



*biogas***max**
A D R I V I N G F O R C E

Cleaner fuels for urban mobility – Pisa - 02.07:2010

Biomethane as a fuel: lessons learnt from Biogasmax project

- **practices, incentives, actions at a EU level ?**

Gildas LE SAUX

Biogasmax project manager

Lille Metropolitan Area (*Lille Métropole Communauté Urbaine*)

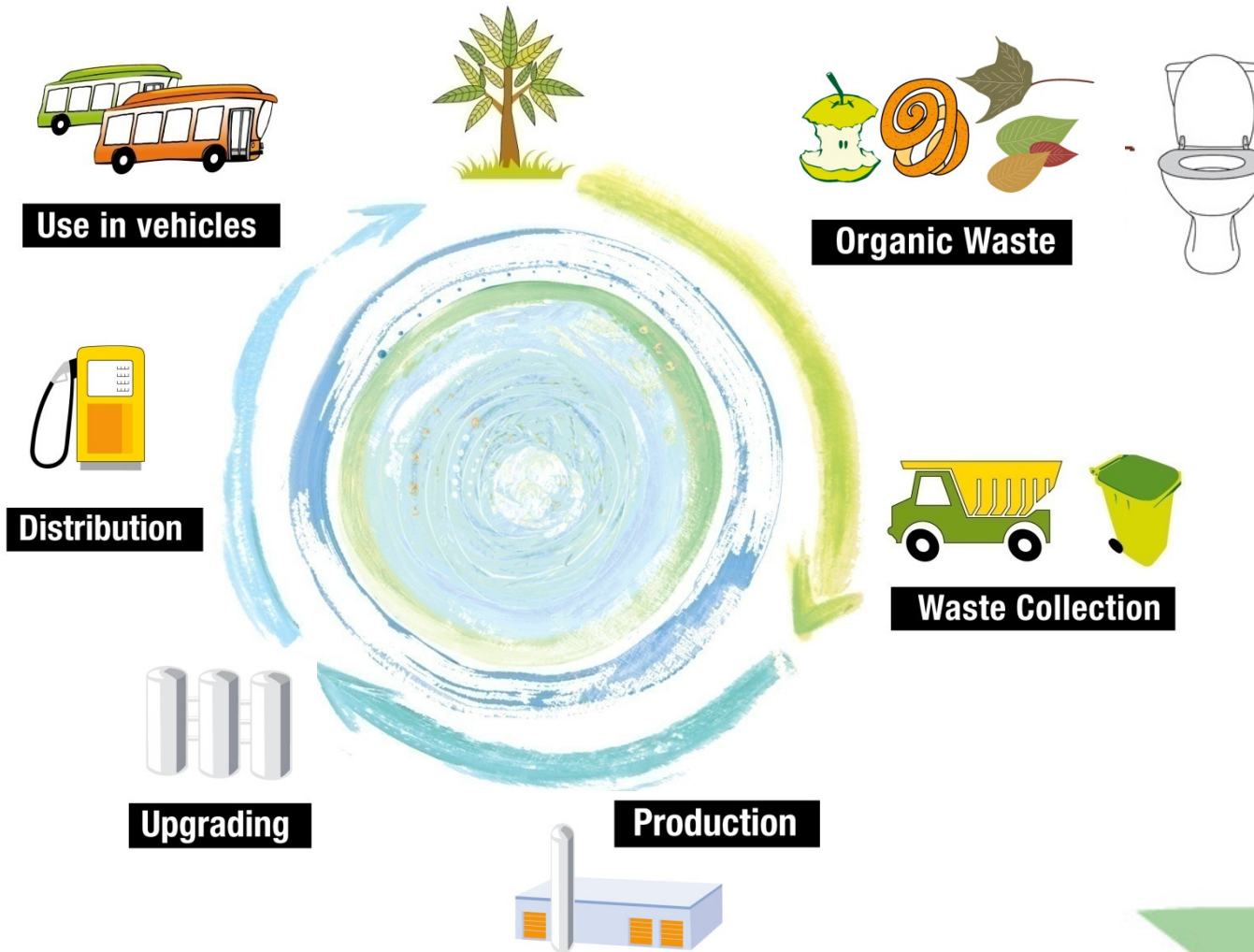
Urban Waste Division

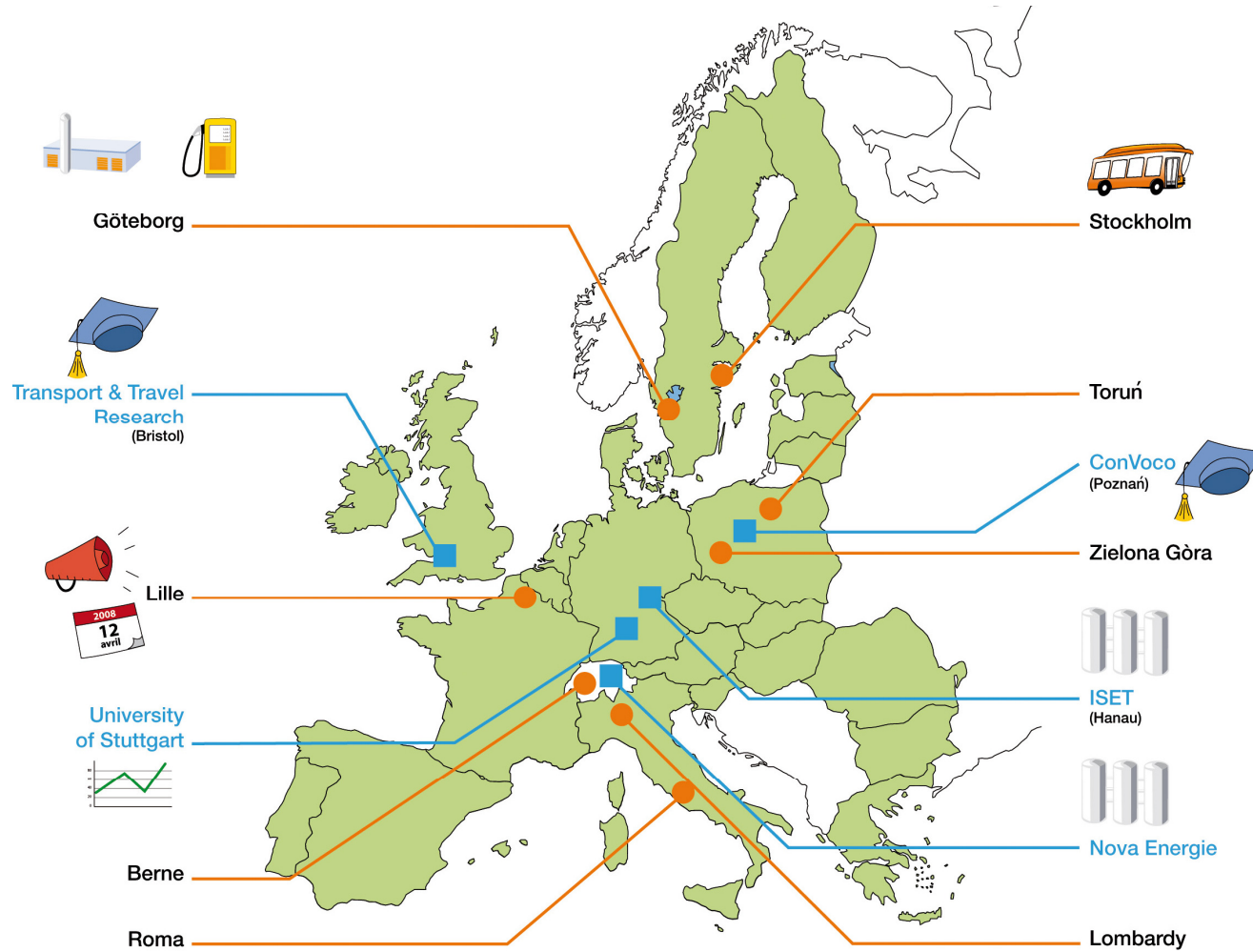
FRANCE





- BIOGASMAX is a EC funded project (FP 6)
- The three major objectives of the project are:
 - demonstrate large scale digestion and biogas upgrading units with waste material available in urban and close by rural areas
 - demonstrate and expand fleets in transport : buses, waste collection trucks, services cars, etc.
