



Avec vous,  
en réseau



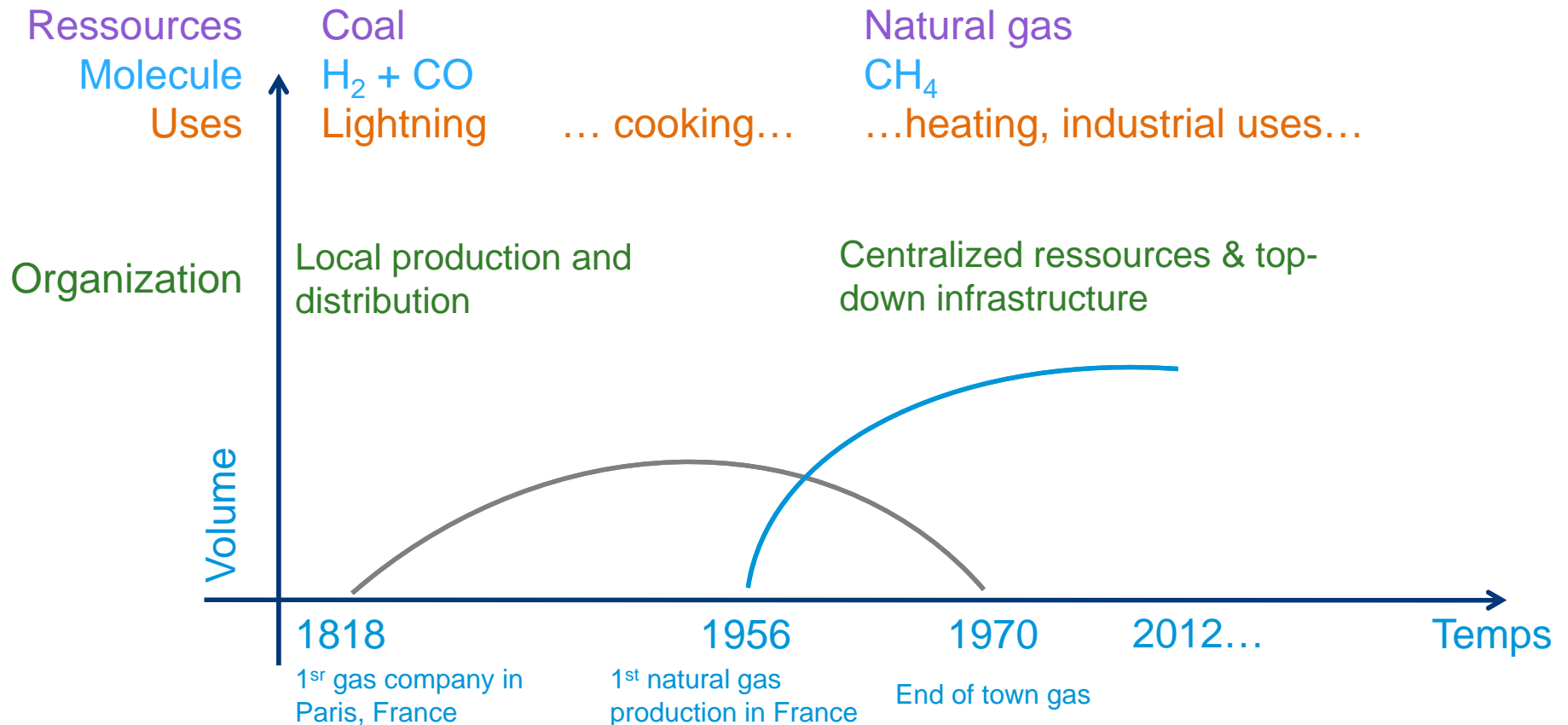
# GrDF 2030

## Preparing the future

IGU – PGCE

*Anthony Mazzenga*  
*Head of strategy unit*

# History of gas : a historical transition



- Gas industry successfully managed the first energy transition
- What the next transition means for us ?



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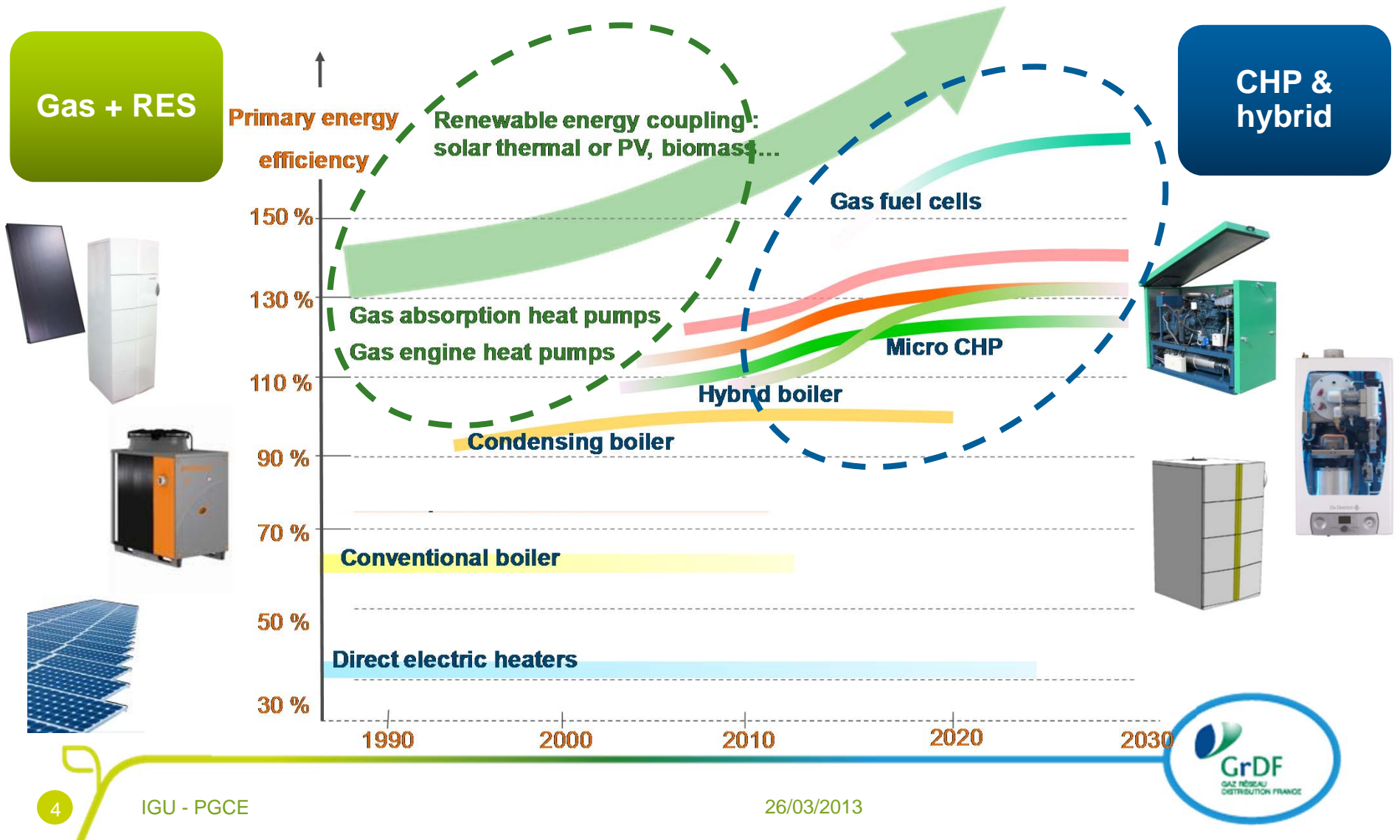


