GAYA Project:
A unique demonstration platform in Europe for a new gasification & methanation industry

« From vegetal to reel »:
Demonstate at a pre-industrial scale the technical, economic, environmental and societal validity of gaseous biofuels by thermochemical production

GAYA participates in the development of European ambitious goals of low carbon energies

Energy Climate package:
3*20 principle in 2020

EBTP:
G€ 6 to 8 over 10 years for 15 to 20 demonstrations and first industrial projects

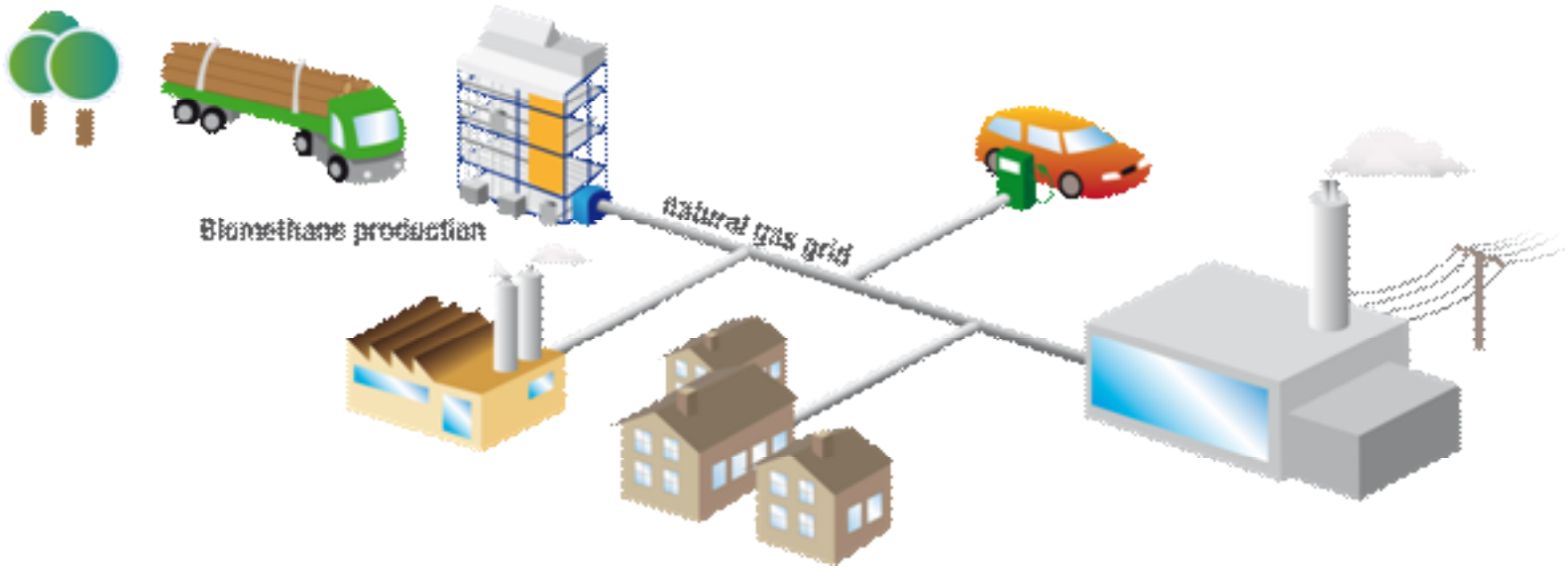
SET Plan implementation:
G€ 50 of inv. during the 10 next years on low carbon technologies
of which **G€ 9** concern **Bioenergies** (multiplied by 3 the annual R&D effort)
⇨ **Public funding, Member States and community contribution**