 - prove the technical reliability, cost-effectiveness, environmental and societal benefits of biomethane fuel

Biomethane life cycle

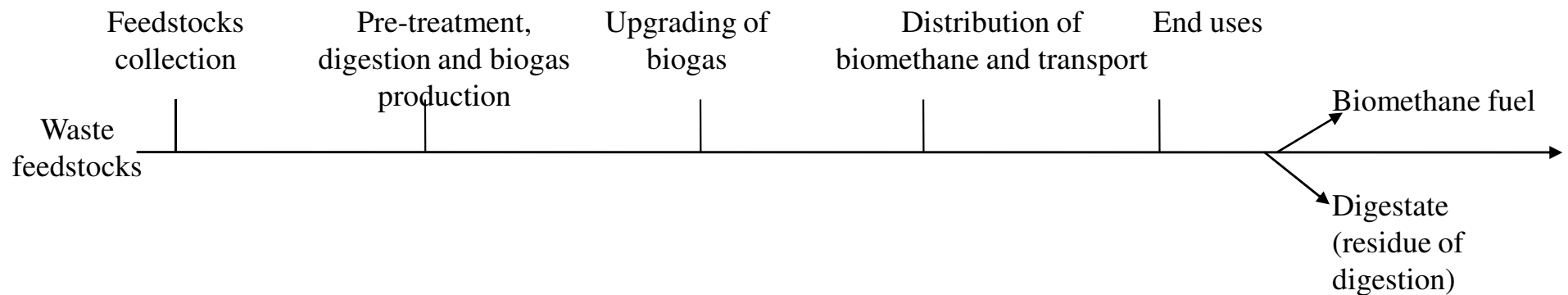




-  Demonstration and research partners
-  Horizontal partners
-  WP1: project management
-  WP2: biogas production
-  WP3: upgrading
-  WP4: distribution
-  WP5: use in vehicles
-  WP6: evaluation
-  WP7: transferability studies
-  WP8: communication and dissemination



- **From waste to biomethane (well-to-wheel):**
>> ... how to ensure success at each stage of the biomethane chain ?



- >> ... how to build an economically viable system ?

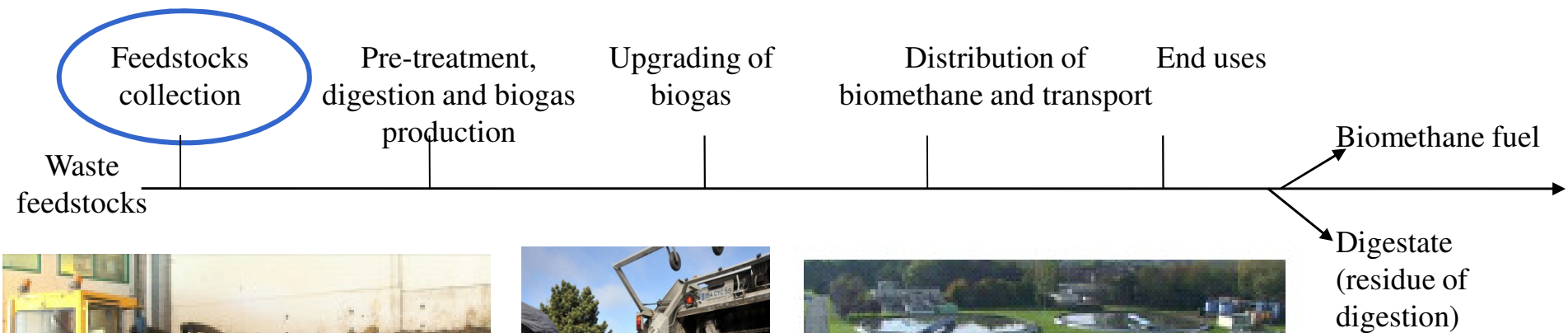
⇒ what can be learnt from Biogasmax best practice?

