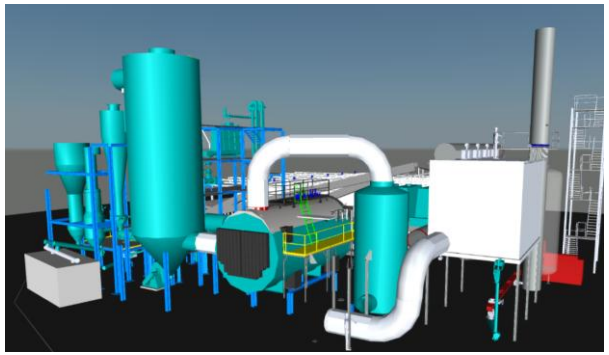


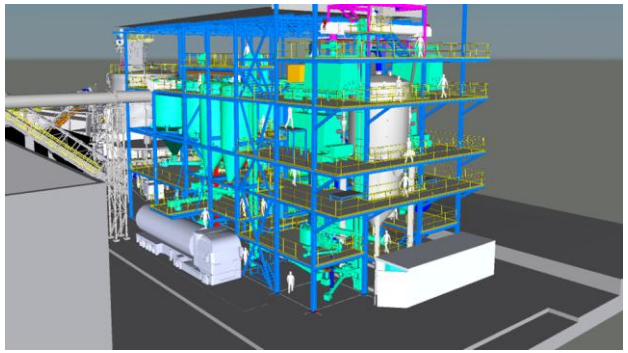
Reference Plants with WtEnergy Gasification Technology



SRF Gasifier Plant
30 MWth syngas to cement kiln. Spain.
Under construction. Startup March 2026



SRF/Biomass Gasifier Plant
12 MWth syngas to steam. Spain.
Under construction. Startup Feb 2026



SRF Gasifier Plant
30 MWth syngas to cement kiln. Spain.
Under construction. Startup Nov 2025

MBM Gasifier Plant
25 MWth steam. St Langis lès Mortagne
France, Under Construction. Startup June 2025

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

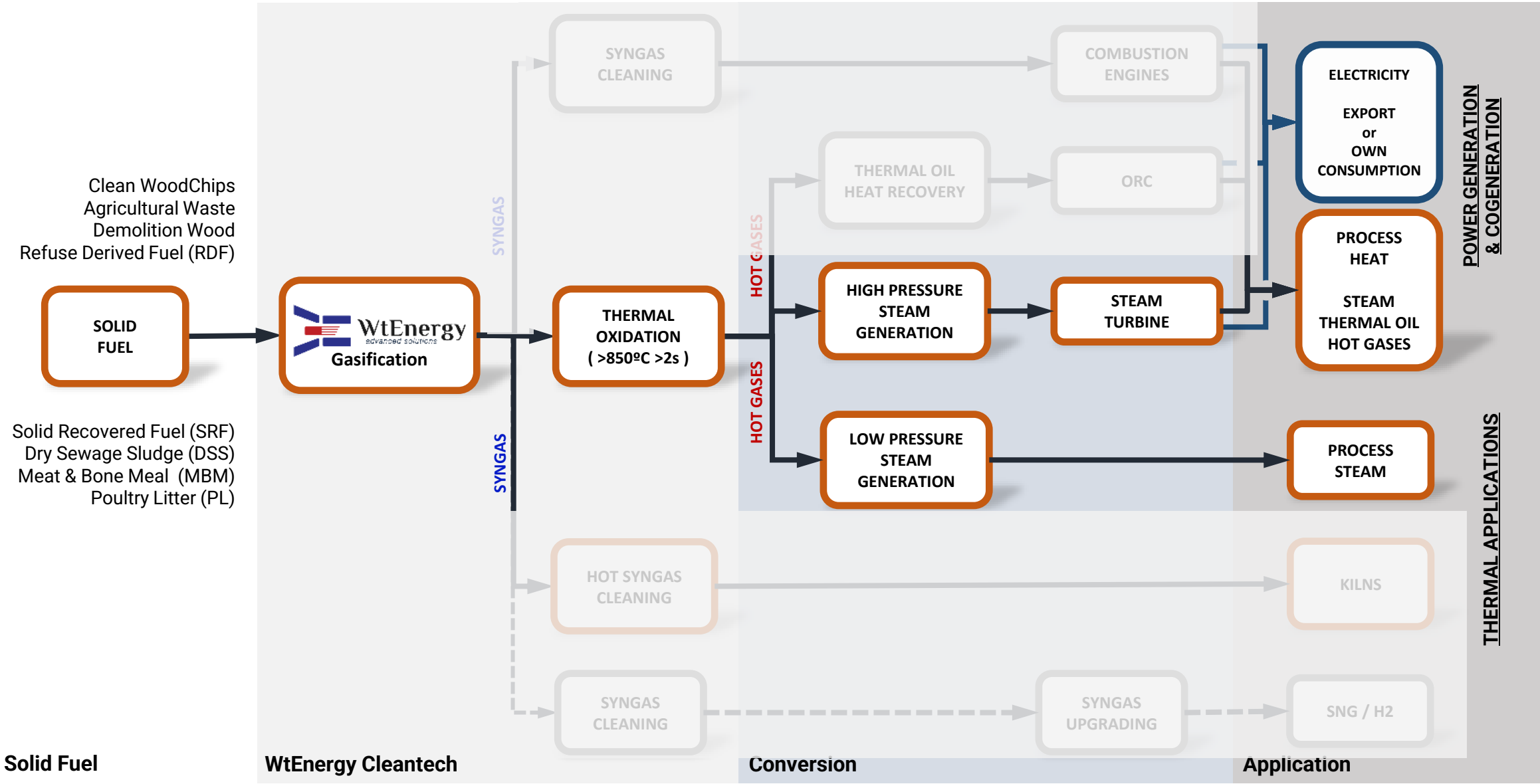
Wood chips Gasifier Plant
2 MWe CHP.
Zaragoza, España