08/12/17 — **09/07** — **09/10/07**

France: decisions of *Grenelle de l'Environnement*

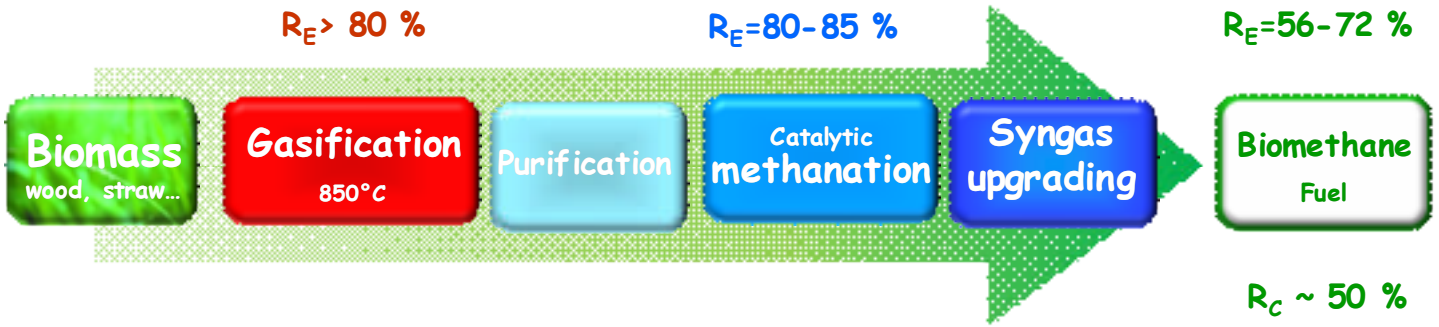
- **GAYA is fully in line with the European programme and will contribute to the European objectives of development of new renewable and low carbon energies**
- **It takes part in the strong commitments of the key players following the French *Grenelle de l'Environnement.***

Objectives of the GAYA project



- **To validate at a preindustrial scale a portfolio of technological solutions to develop an innovating industry of bio-methane production**
  - ➔ To validate the technical relevance for an industrial development of a new biomethane industry
    - ☐ Usable as a gaseous fuel
    - ☐ Transportable via the natural gas network.
  - ➔ To build a profitable industry by 2015
  - ➔ To guarantee that these new activities are in line with a sustainable use of biomass, under the best social and environmental conditions

Bio-methane in few figures



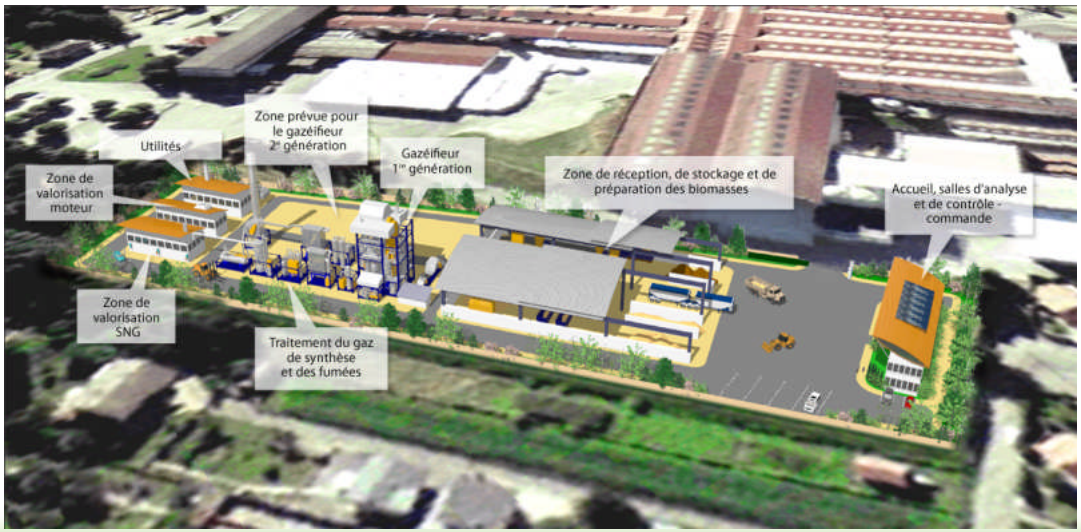
- **Bio-methane, a technological choice in terms of local and sustainable biomass development**
  - ➔ Very high energy yield: 60-70%
  - ➔ Local biomass recovery logic (smaller production units),
    - ☐ Reduced transport of the biomass, therefore reducing emissions
    - ☐ Enabling the local recovery of all heat produced by the process, which would be difficult for larger installations,
  - ➔ Easy and clean transport of bio-methane via the natural gas network

A platform of integrated preindustrial plants, unique in Europe, to solve issues of this new industry

