



**“Energy transition, circular economy, agriculture.
Biochar: a challenge for innovation and climate”**

Nicola Ciolini, Alia Servizi Ambientali SpA

WASTE TO CHEMICAL TECHNOLOGY

The «Waste to Chemical Technology» is the innovative integration between proven technologies coming from different industrial field such as:

- ❑ HIGH TEMPERATURE CONVERSION OF WASTE INTO SYNGAS
- ❑ SYNGAS PURIFICATION TECHNOLOGIES
- ❑ CHEMICAL SYNTHESIS

The above technology, for the first time, are integrated in a common architecture able to convert non recyclable waste into a valuable syngas suitable for the synthesis of chemicals and fuel at low carbon footprint. Fuels may be recognized as «Carbon Recycled Fuel» according to the Renewable Energy Directive in full compliance with the EU waste hierarchy management.

HIGH TEMPERATURE CONVERSION OF WASTE



SYNTHESIS OF CHEMICALS AND FUEL

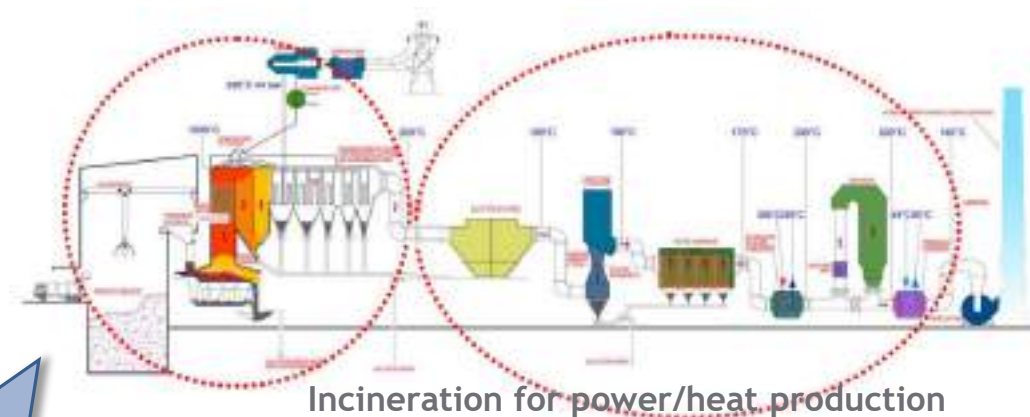


SYNGAS PURIFICATION TECHNOLOGIES



WASTE TO CHEMICAL TECHNOLOGY

The «Waste to Chemical Technology» fully complies with the EU waste hierarchy management.