Wood chips Gasifier Plant
1.6 MWe CHP.
Valencia, España

HEAT/STEAM & COGENERATION

Syngas Applications

Syngas for STEAM & COGENERATION



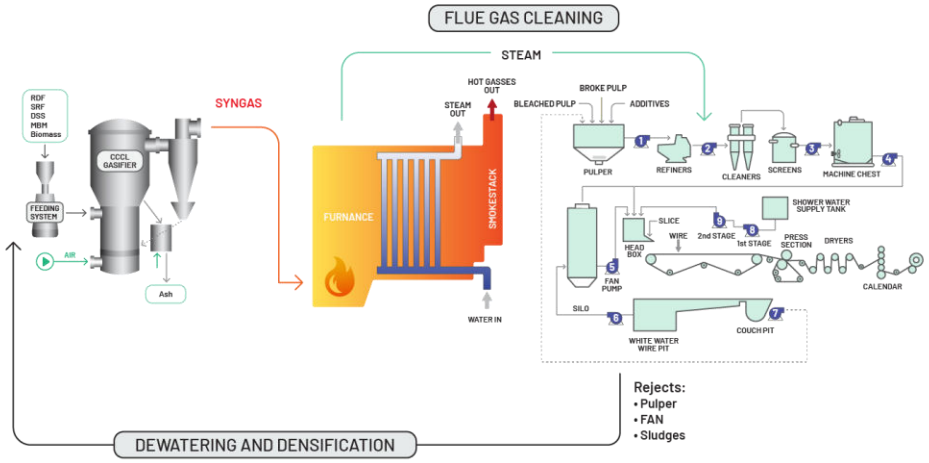
COGENERATION
Refence Case: Lyss Project

Location: Lyss, Switzerland
Startup: 2021
Project Type: Waste to Cogeneration
Thermal Capacity: 18 MWth
Power Generation: 2 MWe
Waste Valorization Capacity: 4 t/h
Waste Fuel: Meat and Bone Meal Cat01
Client type: Industrial
NG Savings: > 100.000 MWh/y
CO2 reduction: > 20.000 t/y

- The Gasification System is fed with Meat and Bone Meal (MBM) produced by the Rendering Plant. This MBM was considered a waste, and with the transformation performed by the WtEnergy Cleantech, the **Syngas from the MBM is currently used to replace the use of Natural Gas** in the production of steam.
- The heat produced is used to supply **steam & electricity** for the production lines of the Rendering Plant, and to generate hot water for district heating.
- The Gasification Module generates18MWth of Syngas to produce **Hot Gases at 1200ºC** from the Therma Oxidizer and used in the high pressure steam boiler.
- Plant efficiency >93% for steam generation.
- The plant adapts the production to the demand required by the steam consumption and hot water from the downstream systems.
- Ash from the process has less than 1% TOC.

