

# AQAMETHA STUDY

Objectivizing the links between methanisation and air quality

**air** pays de  
la loire  
[www.airpl.org](http://www.airpl.org)

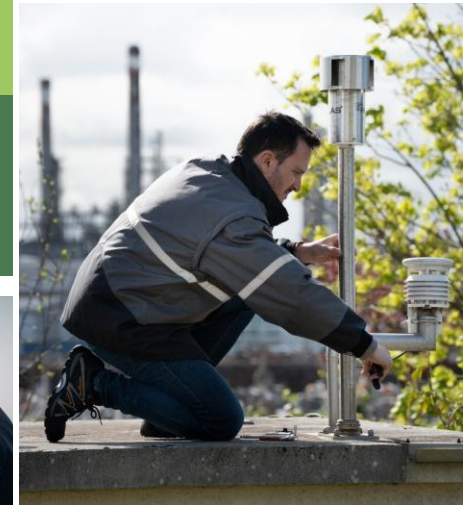
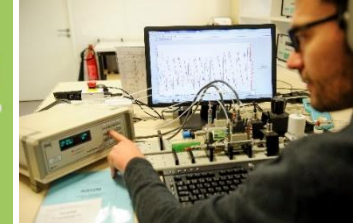
Arnaud Rebours

Air Pays de la Loire

October 16, 2025



Association approved by  
the Ministry of Environment



STATE AND PUBLIC  
INSTITUTIONS



LOCAL GOVERNMENTS



INDUSTRIAL COMPANIES



ENVIRONMENTAL  
PROTECTION ASSOCIATIONS  
& QUALIFIED INDIVIDUALS

Expertise – Independence – Transparency – Adaptability



## Objectives

- Consolidate knowledge about the **olfactory environment and air quality levels at 12 anaerobic digestion units**, based on a standardized assessment
- Respond to **questions** from industry stakeholders and the general public and help to **objectify the debate**
- Provide initial **technical advice** to methanisation units operators