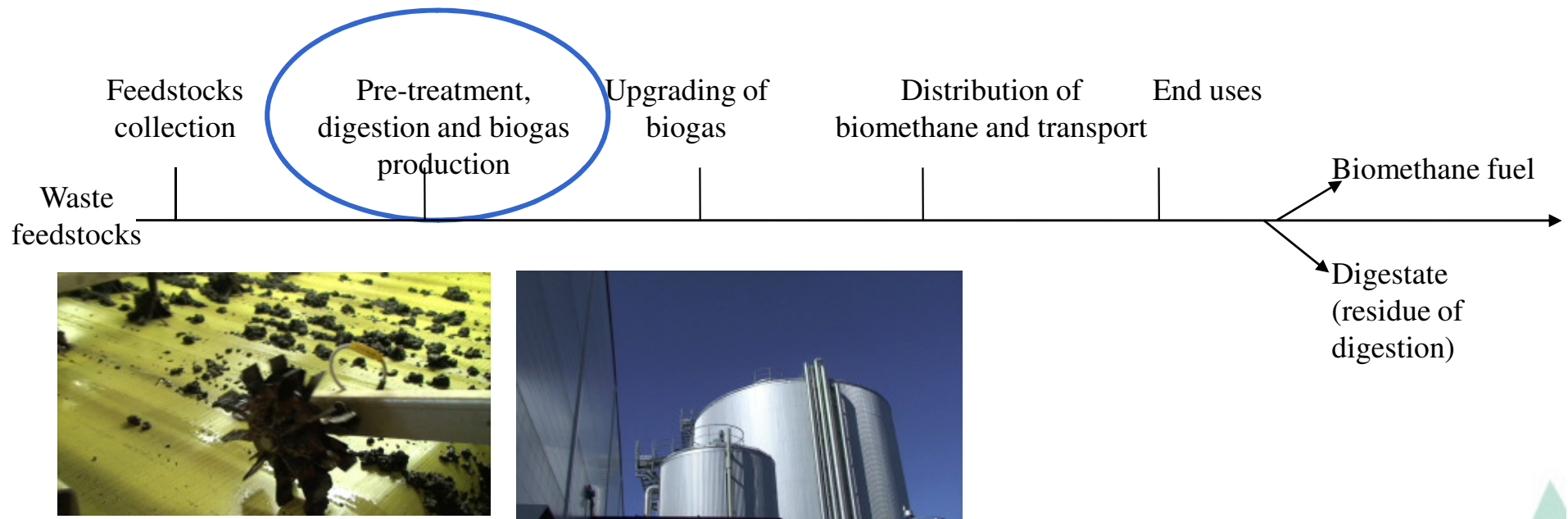
⇒ which actions needed on a European level ?



- **Biomethane as a fuel: a driving force**
 - Biofuel and quality of air : “Waste can clean the air”
 - Greenhouse gas reductions and decreased oil dependency
 - organic recovery of biowaste
 - production of quality organic fertiliser
- **A close-loop system:**
 - strategic policies gathered : waste, transport, water management
 - Local-regional resources, local end-uses
 - Regional development







The Organic Recovery Centre (ORC)



- **biomethane fuel production : 480 Nm³/h of 95% methane content**
- > 4 millions Nm³/a**

The bus depot



- **150 CNG buses whose 100 biomethane-powered**



**2 waste collection trucks
refuelled with pure
biomethane at the Organic
Recovery Centre since March
2009 (10 000 Nm³)**

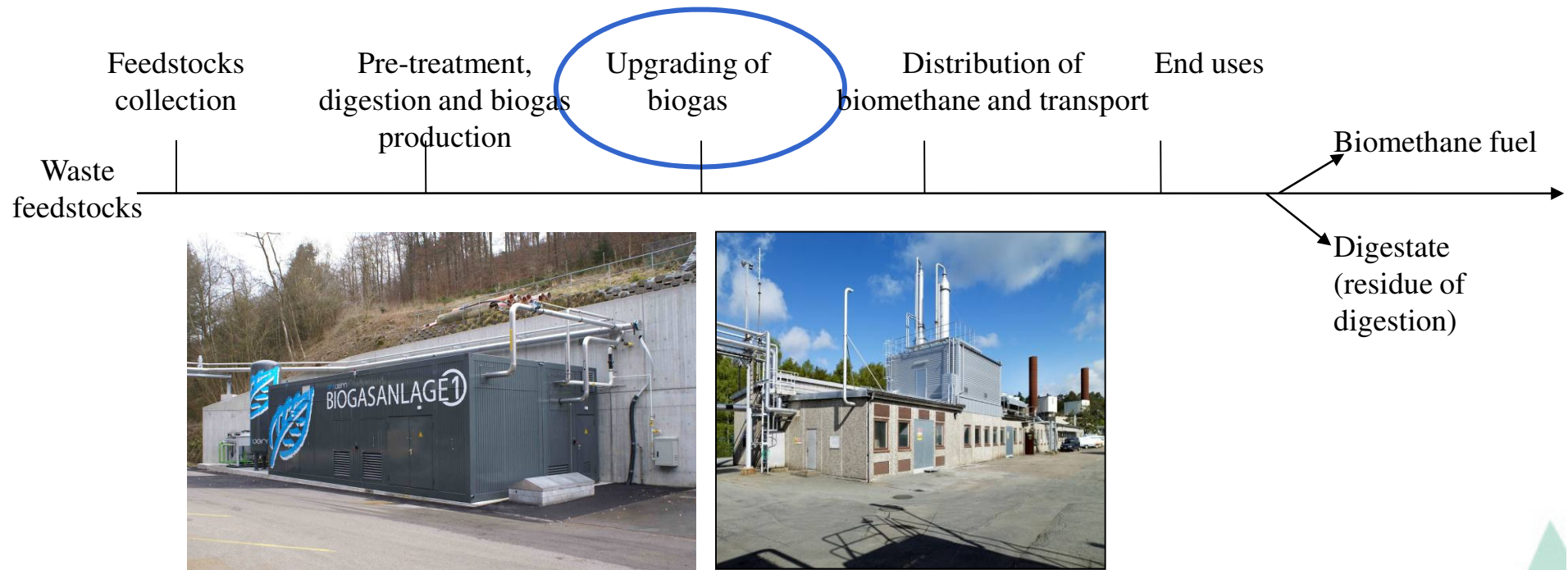


Lille – second biomethane plant

- **Marquette upgrading plant (sewage sludge)**
 - 0,28 million Nm³ of upgraded biogas per year (10 buses consumption eq.)
 - upgrading plant (80 Nm³/h capacity)
 - dedicated gas filling station on site



Upgrading: from raw biogas to biomethane



■ Objectives:

- remove pollutants like H₂S
- remove CO₂ to increase the methane content of the gas

■ Many technologies are available on the market

■ Three techniques have been monitored within BiogasMax:

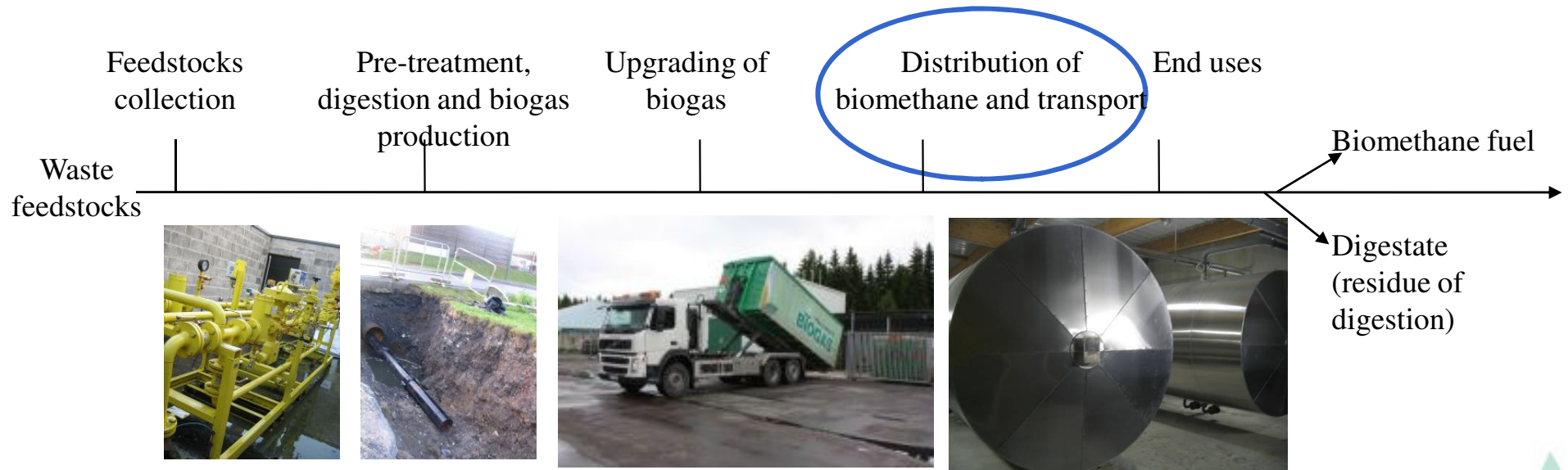
- water scrubbing
- pressure swing adsorption
- chemical absorption

NB: No partner reported essential problems

⇒ state-of-the-art of technologies for biogas upgrading



Distribution and transport



Distribution and transport

Solutions adapted to local contexts and constraints

« Client areas » **far from production site**
No grid or pipe possible



Mobile storage



Västeras

Clients **close to production site**
(housing, bus depot)



Dedicated pipe and security of supply with back up system (LNG or CNG)



Stockholm, Rome, Lille

Natural gas grid **next to production site**



Grid injection



Bern, Göteborg, Lille

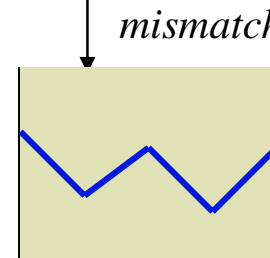
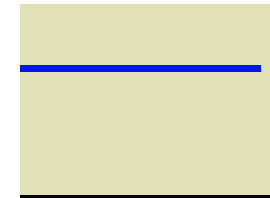
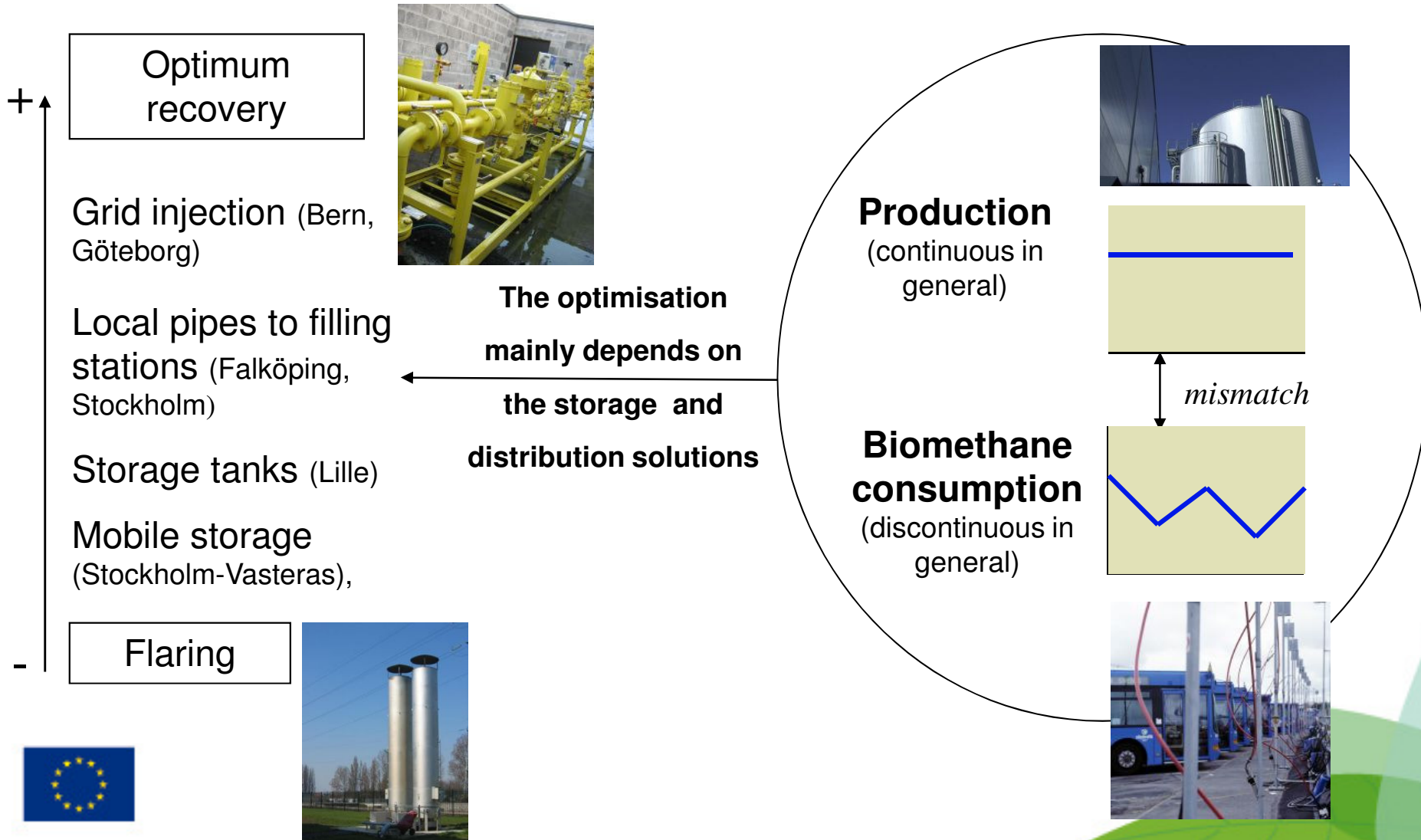
Which solution(s) ?