2. Gas resources

3. Smarter gas infrastructure

# Gas uses (1/3) : heat & DHW for building

Gas technologies are a real asset for energy efficiency toward 2020-2030



# Gas uses (2/3) : industry

Overall optimization of process/fluids/heating & new consumption to respect environmental constraints

- Gas consumption is expected to decrease due to overall optimization of energy uses for process, fluids and space heating
- But industrial sites have to evolve to respect stricter environmental constraints and new policies
  - In the short term, investments in downstream treatment with possible new gas uses
  - In the long term, investment in process using directly less polluting energy such as natural gas



# Gas uses (3/3) : sustainable mobility

## CNG & bio-CNG are a key technology for sustainable mobility

- CNG & dual-fuel vehicles are a mature available solution, with high environmental and economic gains
- Even in 2030, electric vehicles will not be suited to long distance travels & carriages, heavy duty uses (bus, taxi...)
- Since 2011, CNG is the first alternative fuel in the world, +18% market growth per year
- Bio-CNG is the biofuel presenting the best sustainability impact assessment. Produced from waste or solid biomass, bio-CNG is not in competition with human food production





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1. Gas demand evolution



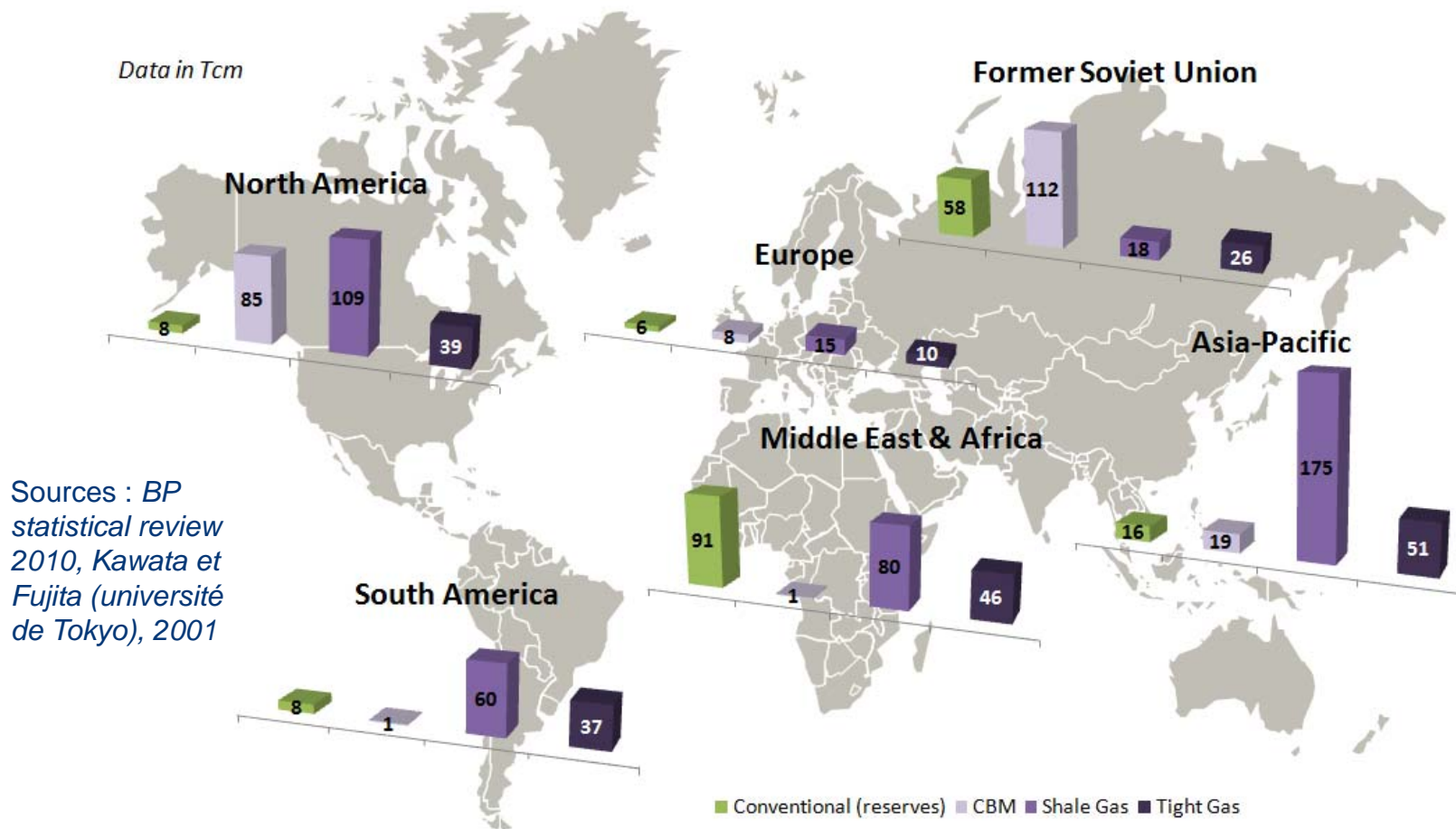
3. Smarter gas infrastructure





# Gas resources (1/5) : natural gas

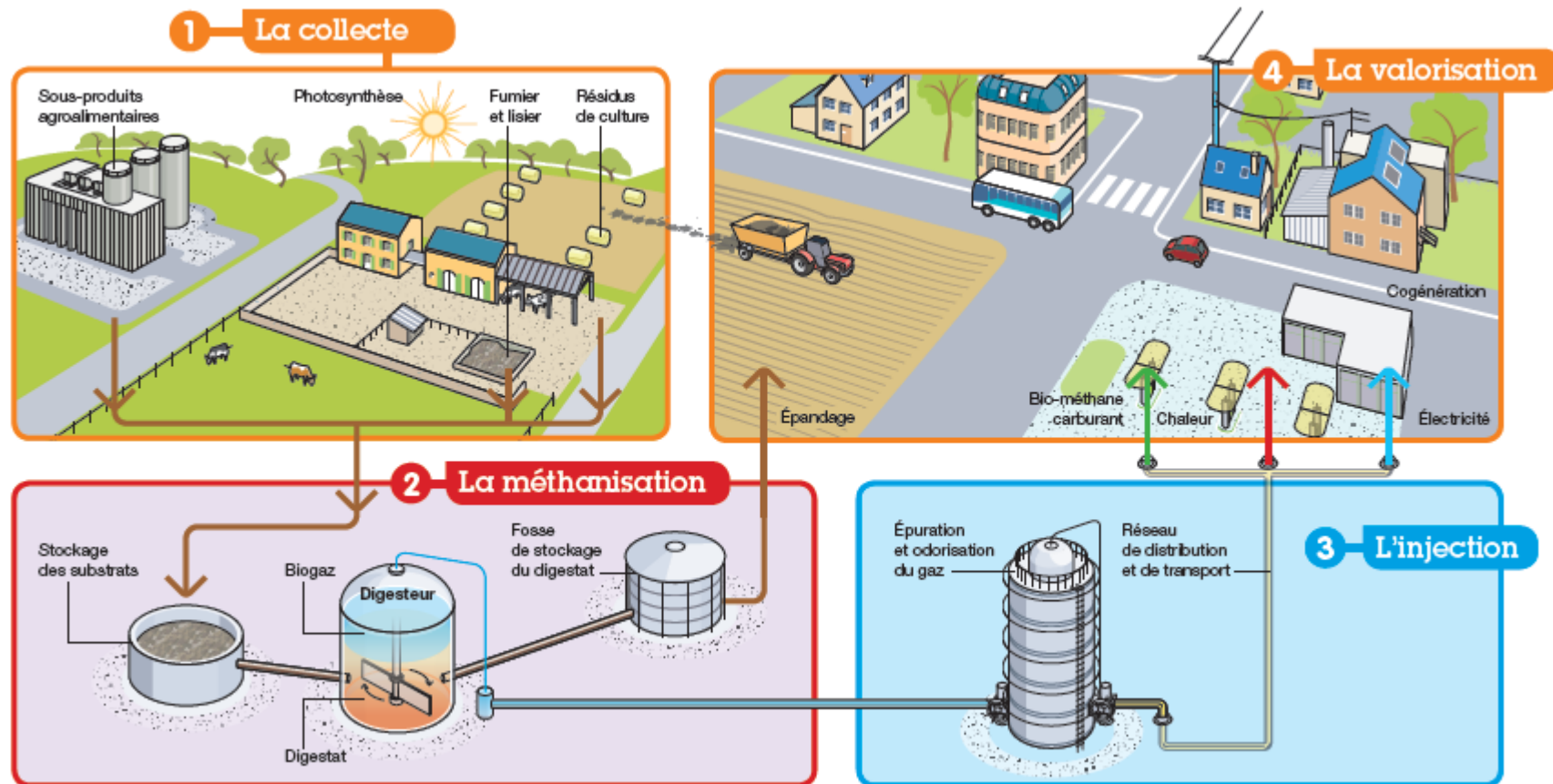
Natural gas from conventional & unconventional sources will meet the demand





# Gas resources (2/5) : biomethane

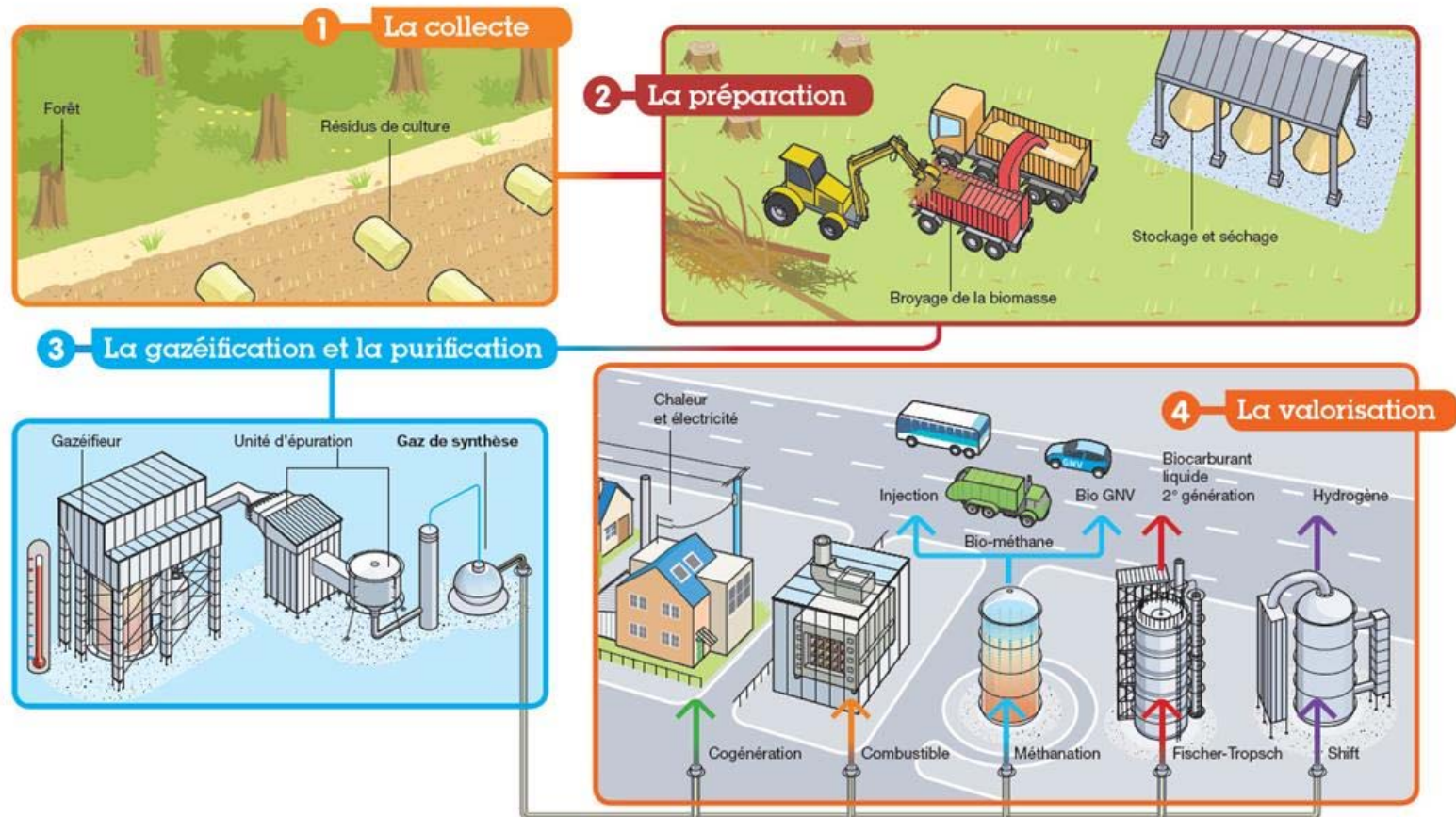
Currently available technology : waste anaerobic digestion



