Overview of centralized biogas plants projects in France

Will the new economic incentives overcome the non technical barriers ?

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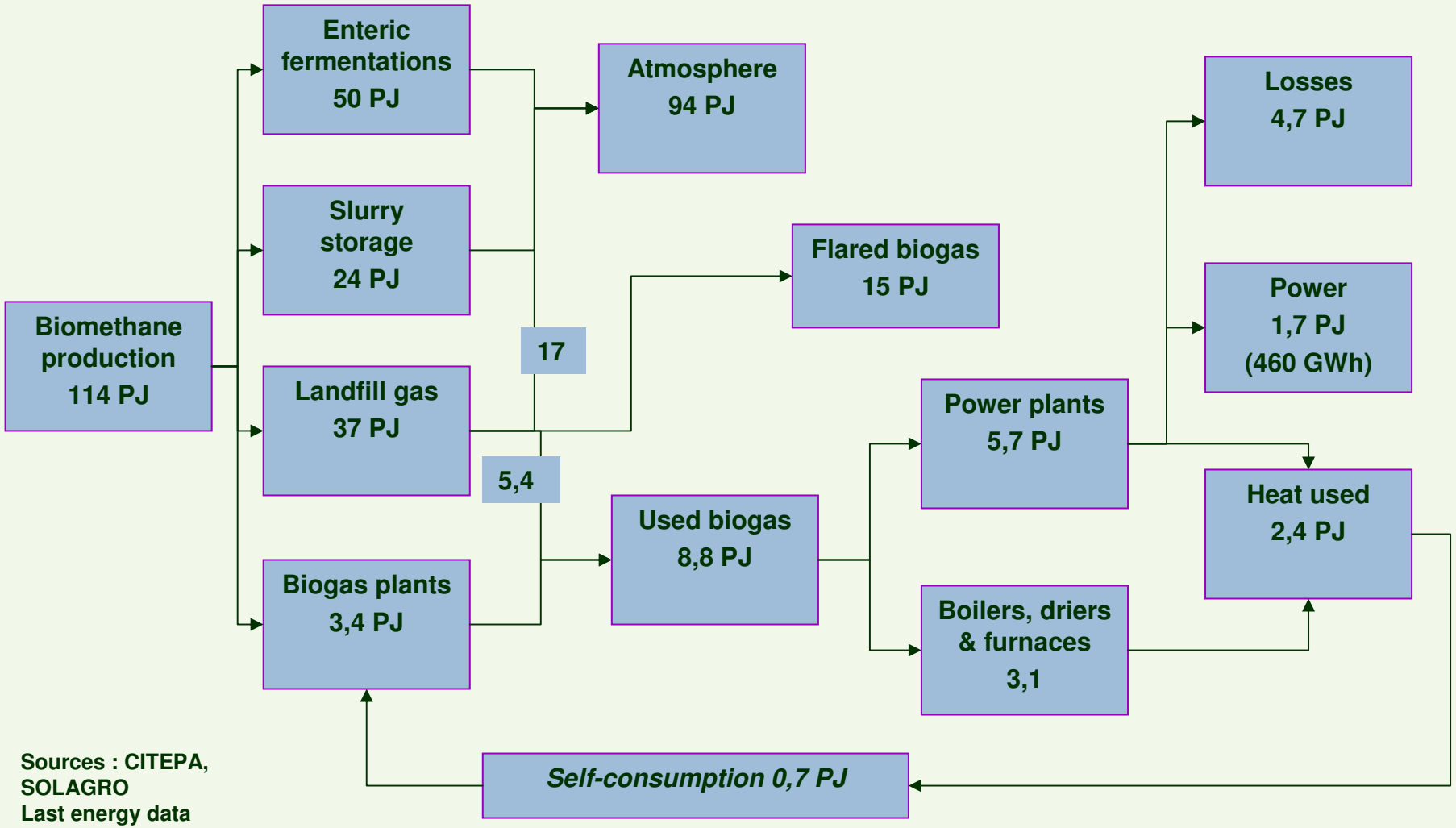
Biomethane production & use