Biomass → Gasification → Purification → Shift / Methanation → Syngas upgrading → Injection

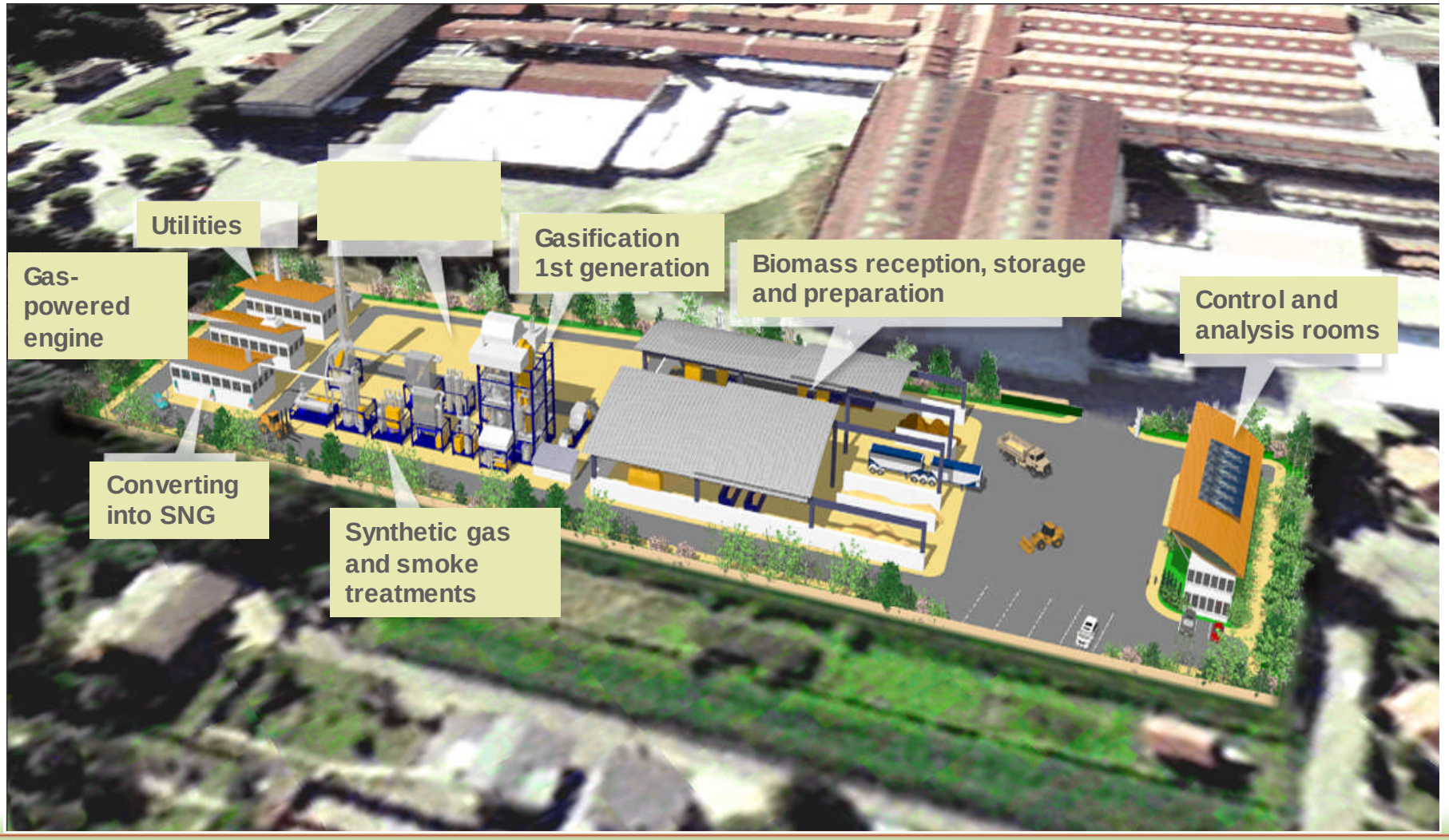
- Many issues to solve in the whole industry
- Interdependent links

- Two requirements...
- Preindustrial scale
- An approach integrated on the whole pathway