## Leaders & Partners

### Leaders



### Partners



# METHANISATION UNITS, VISUALS

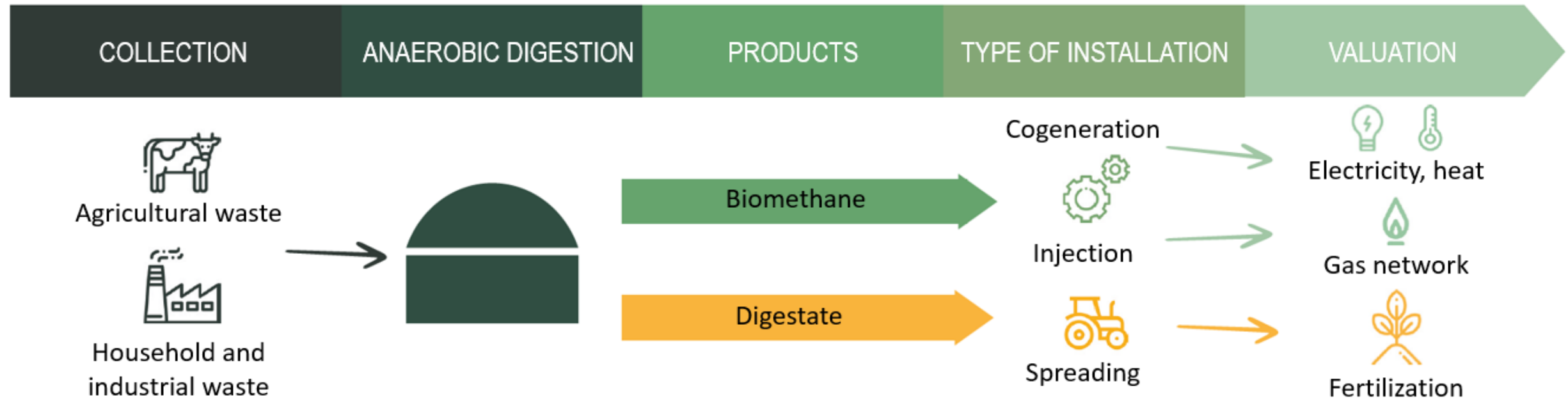
on-farm unit



centralized unit



# METHANISATION UNITS: OPERATING PRINCIPLE

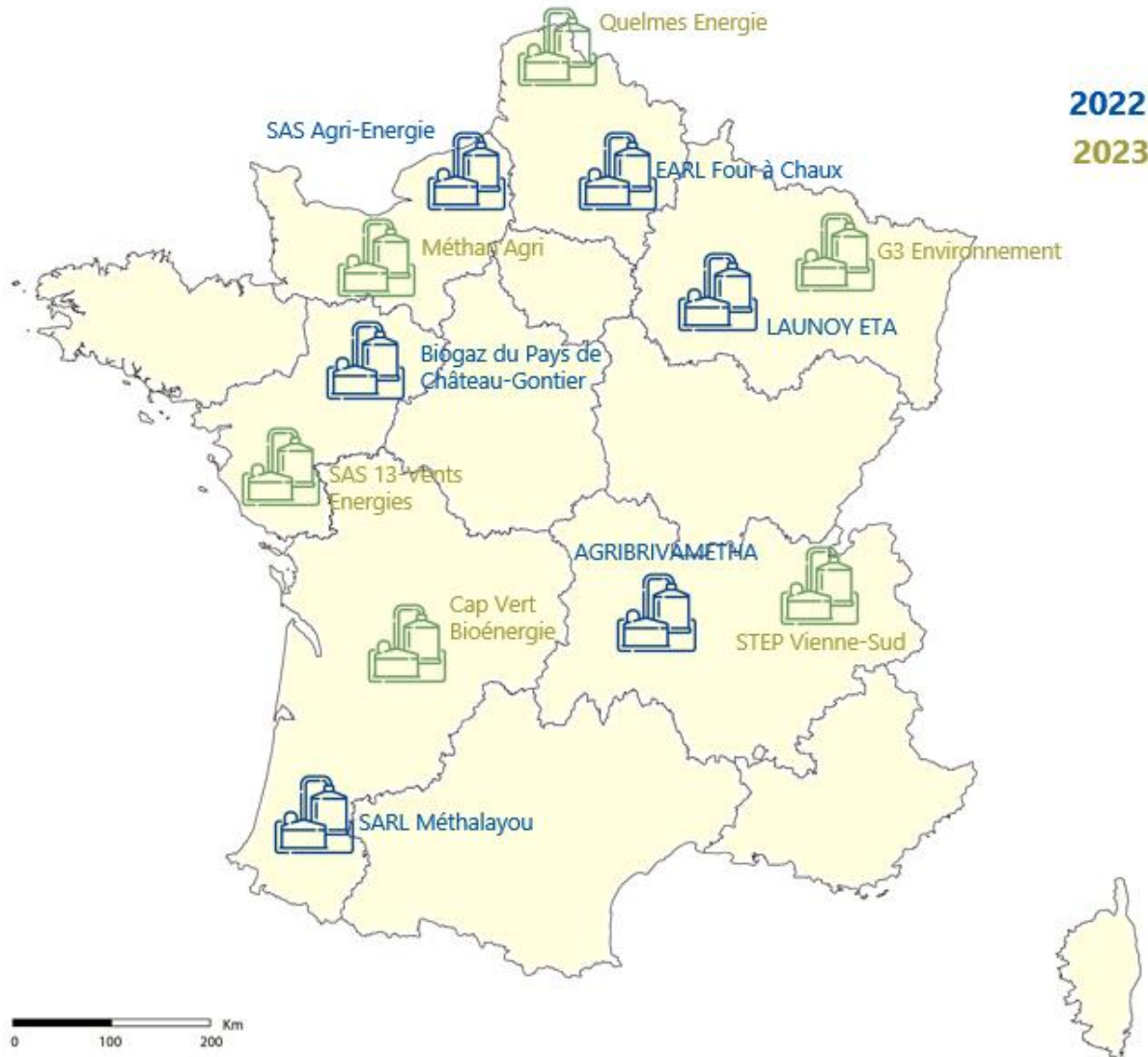


- Biological process of degradation (by micro-organisms) of organic waste, under controlled conditions and in the absence of oxygen (anaerobic environment)

- **Objective** : national representativeness (as far as possible)
- **Selection criteria**
  - Type (farm-based, collective, centralized, industrial, etc.)
  - Recovery method (electricity, heat, cogeneration, grid injection, fuel)
  - Volume and types of organic waste
  - Organic waste storage (open air, buildings, etc.)
  - Air treatment systems (with or without)
  - ICPE regime
- **A top-down approach** : at the “national” level, establishment of guiding principles
- **A bottom-up approach**: pre-identification of 24 units (4 per region), meeting certain guiding criteria and with potential support from stakeholders in the sector
- The merging of these two approaches to arrive at the final list **of 12 units**



# THE 12 ANAEROBIC DIGESTION UNITS



## Geography

6 regions - 12 departments

## Type

6 centralized

5 on-farm

1 wastewater treatment plant

## Energy recovery

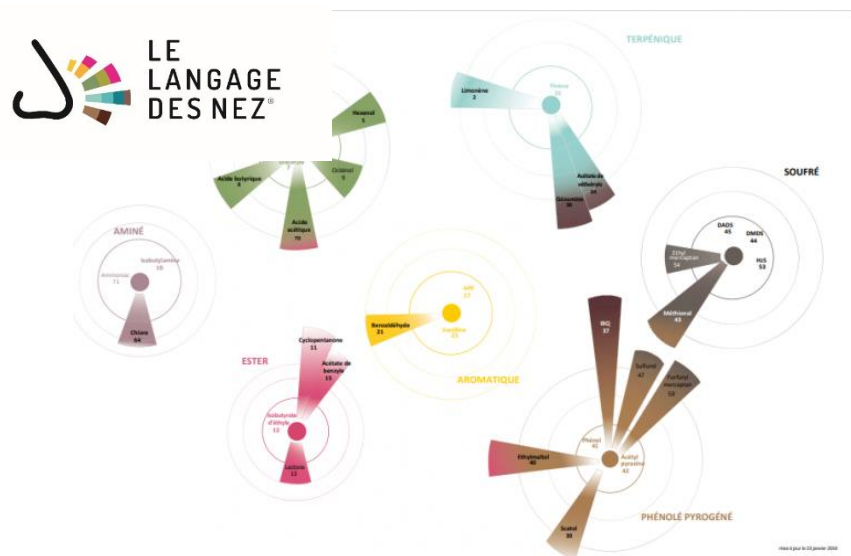
4 cogeneration plants - 8 injections

## Campaigns (2022 and 2023)

1 summer campaign (June)

