

Anaerobic Filter ®



www.agrofutur.eu

CTA → Agrofutur

- ◆ Agrofutur Limited Company = CTA spin off
 - Created in Nov. 2006
 - Objects: Agriculture, Forestry, agricultural technologies, Biomass, Production and sales of nettles, wood chips and digesters

- ◆ CTA: Agricultural Technologies Centre
 - Educational centre (/ Walloon ministry)
 - Financially independent (for Equipment and Projects)
 - Main projects: Nettles (proteins) production, Humus improvement in soils by wood chips, local sheep strains,... and Biomethanation.

BIOGAS :

- ◆ CH_4 : 40-80% → 35 MJ/m³_{CH4} (10 kWh/m³_{CH4})
- ◆ CO_2 : 20-60%
- ◆ H_2O : 2-15%
- ◆ $\text{H}_2\text{S}, \dots$: < 1%

Bovine manures	20-30 m ³ biogas/ton FM	(55% CH_4)
Grasses	100 to 200 m ³ biogas/t FM	(50% CH_4)
Greases	600-1000 m ³ biogas/t	(50 % CH_4)

- ◆ 350 l CH_4 / kg COD_r

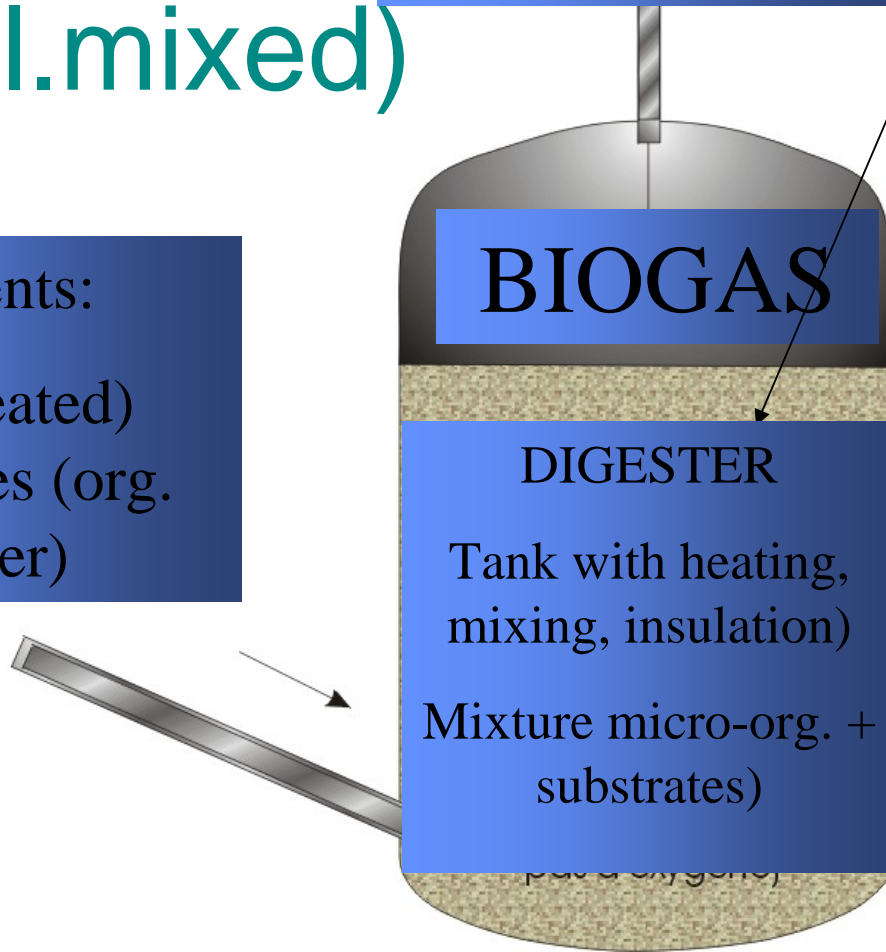
'Standard' Digester (compl.mixed)

Influents:
(Pre-treated)
Substrates (org.
Matter)

Biogas:
(methane)
(storage, treatment,
utilisations)

Retention
Time: 40 to 80
days

Effluents:
Digested Substrates (storage,
post-treatment, mixing with
influent)

