The potential exploitation of bio-hydrogen: ACEA perspective

ACEA Pinerolese Industriale

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Smartenergy
The key players of H2 technologies introduce their companies and activities

10th of March 2021 - online workshop

ACEA: MULTIUTILITY COMPANY

ACEA is a public **multi-utility company**, which carries out the following services:

WATER SECTOR: for the management of the integrated water system

ENERGY SECTOR: for natural gas distribution and heat management

ENVIRONMENT SECTOR: for the integrated waste collection, treatment, valorization and disposal process

AREA AMBIENTE: LOCATION AND ACTIVITY

The **ENVIRONMENTAL SECTOR** operates in the Pinerolo area -south west of the Province of Turin- for **47 Municipalities** and 150'000 inhabitants, carrying out the following activities:

- urban solid waste collection
- separate waste collection
- street sweeping
- waste treatment and disposal

Reference point for the treatment of organic waste

The ACEA Waste Treatment Plant was established **in 2003** to initially serve only the Pinerolo area (150˙000 inhabitants).

Currently, the organic waste treatment line is a reference **at a regional level**, with a potential capacity of **60˙000 t / year** (to be enlarged to 90˙000 t / year), serving roughly **1˙000˙000 inhabitants.**

FROM WASTE TO RESOURCE

BIOGAS

COMPOST

Raw materials

FOOD WASTE

- Household
- Restaurants
- Canteens
- Local markets

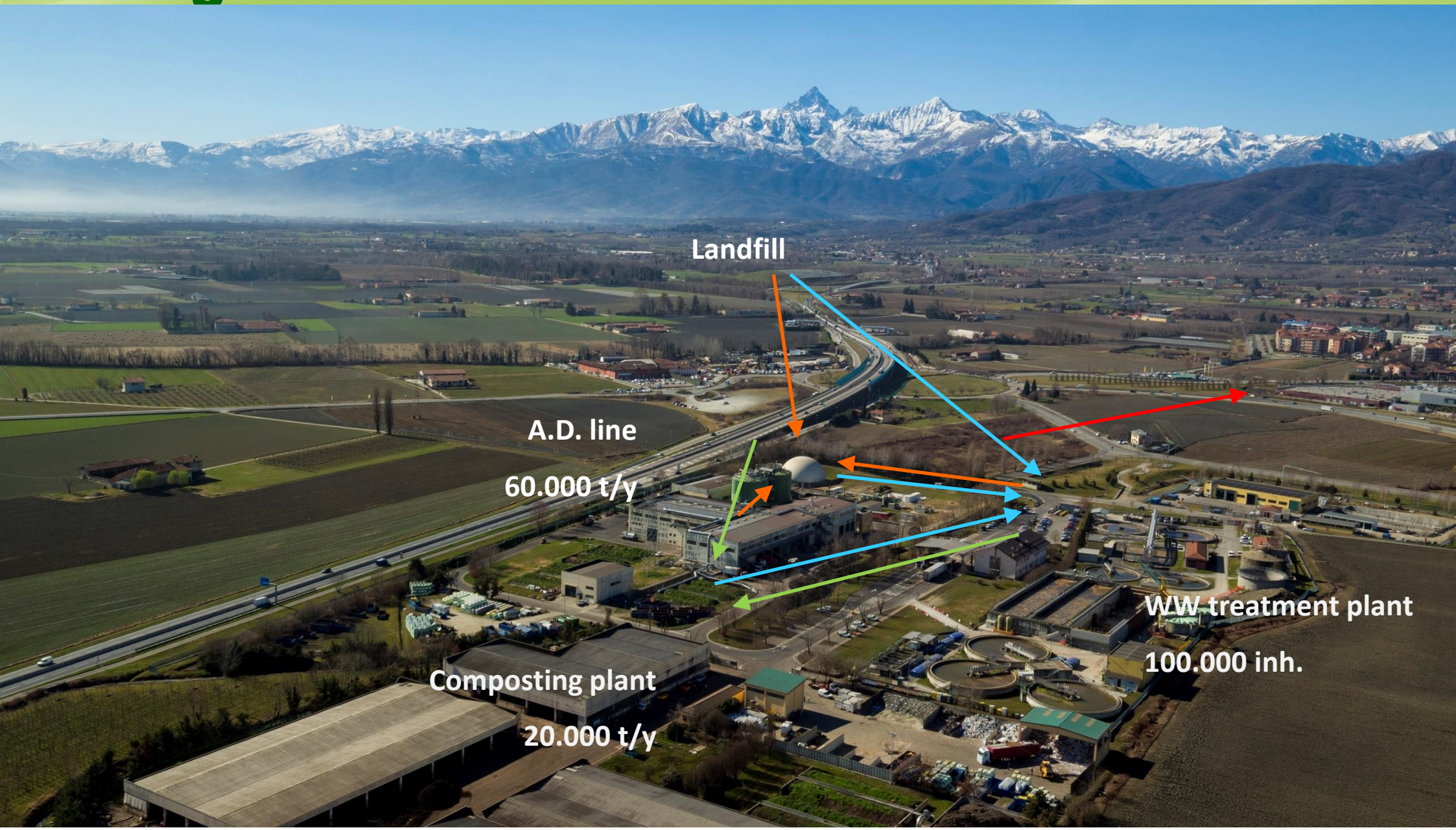
Anaerobic digestion

GREEN WASTE

- pruning of domestic origin
- Urban green waste

Composting plant

Integrated Environemntal district



Biogas

Wastewaters

Sludge/digestate

DHS, biomethane

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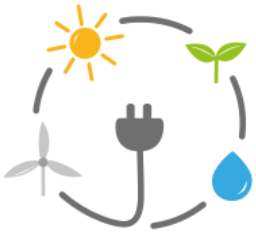


Clean energy

Green chemistry

Energy Community

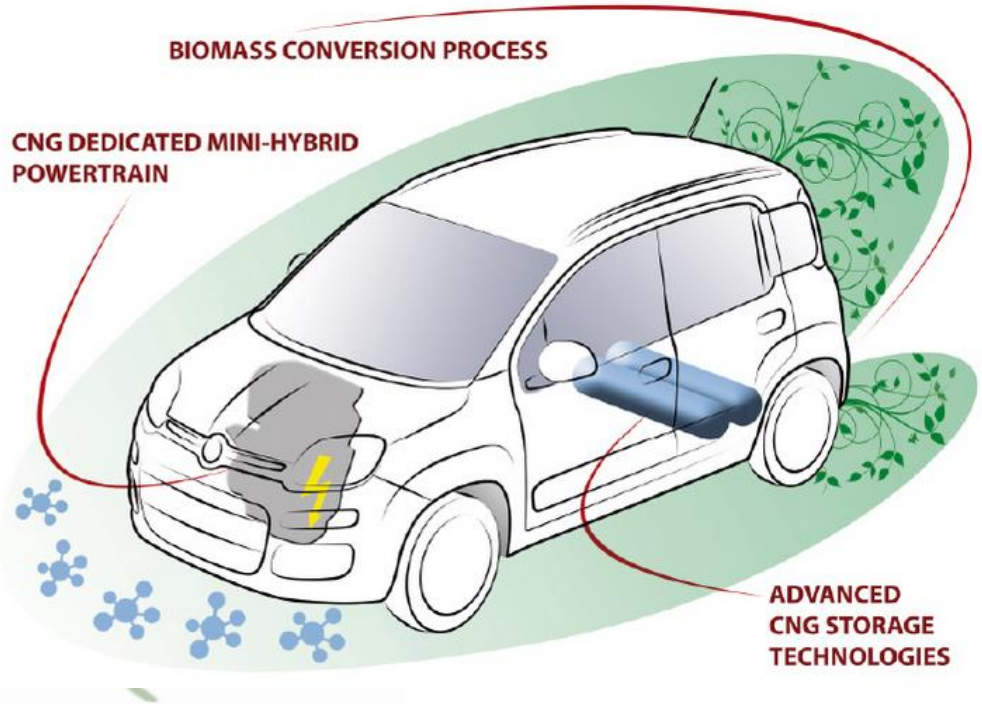
CLEAN ENERGY: BIOMETHAIR

BIOMETHAIR

BANDO REGIONALE PIATTAFORMA "AUTOMOTIVE"

