European Union Network for the Implementation
and Enforcement of Environmental Law

STRATEGIES FOR VERIFICATION OF SELF-MONITORING AND REPORTING ON AIR EMISSIONS WORKSHOP

The "Regional CEMS network" as a monitoring tool:

the reliability and the representativeness of data

Andrea Pagani

Emission Unit

ARPA Lombardia, Milan

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ARPA LOMBARDIA
Agenzia Regionale per la Protezione dell'Ambiente

Summary of presentation:

➢ The "Regional CEMS network": short introduction and plants managed

➢ The reliability and the representativeness of data: main aspects

➢ Actions carried out by ARPA (IT security, signed AEDOS files, specific reference laws, data comparison between Regional CEMS network and Owner's CEMS, specific alerts)

➢ Actions carried out by Owners (hardware maintenance, EN 14181)

➢ Future developments of The "Regional CEMS network"

➢ ARPA Lombardia website - references
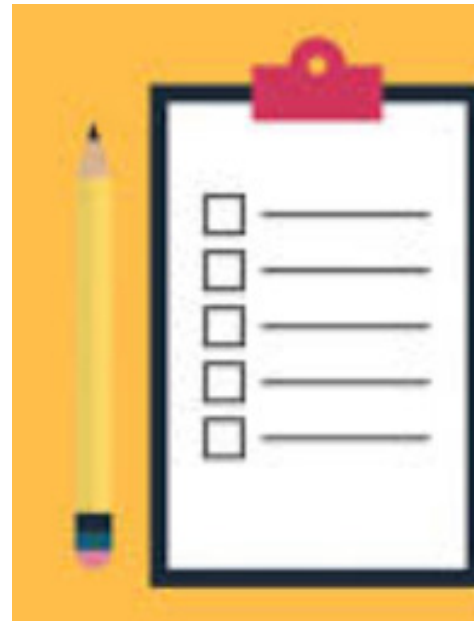
Regional CEMS network

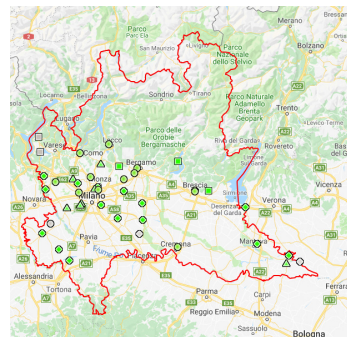▶ Which plants have to connect to the Regional CEMS Network?

- Solid Municipal Waste Incinerators
- Cements Kilns
- Glass Furnaces
- Large Combustion Plants

Software to acquire and manage air emission data of stacks of specific plants

▶ How data are acquired?

By specific software called **AEDOS** (Acquirer and Data Processor Open Source) installed on industrial PC.

Every day, emission data recorded by AEDOS are processed by the **software** called **Regional CEMS Network**.

Regional CEMS network - Plants managed

Type of plant	number	CEMS number
Solid Municipal Waste Inceneritor Plants	10	20
Industrial Waste Inceneritor Plants	2	2
Large Combustion Plants	18	41
Cement Kilns	5	6
Glass Fournaces	7	7
Summary	42	76