Concerned sites



Distribution and transport

■ Which optimisation ?



- **The answer of the “Chicken and Egg” dilemma**
 - the distribution network will make people buy CNG cars!
 - the distribution network will make car manufacturers produce new/more models of energy efficient vehicles



Expanding filling station network

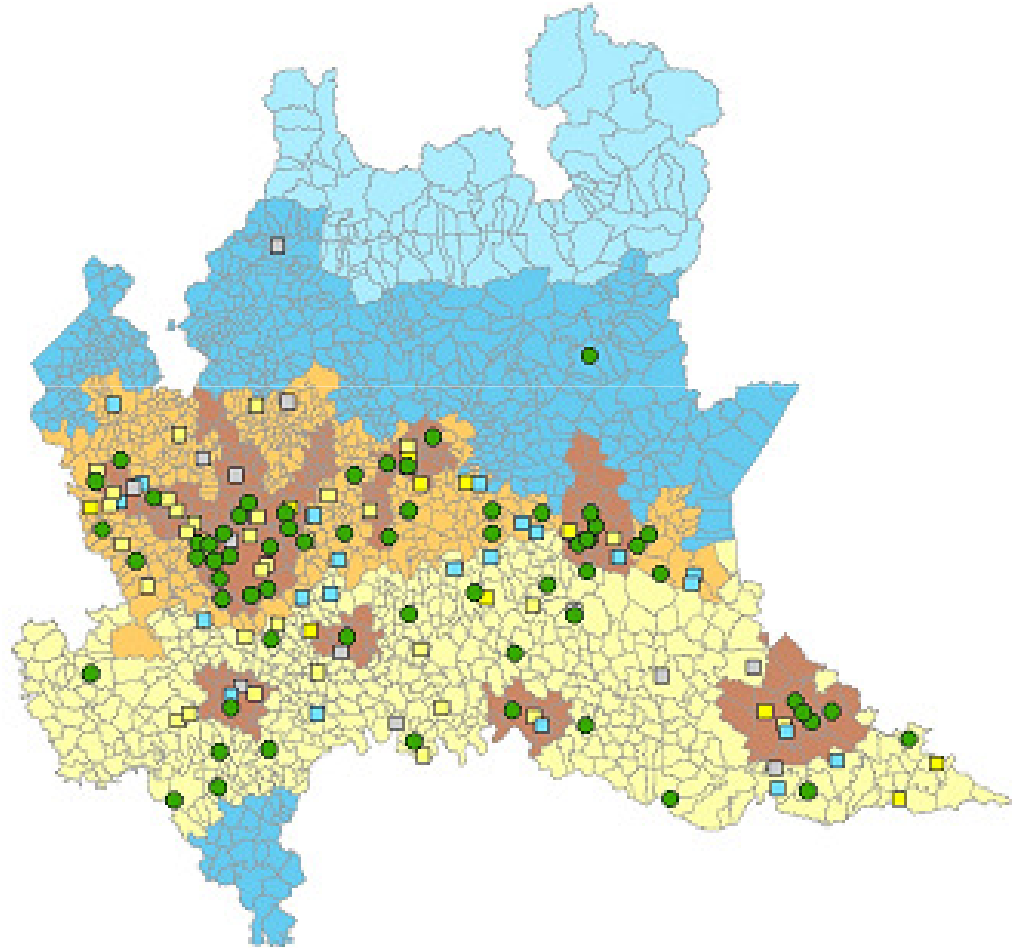
- **Need for public incentives** (location finding, ground financing...)

- **Need for common technical/safety rules for the building and the operation**
 - => **synergies with gas industry to be set up**