High temperature conversion of waste into valuable syngas

Disposal in landfill limited at 10% of global waste production within 2035



WASTE TO CHEMICAL TECHNOLOGY HIGH TEMPERATURE GASIFICATION

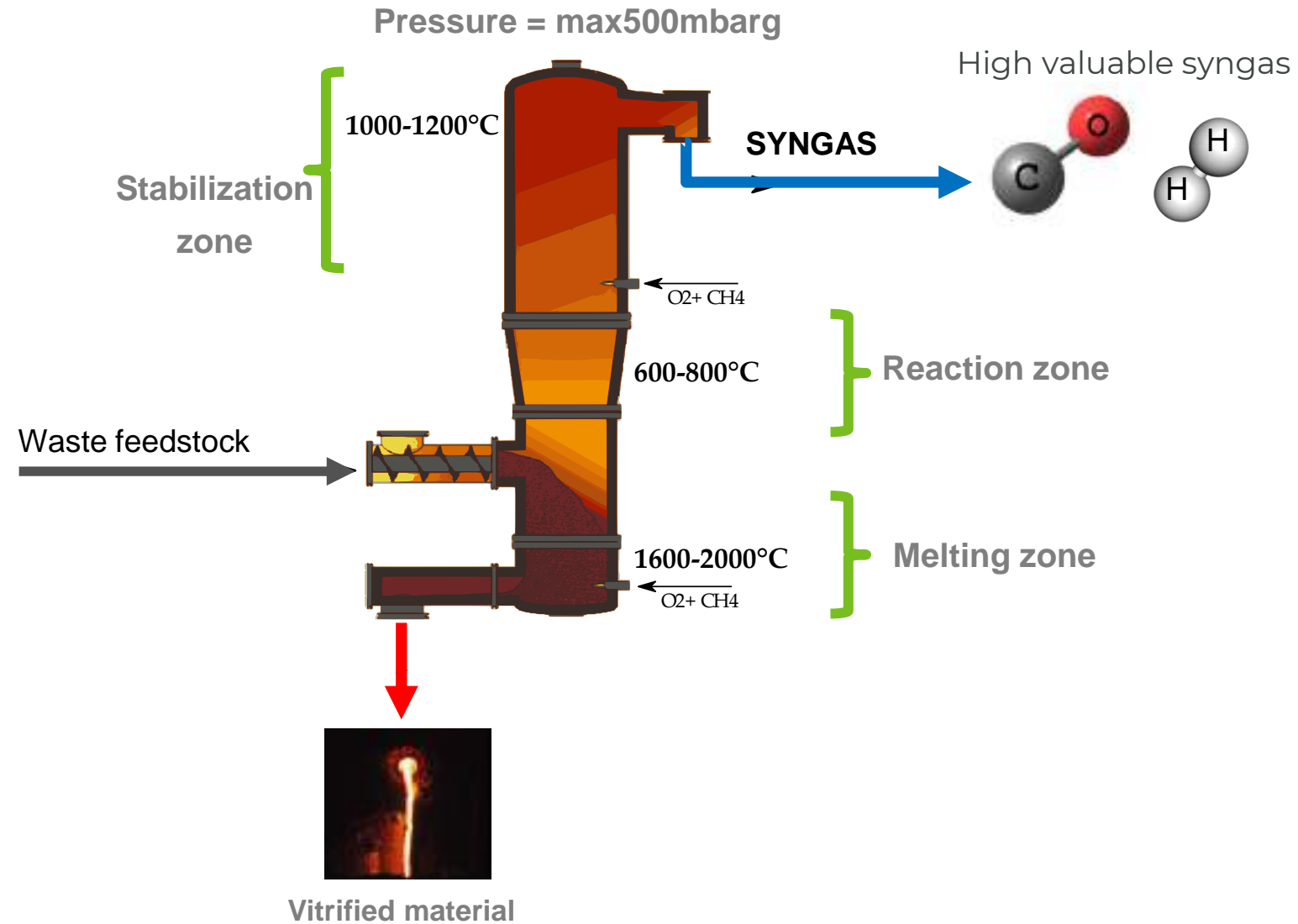


Wide range of waste feedstock:

- ☐ RDF
- ☐ Plastics
- ☐ MSW
- ☐ Industrial waste
- ☐ Sludge

- ☐ Size (95%): 30x30 mm - 200x200 mm
- ☐ Size (100%): 10x0 mm - 250x250 mm

- ☐ LHV wet: 12-18 MJ/kg



High temperature gasification BOTTOM characteristics

Inert fraction available as fully inert and vitrified material



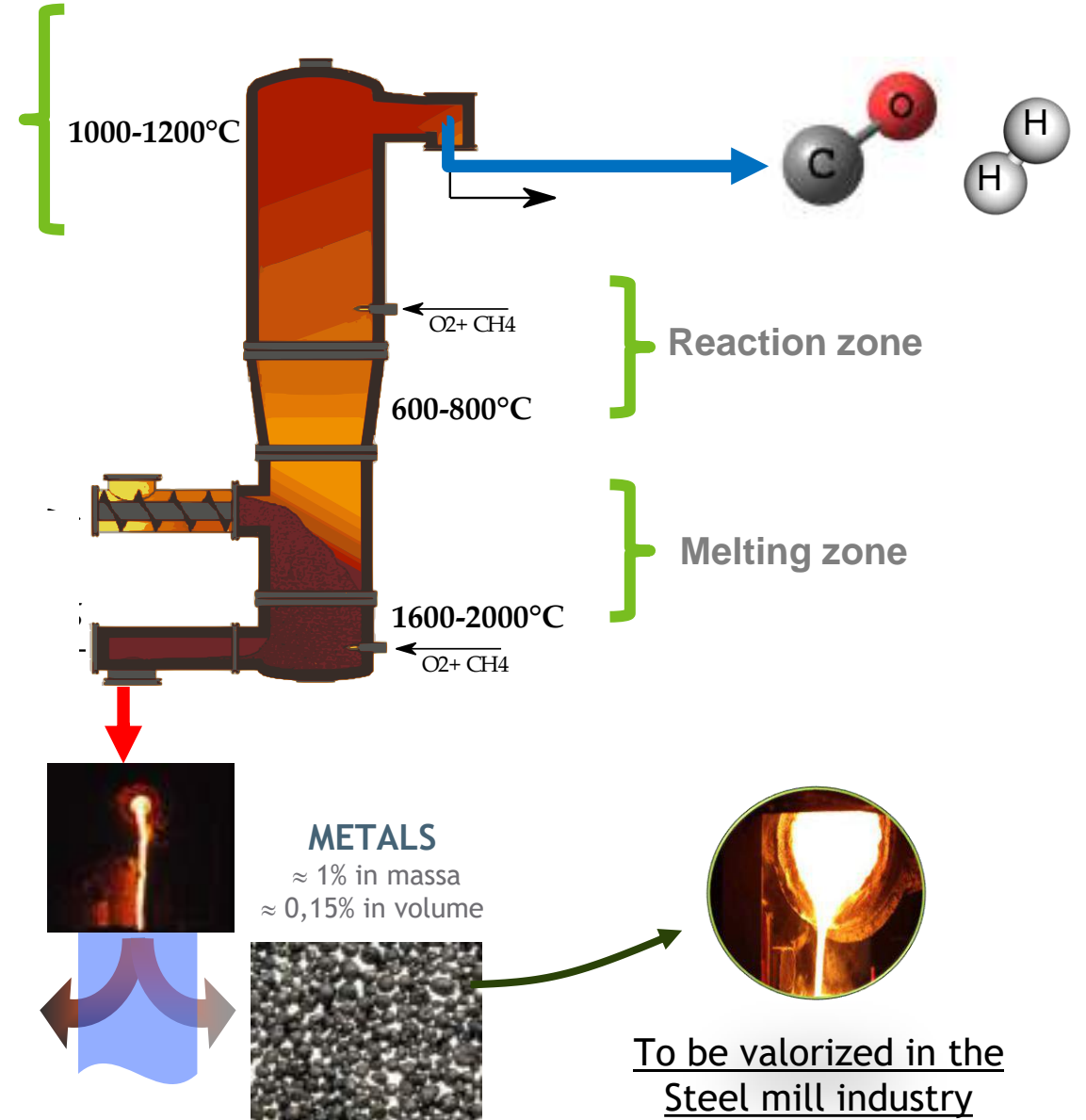
Ceramic industry



Cement industry

INERTS

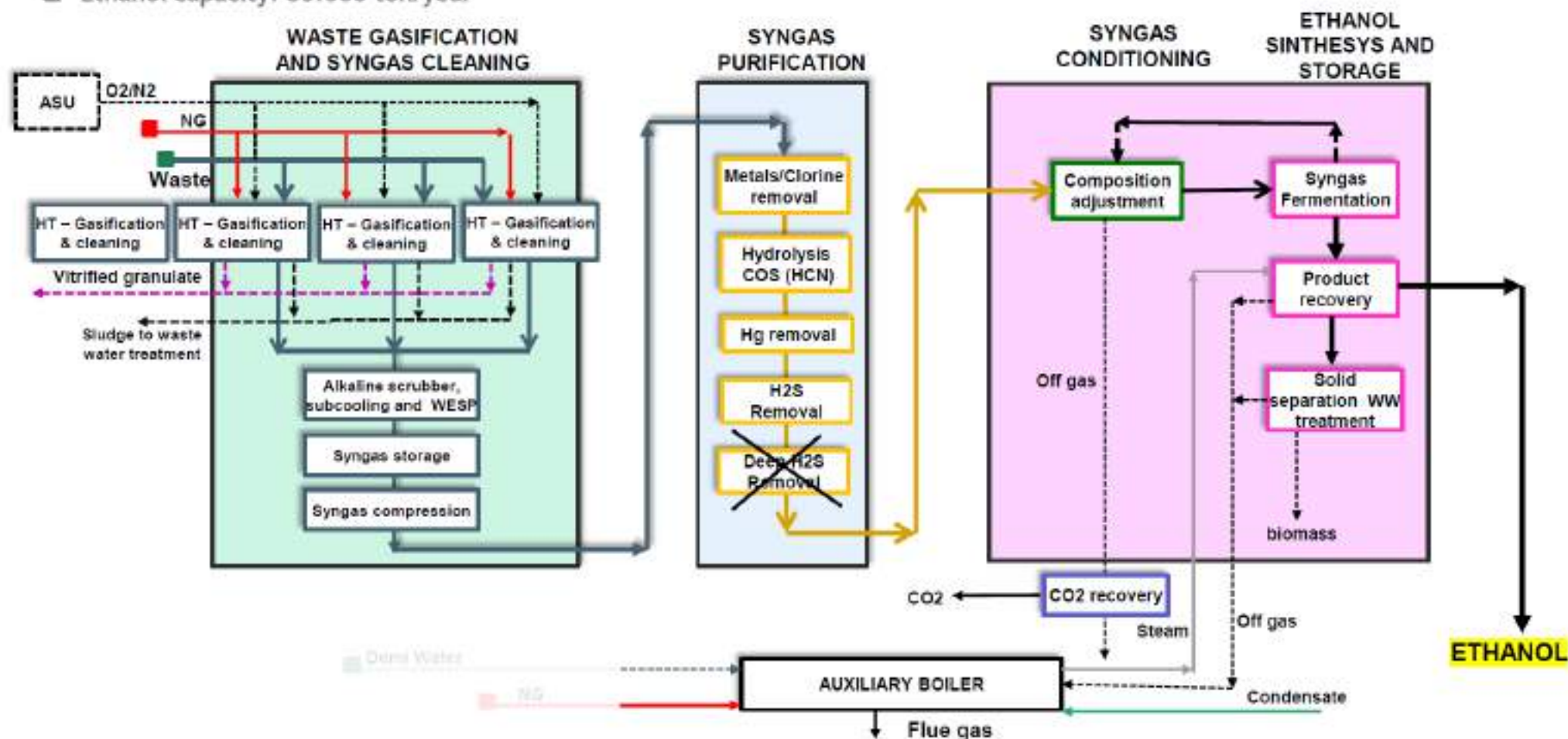
≈ 10% in massa
≈ 1% in volume



WASTE-TO-CHEMICALS

GENERAL PROJECT DESCRIPTION – BLOCK DIAGRAM

- ❑ Waste capacity: 256.000 ton/year
- ❑ Waste characteristics: Residui delle filiere di recupero ALIA/RENET, LHV as = 16-16.2 MJ/kg, % biogenic = 37%
- ❑ Ethanol capacity: 85.000 ton/year



WASTE-TO-CHEMICALS

- The high temperature gasification of waste under an oxygen environment, allows to convert waste into a valuable syngas (mixture of CO, H₂ and CO₂), to be used as building block for the synthesis of a wide range of chemicals.
- By this way Hydrogen and Carbon contained in the waste find a second chance of life.
- Non combustible fraction of waste is converted into a vitrified and inert material suitable to be reused in different field.