Regional CEMS network - type of plants

- Solid Municipal Waste Inceneritor Plants — 24%
- Industrial Waste Inceneritor Plants — 5%
- Large Combustion Plants — 43%
- Cement Kilns — 12%
- Glass Fournaces — 16%
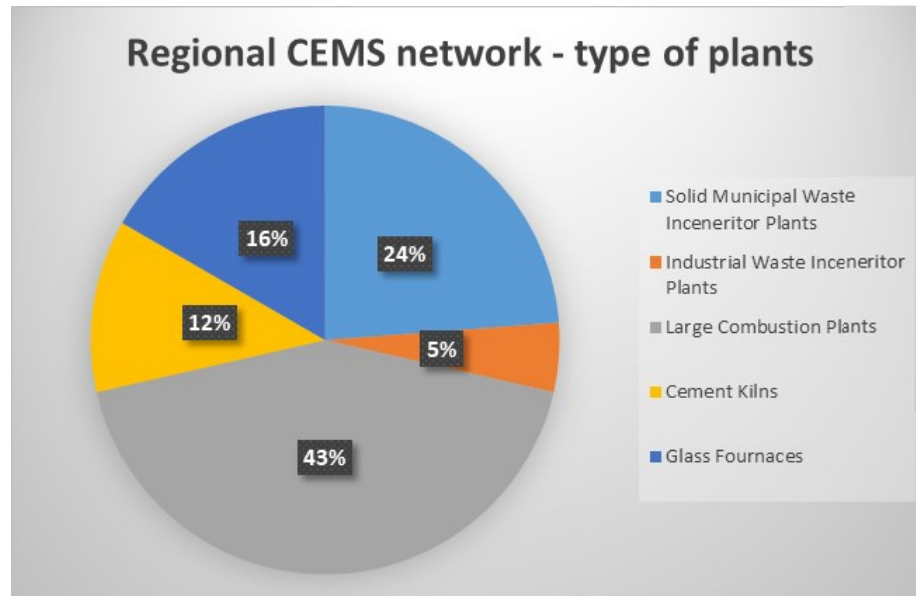
Why guarantee the reliability and the representativeness of data?

CEMS data have to photograph the situation of the plant and for this they have to be as precise and reliable as possible.
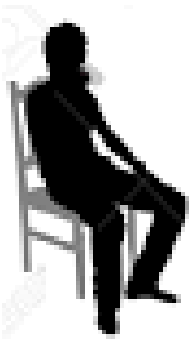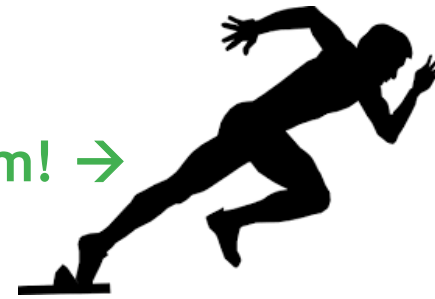
CEMS data provide informations about:

▶ emission trend in relation to the VLE

▶ mass flows

▶ failures to the plant and purification devices

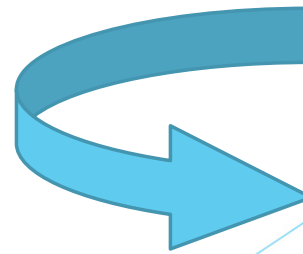# How guarantee the reliability and the representativeness of data?

no static system! ... but **dynamic system!** →

Data acquisition system requires continuous updating and supervision!

Surveillance and updating actions are carried out by ARPA and by the Owners.

ARPA actions

Multiple factors:

1) IT security (for data download)

2) signed AEDOS files (not to allow any data changes)

3) Specific reference laws (national laws and regional decrees)

4) <u>Data comparison</u> between Regional CEMS network and Owner's CEMS

5) Alerts

1) IT security (for data download)

To ensure network security, for each Plant, ARPA communicates the <u>range of IP addresses</u> (about ARPA server) to allow the secure sending of data from AEDOS to the CEMS network.

Each Owner must set these addresses to ensure the correct configuration of AEDOS.

2) signed AEDOS files (not to allow any changes)

```
-----BEGIN PGP SIGNATURE-----

iQFFBAEBCAAvFiEEewBSB/mwA6RR6vgxLsLYaQIbdXlFAmEqsiARHGhvbGNpbUBh
ZWRvcy5jb20ACgkQLsLYaQIbdXK8cwgArmbtbkUGjZ+zdzCICchB9H/URhHXAFu+
xnQ0QMzA5egitgFF+i0MfKjFXRKexRu05x5WpLtqeyaXqKsSusnl8TNiwDRkz/bi
MGYWJp78cSnGc1R4dQMm4Z1Dl+JV2TPLntHFpzKrdHBqfpUUOEfm7x5vVVH+VsIn
UKHzsCEejsMKQbKCCe+YA1PzXRFwIzhI6EPk9dlwloei5wrPpDFdN32aqfQ3uyGy
r7vTADzdedNpeBhSZz14NozR566LLAiHcuwbIUmt5Zll/+kMOH9WNpqAkIb12WcC
sHqmf17S7D40w3cWry+uab6kj6pxp33xDus0JRHJtBiTQkG2ys5ziA==
#NOME?
-----END PGP SIGNATURE-----
```