REGIONE PIEMONTE

Fondo Europeo di Sviluppo Regionale
P.O.R. 2007 - 2013



September 2015: opening of the Panda prototype fuelled by **biomethane and biohydrogen** produced in ACEA

CO2 target
67 g/km (CH_4)
59 g/km (CH_4&H_2)

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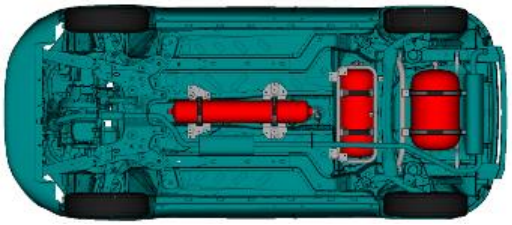
CLEAN ENERGY: BIOMETHAIR

Progetto Biomethair: urban mobility

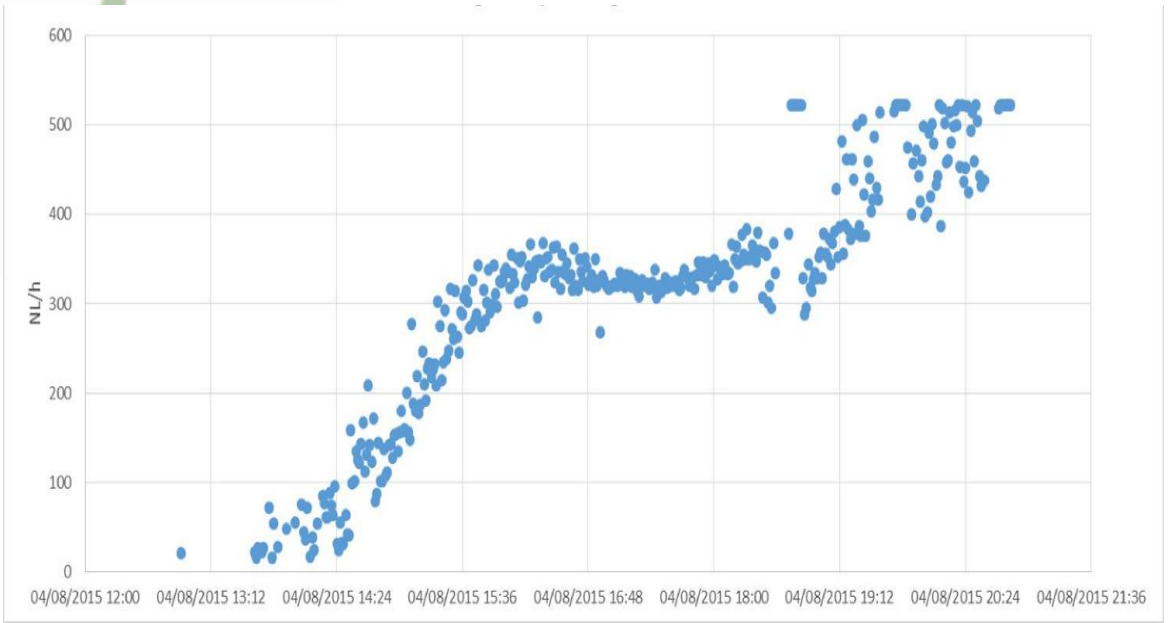
BANDO REGIONALE PIATTAFORMA «AUTOMOTIVE»
FONDO EUROPEO DI SVILUPPO REGIONALE
P.O.R. 2007 – 2013