STEAM GENERATION
Reference Case: Papermill Project

Location: Spain
Startup: Feb 2026
Project Type: Waste/Biomass to Steam
Thermal Capacity: 12 MWth
Waste Valorization Capacity: 1,5 t/h
Biomass input: 1,5 t/h
Waste Fuel: Pulper reject, sludge & biomass
Client type: Industrial
NG Savings foreseen: > 82.000 MWh/y
CO2 reduction expected: > 10.500 t/y

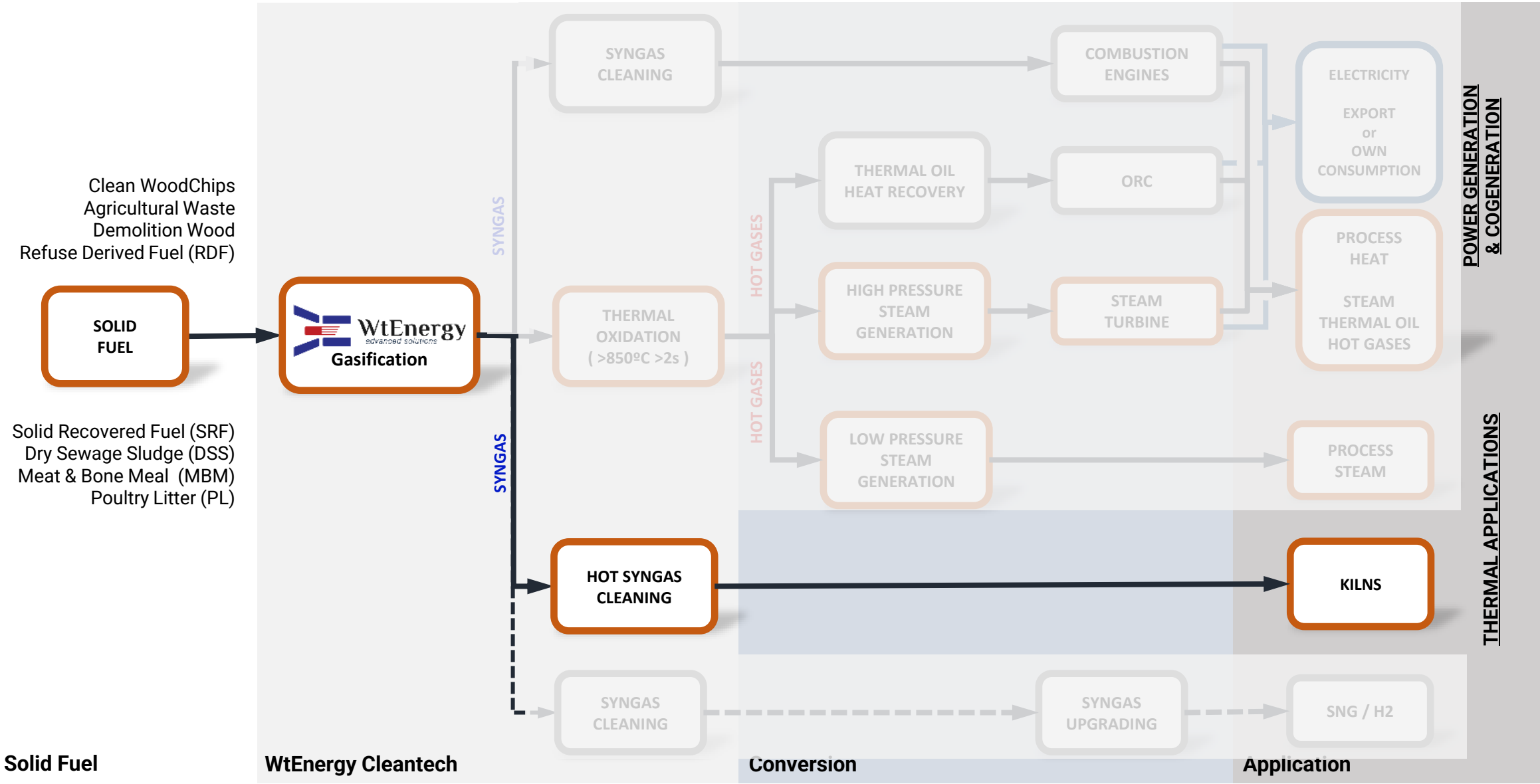


- Use of waste from the same papermill as part of the fuel: pulper reject & wastewater sludge.
- Biomass Integration, achieving a higher CO2 reduction.
- Syngas Production for Steam Boiler, with hot gases over 900ºC.
- Avoidance of Landfill: Instead of disposing waste in landfills, the gasification process allows the plant to divert this waste from energy applications.
- Reduction of Emissions: Gasification helps in mitigating the emission of harmful substances such as furans, dioxins and nitrogen oxides (NOx).
- Plat efficiency > 90% for Steam Generation.
- The plant adapts the production to the demand required by the steam consumption and hot water from the downstream systems.
- Ash from the process has less than 1% TOC.

