Landfill gas extraction

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ITS® plants


Dumfries & Galloway

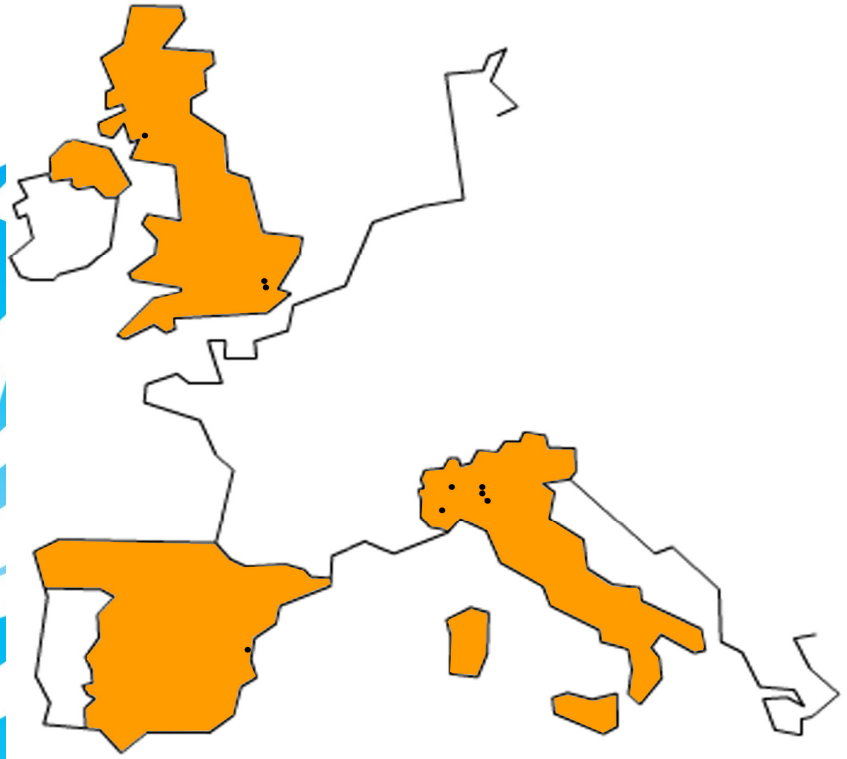

Londra - Frog Island


Londra – Jenkins Lane


Spagna - Castellon de la Plana


Villafalletto (CN), 2004


Cavaglià (BI), 2003




Giussago (PV), 1996

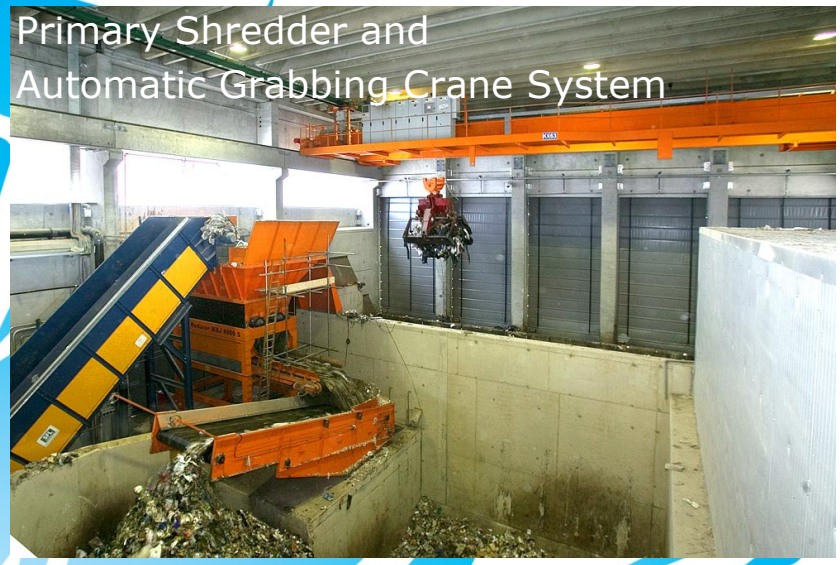

Corteolona (PV), 1996

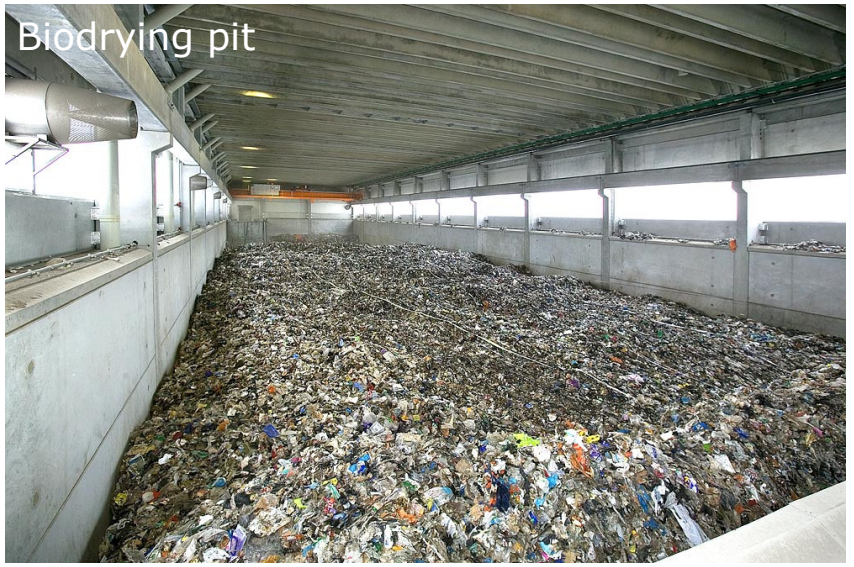

Bergamo, 1998


Montanaso (LO), 2000


Lacchiarella (MI), 2002

Technical details of ITS plants


Primary Shredder and
Automatic Grabbing Crane System


Biodrying pit

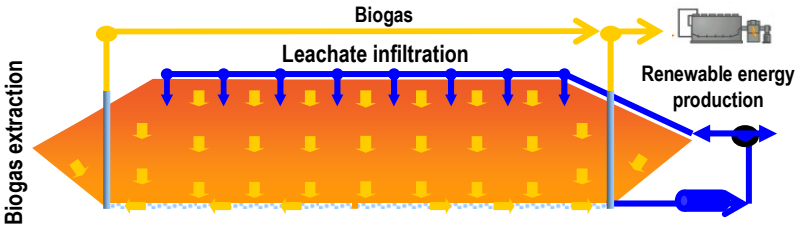

Biofilter and
Ventilation System


Refinement Section View

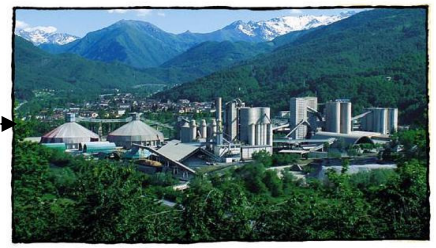
Flexibility in the use of products

Mechanical Selection