Sources : CITEPA, SOLAGRO
Last energy data updating : 2005

Trends

Biogas production : +10% / year during the last decade

Power production from biogas : +18% / year

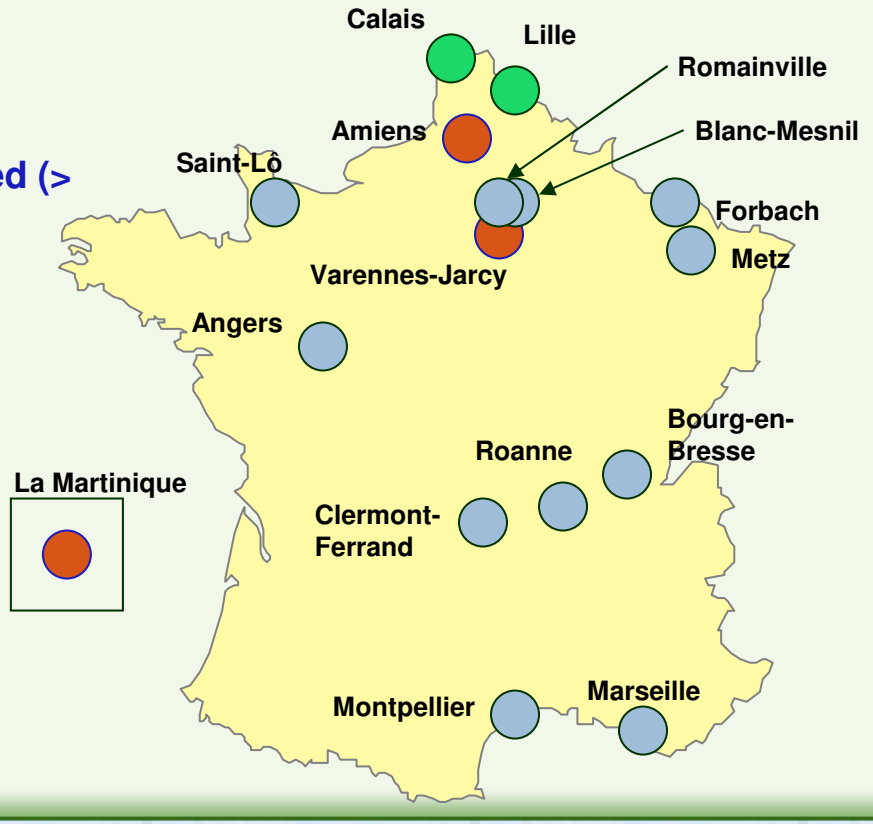
Landfill gas schemes : +23 MW in 2006 (+33% of capacity)

MSW methanization plants :

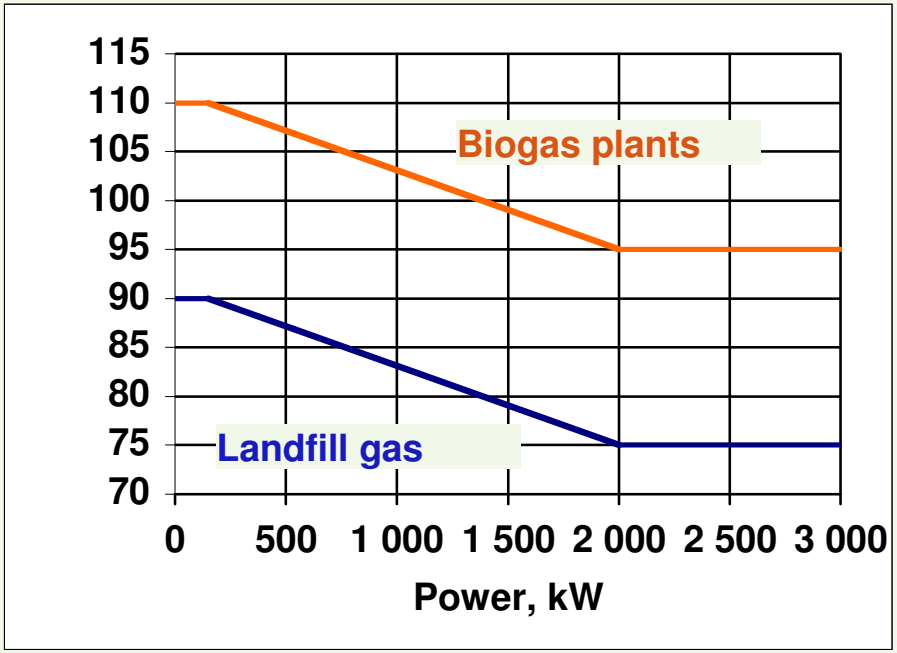
- 3 plants under operation (150.000 t)
- 12 new plants under construction or planned (> 1.000.000 t)