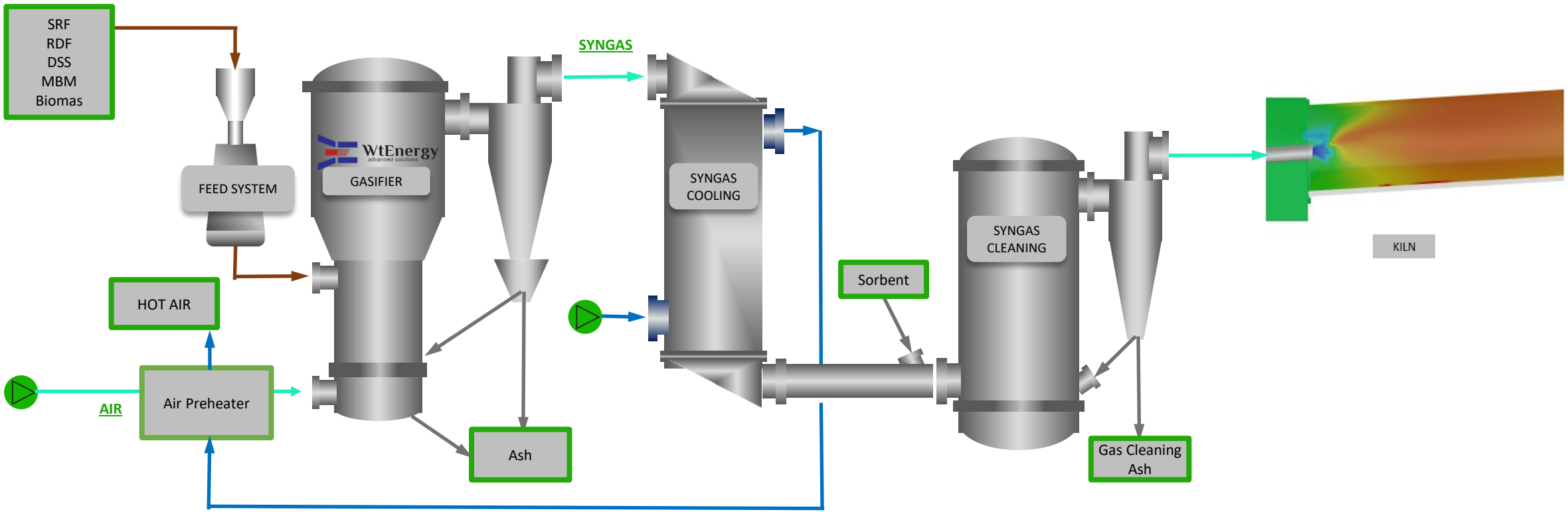

HUGE Potential
in the CEMENT INDUSTRY

Syngas Applications

Syngas for KILNS



Cement production with Syngas – The Process



The use of Syngas in the kiln as an alternative fuel allows:

- Separation de Cl to allow use of high Cl content fuels, increasing the fuel versatility
- Improvement of the combustion cinematics on the kiln burner
- Improvement of the flame control over heterogenous material
- Use of different fuels in the same installation