Biodried Material



SF



Fe

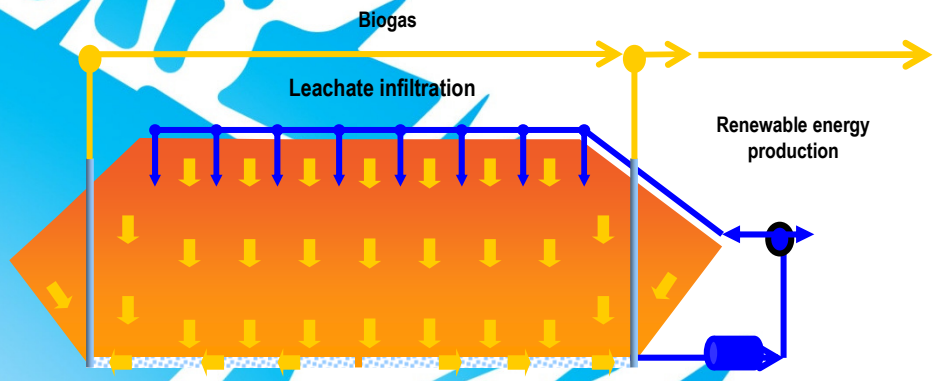
Al

RECYCLING

Under-sieved

Heavy discarded materials

ACTIVABLE BIOREACTOR:
Energetic exploitation of the Biodried Material

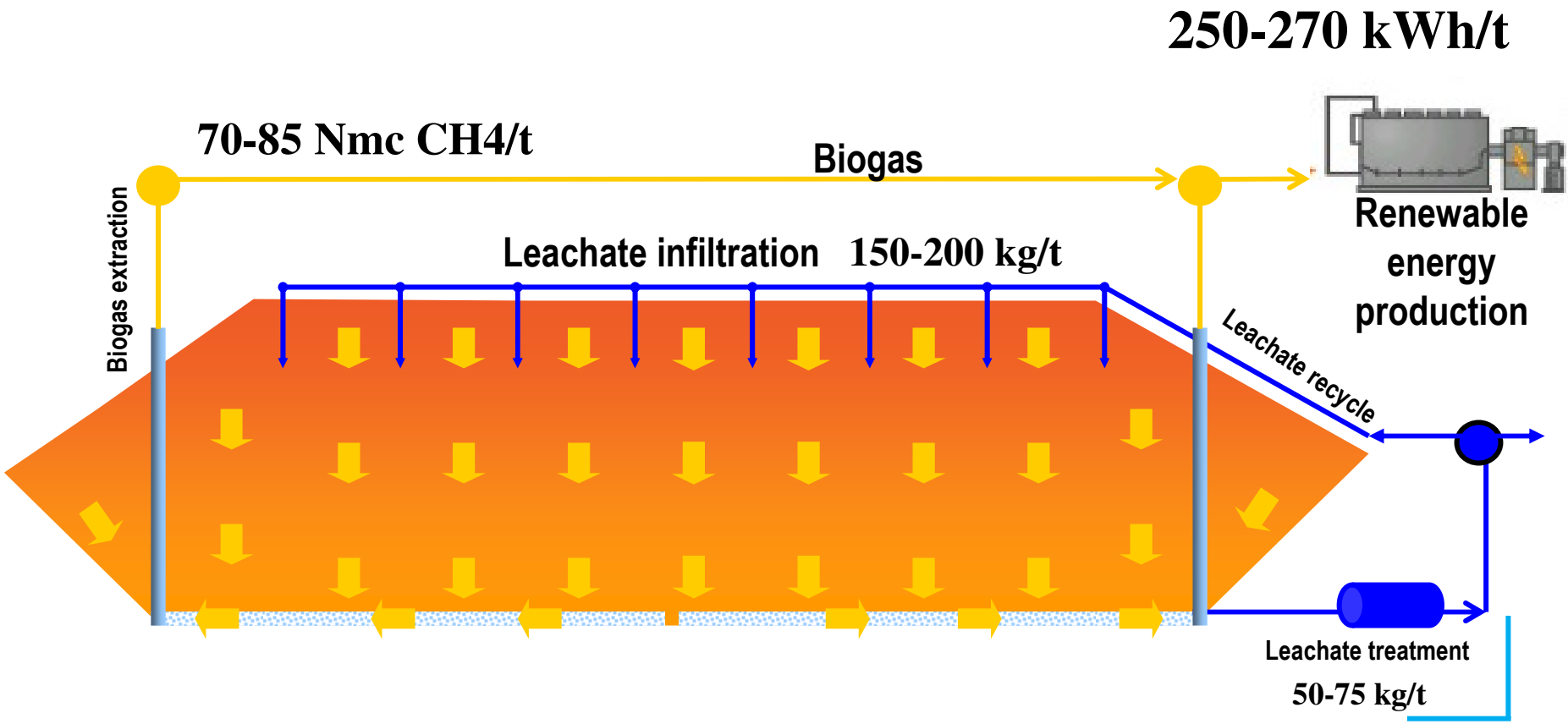


The discarded materials coming from the Secondary Fuel production is where the slowly degradable (methanogenic) fraction is concentrated.

This fraction and/or the biodried material can be exploited energetically speaking by means of an Activatible Bioreactor which assure the following:

- **High conversion rate of Degradable Organic Substance into biogas**
- **Minimisation of the emission during landfilling stage**
- **Recovery of the Bioreactor volumes through landfill-mining and energy recovery of the residual plastics**

