ALGAE 4 BIOMETHANE PROJECT

Interreg North-West Europe IDEA

Chaire de Biotechnologie CentraleSupélec

FARMERS' MICROALGAE WEBINAR

MICROALGAE: a new all-year round crop for North-West Europe

Interreg NWE IDEA Webinar 17th September 2020

Session: Industrial Microalgae Presentation

GRTgaz

ALLIANCE SORBONNE UNIVERSITÉ

utc Université de Technologie Compiègne

UniLaSalle Terre & Sciences

RENEWABLE GAS PRODUCTION CHANNELS

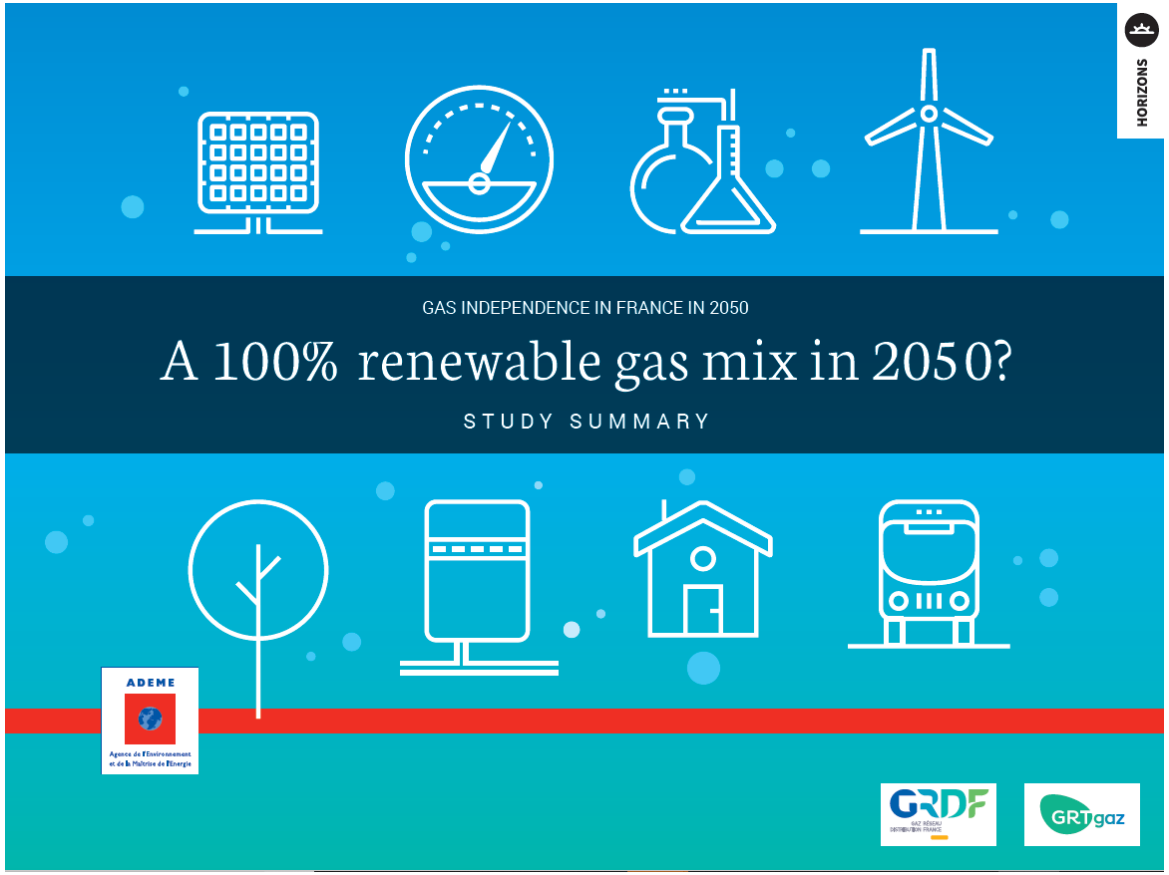
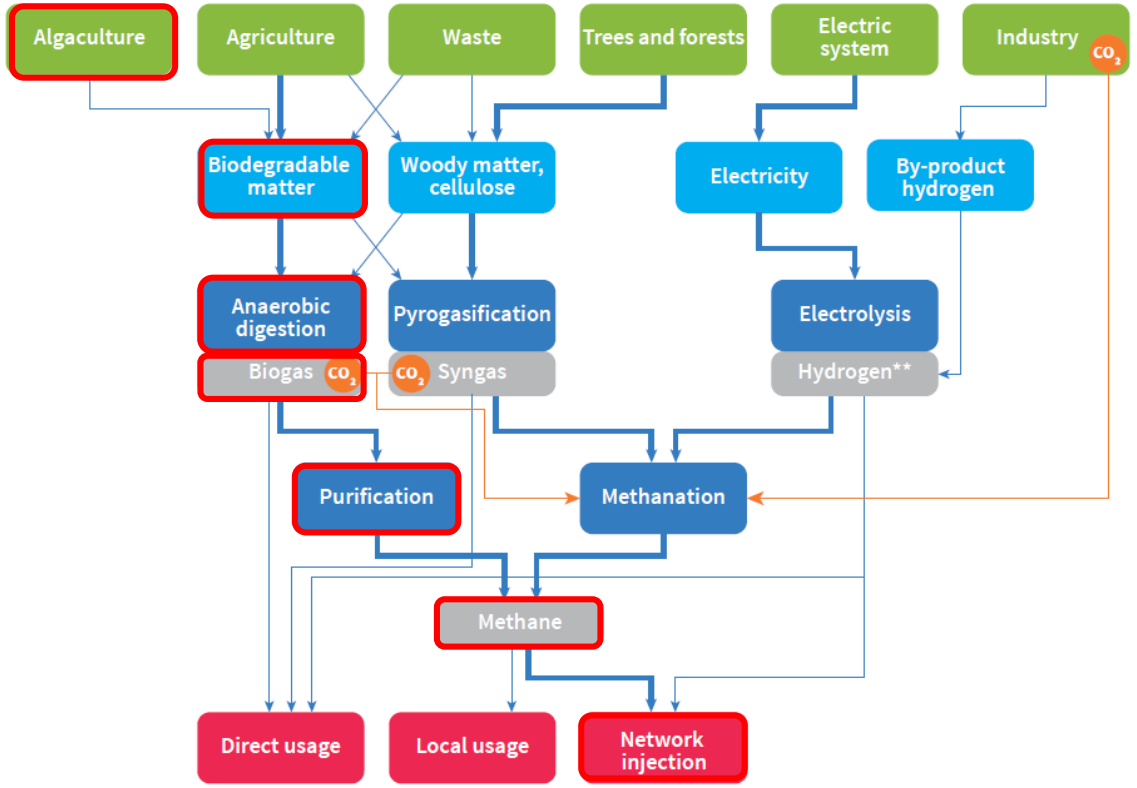