CIRCULAR ALLIANCE @ ROSIGNANO - SOLVAY



Project leader +
Waste supplier



Project partner +
Expert as developer of
complex projects sviluppo di



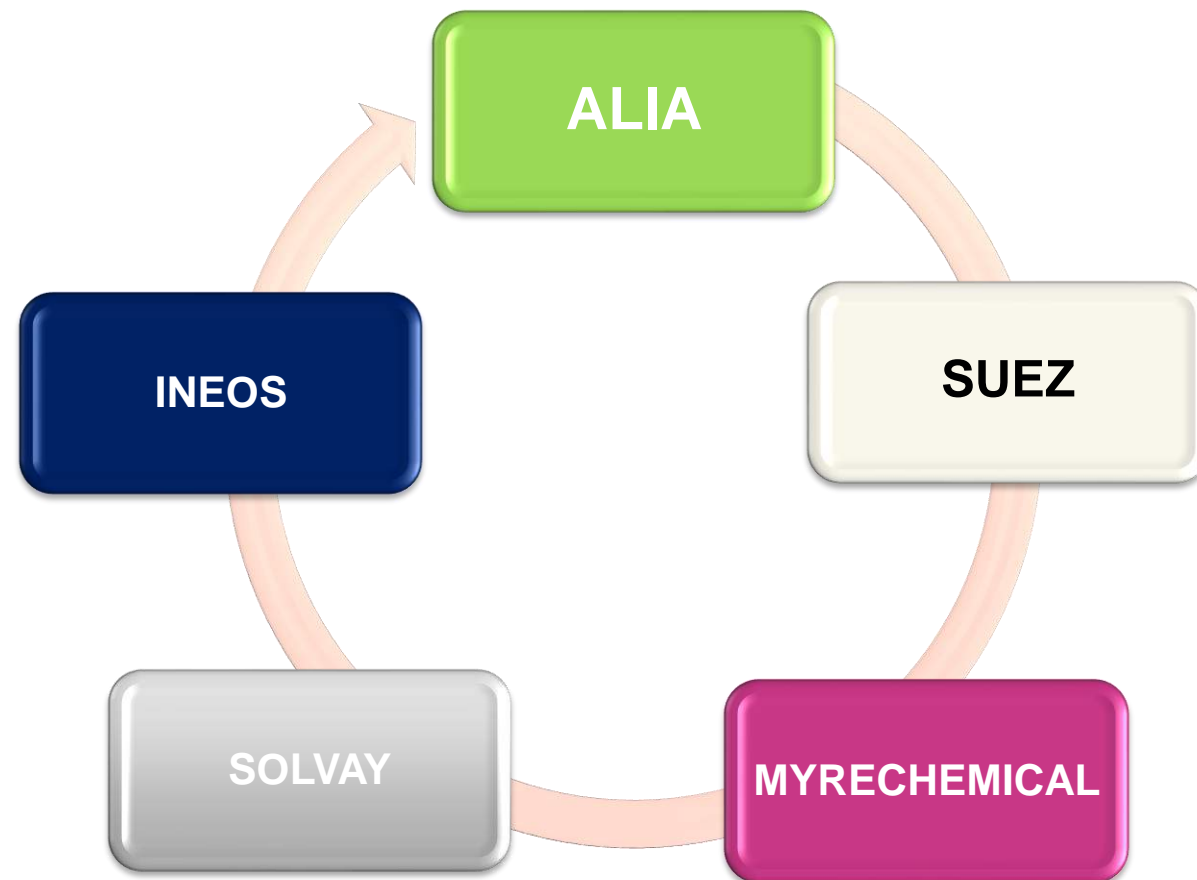
Project partner +