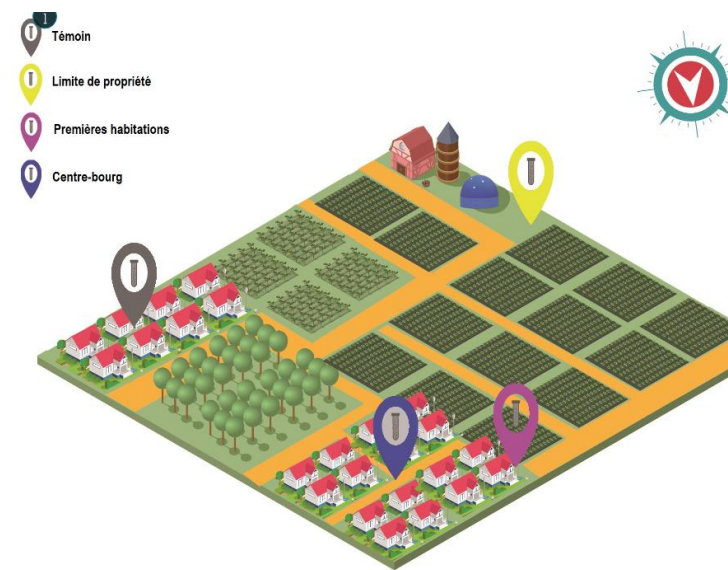
1 winter campaign (October)

## Odours (standardised sensory approach)



- **Nature and intensity of odour**
  - Internal profile of the unit (characterisation and prioritisation of sources)
  - External mapping (distance of influence)

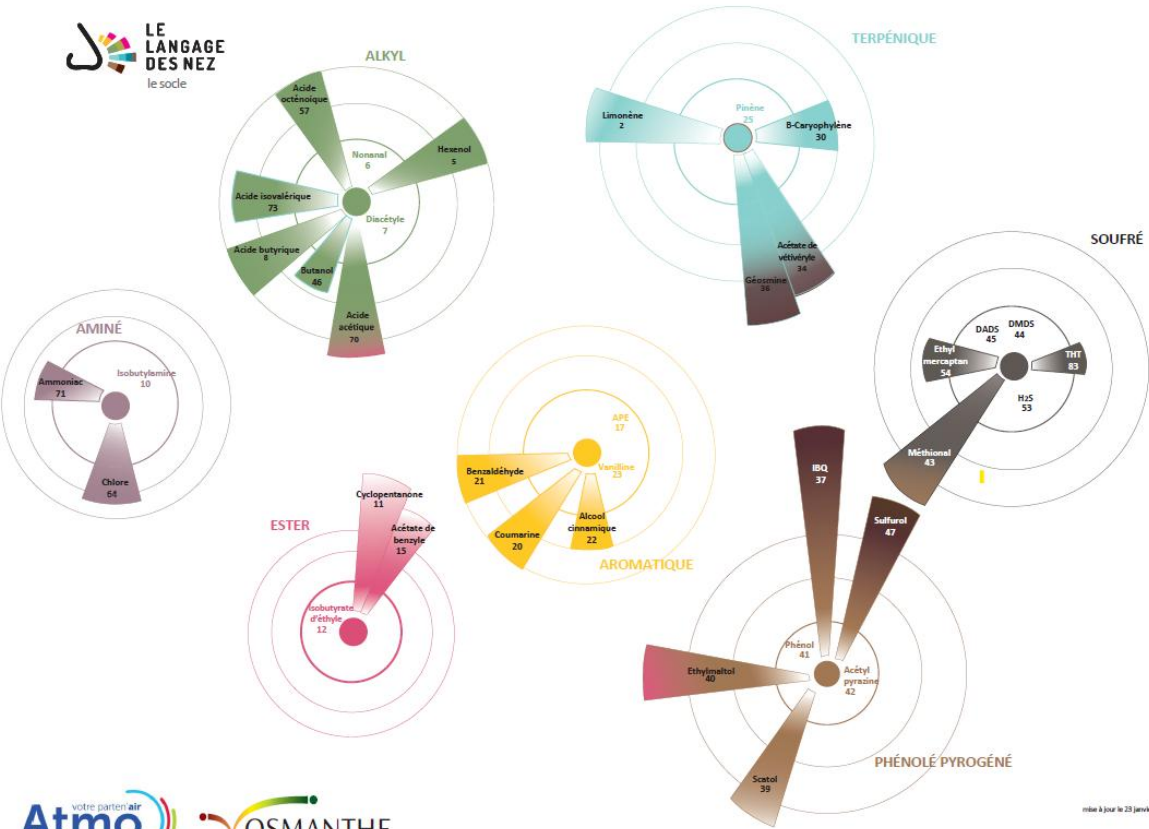
## Pollutants (metrological approach)