- An expanding technology in Europe driven by waste treatment and renewable development preoccupation

# Gas resources (3/5) : gasification

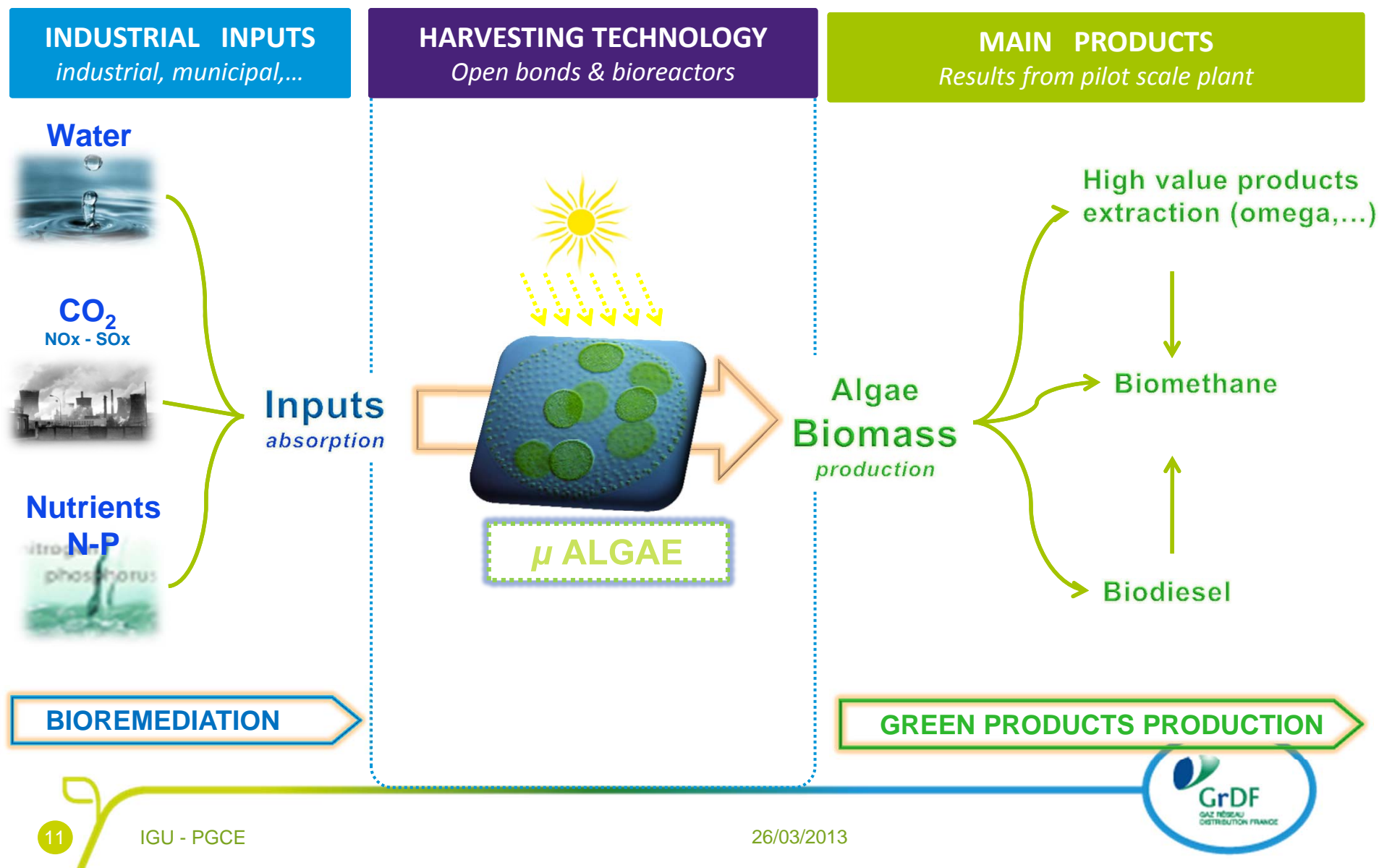
A high efficiency technology at industrial pilot stage



- Key competitive advantage: a conversion efficiency 25% higher than liquid biofuel competitors