Technology supplier



Sito industriale
Owner of
industrial site

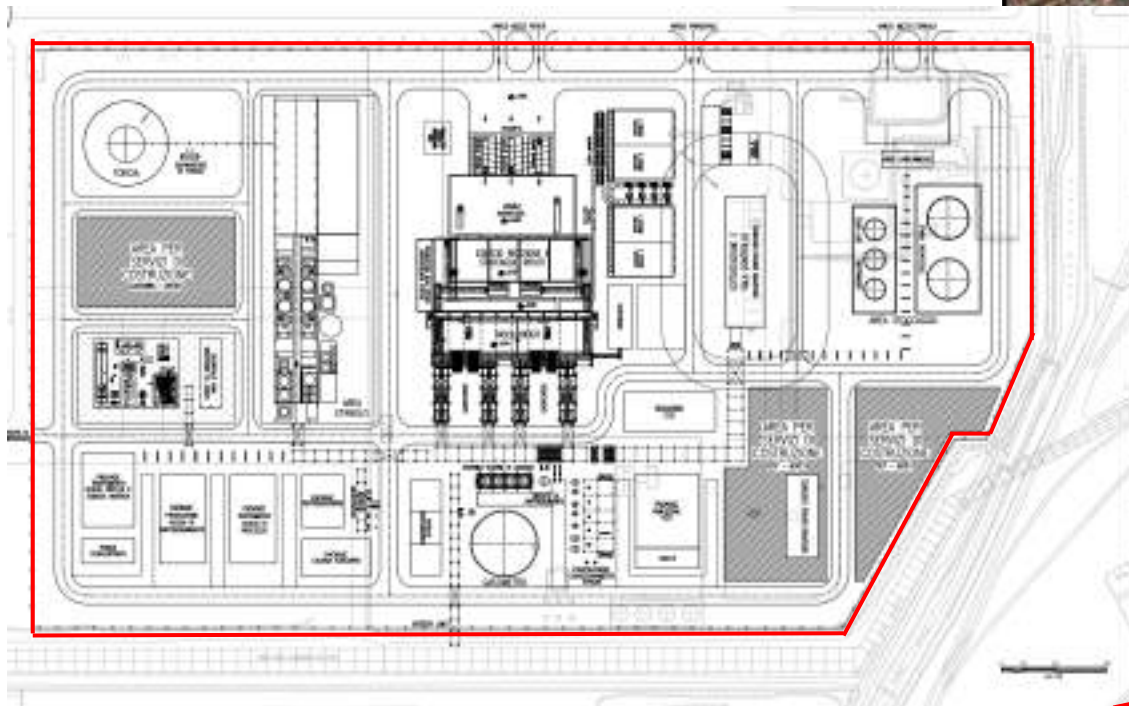


Potenziale product off taker

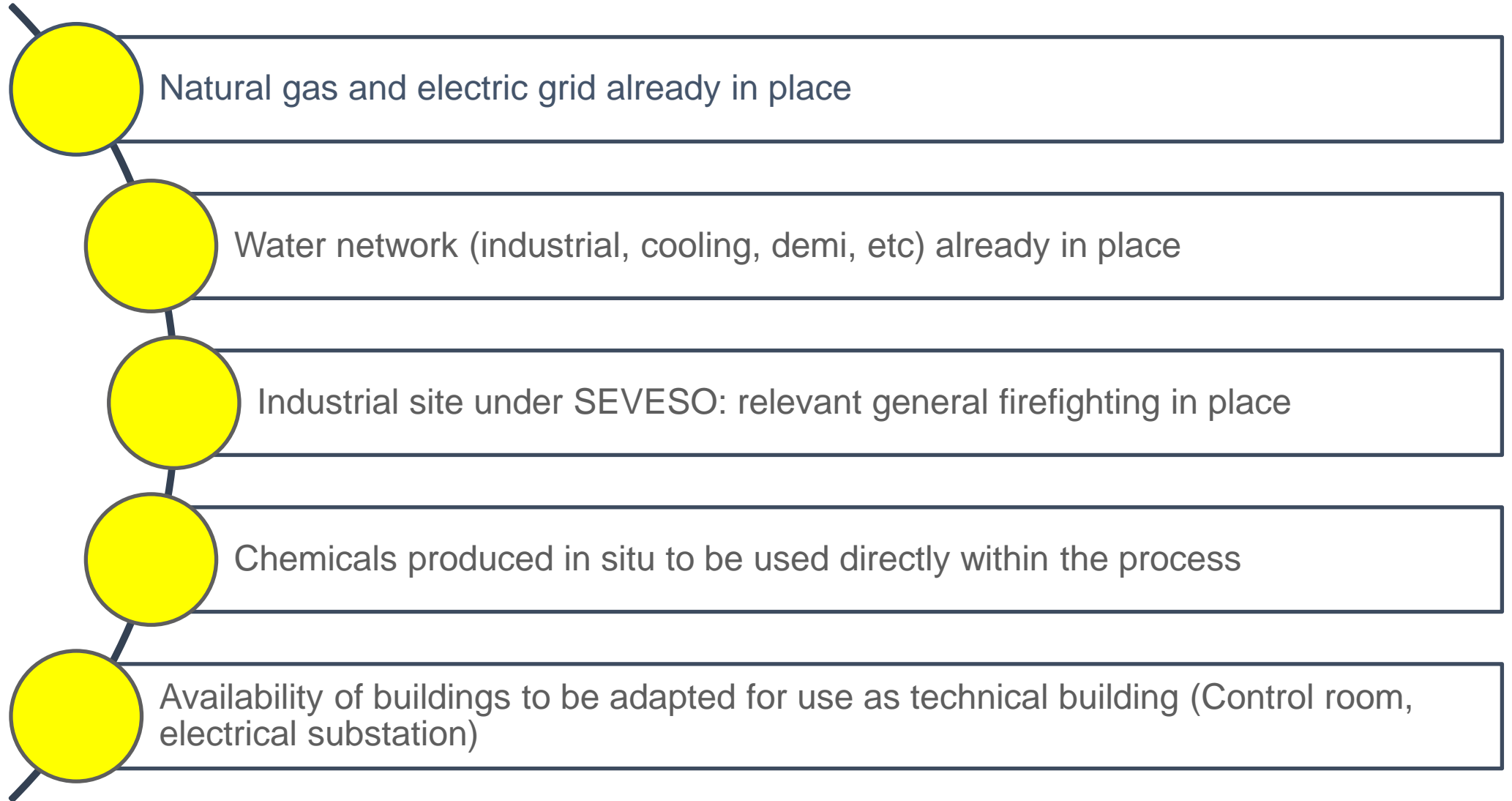