Advanced solutions for CNG storage optimization in terms of weight and capacity

mobilità urbana

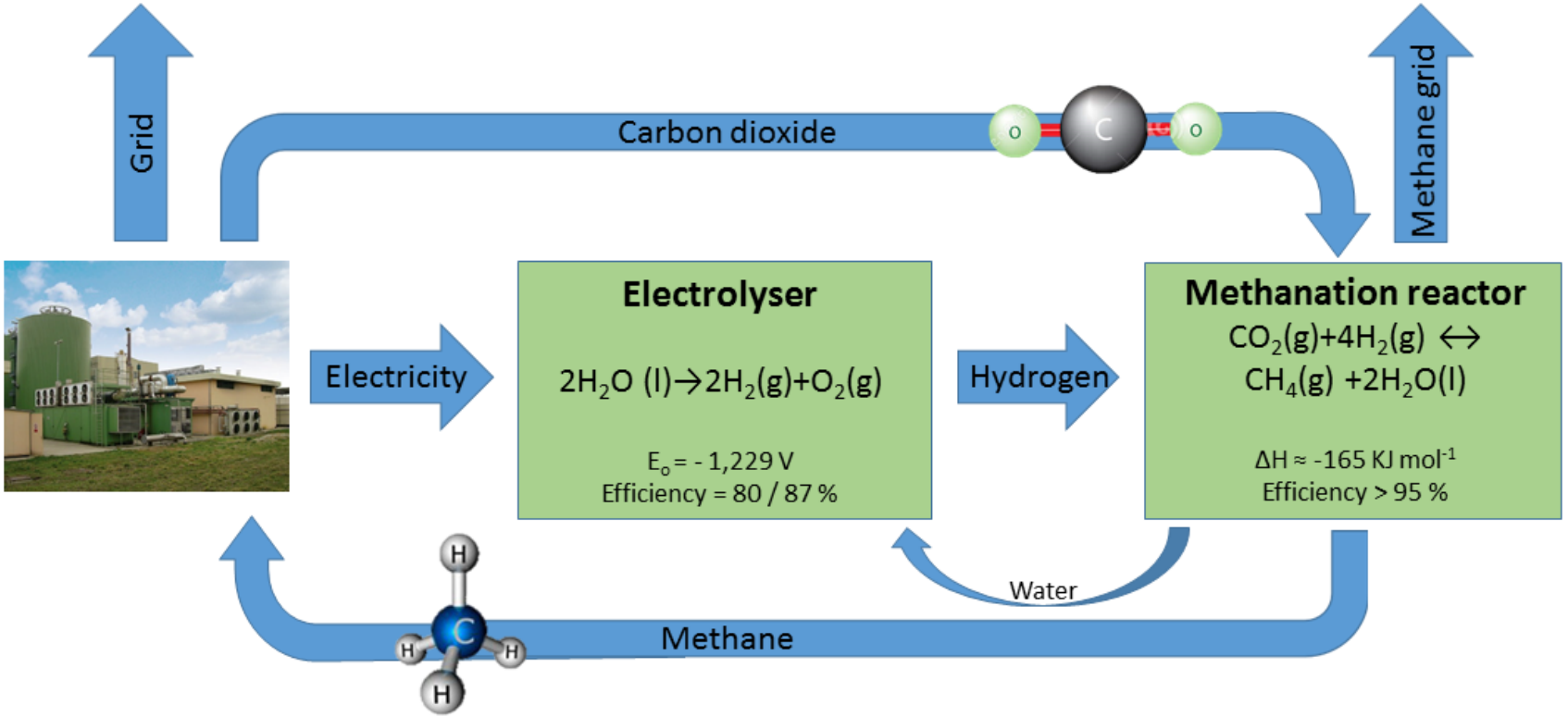
High efficient CNG dedicated TC engine: CNG/Biomethane/H_2&CNG