Agriculture sector

- Farm scale plants : 3-4
- CAD : 0

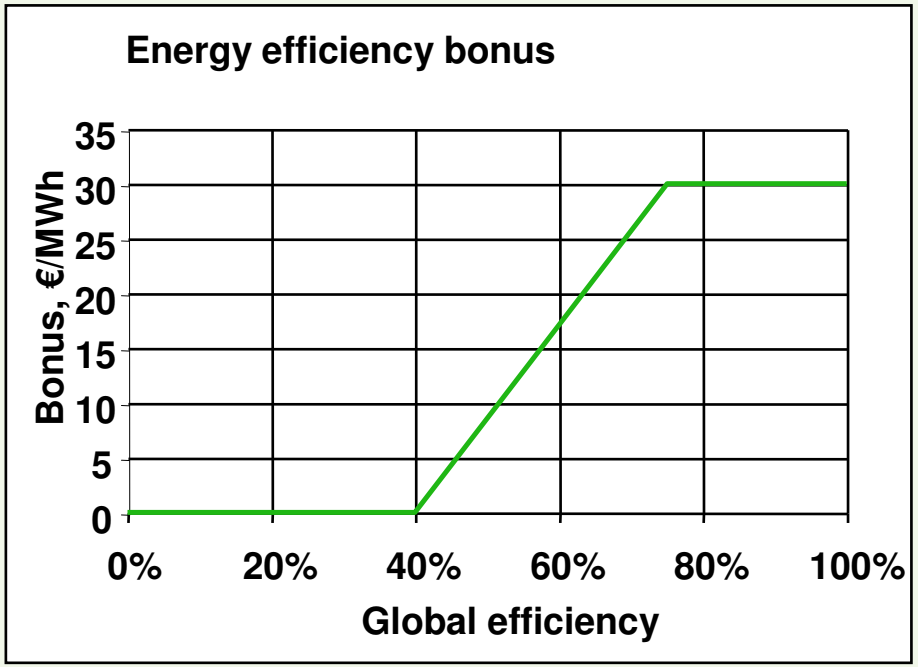


New economic incentives



Price for electricity from biogas

Feed-in tariff, revised in july 2006

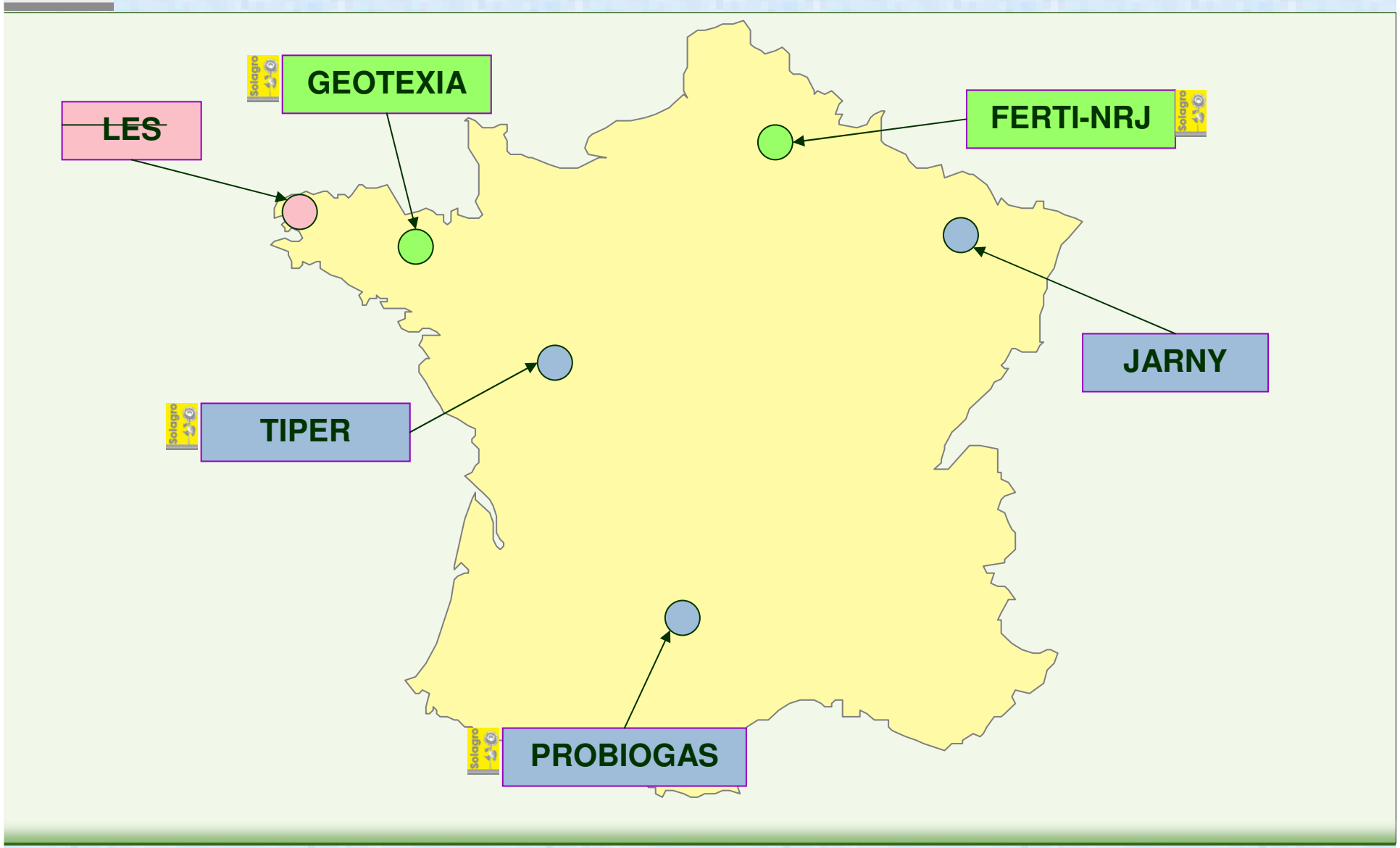


Biogas plant,
< 150 kW el,
efficiency > 75 % :
140 €/MWh

Global efficiency = (Power + Heat*) / 97% x Fuel

*** Including digester heating**

CAD projects in France



CAD projects in France

	Project start-up	Status	Size (Tg)	Manure (%)	Investment (M€)	Heat use	Comments
GEOTEXIA [Brittany]	2000	Permitting	60	50 %	16	Self-use	Production of a solid fertilizer ; nitrate vulnerable zone Partnership farmers organization / private company
FERTI-NRJ [Picardie]	2001	Permitting	38	0 %	5,5	Food industry	Private project, includes 89 farmers for digestate use
TIPER [Poitou Charentes]	2005	Studies	52	75 %	~7	Food industry, steam and water	Local association under creation (farmers & municipalities)
PROBIOGAS [Midi-Pyrénées]	2005	Studies	44	75 %	~5	Food industry	Case-study for the PROBIOGAS programme 10 km biogas canalization
JARNY [Lorraine]	2005	Studies	20	95 %	~5	District heating	Farmers'cooperative created