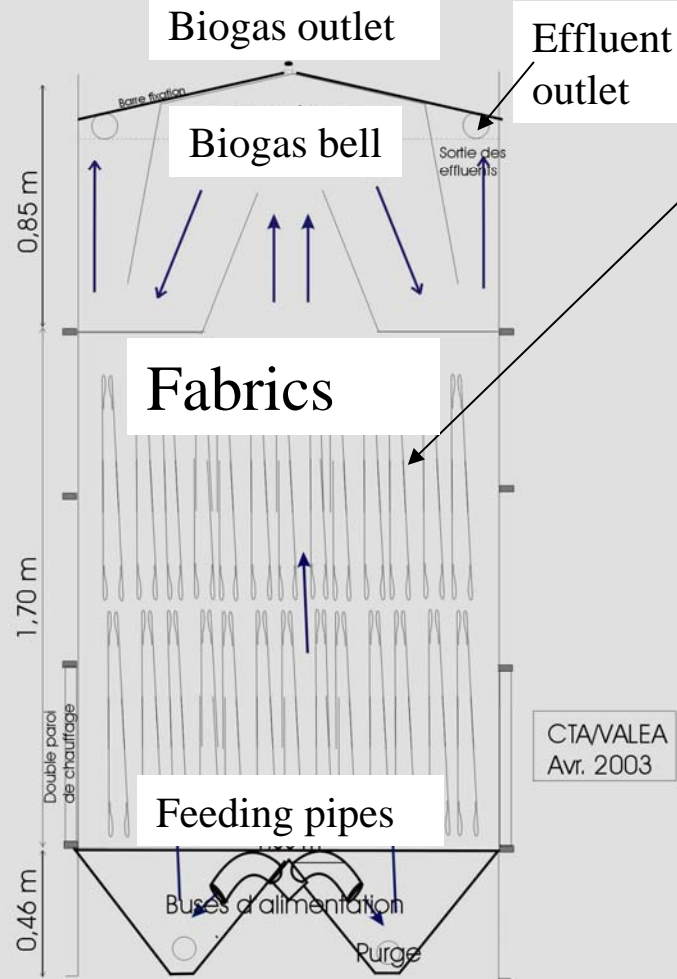


Anaerobic Filter

® System (CTA)

Anaerobic Filter (CTA ®)

Retention Time: 3-10 days



® Anaerobic digester @ CTA

Biomethanation of 3.3 m³ slurries/d

10 m³ Anaerobic Digester

Digestion in 3 days !

'Anaerobic Filter' 10 to 20 times smaller than a classical digester

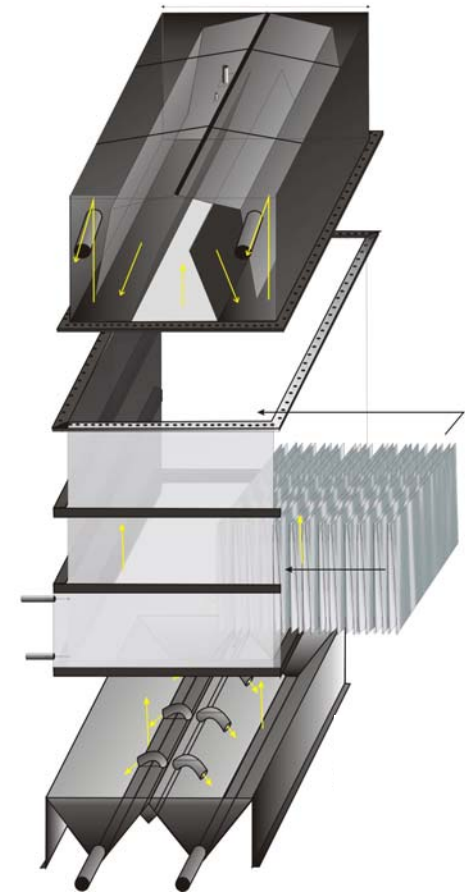
Main Advantages: Investment reduction, odors reduction, lower maintenance, simpler and smaller digesters, no mixing or crushing engines, lower energy requirement, biological robustness, no big installations (no authorization), no control drains,...

High production (with manures): 2.5 m³/m³.d at 35°C, up to 7 to 8 m³/m³.d at 55°C !