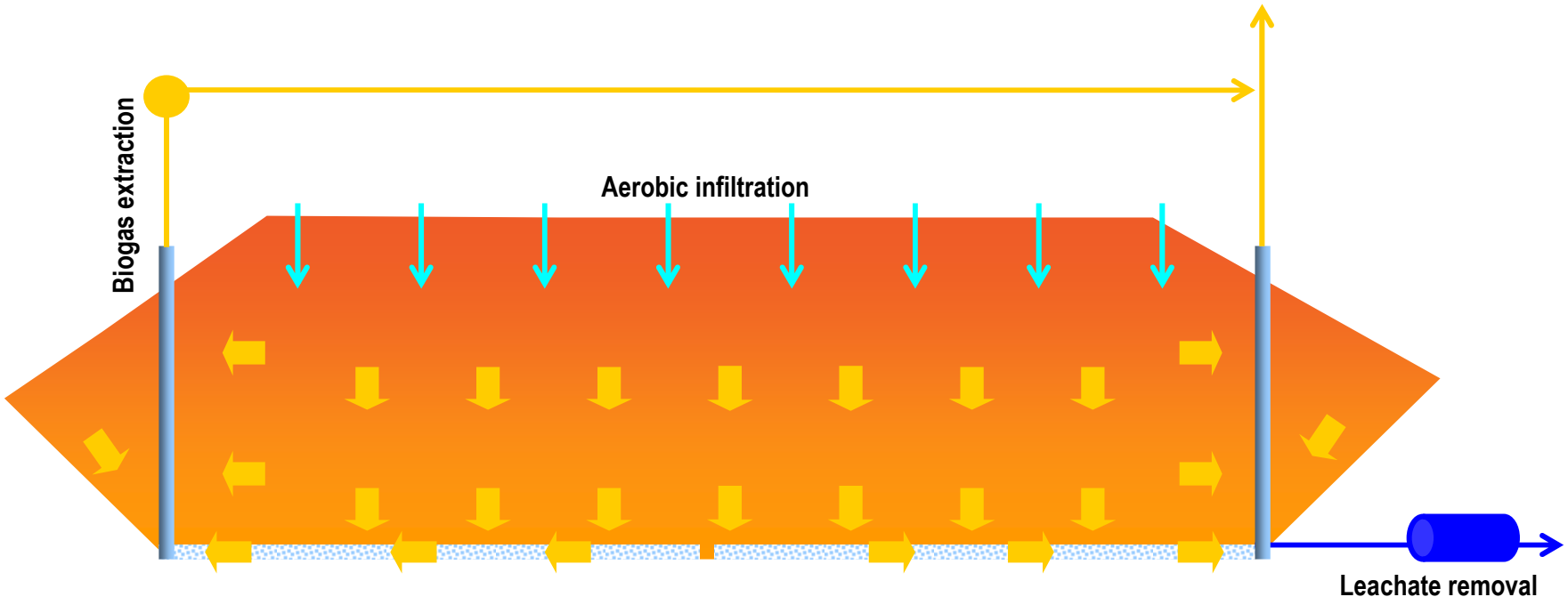
Activable Bioreactor



Landfill gas extraction

Flow monitoring

Quality monitoring



LFG extraction

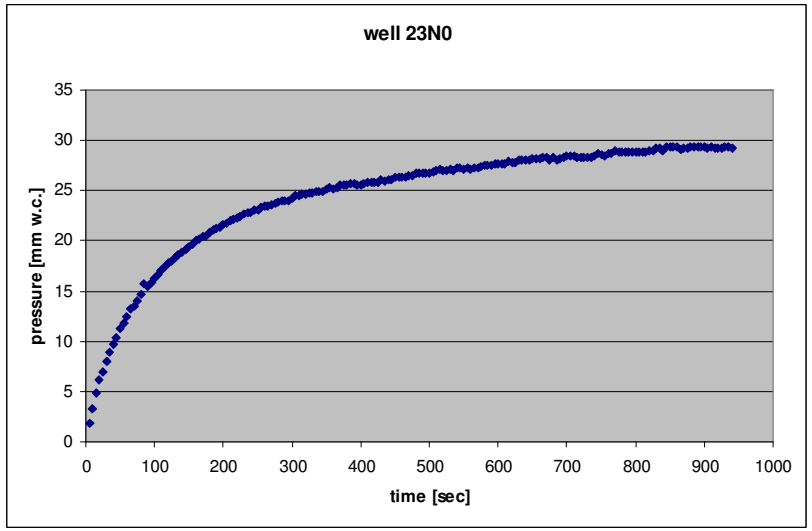
- Flow monitoring
  - Extracting pressure
  - Overpressure
  - Biogas flow
  - Pressure/time test

- Quality monitoring
  - Methane, Oxigen, CO2 concentration
  - CO concentration
  - Temperature