- **NH<sub>3</sub> et H<sub>2</sub>S (4 weeks) concentrations**
- 4 sites
  - On site (limit of unit)
  - 1st residences
  - Town centre
  - Site not influenced



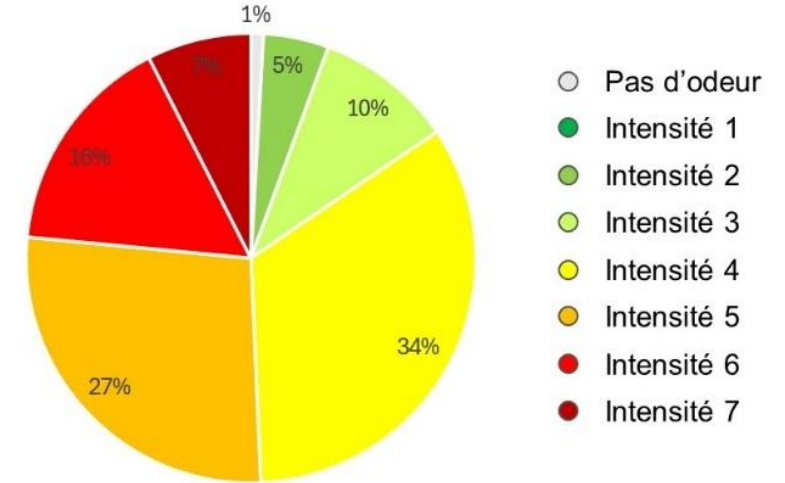
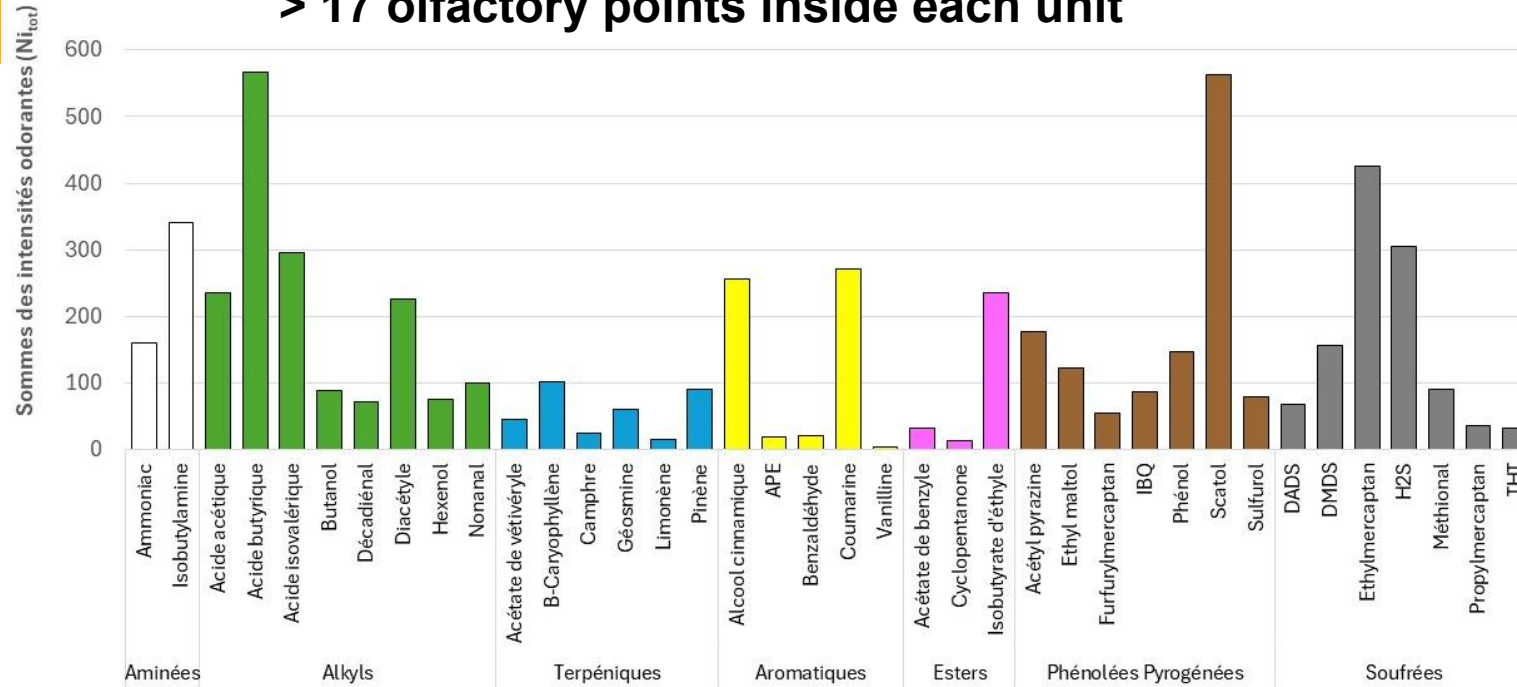
extension of the methanisation standard  
(AQAMETHA– 2024)