High purification efficiencies: f.i. 95% for beet roots,...

In activity
without
problem since
1990 !

Anaerobic Filter (CTA ®)

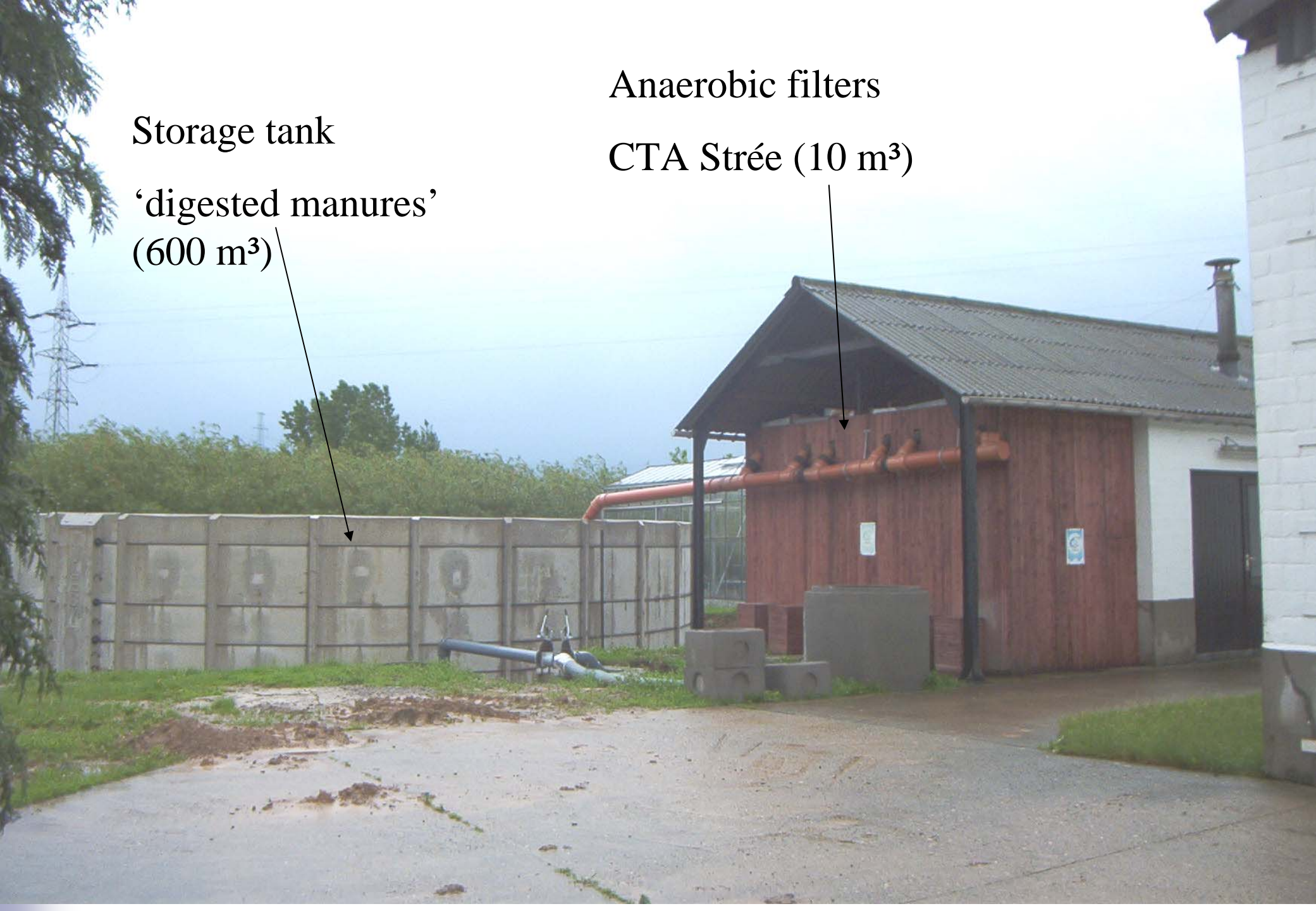


Storage tank

'digested manures'
(600 m³)

Anaerobic filters

CTA Strée (10 m³)