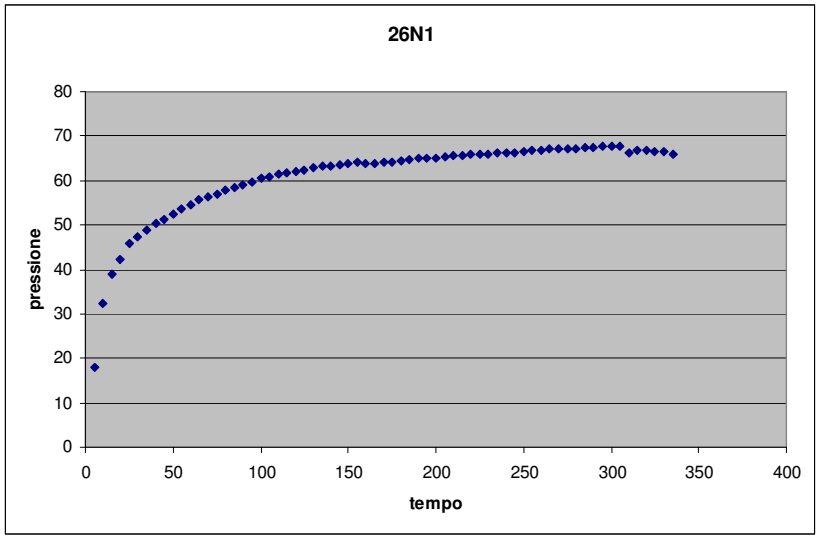
Flow monitoring

- Pressure/time test

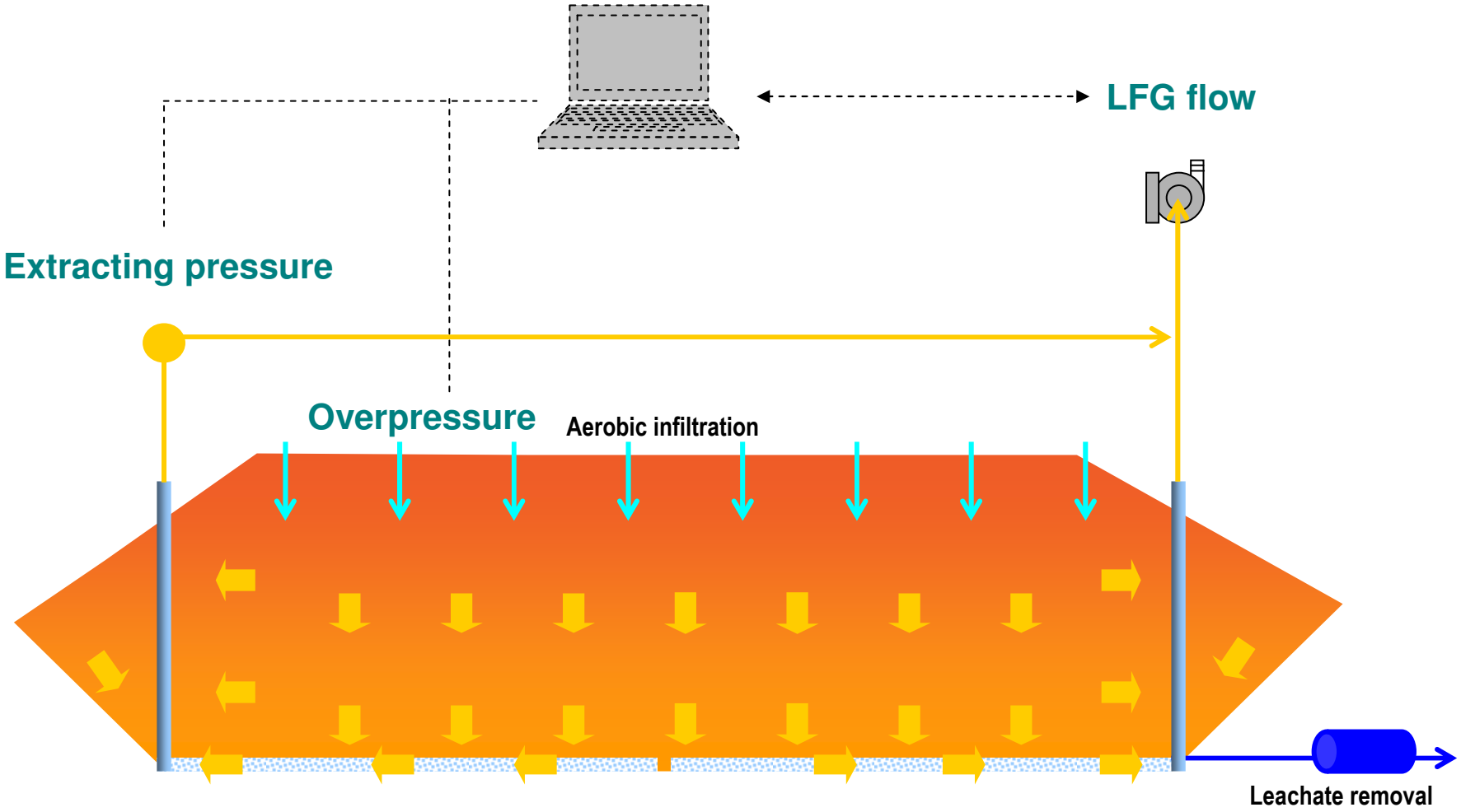
Low flow well



High flow well



Flow monitoring and control

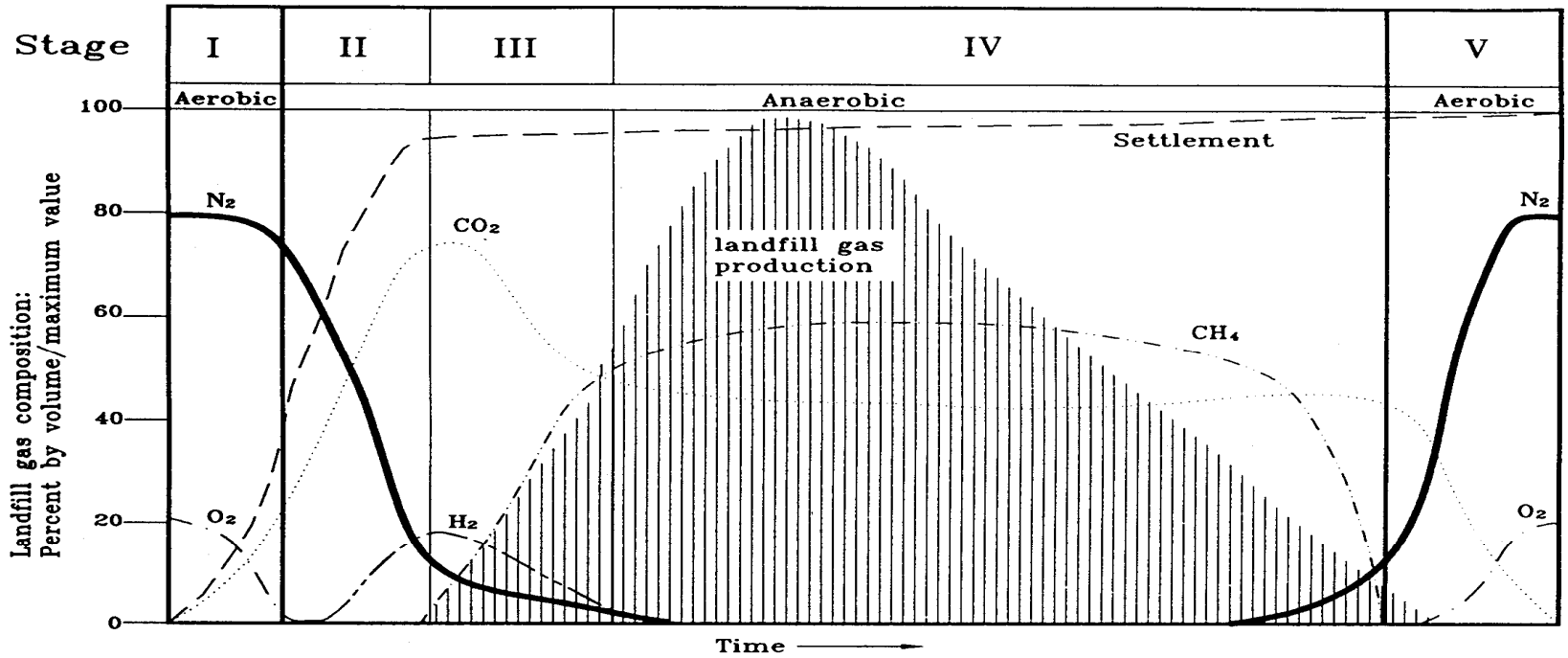


Quality monitoring

- Methane concentration
- Oxigen concentration
- Methane/carbon dioxide ratio
- Temperature
- CO (carbon monoxide) concentration
- H2S and siloxane

Quality monitoring

- Methane, carbon dioxide and oxigen concentration
- Residual nitrogen



Young landfill **Old landfill**

Quality monitoring

Methane and carbon dioxide ratio

Carbon dioxide is usually considered the floating variable in the LFG mixture and could reflect the condition of the landfill.

In our bioreactor landfills, CH_4/CO_2 ratio value:

< 1 beginning of activation, or over-stressed
1.0 – 1.1 aggressive extraction
1.1 – 1.2 normal desiderable operating range
> 1.2 normal to understressed

Quality monitoring

Landfill gas Temperature

Excessive localized overpull encurages aerobic activity, and this could increase the operating temperature.