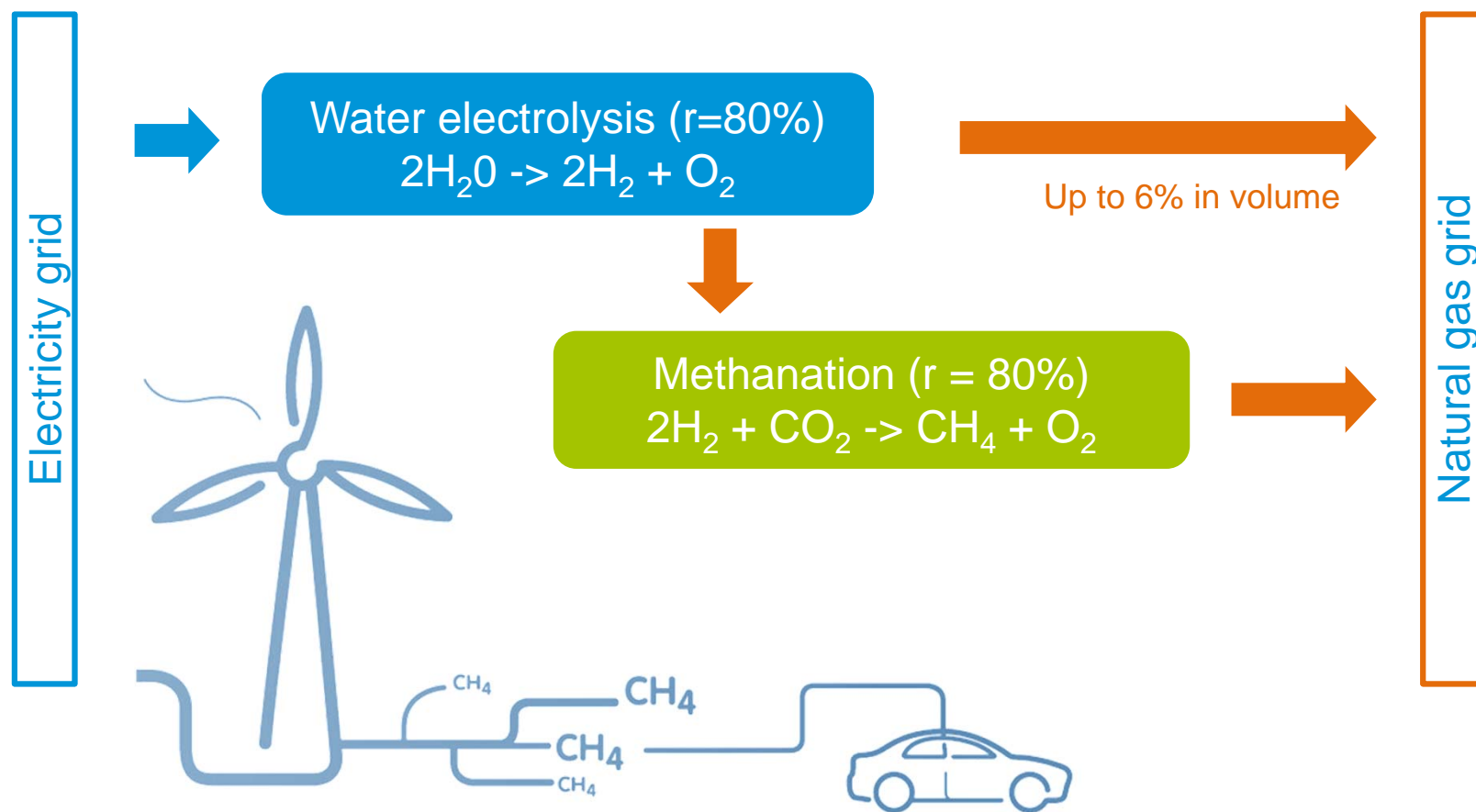
# Gas resources (4/5) : Biogas from microalgae

## A promising technology



# Gas resources (5/5) : Hydrogen & methanation

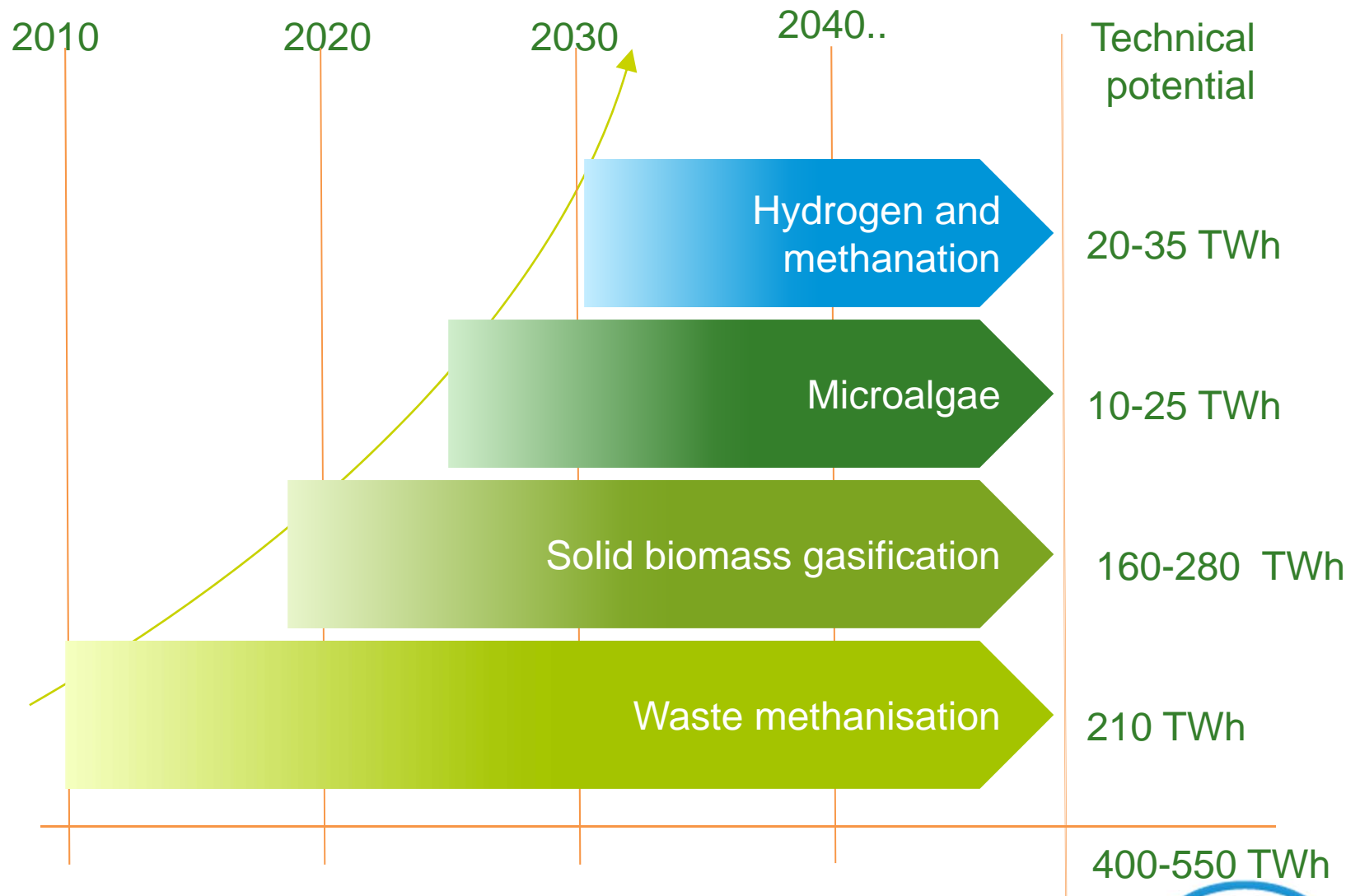
## A path to convert green electricity



- Hydrogen and syngas from methanation can play a major role in electricity conversion if intermittent generation exceed demand