- **Need for urban planning rules**
 - The example of the Region of Lombardy

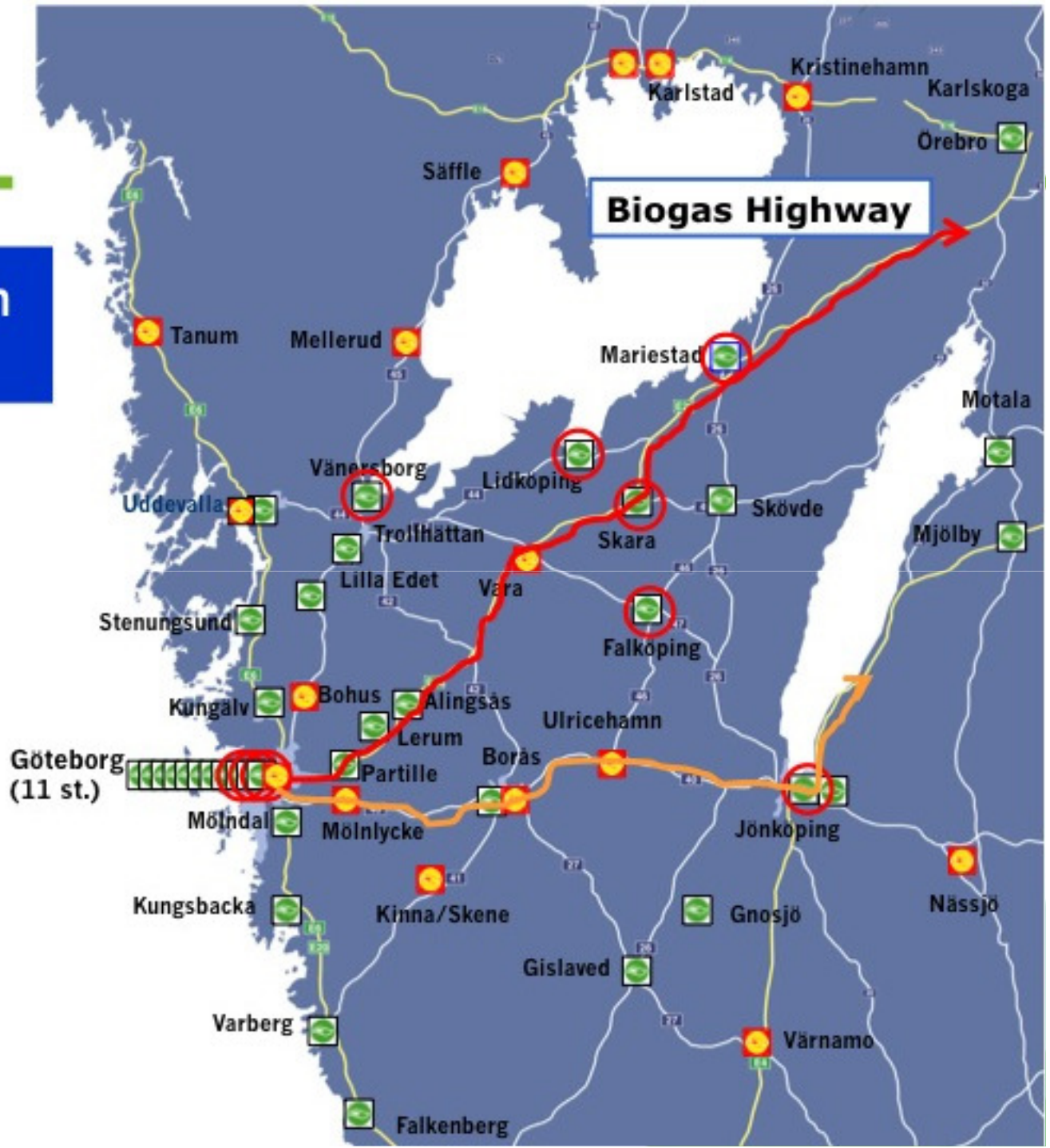
■ The Region of Lombardy

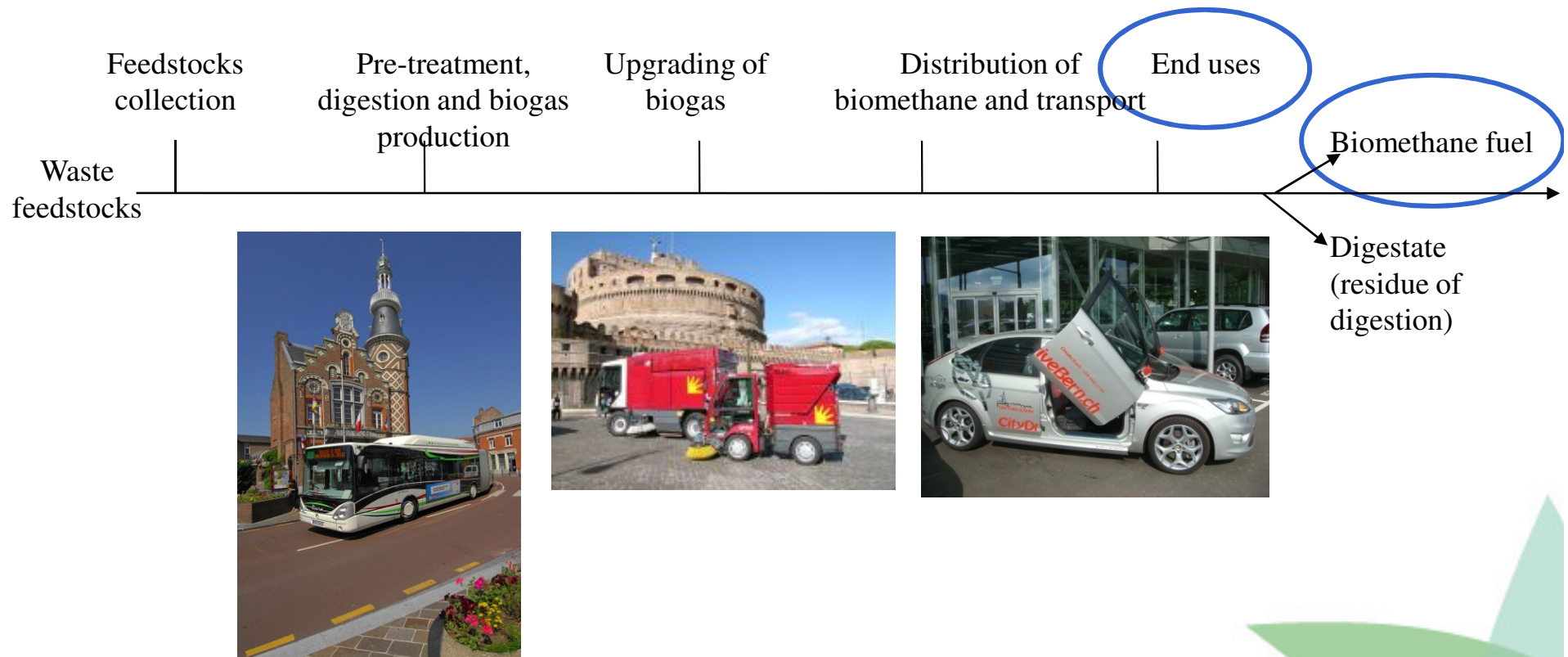
- 148 CNG filling stations:
 - 88 are in operation
 - 14 are under construction
 - 12 have been authorised
 - 34 are planned