CLEAN ENERGY: PROGEO

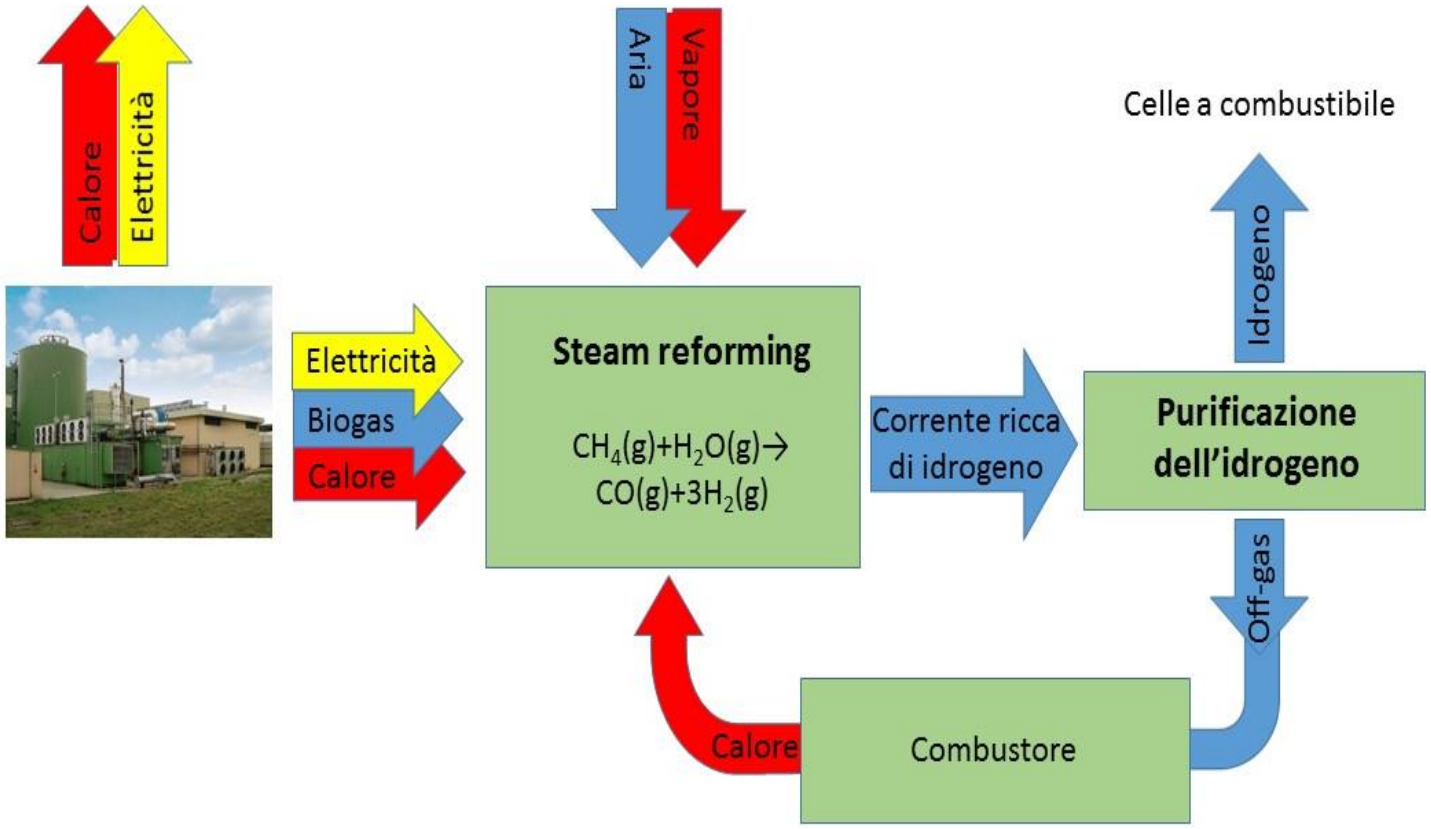
Progeo (EU Framework Program Horizon 2020)
Leader: PLC System Srl

Conversion of CO_2 and H_2 from water electrolysis into bio-methane through a methanation reactor (Sabatier reaction)



BioroburPlus (EU Framework Program Horizon 2020)
Production of bio-hydrogen, derived from biogas produced by the anaerobic digestion of organic waste, TRL 6, for feeding fuel cell systems