# Gas resources conclusion

A 100% green gas supply is technically feasible





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1. Gas demand evolution

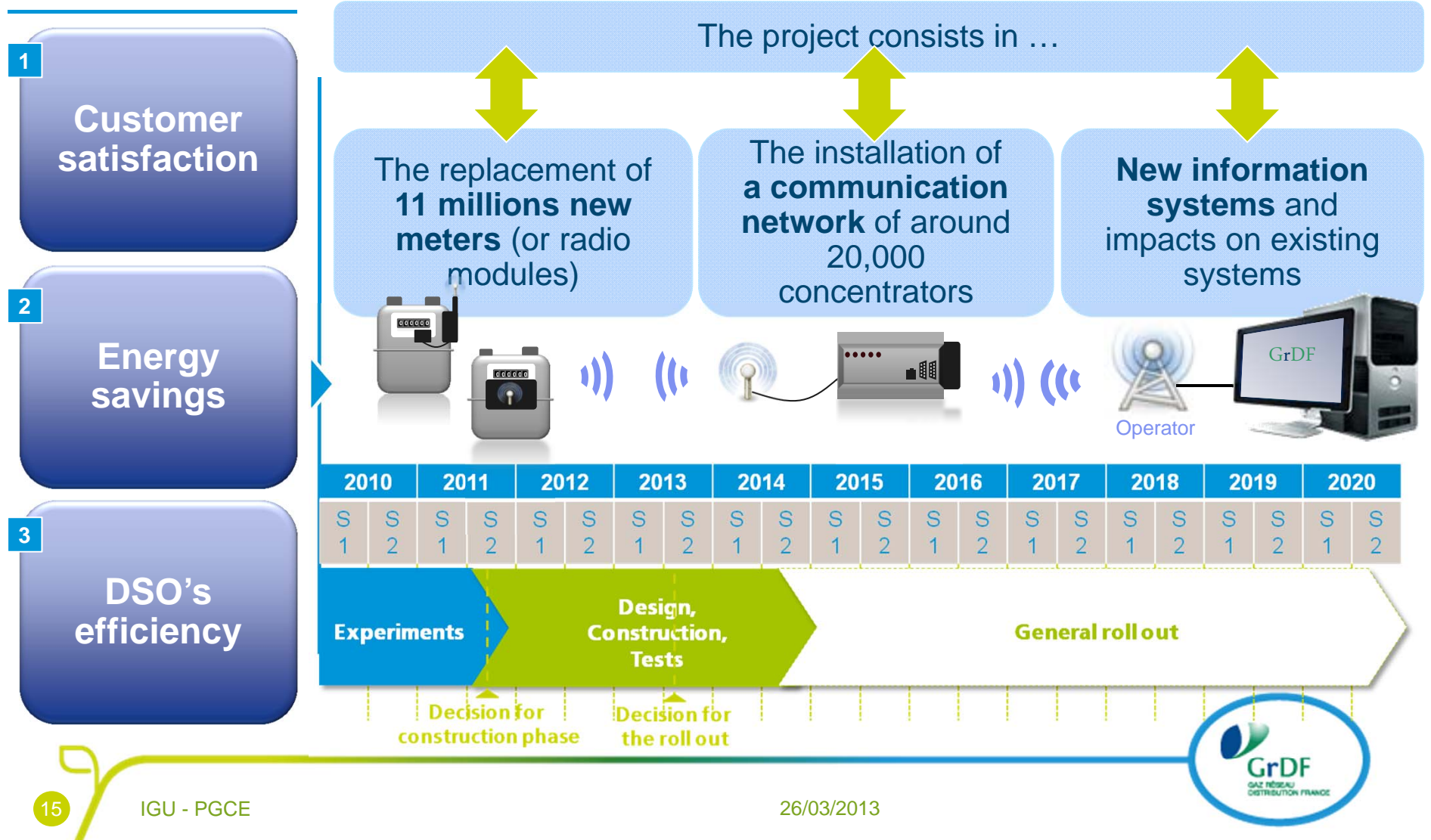
2. Gas resources





# Gas grid (1/4) : smart meters

Better grid knowledge & better empowerment of end-users to optimize their energy use