Filling stations in west Sweden

-  Existing
-  Under construction
-  Planned





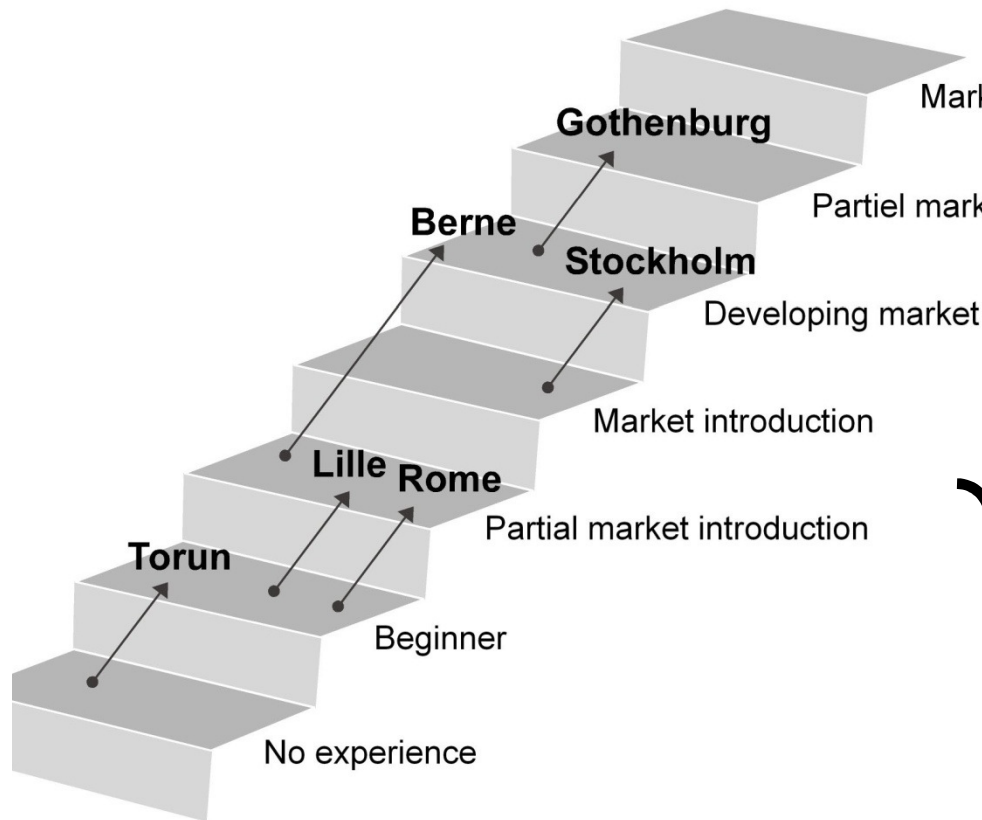
CNG vehicles experience

- **Biomethane vehicles** are operated in fairly **large numbers** at all demonstration sites.
- The experience of biomethane vehicles dates back **over ten years** in some cases.
- Biomethane is used in **many different kinds** of vehicles. Buses and waste collection are the most common applications
- The biomethane vehicles are used in **everyday service** and fulfill the requirements of the fleet operators.



Vehicle use : how stimulating market ?

- Which incentives ... and when ?



market development phase calls for incentives that stimulate markets:

- campaigning and networking
- expansion of refuelling network
- green procurement
- monetary incentives

pre-market phase requires “preparative” incentives:

- establish basic refuelling infrastructure
- legal and tax measures (to remove disadvantages)
- introduce captive fleets



■ Information campaigns (Bern)

Campaign 1: Testimonials



Campaign 2: are you old fashioned?



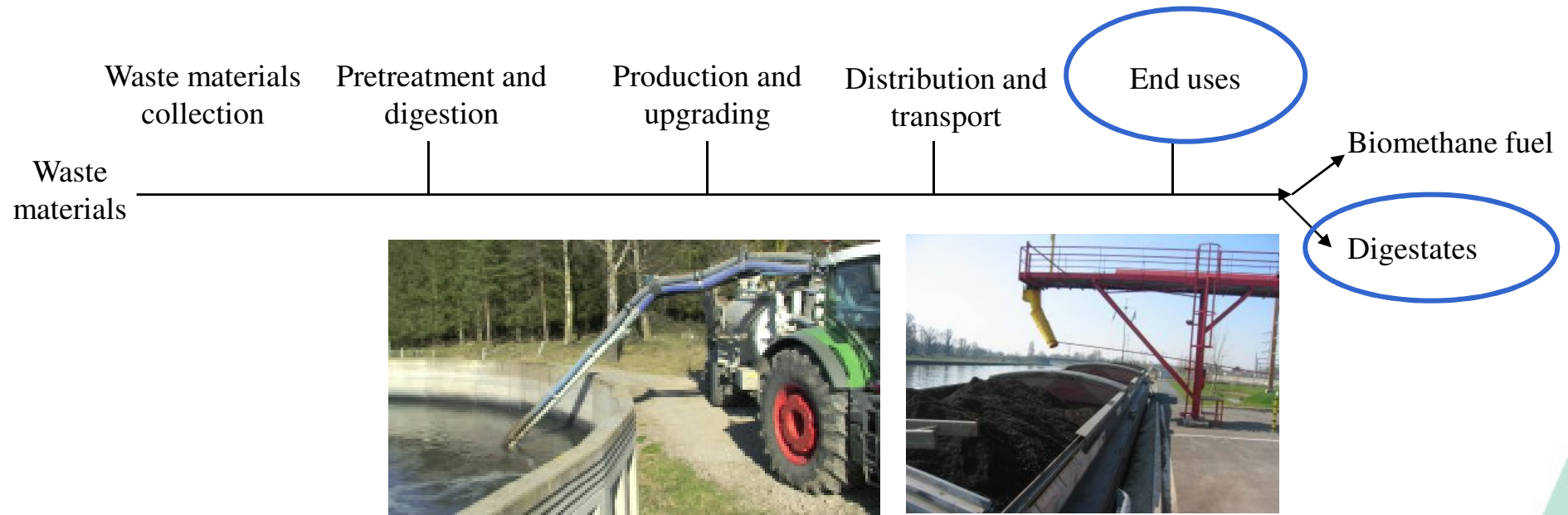
■ Synergies to strengthen

- with the Natural Gas industry
 - safety/technical specification of vehicle, filling station, pipes...
 - security of supply

- with the car manufacturers:
 - increase energy efficiency of gas vehicles,
 - increase range...



Use of residual materials



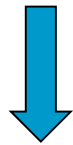
How to ensure economic feasibility ?

Stimulate demand



Green Certificate

(Switzerland, France)



Labelling



Stimulate production



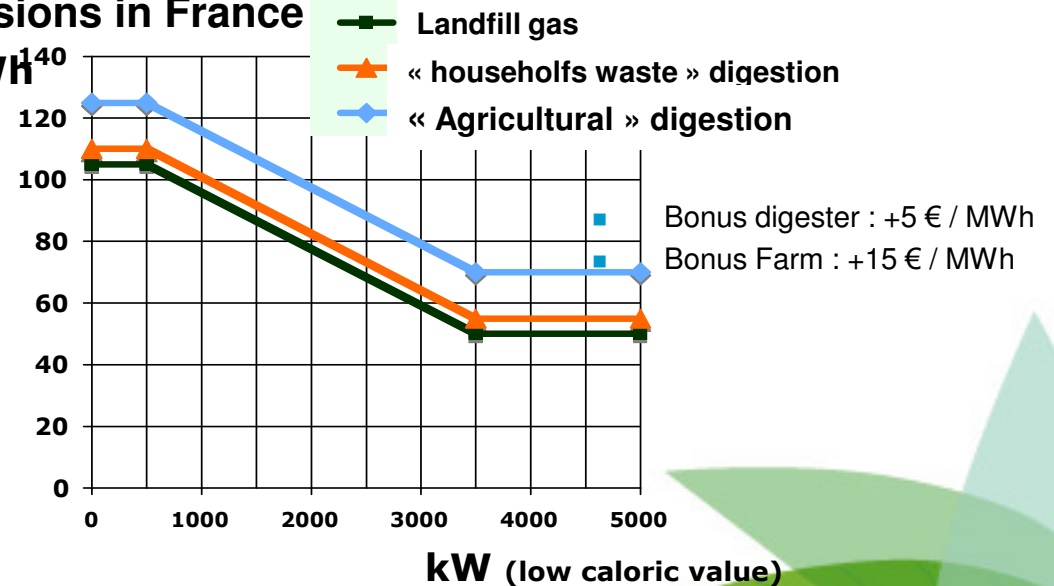
Feed in tariffs for biomethane grid injection