GREEN FUELS

SYNGAS FOR GREEN FUELS

N2 Free Syngas - the Next Applications

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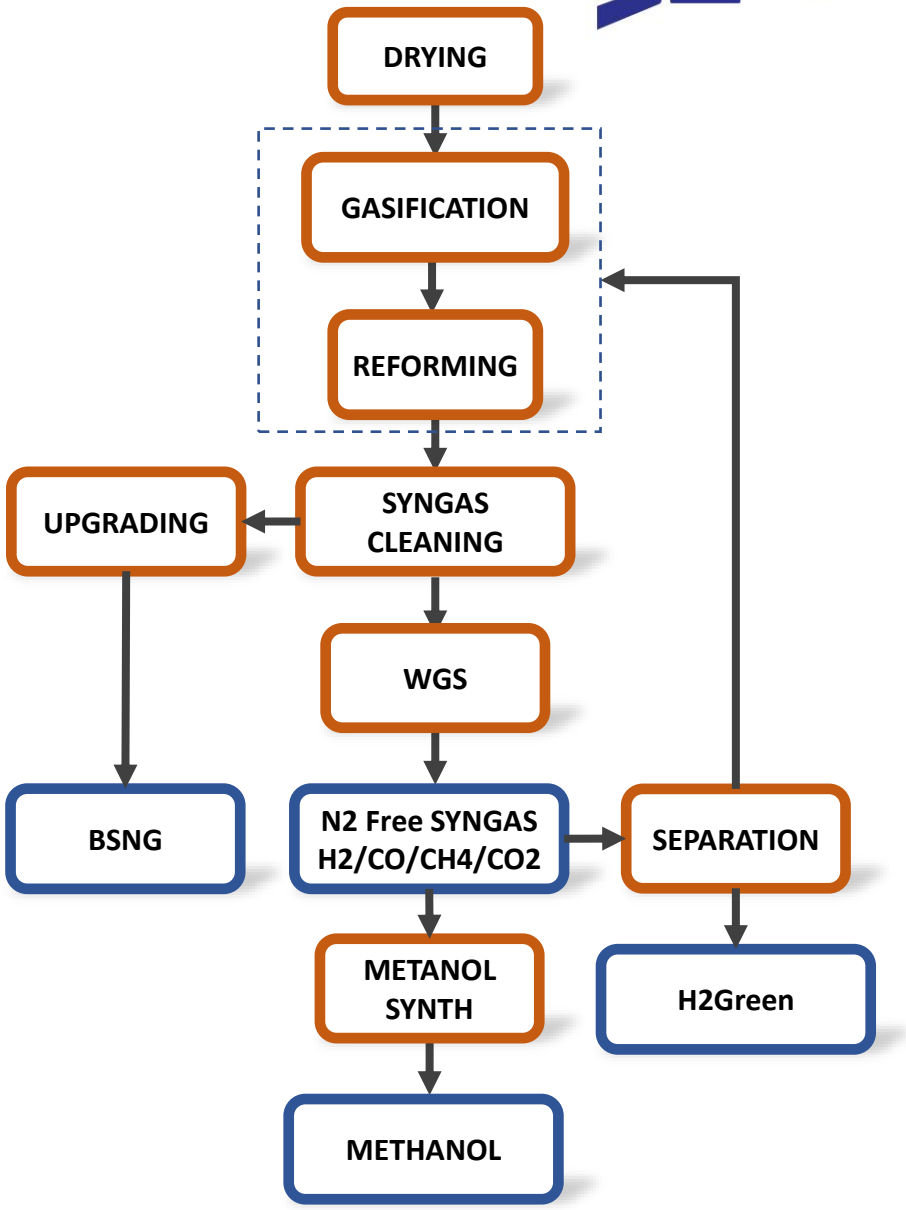
H_2
HYDROGEN

METHANOL

BioSNG

Steam gasification of Biomass&waste is one of the most promising options for renewable gases generation.

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



BioWaste to Hydrogen Demonstration Plant (3MWth)

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Horizon Europe

H2 hyield

400t
Clean H_2 production target

>50%
Energy conversion efficiency KPI

<3€/Kg
Levelized Cost of H_2 KPI

99.97%
H_2 purity KPI

Magtel · CEMEX · VEOLIA · WtEnergy · H2 SITE · Mincatec Energy

eurecat · SINTEF · AristEng · Synhelion · CETAQUA

invenam · LAFARGA · ArcelorMittal · enagas · CSIC

HYIELD in numbers

48
Months

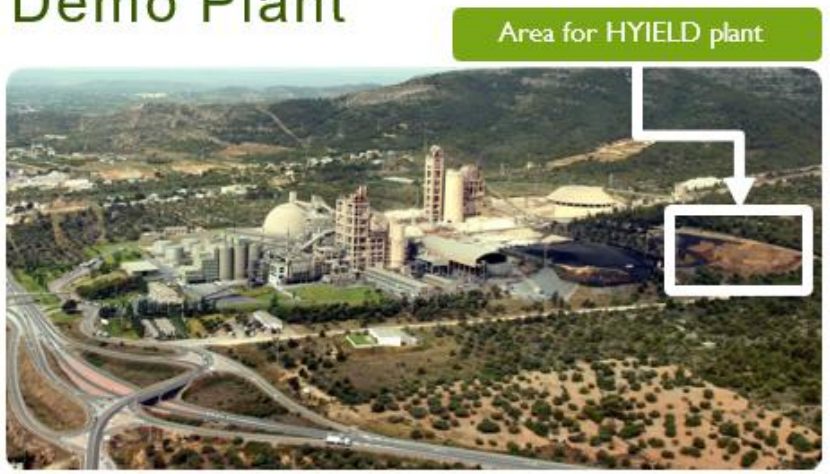
16
Partners

6
Countries

10M€
EU Funding

5,5M€
Private Contribution

Demo Plant



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HELP US DRIVE THE CHANGE!

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