Intensity	Feelings
1	extremely faint, indefinable odour
2	odour perceived if known and with careful lighting
3	odour perceived by simple lighting
4	odour perceptible without lighting (in normal breathing)
5	odour perceived even when attention is focused elsewhere
6	odour interfering with other intellectual activities
7	odour unavoidable polarising attention
8	very powerful odour making olfaction difficult

The *Langage des Nez*® has been completed and specified for the methanisation sector

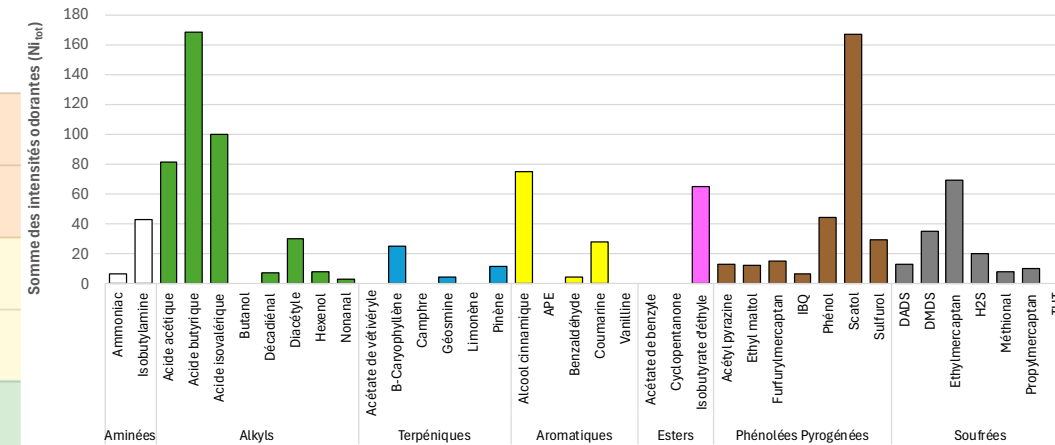
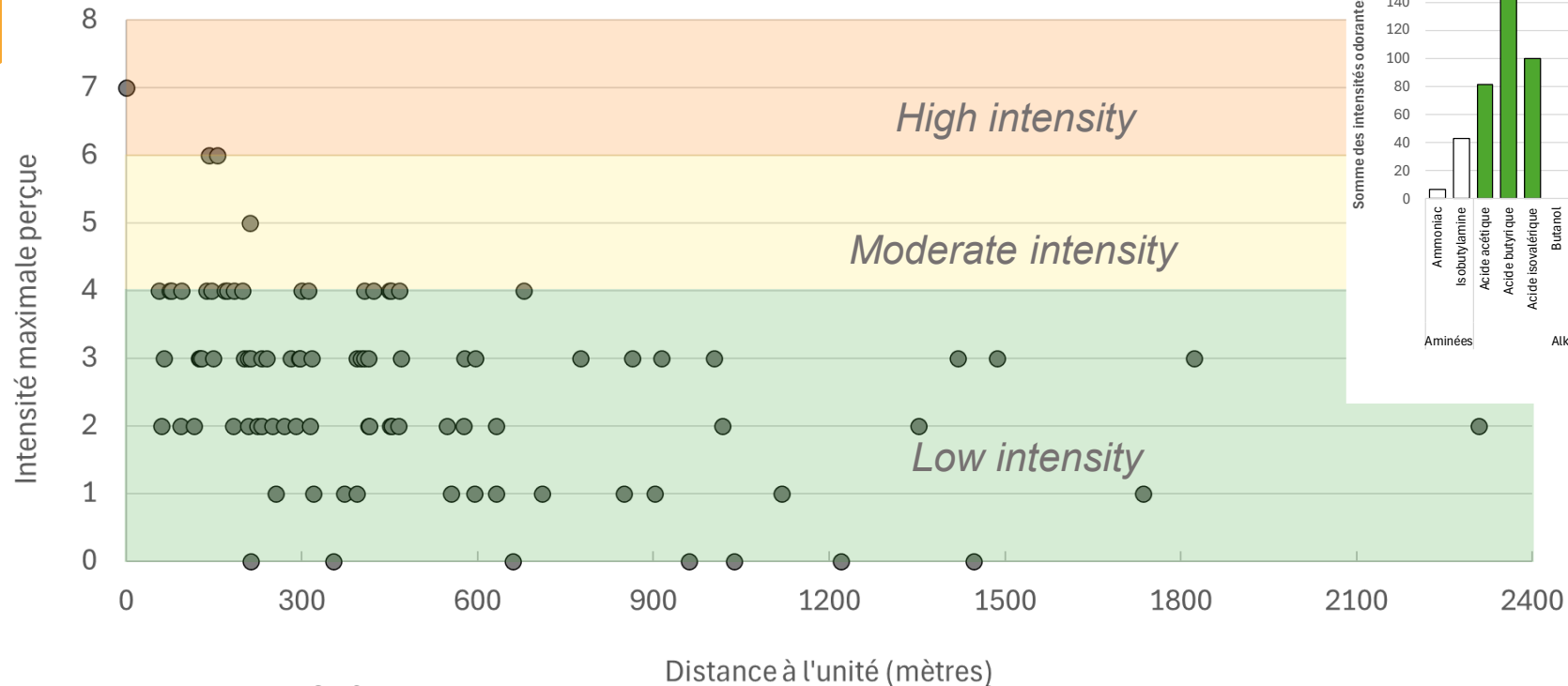
> 17 olfactory points inside each unit