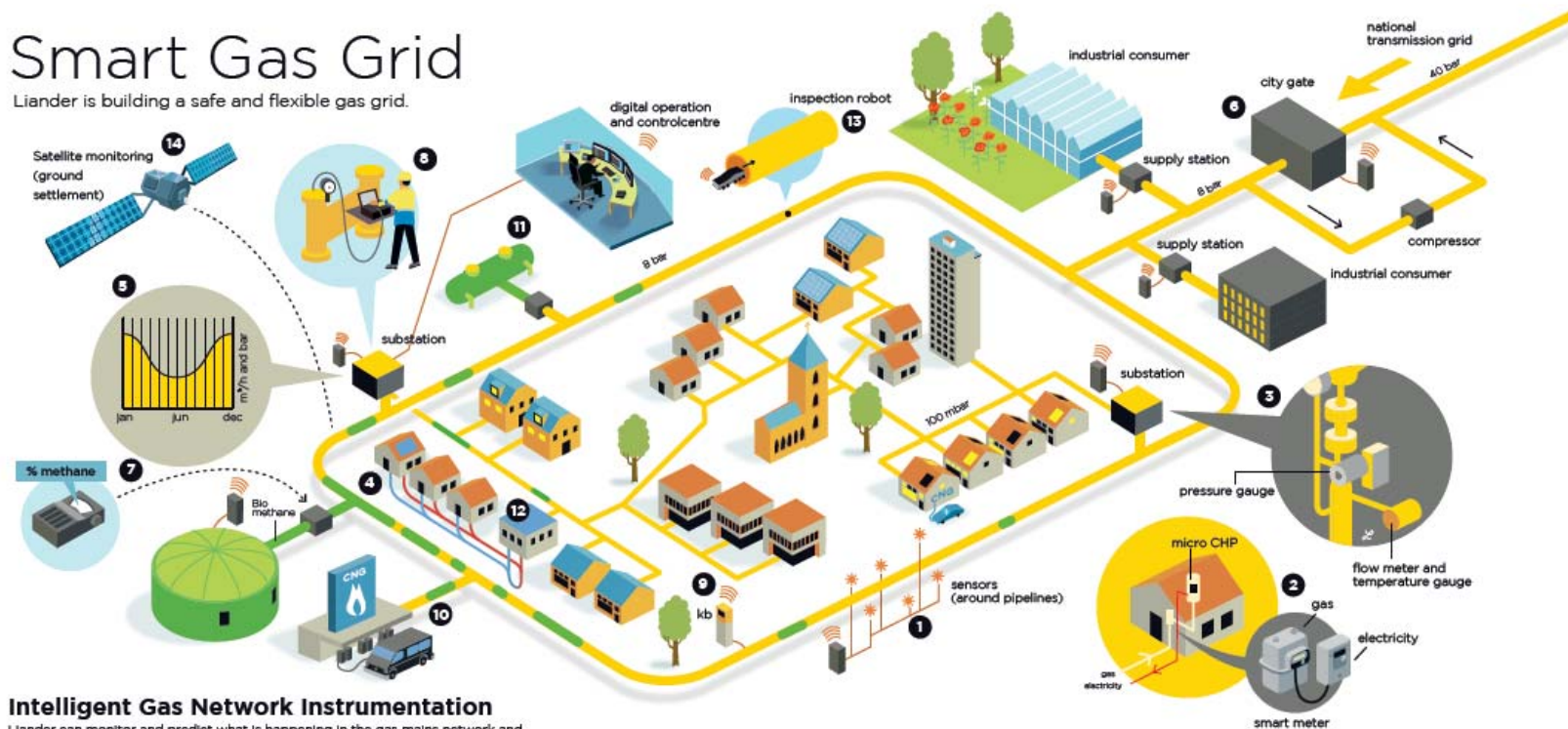
# Gas grid (2/4) : smart gas grid

Improving efficiency and security in operation and emergency response

- Thanks to system robustness and gas properties, quality of operation is good but can be improved tomorrow with gas smart grids

## Smart Gas Grid

Liander is building a safe and flexible gas grid.



### Intelligent Gas Network Instrumentation

Liander can monitor and predict what is happening in the gas mains network and intervene in timegrid using remote measuring and control equipment.

#### 1 Gas Grid Monitoring

Sensors measure ground vibrations, traffic loads, ground settlement, gas leakages, etc., around gas mains 24/7.

#### 2 Smart Metering

Gas meters record gas consumption profile and make this data available in digital format.

#### 3 Measurements in stations

Remote monitoring of gas inlet and outlet pressures, volumes and temperatures.

#### 4 Gas Diffusion

Sensors and computer models measure and predict gas flow diffusion and mixing.

#### 5 Dynamic Pressure Management

Varying the gas pressure depending on demand and supply.

#### 6 City Gate

Real-time GTS (Gasunie) data for gas outlet pressures, volumes, temperatures and quality.

#### 7 Monitoring Gas Quality

The quality of bio methane added to the grid is monitored 24/7.

#### 8 Station Diagnostics

Periodical diagnostics are run to ensure control systems are working properly.

#### 9 Cathodic Protection

Remote diagnostics and monitoring of the polymer coating around steel pipelines.

#### 10 Gas for mobility

Filling stations for gas used as vehicle fuel on the road and on the water.

#### 11 Local Storage

Storage of overcapacity of bio methane.

#### 12 Energyhub in residential area

CHP analog gas driven heat pump for district heating and electricity.

#### 13 Inspection Robots

Internal pipeline inspection.

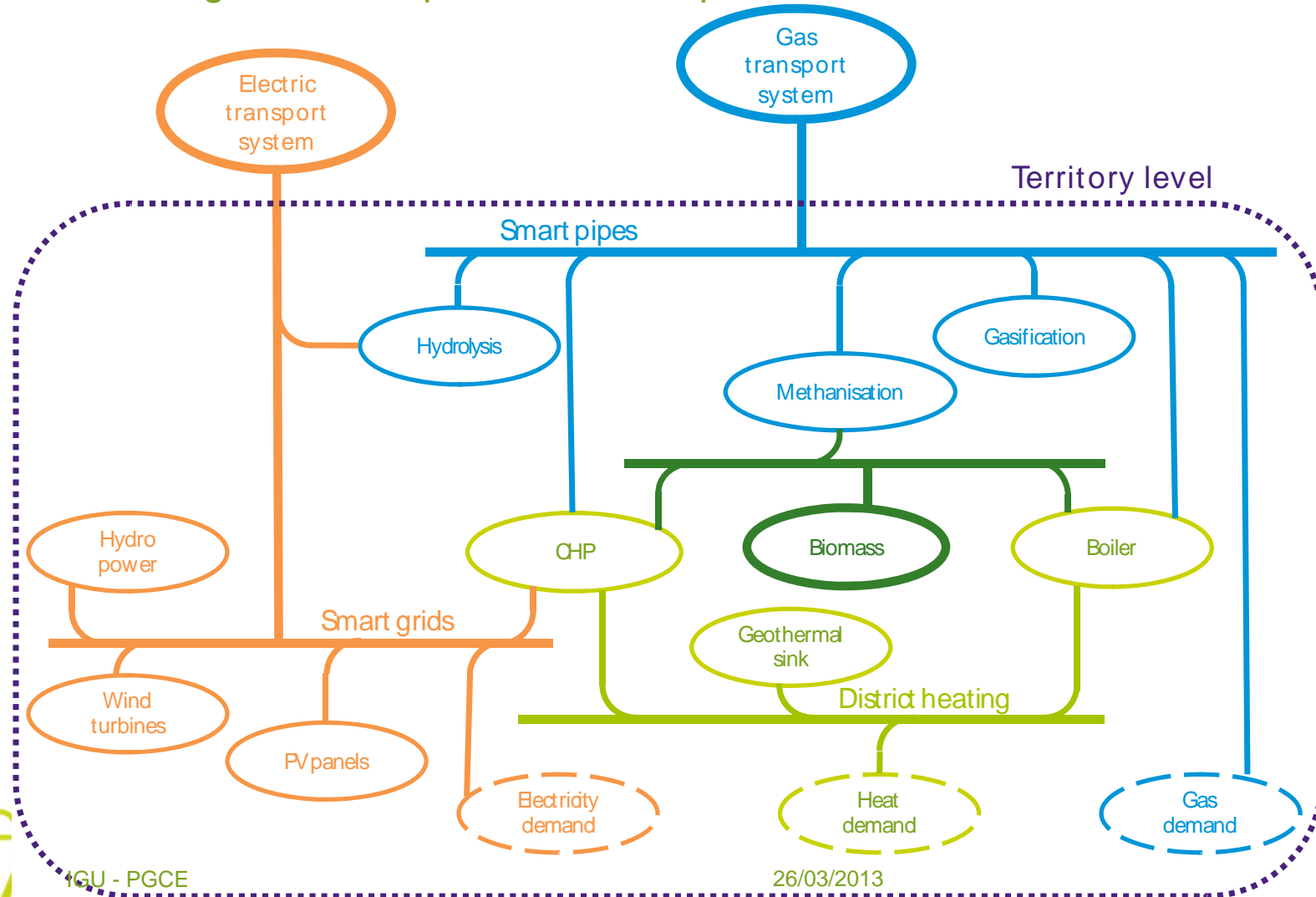
#### 14 Satellite Monitoring

Monitoring ground settlement at a street and neighbourhood level.