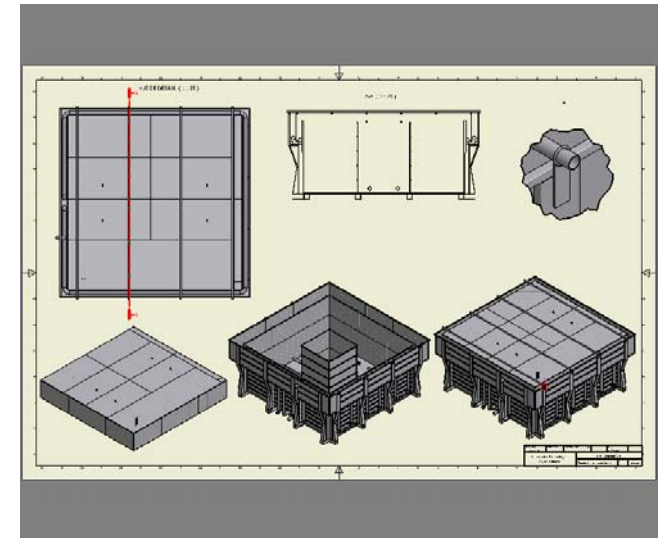
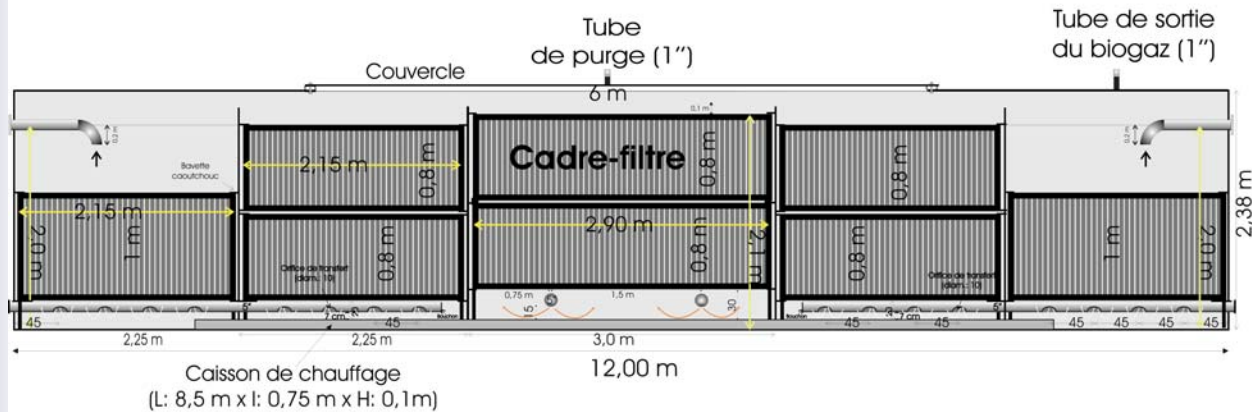


Anaerobic filters (AF)

Different kinds of Anaerobic Filters appropriated for 10, 20, 30,.. m³ effluents / day

Anaerobic Filter
AF container 60 m³

AgroFutur
@ S.A.

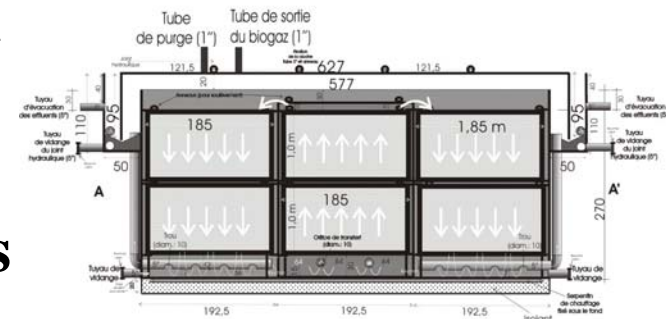


Anaerobic Filters

Description:

- Steel or concrete walls
- with Filter-package-Frames (bacterial support = special fabrics)
- Up- or down-flows
- External Pumping and heating systems

Anaerobic Filter (80 m³)



Echelle: 1:25
Cotes en cm



Anaerobic Filters

Description:

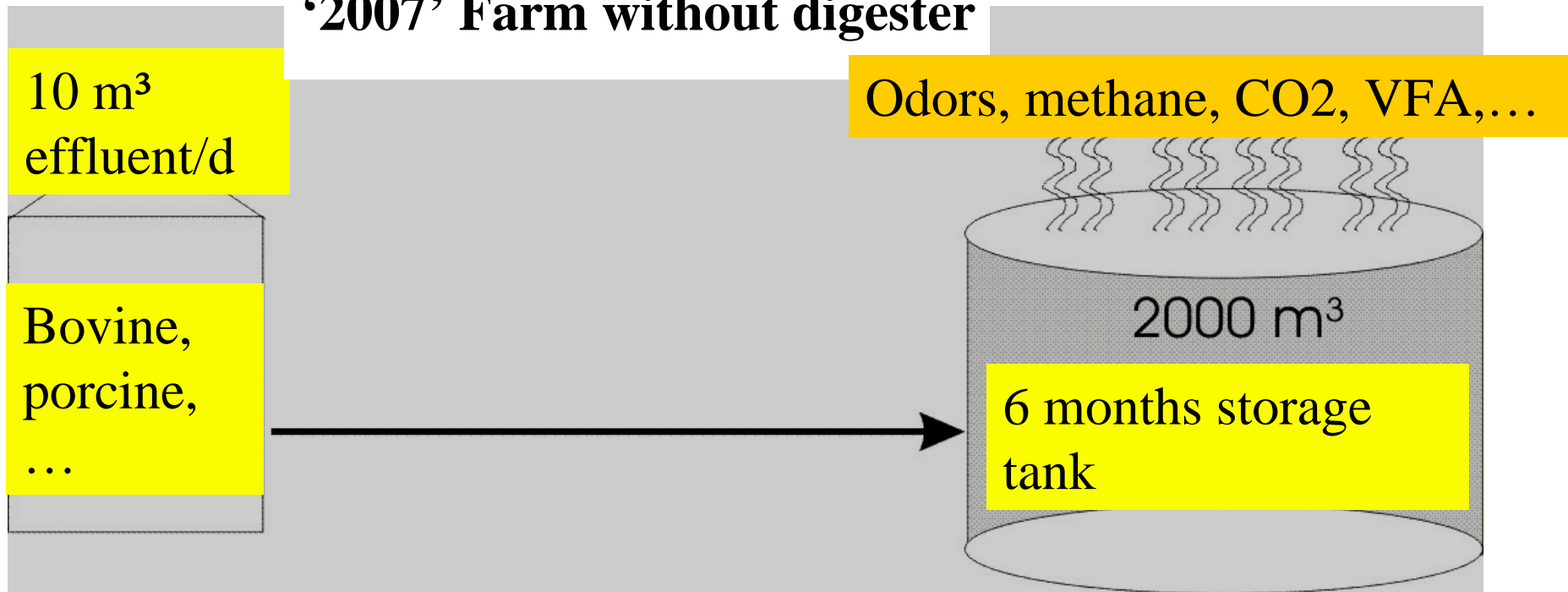
Feedings by:

- **Industrial liquids, manures, 'juices', wastewater, sludges, wastes**
- **Pre-fermented and compressed (or crushed) solids (vegetables, roots,...)**
- **ca. 75000 € 60 m³ Container. 91000 € 150 m³ (filters-Packages)**