FIGURE 7: THE DIFFERENT PRODUCTION CHANNELS OF RENEWABLE GAS



* "Pyrogasification" includes hydrothermal pyrogasification of seaweed.
** Hydrogen can also be used directly for various usages; this is not included in this study.

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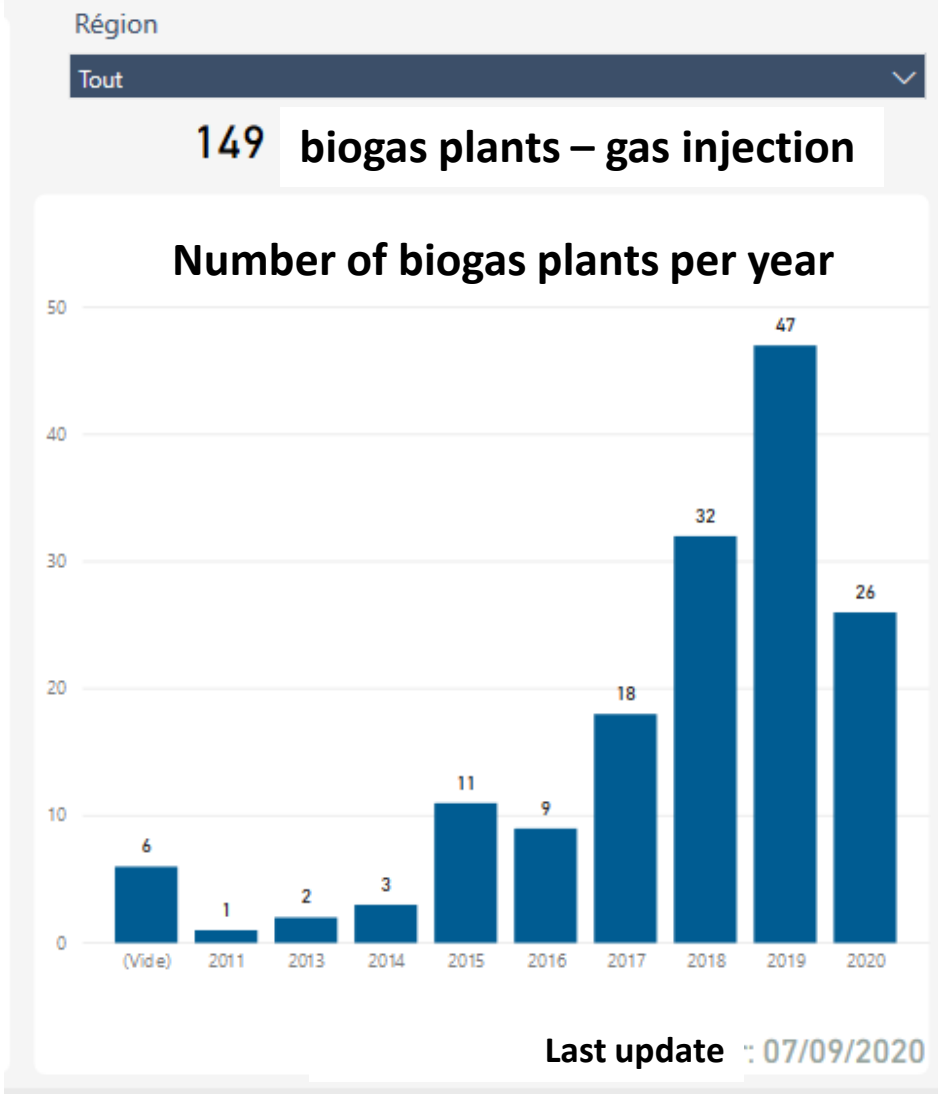
ANAEROBIC DIGESTION: CONTEXT

- Treatment of organic waste (directive décharge du 26/04/1999 et Grenelle Environnement)
  - Alternative technologies to existing treatment processes
  - Reuse of organics from household waste: 35% in 2012 and 45% in 2015 (Grenelle1)
  - Production of fertilisers (digestate or compost)
- Greenhouses gases: reduction of 3%/year, emission divided by 4 in 2050 (Plan Climat et Grenelle 1)
  - Non emission of biogas in atmosphere
  - Valorization of biogas in energy
- Specificity of AD in France
  - Agricultural substrate mainly
  - « Codigestion » : agricultural byproducts and biowaste
  - Manure with straw (lignocellulosic materials)
  - Environmental and sanitary restrictive regulation



MICROALGAE FOR BIOGAS & ANAEROBIC DIGESTION

- Advantages of microalgae
  - Interesting productivity
  - No competition with food
  - Reuse of CO_2 from industries
  - High methanogenic production (170 – 300 m^3/T_{VS})
    - higher than agricultural byproducts such as manure

- Disadvantages of microalgae
  - Needs of R&D works
  - Production and harvesting systems are still quite expansives