- Most odorous processes : Storage of solid inputs; Hopper; Biofilter; Ponds, pits, and pipes
- Least odorous processes : Closed storage of liquid inputs; At the digestate level
- Similar odor profile between farm-based and centralized type
- Specific odor profile are available for each process

# ODOUR EVOLUTION IN THE OUTDOOR ENVIRONMENT

## 184 olfaction points outside the 12 units



- Olfactions carried out downwind of the unit, giving priority to inhabited areas
- 47% of points were odorous
- Butyric acid and Scatol are the notes mainly perceived externally
- Beyond 230 meters from the unit, odours generally become weak
- Yet, odours can be smelled up to > 2 km (*at low intensity*)
- These results support the regulatory decision not to authorize the construction of new units located less than 200 meters from the first residences

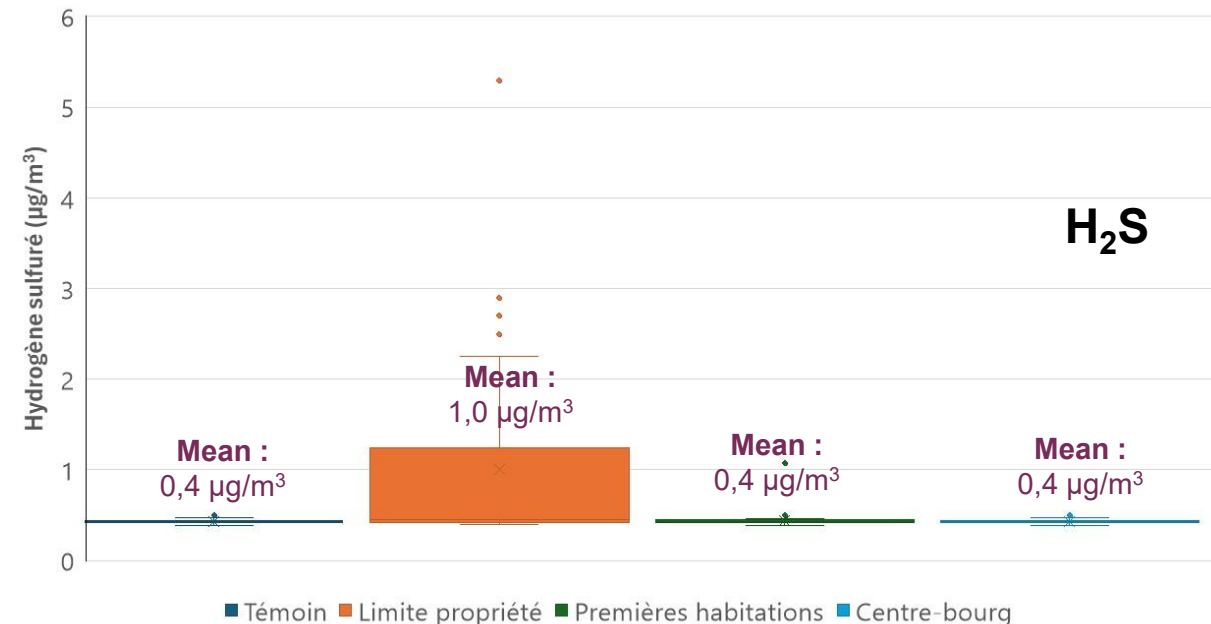
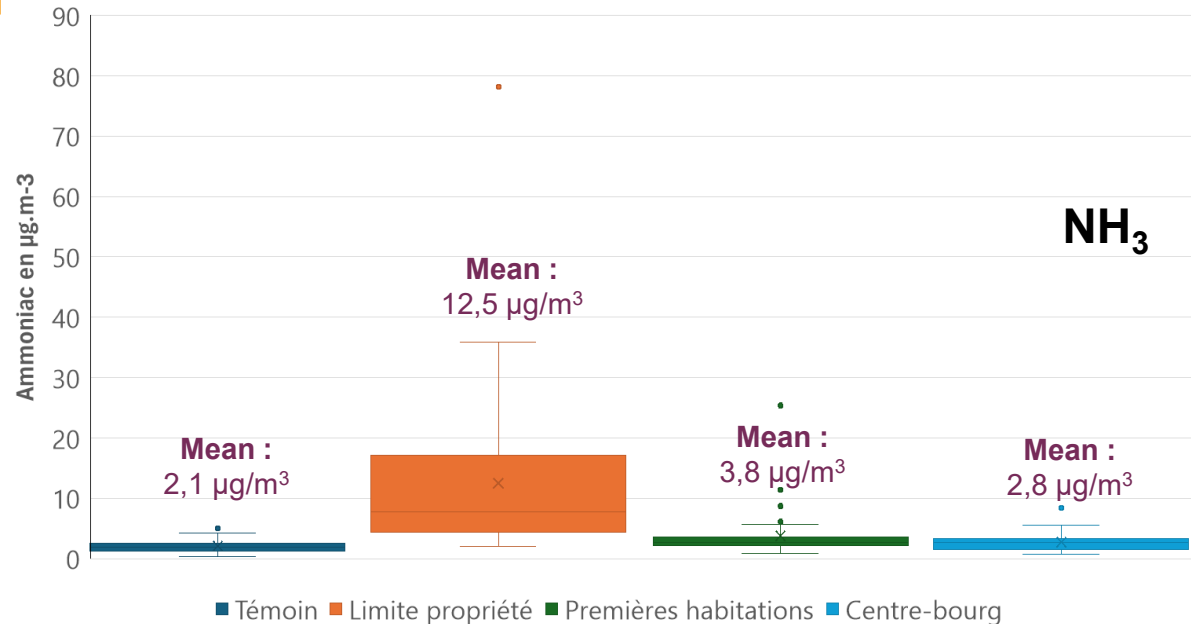