Temperature > 60°C indicates aerobic conditions:

LFG flow should be reduced

Quality monitoring

- Carbon monoxide concentration

Carbon monoxide is a possible intermediate in the metabolic pathway of anaerobic and aerobic bacteria.

Carbon monoxide was found in significant level during activation or starting of the methanogenic production.

High level of carbon monoxide should be viewed with caution as an early indicator of conditions that can lead to landfill fires.

Quality monitoring related to energy production

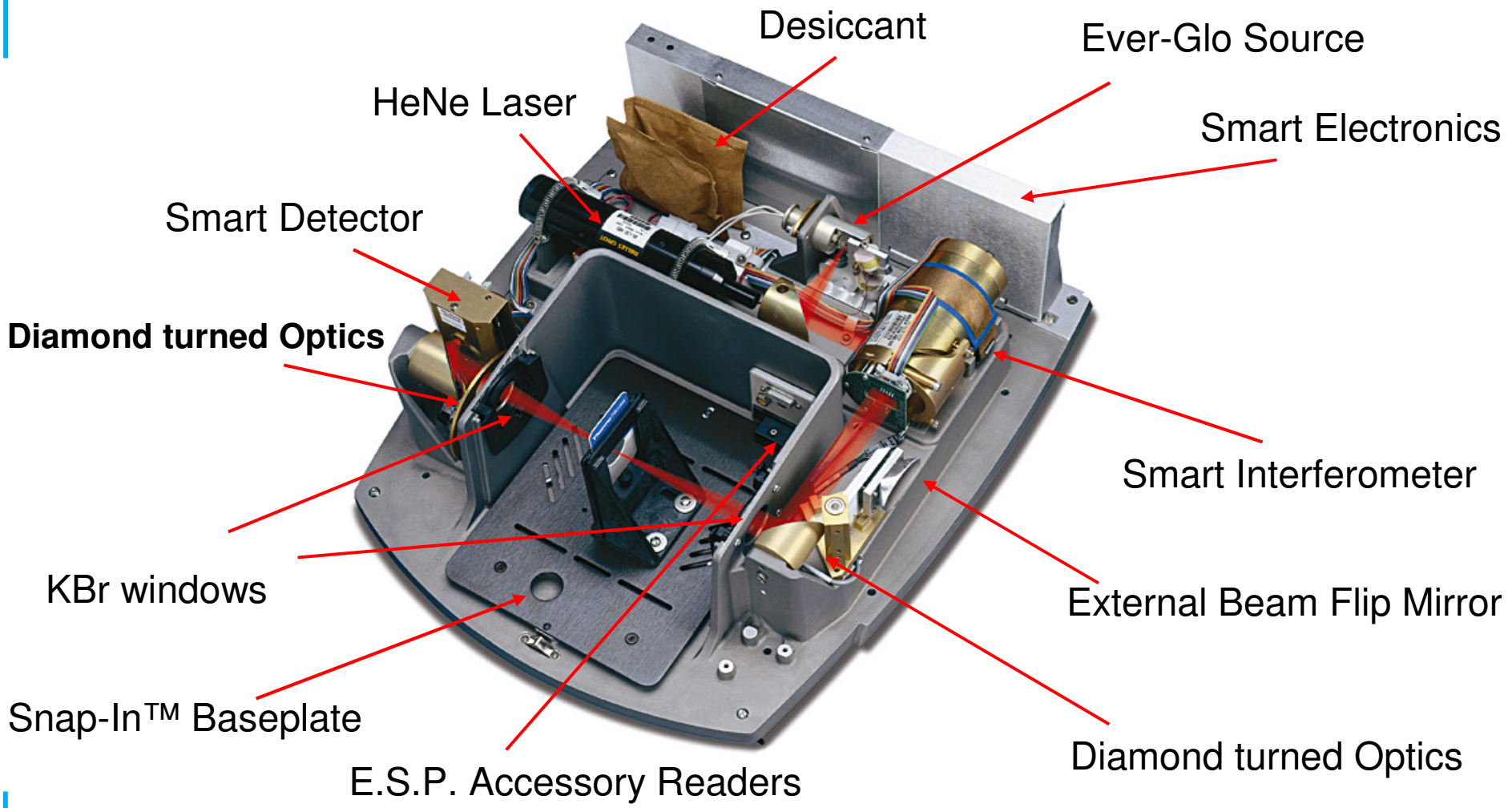
- Sulfide
- Halogenated compounds
- Siloxane

Sulphur compounds are corrosive in the presence of free water or the moisture found within the engine oil and/or landfill gas

Halogenated compounds containing chlorine, bromine and fluorine (e.g. carbon tetrachloride, chlorobenzene, chloroform and trifluoromethane) are broken down during the combustion process and can form the acid gases, HCl and HF, in the presence of moisture. These are responsible for corrosion of metal piping and engine components.