Non technical barriers
n°1 : Heat use

Renewable heat issues

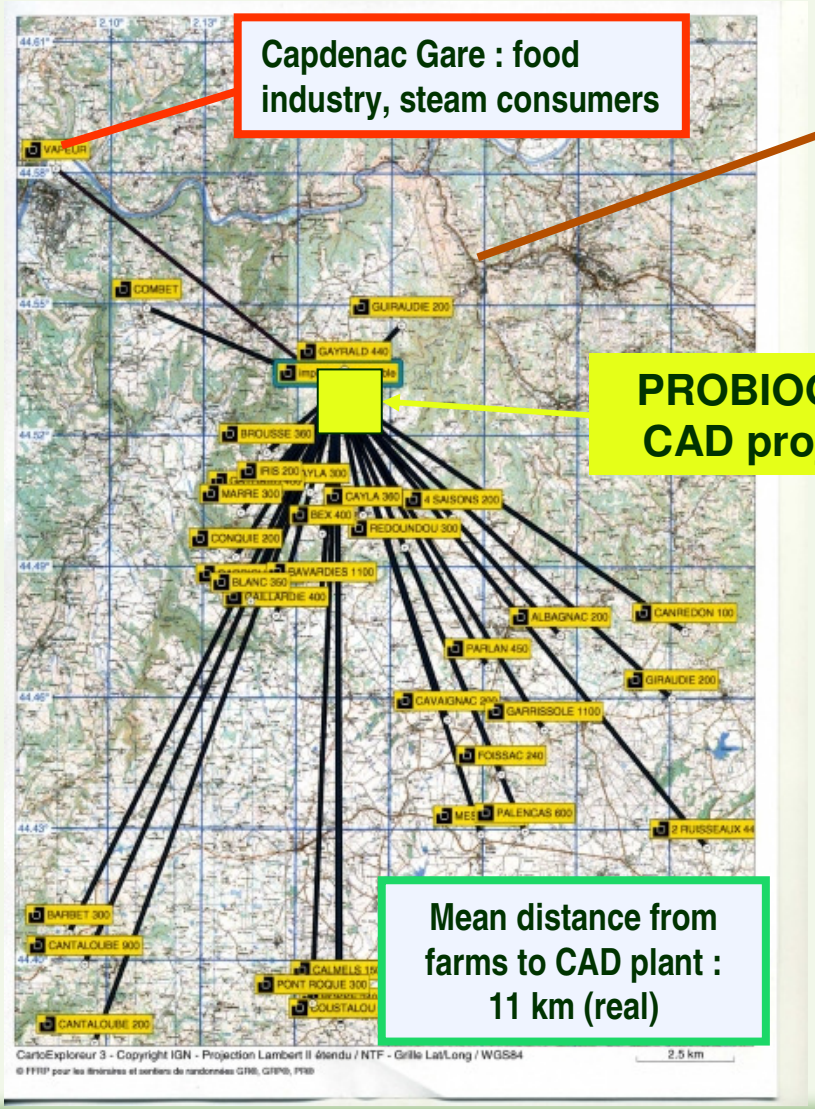
- Heat = 50% of final energy consumption
- Hot water = efficient heat carrier from producer to consumers
- Distribution => canalizations
- District heating in France : 3% of the housing ; mainly big cities
- Heat for industry ; but need for steam (only 17% of the fuel energy can be convert to steam with a gas motor ; and a gas turbine produces less electricity)

Solution

- Development of district heating : European Directive for renewable heat ; long-term financing ;
- Looking for heat consumption (housing, services, industry)
- Construction of canalizations for hot water or for biogas, according to the distance between the biogas plants and the heat consumers