Each file (istant and average) is signed automatically at the end of the day so as <u>not to allow any changes</u>.

```
AEDOS - ALICE - vrs. 2.2.3 build: 20201125
Impianto 32451 - ISTANTANEI
```

→ unique code of the CEMS
(to identify related data)

3) Specific reference laws

CEMS LEGISLATION

- National law: *D.lgs 152/2006* (Unique Text of Environmental Laws)
- Regional laws: DDS 4343/2010 + DDUO 12834/2011

<u>Laws define homogeneous data processing criteria and code the information in the same way for all plants</u>.

- ✓ Data processing
- ✓ Specific tags to identify:

- ❑ Polluting parameters, fumes parameters, system parameters, …
- ❑ the validity of the data (for ex: VAL define valid data, ERR incorrect data, AUX auxiliary data, …)
- ❑ Data source (m – measured, c – calculated, s – estimated)

|	CO_V_m_TP		HCl_V_m_TP		NH3_V_m_TP		SO2_V_m_TP		NOx_V_c_TP	
	mg/Nm3		mg/Nm3		mg/Nm3		mg/Nm3		mg/Nm3	
00:00:00	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:05	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:10	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:15	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:20	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:25	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:30	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:35	129.241	VAL	1.3919	VAL	7.3977	VAL	19.7353	VAL	249.6041	VAL
00:00:40	122.839	VAL	1.3152	VAL	7.2411	VAL	19.8435	VAL	252.7883	VAL
00:00:45	122.839	VAL	1.3152	VAL	7.2411	VAL	19.8435	VAL	252.7883	VAL

4) Data comparison between Regional CEMS network and Owner's CEMS

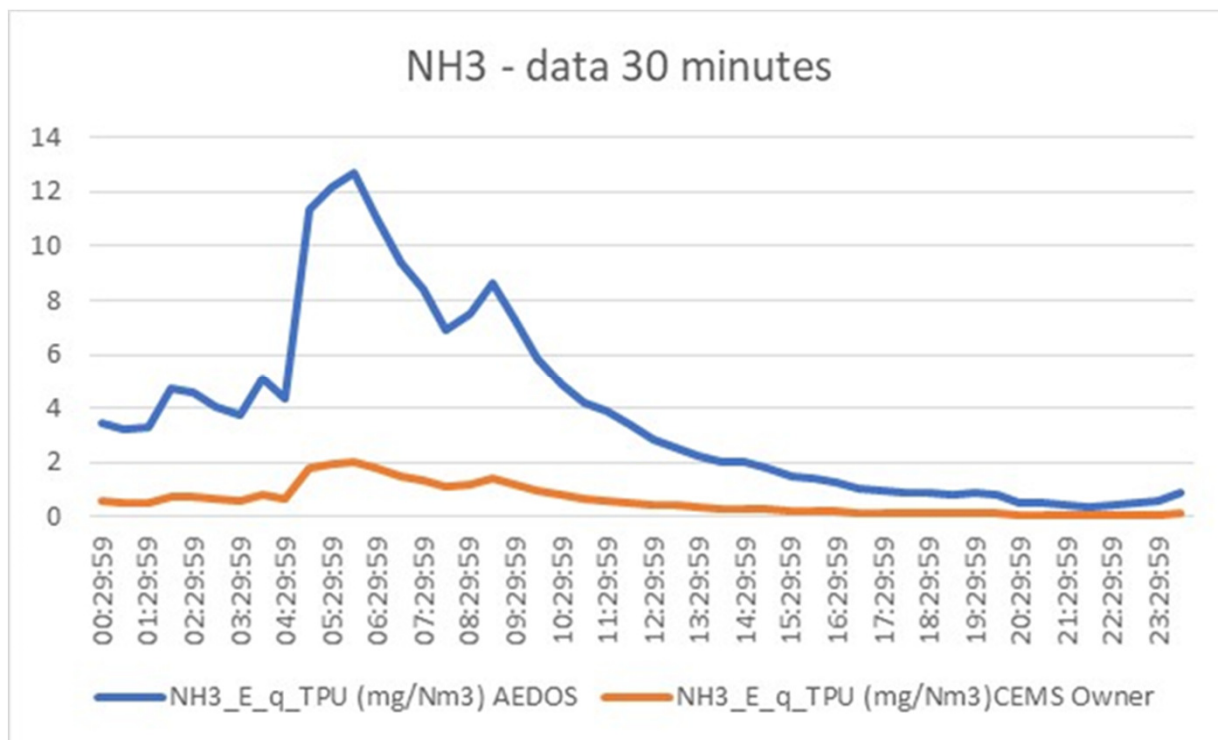Very important because it allows to have a reference about the *quality* of data!