Source : LBE Narbonne

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LOCATION

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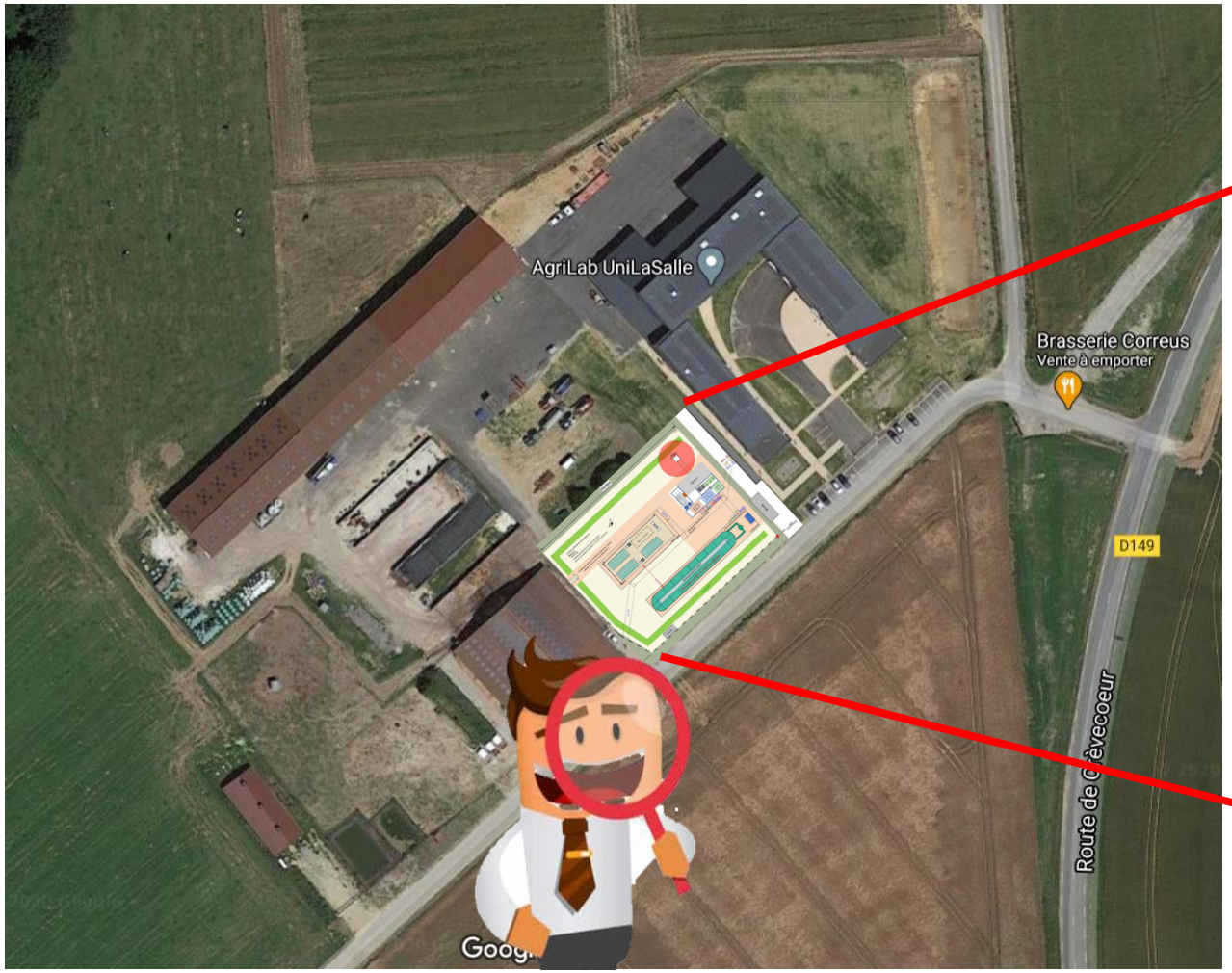