- ... GAYA responses:
- A platform of preindustrial equipments
- Integrated and unique in Europe ...
- Open to future partnerships

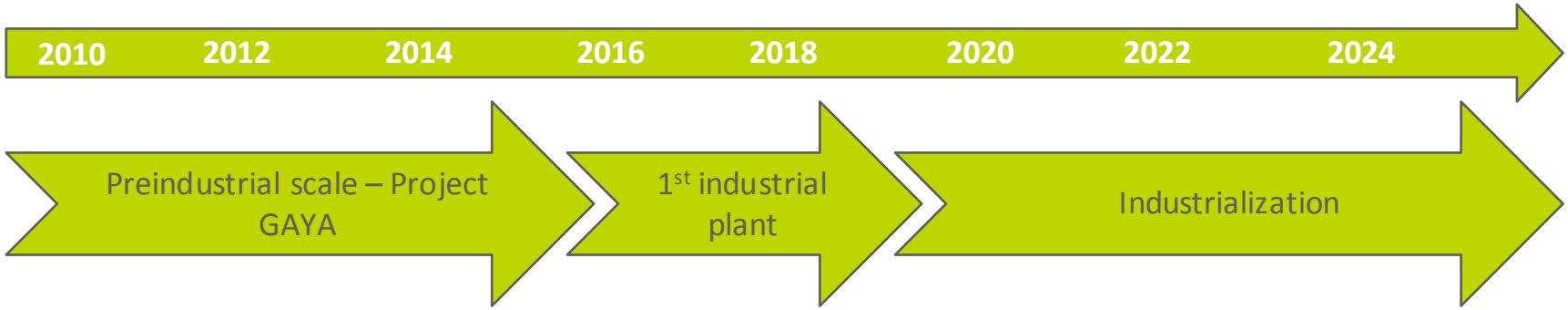
Demonstrator's site



List of equipements

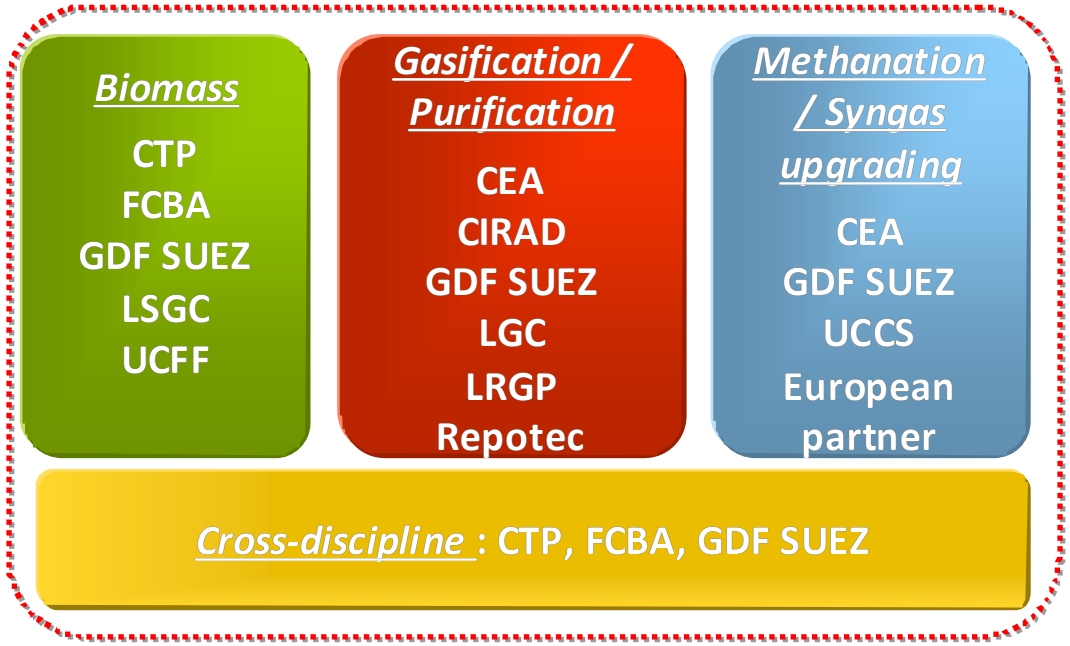
- **Biomass reception, storage and preparation**
- **Gasification : FICFB process : Repotec**
  - High methane content of the substitute natural gas, and high net calorific values
  - Limited tar content in relation to fixed beds,
  - Adaptability to medium-sized plants,
  - Reliability demonstrated: more than 7000h/y in the past 5 years
- **Methanation step:**
  - Pre-identified methanation processes are under qualification – final choice has to be done