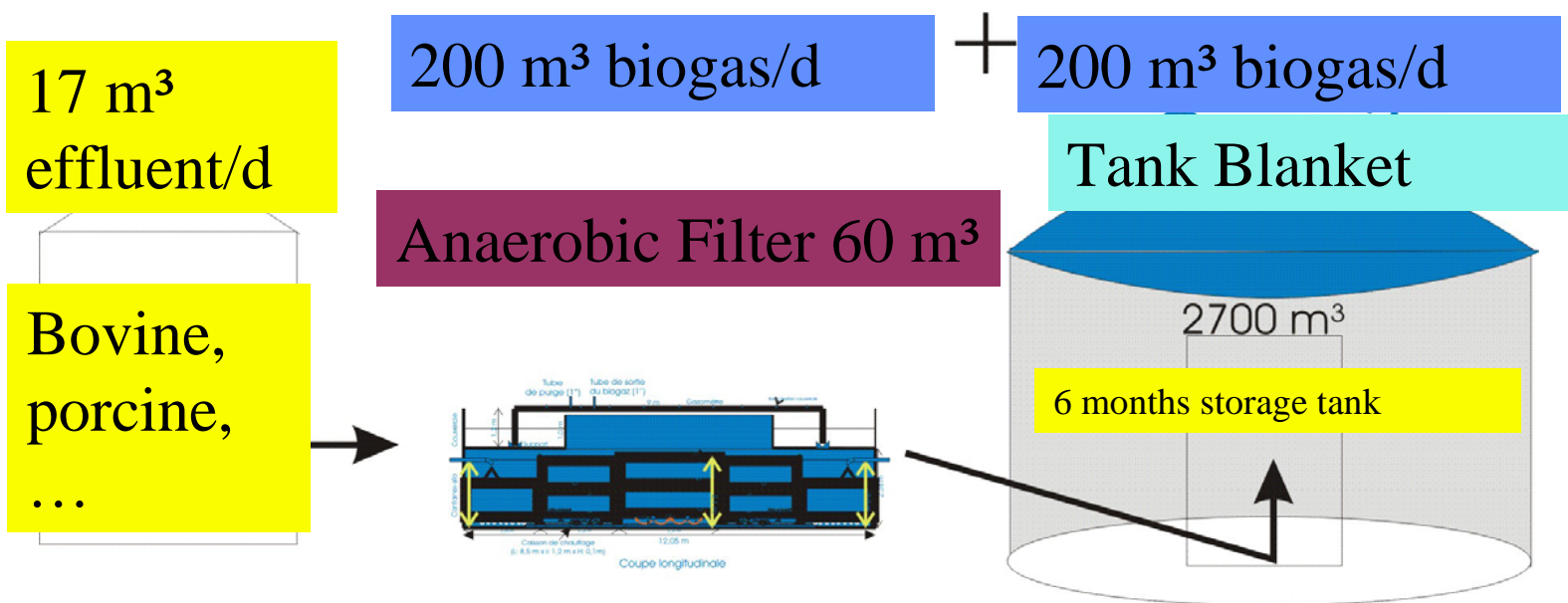
Comparison Anaerobic Filter – ‘Classical’ digester

‘2007’ Farm without digester



Comparison Anaerobic Filter – 'Classical' digester

Option 'Anaerobic Filter'



Comparison Anaerobic Filter – ‘Classical’ digester

Option ‘Classical Digester’

17 m³
effluent/d

320 m³ biogas/d + 80 m³ biogas/d

Bovine,
porcine,
...

Classical Digester 600 m³

Tank Blanket

600 m³

2100 m³

6 months storage tank

Comparison Anaerobic Filter – 'Classical' digester

Financial comparison	Classical Digester	Anaerobic Filter
Capacity (daily feeding :17 m ³ manure/d)	600 m ³	60 m ³
Biogas production	400 m ³ /d	400 m ³ /d
Investment (digester + gasometer) (Motor, el. and heating net,...)	150 000 € 150 000 €	110 000 € 150 000 €
Total incomes	51000 €/a	52200 €
Annual costs	13000 €/a	11000 €
Subsidies	50 000 €	50 000 €
Internal Rate of Return	1,3 %	+ 7,6 %
Net Present Value	-33 380 €	+ 83 950 €
CONCLUSION	Not profit-earning	Profit earning

Integration examples

Current integration studies (Belgium, Canada, France,...):

Vegetables conditioning Hesbaye-Frost:

- 4000 m³ wastewater / day (ca. 5 g DM/l)
coming from veg. washings and peelings
If 'classical digester': 160 000 m³ !!
If Anaerobic Baffled Reactor + filtres: 3600 m³
- 80 t vegetables waste/d
If 'classical digester': 3200 m³ (expensive, big surface, difficult to heat and to mix)
If Anaerobic Filter: 400 m³

Crop greenhouses at Sprimont:

-10 m³ porcine manures → 60 m³ An. Filter

Manures treatment (Canada, France,, Belgium), compost juices, roots wastes, industrial Effluents (Belgium, Canada,...), sludge, bio-ethanol process wastes (vinasses),...