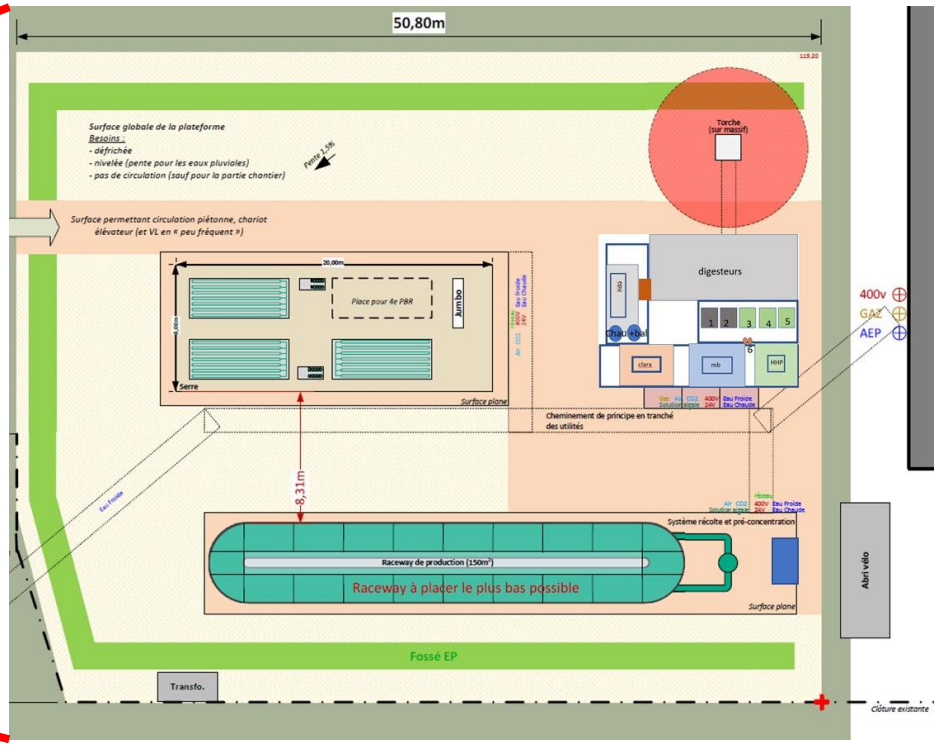

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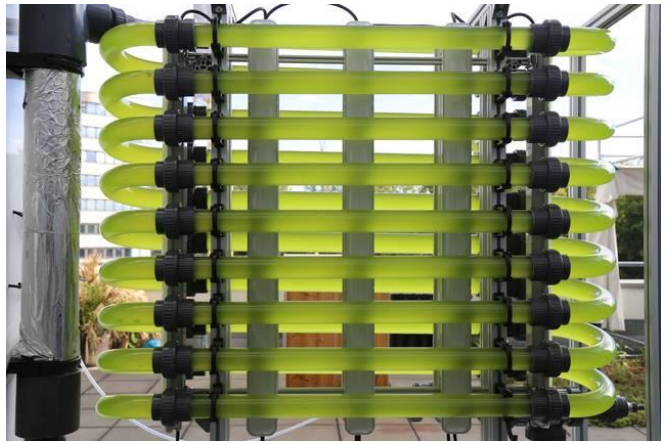
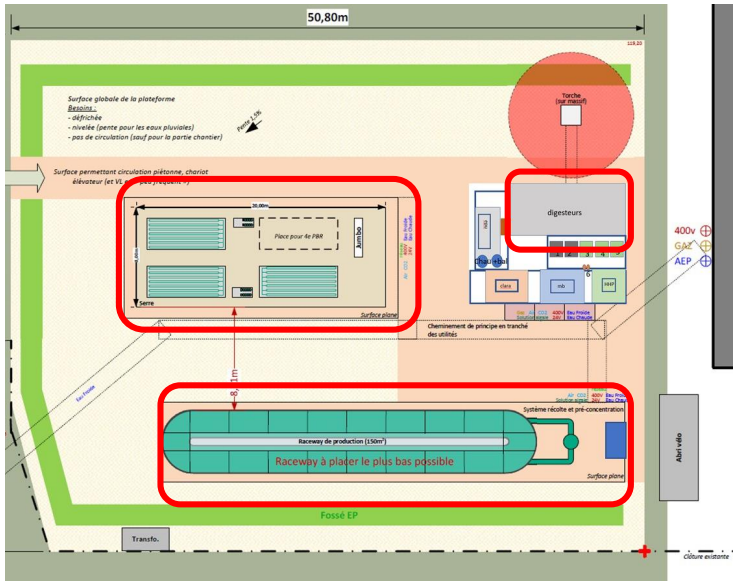
EQUIPMENTS