# NH<sub>3</sub> AND H<sub>2</sub>S CONCENTRATIONS IN THE ENVIRONMENT

(4 WEEKS MEAN)

Toxicological reference value (ANSES) :  
500 µg/m<sup>3</sup> (annual average)

WHO guideline value :  
150 µg/m<sup>3</sup> (daily average)



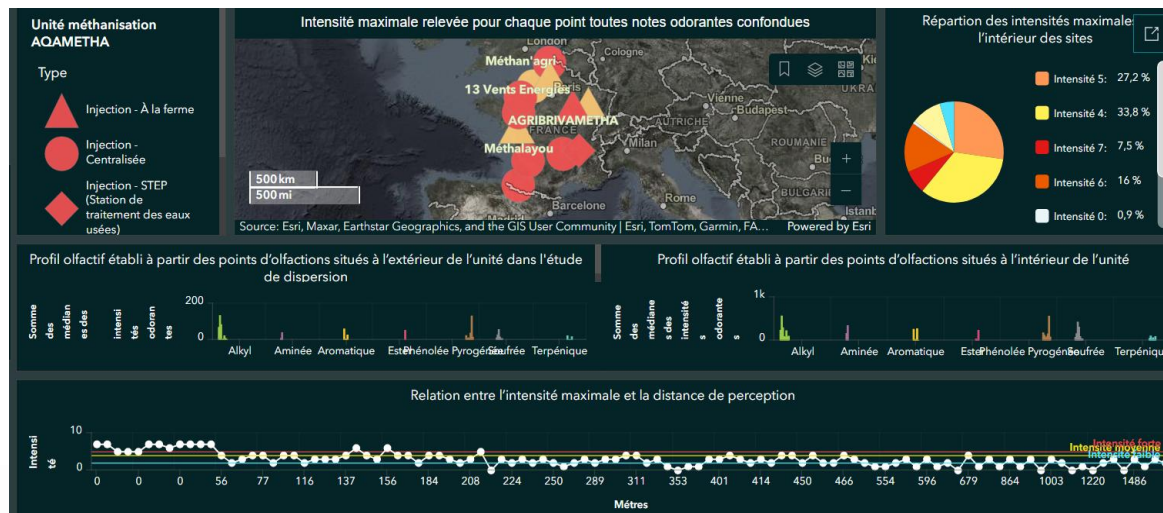
- The highest concentrations are located at the property boundary and decrease very rapidly
- From the very first dwellings, hydrogen sulfide values are close to or even below the measurement device's quantification limit.
- The health reference values are most likely being widely complied with

- **Input storage management**
  - Reduce storage time in the open air / the storage of solid inputs in closed sheds is recommended
  - Maintain storage of liquid inputs in covered pits
  - Ensuring that treatment systems such as biofilters and hygiene tanks are working properly
  
- **Good hygiene practices**
  - A better visual appearance of the methanisation unit will have a positive impact
  - Limit the flow of digestate to the ground
  - Regular maintenance of wastewater collection pits
  
- **Maintaining a channel of communication with local residents riverains**
  - The Langage des Nez® : can be used to support this link

## AQAMETHA (arcgis.com)



- Database
- Presentation of the project and results
- Recommendations to operators