Main deviations found:
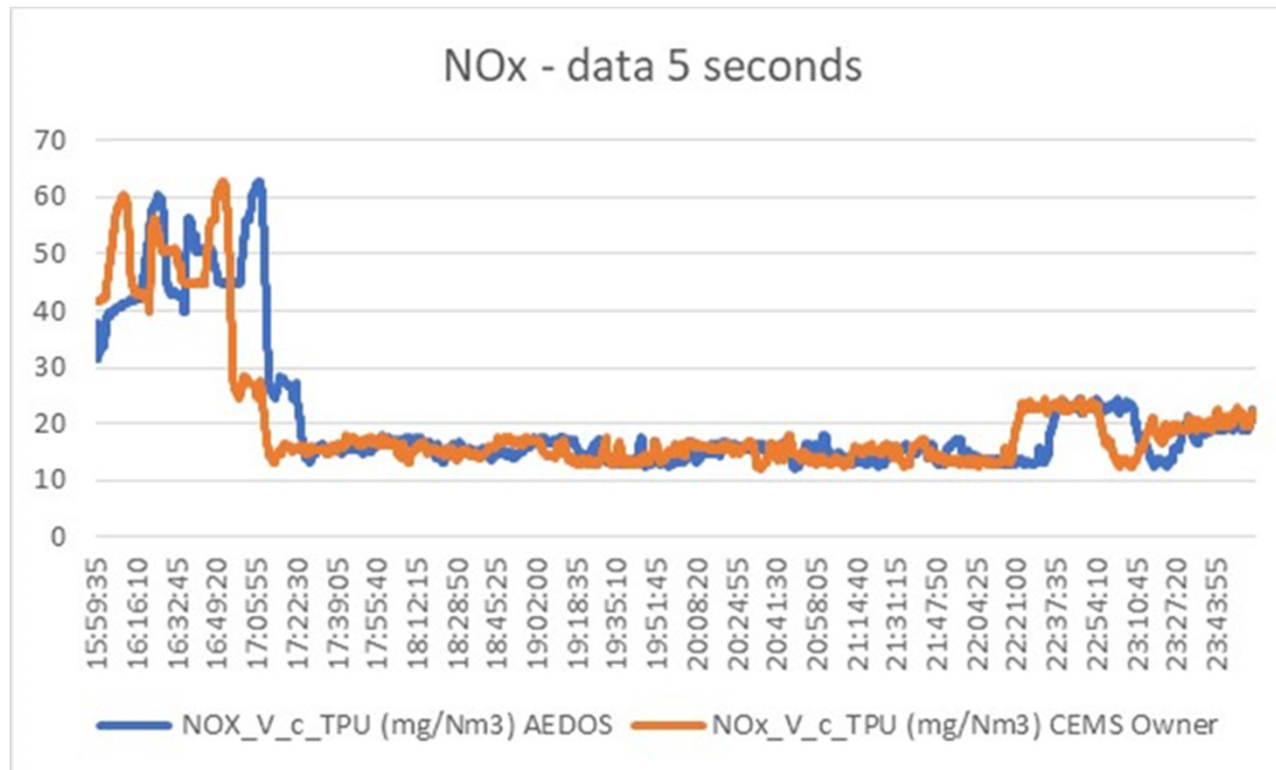
➤ Dry / wet data (ex. O2 wet instead of dry)
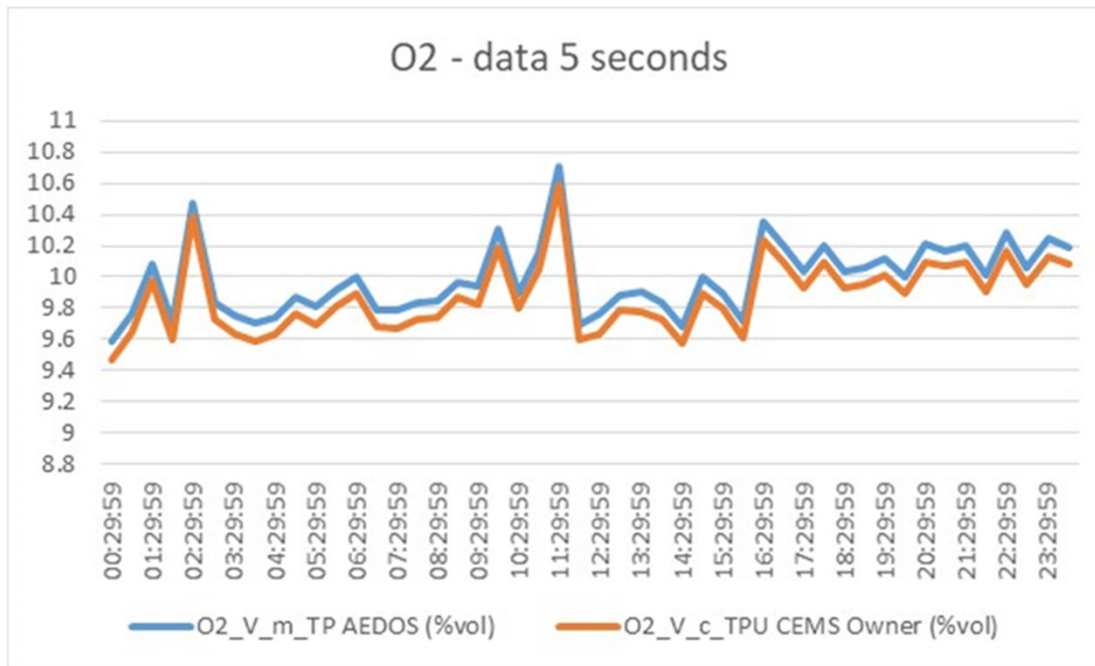
➢ Calibration line (QAL 2) applied not correctly or transcribed incorrectly