Schedule



- **Key steps:**
  - GAYA will be cofinanced by the French Environment and Energy Management Agency (Project selected in 2009)
  - That funding has been approved by the European Commission in March 2010
  - The project has been launched with the partners in June 2010
  - Feasibility studies have been done, basic design should start shortly, the erection is supposed to start at the beginning of 2012

A consortium federator of best competences and supported by a key industrial partner



- Key actors in their fields of competence
- 11 partners federating research and industry

- A consortium driven by an industrial leader (GDF SUEZ)
  - A high gesture of goodwill for industrial and commercial development

A 7-year R&D programme

Gasification process → Syngas treatment → Direct and indirect use → « Green » energy

Technological platform
To test and validate the results

Biomass
Biomass potential and availability
Biomasse pre-treatment
Impact of the biomasse quality on the process

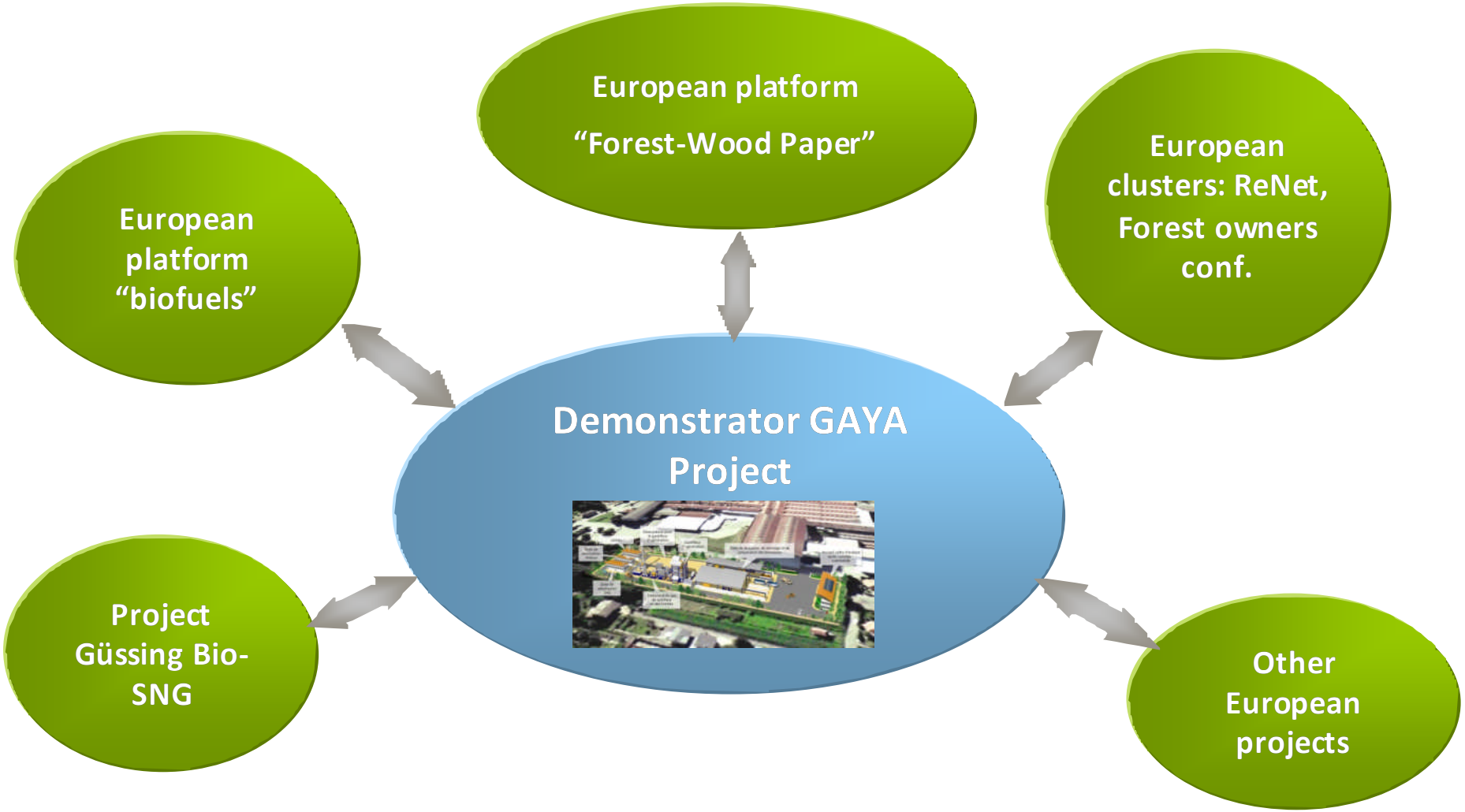
Gasification
Process modelling and simulation
Process optimization
Optimization of the quality of the syngaz for methanation
Purification