# Gas grid (3/4) : smart networks

Interactions between all urban infrastructure including gas grid allow new optimizations

- Gas smart grids will be part of overall optimization of urban infrastructures



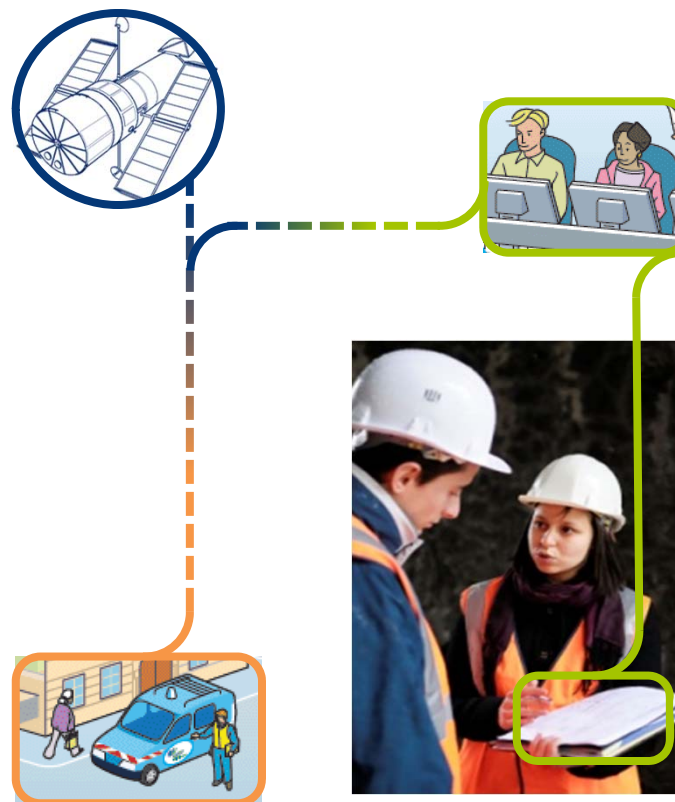
# Gas grid (4/4) : smart people

The skills of gas distribution system operators will be enhanced by the use of communication technologies

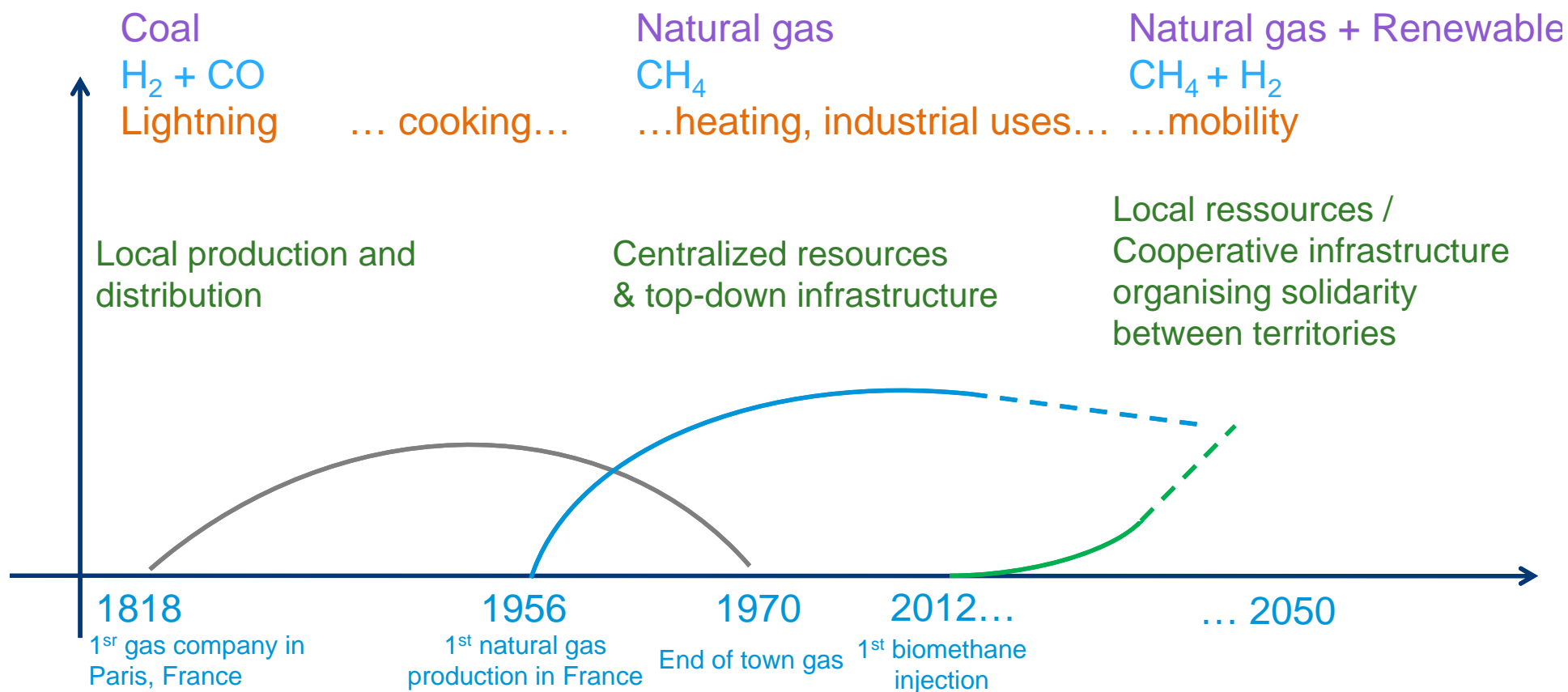
- Operators are being equipped with new technological devices to improve their efficiency

- Advanced communication terminal for equipment identification (RFID), distant database interrogation...
- Geosatellite positioning of service vehicles linked with advanced grid and urban mapping

- The future of grid operations will still strongly rely on human skills



# Future of gas : an already engaged transition



- Gas industry is able to lead the next energy transition for a more sustainable growth





# GrDF 2030 Preparing the future

Thank you !