WASTE-TO-CHEMICALS plant within ROSIGNANO SOLVAY industrial site

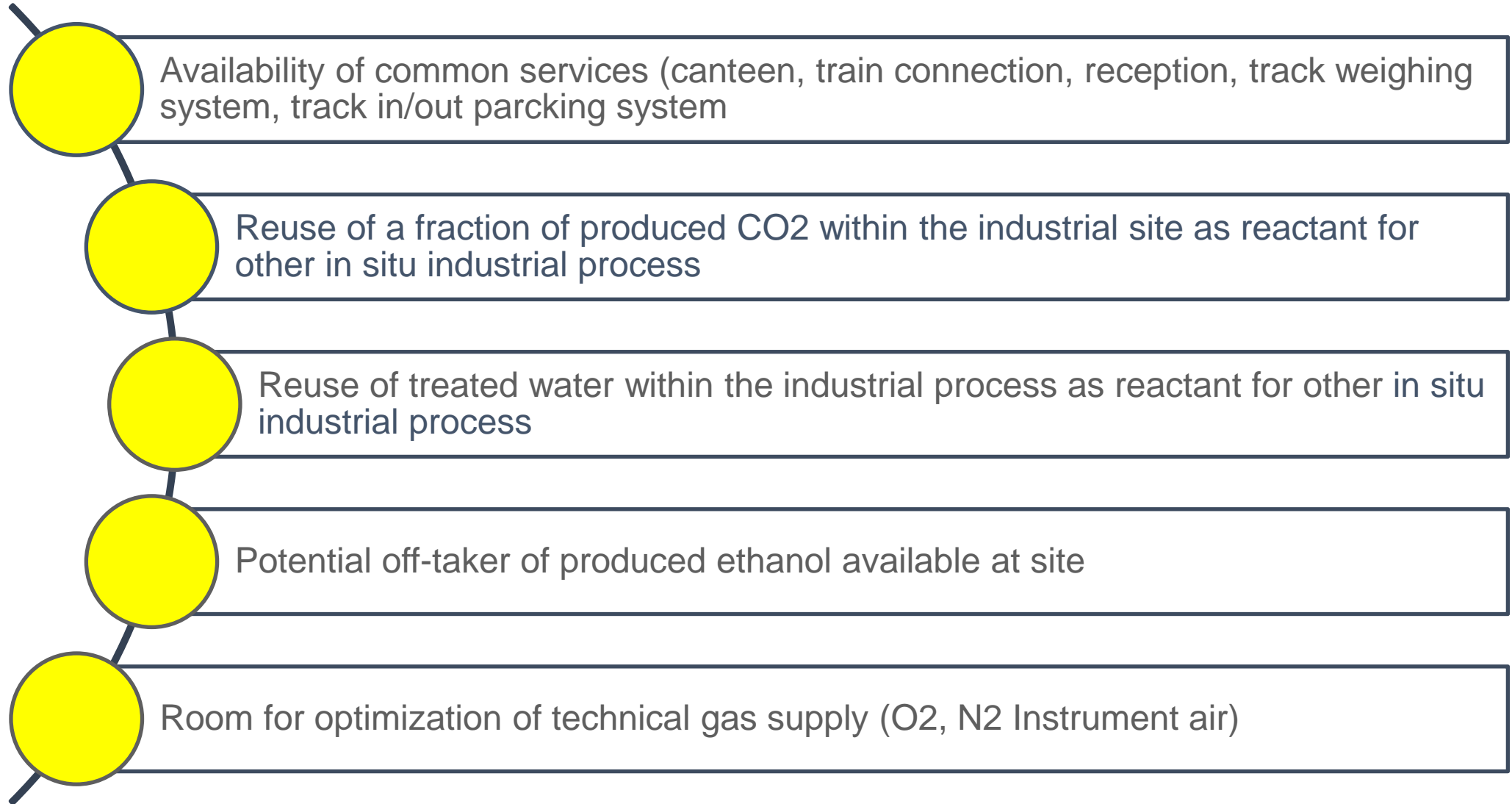
Waste to Ethanol in Rosignano as redeveloping of a dismantled brownfield area within an industrial site.