Green hydrogen



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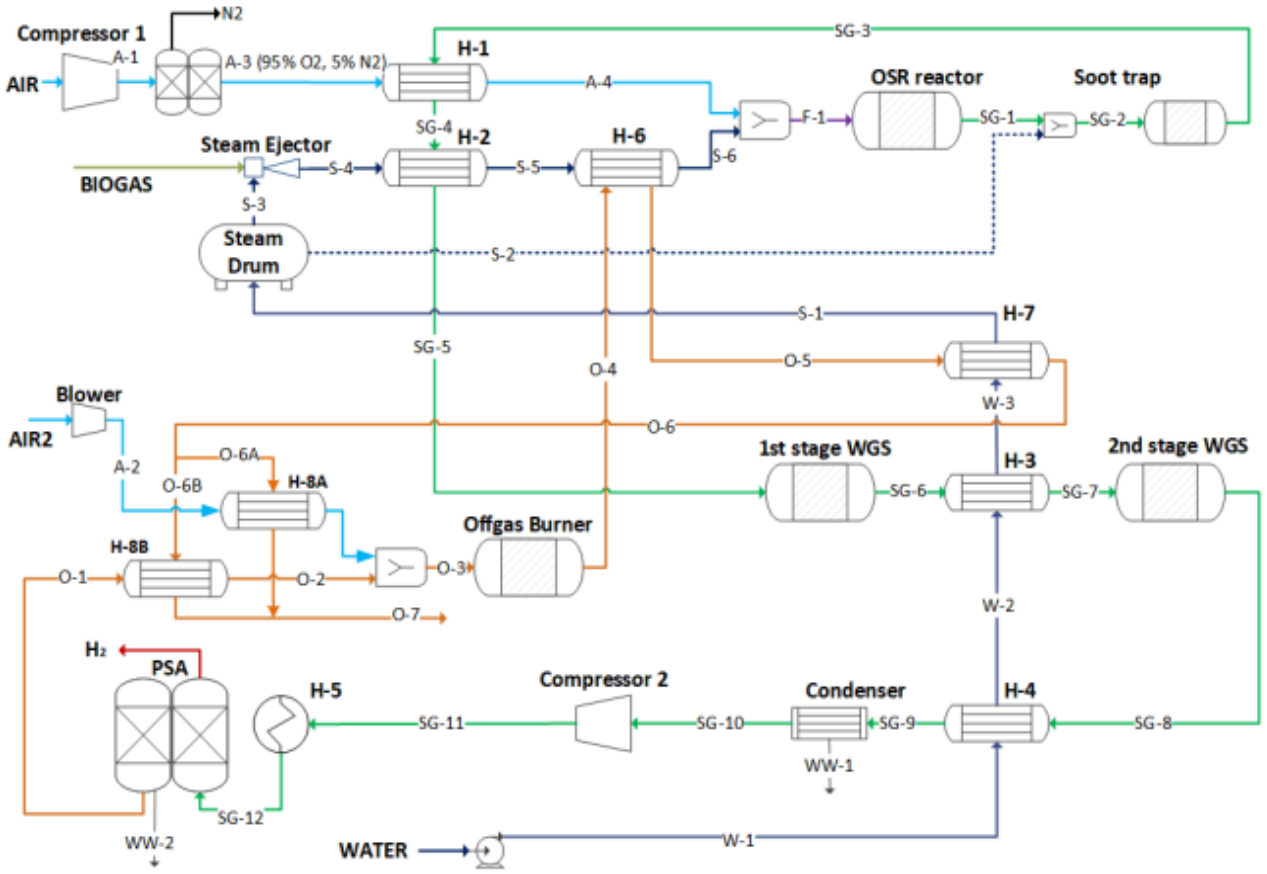