Photobioreactor

Anaerobic digesters



Raceway

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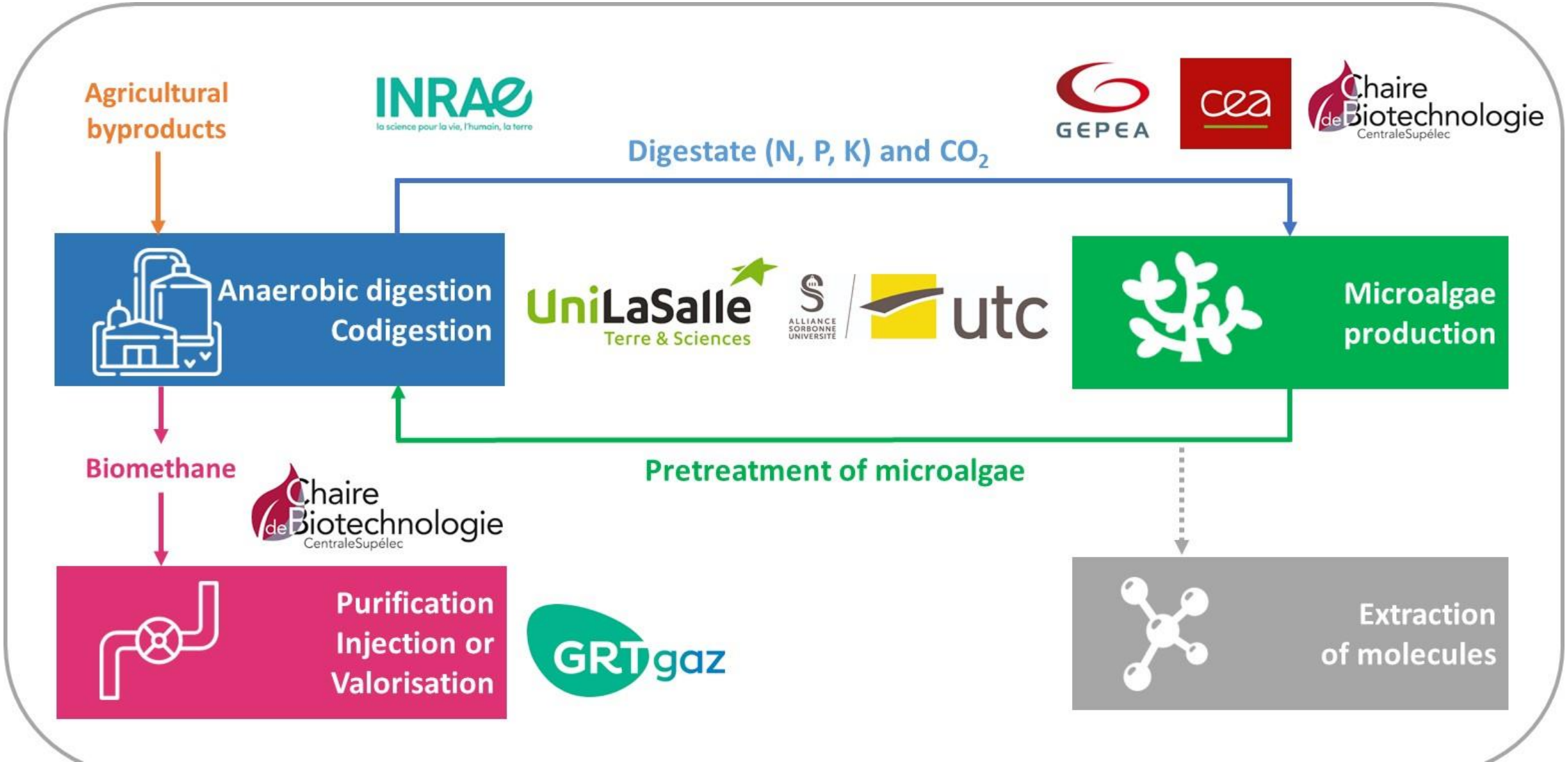
FULL LOOP OF VALORIZATION



ALGAE 4 BIOMETHANE PROJECT

OBJECTIVES

First step of the project

- **Optimization of the microalgae production and harvesting processess**
  - Annual production with equipments outside and natural light (additional artificial light)
- **Fragilization of microalgae** for incorporation in AD process, codigestion with liquid manure
- **Optimization of biogas and biomethane production**
- **Recovery of the nutrients N, P, K of the digestate** and **CO_2 from biogas**
- **Achievement of positive energy balance for the full loop**

Second step

- **Recovery of molecules with medium and high added value** before AD process (green chemistry, …)
- **Injection of biomethane in the gas grid**

ALGAE 4 BIOMETHANE PROJECT

BUILDING SITE

2020, mid July

2020, end of July

ALGAE 4 BIOMETHANE PROJECT

BUILDING SITE

2020, mid August

2020, September, yesterday ;-)

THANKS FOR YOUR ATTENTION!

PAUSS André
andre.pauss@utc.fr

MUHLKE Robert
robert.muhlke@grtgaz.com

RIBEIRO Thierry
thierry.ribeiro@unilasalle.fr
THOMAS Hélène
helene.thomas@unilasalle.fr