(Bern, Göteborg, soon in France)



Discussions in France

€/MWh¹⁴⁰



Conditions for success :

- provide a long term perspective for investors (both biomethane producers and users)
 - Aim : secure investments
 - purchase obligation of biomethane for 15-20 years (contracts)

- Set up balanced incentives policies (on a EU level ?)
 - long term policies for biowaste management (New Directive ?)
 - long term tax policies both on fuels and waste treatment options
 - no competition between the feed-in tariffs (electricity, heat, fuel):
 - to make biomethane competitive comparatively to electricity and heat recovery from biogas

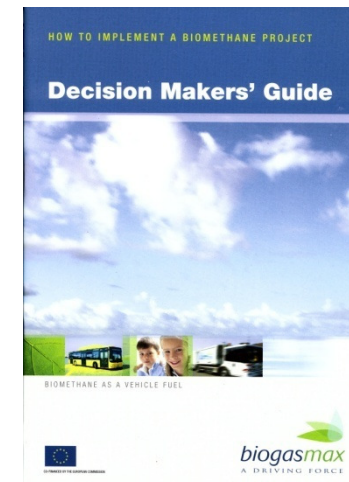
EU level : which actions needed ?

- Establish common technical rules
 - European standard for fuelling station (work has been done !)
 - European quality standard for grid injection (ongoing)



How to ensure economic feasibility ?

- **Increase the knowledge of stakeholders**
 - BiogasMax training sessions
 - BiogasMax Tool
 - Car dealers training



Thank you for your attention



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The screenshot shows the biogasmax website with a navigation menu at the top (Home, Contact, EBA, Community, Events, Publications, Press and Publicity) and a sidebar on the left with categories like 'PARTNERS INTERVIEW', 'THE PROJECT', 'STRATEGY & STAKES', 'BIOGAS LIFECYCLE', 'EVALUATION', 'KNOWLEDGE TRANSFER', 'BIOGAS TECHNOLOGIES IMPROVEMENT', 'SUBSCRIBE TO THE NEWSLETTER', 'DOWNLOADS', 'LINKS', and 'CONTACT'. The main content area features several news items:

- European Biomethane Fuel Conference 7-9 September 2009 Göteborg - SWEDEN**: Participants from 30 different nations registered for the forthcoming EBFC. Come and join them!
- Sweden: proposal of national goal for biogas**: Biogas can play an important role in the ambition to decrease the emission of greenhouse gases from the transport sector...
- European Biogas Association (EBA) makes proposals to European Commission**: The European Biogas Association (EBA), based in Brussels, aims to promote sustainable biogas production and use in Europe...
- Biogasmax partners on videos!**: Let's discover some Biogasmax partners on www.biogasmax.eu...

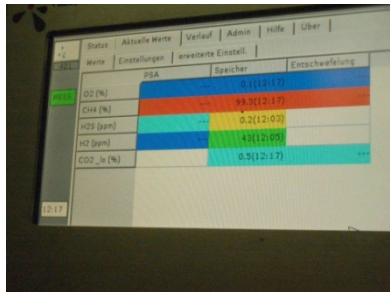
Technical reports, videos, training sessions, agenda of events, newsletters...

> visit www.biogasmax.eu

- **A European standard on gas: why ?**
 - Technical specifications (SPEC) vary according countries or regions

...





EU level : which actions needed ?

■ Technical specifications on biomethane and natural gas

Parameter	SWEDEN	SWITZERLAND Requirement	FRANCE	Unit
Methane (CH ₄)	> 96% volume	≥ 96 %		% (V/v)
Dew point at max. pressure of injection point	-9 °C at 200 bar (32 mg/m ³)	- 8	T < 5 °C at service pressure of the grid	°C
Mist, dust		technically free		(-)
Odourisation	13 mg/m ³	According guidelines (SVGW G11)	15 < THT < 40 mg/Nm ³	(-)
Heating value (H _{u,n})	12,15	10.6 – 13.1	9.5 to 10.5 kWh/Nm ³ à 0 °C	KWh/Nm ³
Upper Wobbe index (W _{u,n})	> 12.4	13.3 – 15.7 local deviation accepted (+0.7/-1.4)	8.10	KWh/Nm ³
Relative density		0.55 – 0.7	0.555 < d < 0.7	(-)
Oxygen (O ₂)	< 1% volume	≤ 0.5	< 0.01% mol.	% (v/v)
Carbon dioxide (CO ₂)	< 4% volume (CO ₂ + O ₂ + N ₂)	≤ 6	< à 2.5% mol.	% (v/v)



- **A European standard on gas: why ?**
 - Each installation needs to be adapted to the local SPEC
 - equipment (upgrading unit, compressors...)
 - measurement tools
- => this diversity of standards inhibits biogas expansion throughout Europe



Werte	Einstellungen	aktuelle Einstell.	Entschärfung
O ₂ (%)	0.17 (0.17)	0.17 (0.17)	
CH ₄ (%)	99.31 (9.31)	99.31 (9.31)	
H ₂ (ppm)	0.2 (1.03)	0.2 (1.03)	
H ₂ (ppm)	4.2 (1.03)	4.2 (1.03)	
CO ₂ (u (%))	0.5 (1.17)	0.5 (1.17)	

■ A European standard on gas: objectives

=> A common European standard on gas should lead :

- to reduce investments costs
- to simplify authorizations and measure requirements
- to ensure a stability of gas quality

Goals :

- Ensuring greater economic feasibility of projects
- Establishing better conditions for biomethane expansion



- **Need to take into account the difference of transport/distribution issues between natural gas and biomethane**
 - Biomethane is an energy produced locally and used locally
 - ... whereas natural gas (NG) comes from various and far sources (Russia...) :
 - NG needs long transportation throughout Europe
 - NG is used in various countries and regions
 - The quality of NG needs to ensure the integrity of many transport and storages systems => need for a strict quality (e.g. O₂ content) => strict specifications
 - ... whereas biomethane specifications will vary according the local network (pipe, pressure...) => flexible specifications



- **Need to take into account the difference of transport/distribution issues between natural gas and biomethane**

- The quality of NG needs to ensure the integrity of many transport and storages systems => need for a strict quality (e.g. O₂ content)
=> strict specifications are needed

- ... whereas biomethane specifications will vary according the local network (pipe, pressure...)
=> flexible specifications are needed



■ A European standard on gas:

The need for specifications is different between natural gas (transport on long distances) and biomethane (local production, local uses)

> A common standard on biomethane will have to ensure a flexibility (with, as a basis, the current SPEC applied in injector countries)