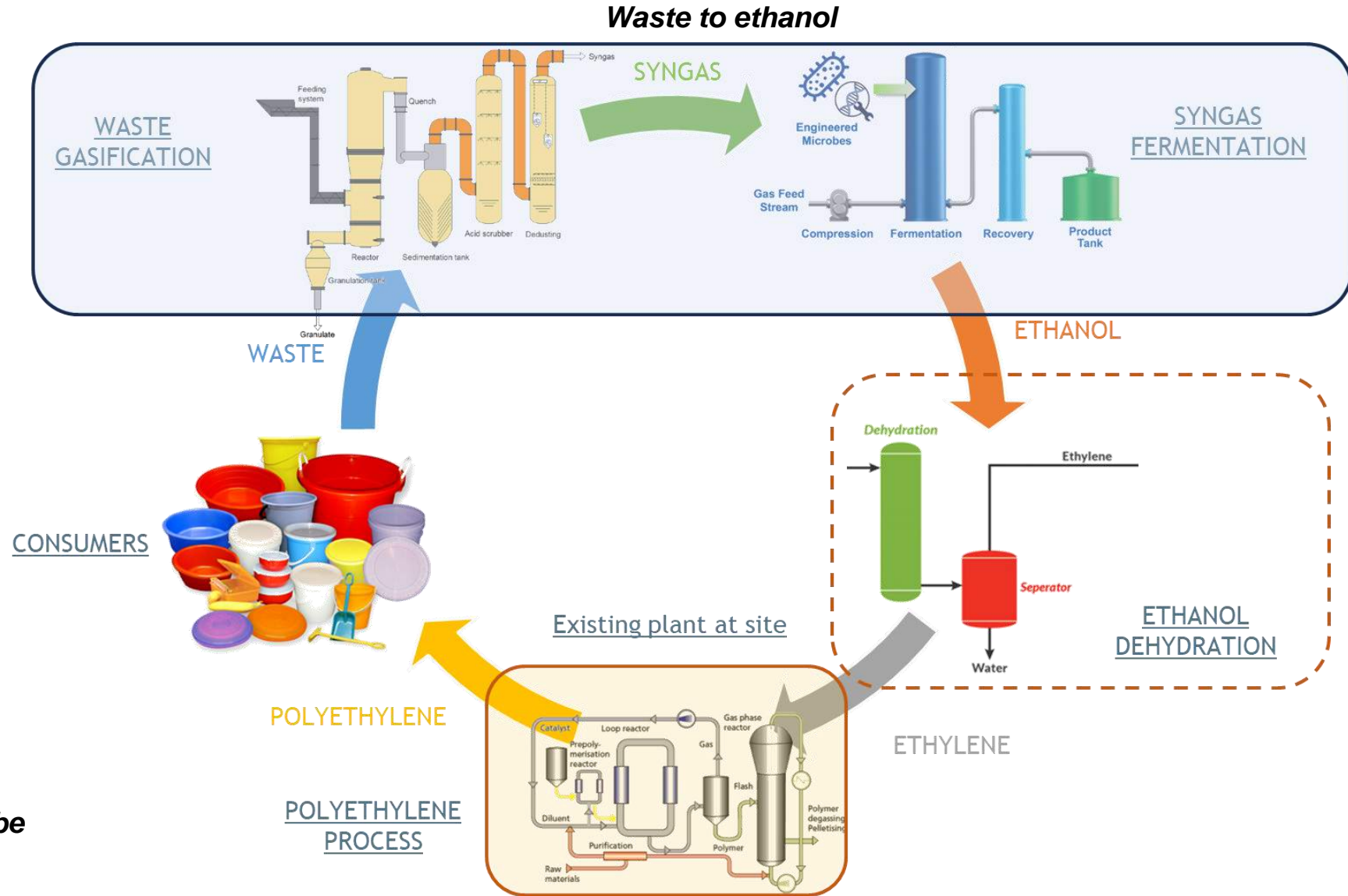
Sinergies with industrial site



Sinergies with industrial site



Potential use of ethanol



**Under the scenario of ethanol
conversion to Ethylene
A fully circular approach may be
achieved**

OTHER PROJECTS

- Alia is one of the partners of a research and development project, in collaboration with the RE-CORD Consortium, aimed at studying the recovery of textile processing waste and its transformation into biochar, a carbonaceous material obtained by thermal degradation of biomass (biochar)
- RE-CORD Consortium is a research consortium that brings together both industrial entities and universities such as the University of Florence, the Polytechnic of Turin and the University of Siena as a partner; this consortium deals with research and development activities in the field of renewable energy and biomass. of bioenergy and the bioeconomy and collaborates with industrial companies to identify and develop technologies in these sectors





**ALIA SERVIZI
AMBIENTALI**
SpA



**ALLEANZA
CIRCOLARE**