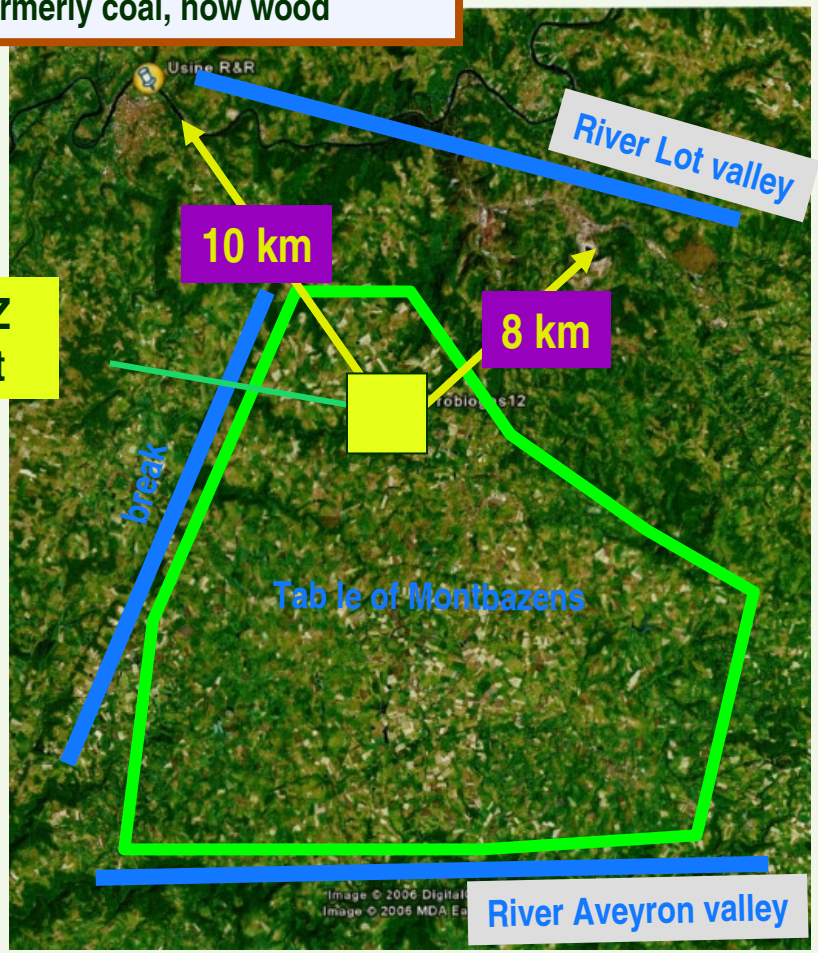
Non technical barriers

n°2 : Specific biogas canalization



Decazeville : district heating, formerly coal, now wood

PROBIOGAZ CAD project



Non technical barriers

n°2 : Specific biogas canalization