Organosiloxanes are semi-volatile organosilicon componds which, while not an aggressive gas component in terms of emissions, can be converted to solid inorganic siliceous deposits within the engine combustion chamber

Analysis of biogas compounds by FT-IR instrument



High Quality spectrum of many LFG compounds

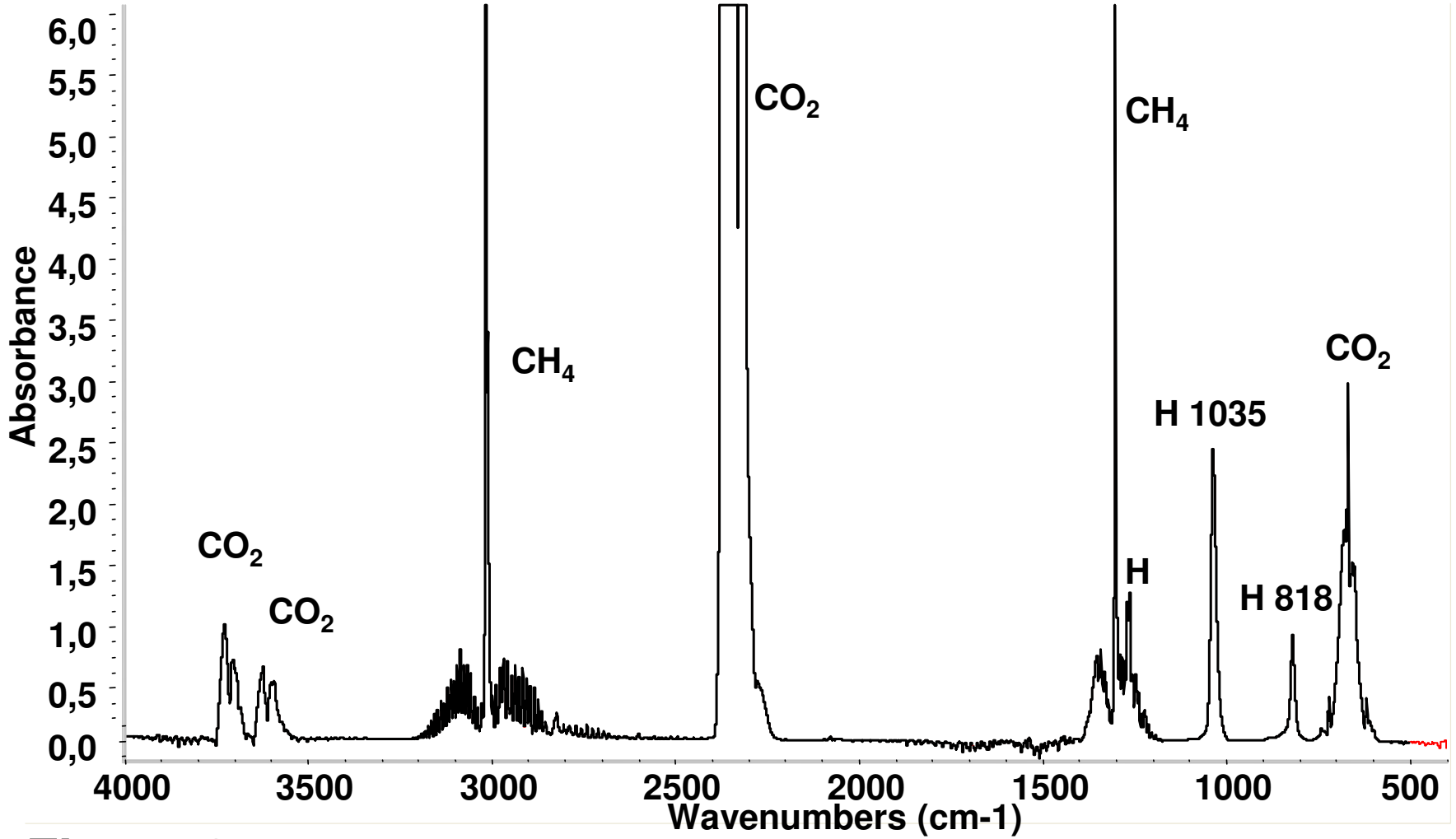
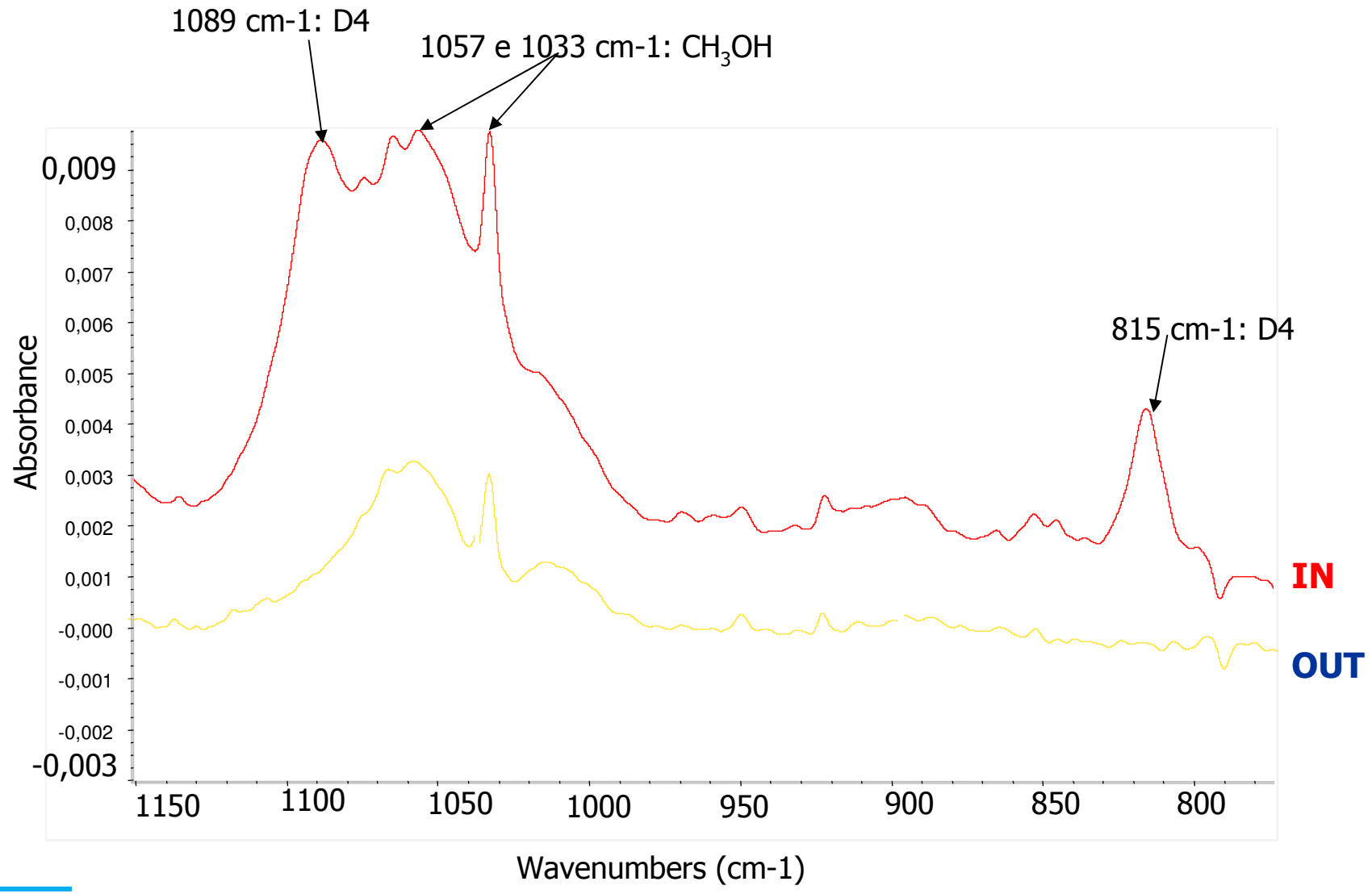
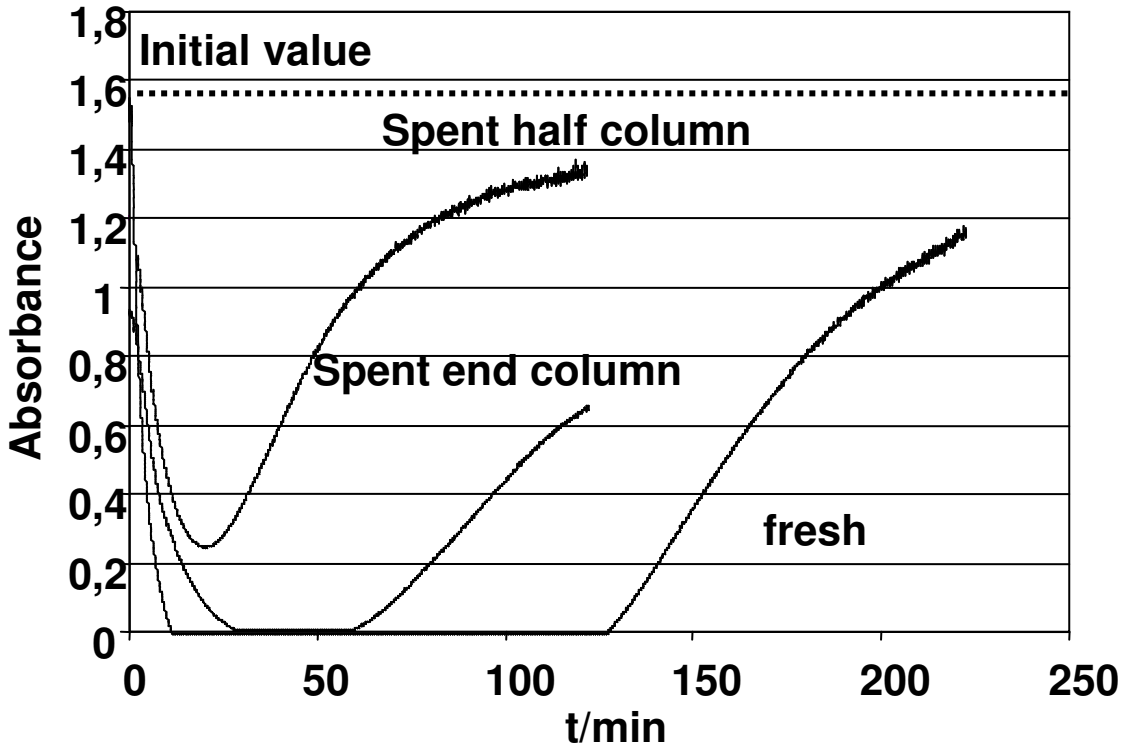


Figure 2

Analysis of the adsorption capacity in a filter



Analysis of activated carbon residual capacity



Analysis of all biogas component

With FT-IR instrument we are developing a procedure to analise many biogas component before and after the gas cleaning system

In the future we plan to extend the same procedure to the exhausted gas from the energy production systems

With the analysis of some biogas components is it possible to know better the process and/or degradation phase of the refuse ??

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