Converting for usage
Process modelling and simulation
Process optimization
Syngas upgrading

Cross-disciplinary studies
Life cycle analyses, energy integration, economic analyses, regulation

Industrialisation

A work in synergy with European works



Major stakes are linked to the project

➢ The development of bioSNG responds to major issues:

- ➔ **Economic**: development of new industrial activities, especially in rural areas
- ➔ **Environmental**: improvement of forest management, reduction of greenhouse gas emissions
- ➔ **Geopolitical**: reducing dependency on fossil fuels, diversifying energy sources

➢ BioSNG production appears as a major opportunity :

- ➔ Biomass is one of the most available renewable energy in the world
- ➔ Biomethane complements perfectly natural gas:
  - ☐ It can be substituted to natural gas without any modification of the equipments
  - ☐ It can be transported cleanly and without CO2 emissions through the existing gas grid
  - ☐ It can be used as a second generation gaseous biofuel in the transport sector

Conclusion: a project presenting many assets and high stakes

- A complementary partnership and a solid research programme integrating all the issues of this new industry and directed towards the industrialization
- A development of an environmental-friendly industry in line with a sustainable development approach
- The creation of a new and innovating industry
- An open platform federating actors working on that pathway

Thank you for your attention!

GDF SUEZ Coordinateur

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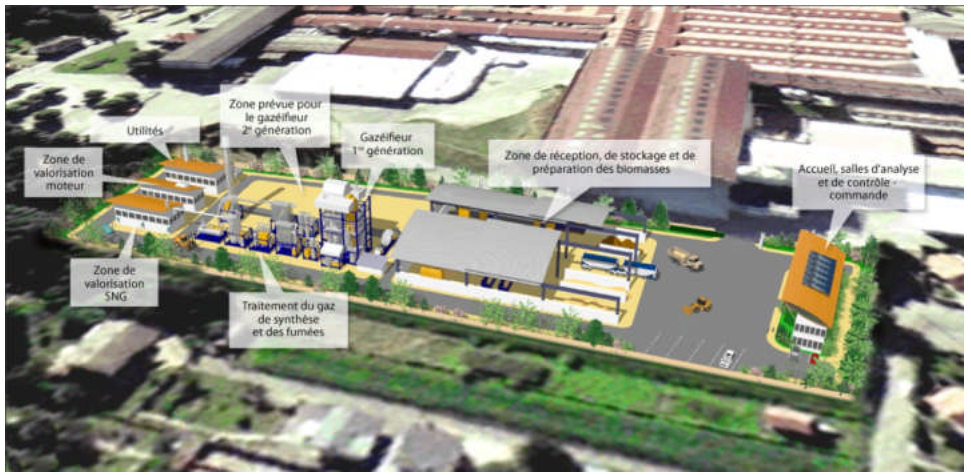
LRGP Laboratoire Réactions et Génie des Procédés

le LABORATOIRE DE GÉNIE CHIMIQUE UMR 5503

FCBA Institut Technologique

ADEME Agence de l'Environnement et de la Maîtrise de l'Energie



ECOLE DES MINES D'ALBI CARMAUX

cirad LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

tenerdis

UCFF pération Forestière Française

repotec renewable power technologies

ctp centre technique du papier

UCCS