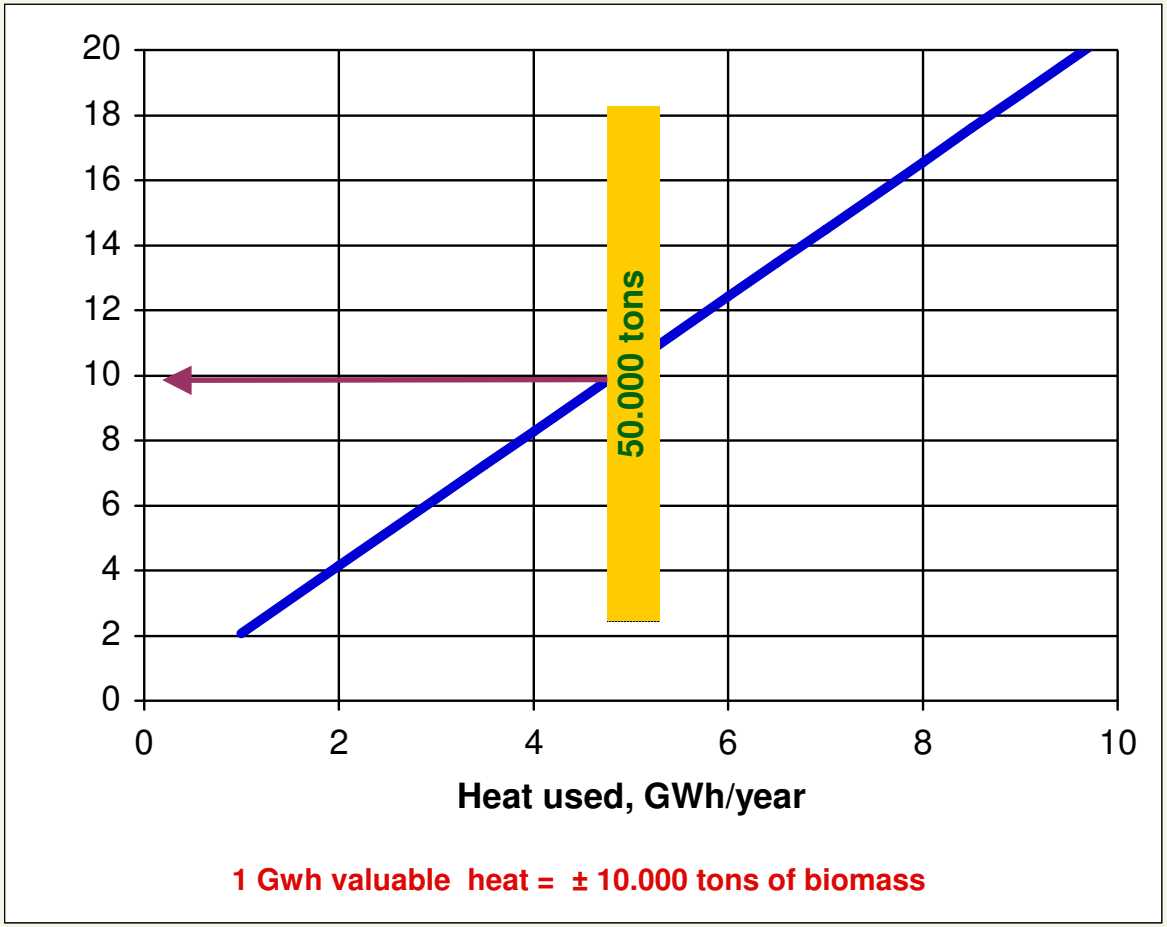
- Investment : 100 k€ / km
- Annual cost : 15 k€ / km
- Heat value : 20-25 € / MWh (gas price) + 15-25 €/MWh (efficiency bonus) = 35 - 50 €/MWh
- Profitability limit : 300 - 500 MWh/y per km