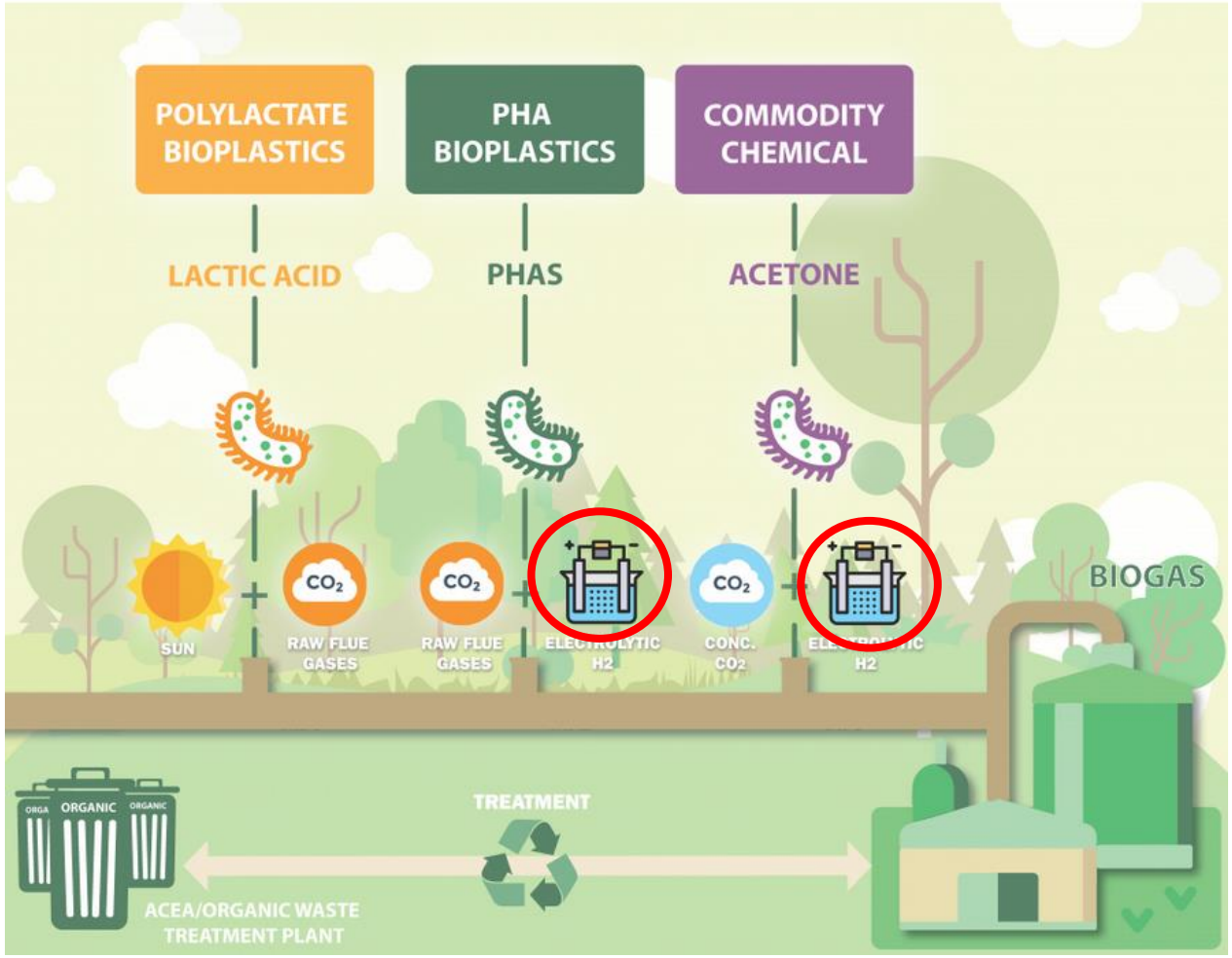
Figure 1: Flow scheme BioRoburPLUS

OSR: oxidative steam reforming

WGS: water gas shift

PSA: pressure swing absorbion

Engicoin (EU Framework Program Horizon 2020)
Production of bio-plastics from the waste matrices of the organic waste treatment process, both liquid and gaseous.



GREEN CHEMISTRY

Saturno (Piattaforma Regionale Bioeconomia)
Conversion of organic waste into raw materials for use in various sectors (industrial chemistry, agriculture, etc ...) and recovery of carbon dioxide and its conversion into fuels and bio-fertilizers

Therefore, it is possible to initially inhibit the methane process in favor of the production of biohydrogen, through the fine adjustment of operative parameters.

A fermentation stage will be placed before the conventional anaerobic digestion process for the production of hydrogen that will be used in the regeneration of the pyridine cofactor NADH, useful in the conversion processes of carbon dioxide to methanol.

ENERGY COMMUNITY

E-crew (EU Framework Program Horizon 2020)
Implementation of a business model and an operational tool for the creation of virtual communities for the management and development of renewable energy

ENER.COM (Piattaforma regionale)
Feasibility study on the full implementation of the Energy community concept on the area of Pinerolo

ALTERNATIVE STORAGE?

Commissione Europea

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“Good decision-making about how we manage the waste we create is one of the most important contributions humanity can make to reducing its impact on the natural world.”

ISWA Global Waste Management Outlook foreword

Thank you for your attention

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