Report available on ADEME's online bookshop



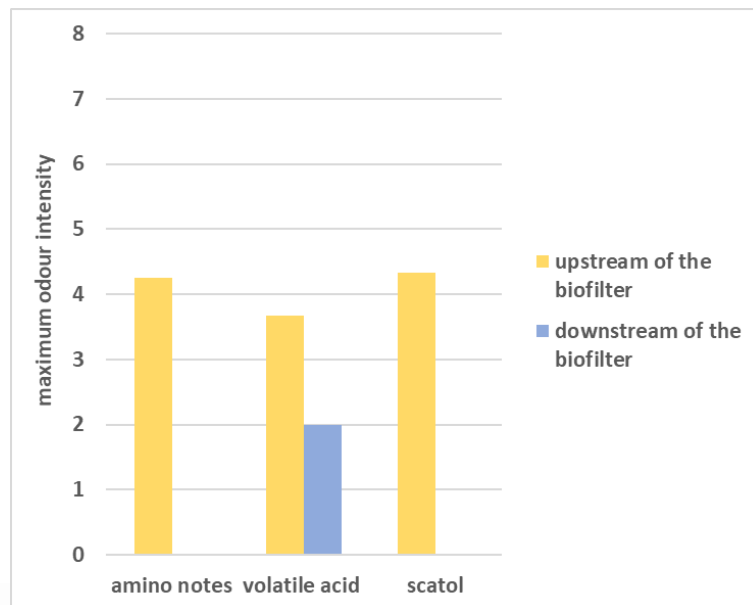


- Feed the database and the storymap with **additional investigations**
- PROMETH'AIR project 2025-2028 : **under contract with ADEME (AQACIA 2024)**
  - Analyse the effectiveness of equipment and best practices in the field and recommend the most effective solutions ;
  - Characterise the air quality associated with the spreading of digestates in comparison with other fertilisers ;
  - Define a proven method for monitoring pollutants from the methanisation process.

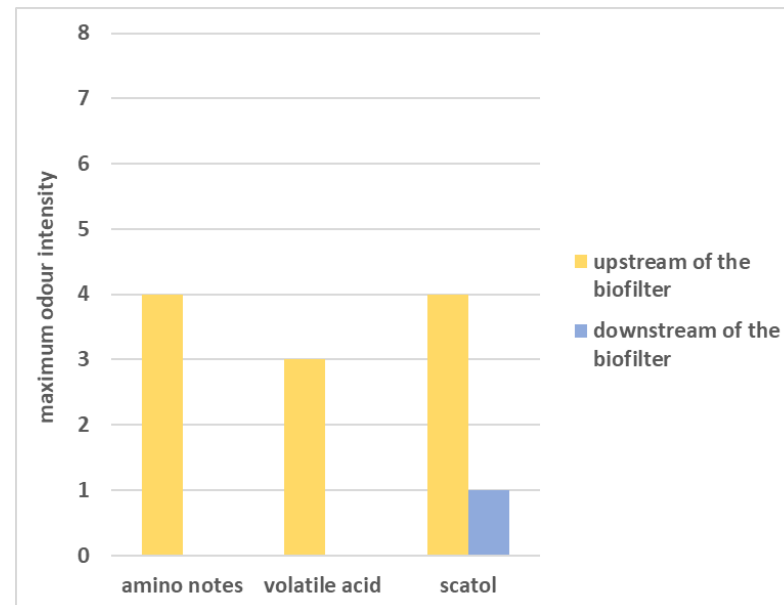


- EPIQUE-FM Pays de la Loire's study (2020-2023)

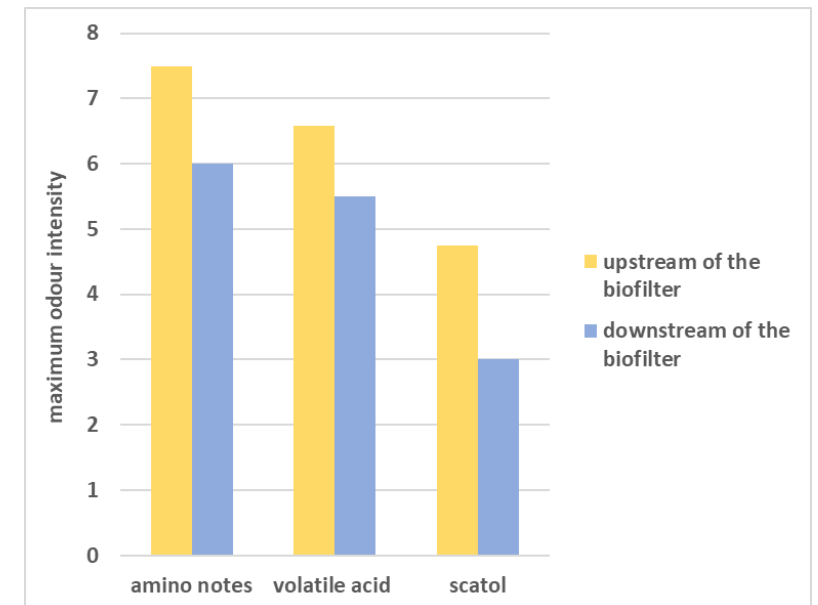
<https://www.airpl.org/rapport/investigation-de-la-qualite-de-l-air-de-la-filiere-methanisation-enseignements-principaux-et-preconisations>



UNIT 1



UNIT 2



UNIT 3



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