Barrier :

- Existing regulation

Solution :

- Working group : security, construction, guideline

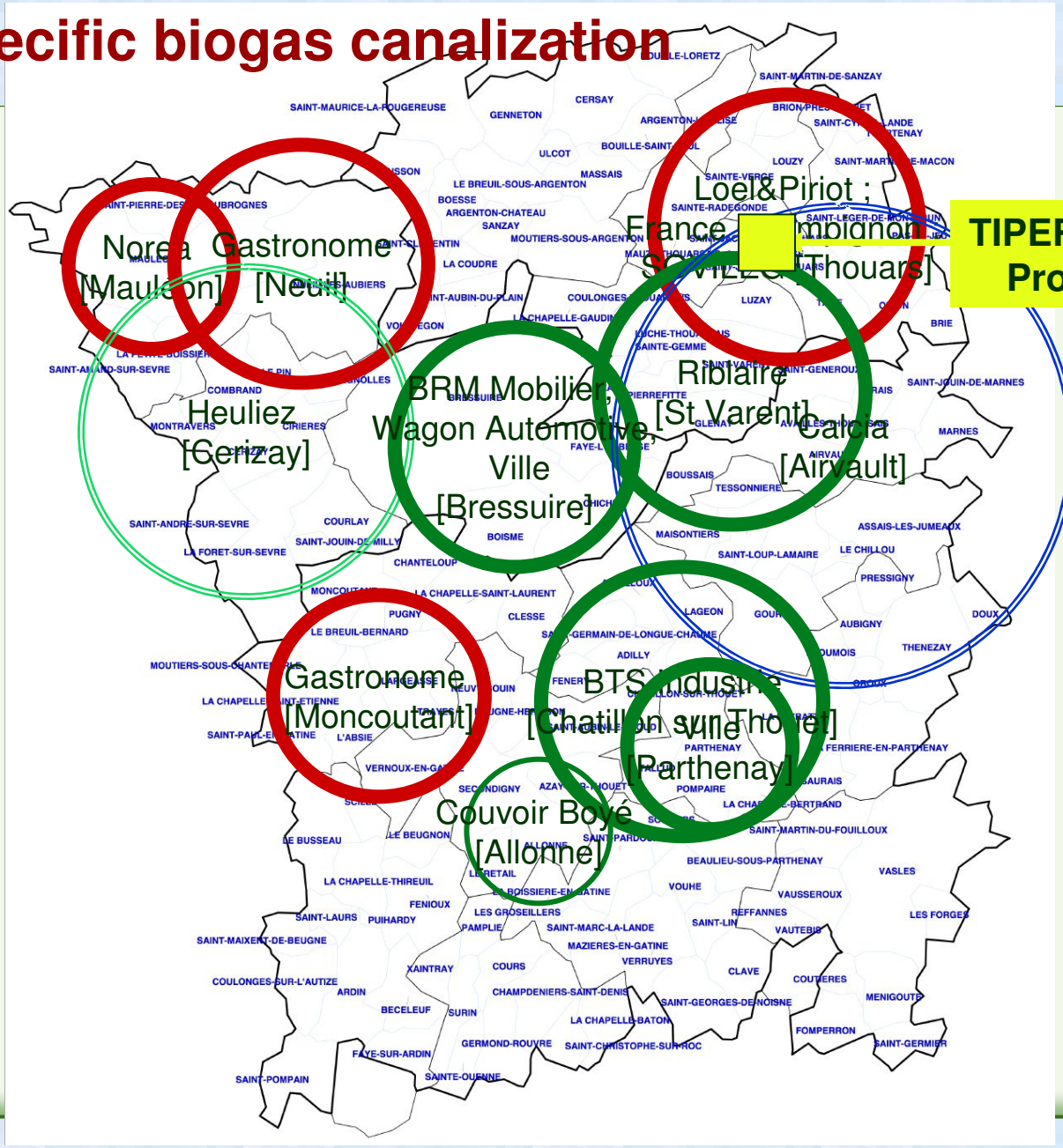


Non technical barriers

n°2 : Specific biogas canalization

Heat consumers

- Water
- Steam and water
- Gas



Non technical barriers

n°3 : Gas injection to the grid

Advantages for biogas injection

- High energy efficiency : not heat losses, few power consumption
- Low risk to loose the customer
- Production « with the stream », no influence of season / night / week-end
- Need for a renewable « green gas » in substitution to fossil gas

Barriers

- Legal status : biogas injection is « lawful but not permitted » ; specifications from authorities and gas operators are waited
- Health issues were cited about the Montech project (landfill gas upgradind): halogenated compound, heavy metals…

Solution :

- Expert group of AFSSET (french agency for health and environment at work) since Feb. 2007

Non technical barriers
n°4 : administrative barriers

The legislation is unaware of biogas

- No legal norm for the solid digestate, unlike aerobic compost : problem for the commercialization and sale
- => AFNOR (french agency for normalization) work group dedicated to « digestate » from biogas plants, created in 2006

- Regulation concerning hazard for biogas plants is not clear

- Regulation concerning specific biogas canalization is not clear

Non technical barriers
n°5 : the involvement of farmers

Involvement of farmers in a CAD project : several conditions are required

Fertilizing issues

- Prove that digestate is better than slurry (for exemple : N-enrichment by adding protein rich substrates from meat industry…)

For solid manure systems :

- Limit change for slurry spreading (same equipments…)
- Take in charge the switch to liquid digestate (equipement, storage)
- Prove that digestate is better than compost, i.e. mineralization of organic N is favorable

Economic issues

- Prove that CAD option is more profitable than farm-scale project, for each individual case
- Fairly share out the benefits between all partners : farmers, waste producers, heat consumers, plant investor…
- Afford services - storage, spreading… - or money for slurry delivering
- Don’t ask for a fee from farmers : slurry is not a waste (except in N-excess areas)

Non technical barriers

n°6 : CAD operator

Need for a specialized developer

- Development costs for a CAD project = some hundreds of k€ ; duration : 4 - 5 years
- Includes : technical studies ; contracting with farmers, food industry, heat consumers, digestate users ; financement ; environmental studies, risks assesment ; planning ; permitting ; contracting with manufacturers…
- => Specialized business in biogas systems engineering is required, besides partnership with farmers, municipalities, local food-industry
- Cross-cutting concerns : energy, waste, agriculture… => a new profession

Conclusion

Due to the new feed-in tariffs for electricity, a new age is just beginning for biogas in France. In particular, biogas from agriculture is coming back.

Several CAD projects are under development. They will indicate what could be the « french way » for biogas from agriculture (obvisouly plural).