NH3 - data 30 minutes

➢ Different time reference (cems clock not synchronized)

NOx - data 5 seconds

5) Alerts

➤ Download failed

+ DOWNLOAD

File	Data download	Data inizio	Data fine	Diagnosi	Messaggio	Messaggio esteso
.sad	20/09/2021	21/09/2021 02:00:04	21/09/2021 02:00:05	⬤		
.600.medie	20/09/2021	21/09/2021 02:00:05	21/09/2021 02:00:05	◯	The remote server returned an error: (404) Not Found.	
.1800.medie	20/09/2021	21/09/2021 02:00:05	21/09/2021 02:00:05	◯	The remote server returned an error: (404) Not Found.	

➤ Instrument status: anomalies, related to the instrument (FTIR, FID,...) are reported in a specific table; the item "alert hours" indicates the number of hours for which the anomalies are recorded

– STATO STRUMENTO:

Data	Sensore	Funzione	Ore alert	Data inizio	Data fine	
24/02/2021	statoSTRUM-FID	N_C_e_	8	24/02/2021 08:20:00	24/02/2021 16:10:00	📈
24/02/2021	statoSTRUM-FTIR	N_C_e_	8	24/02/2021 08:20:00	24/02/2021 16:10:00	📈

Owner actions
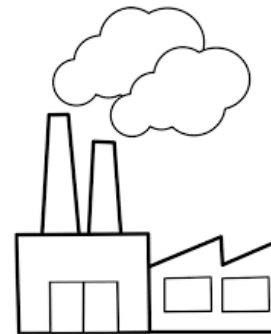
▶ Follow the indications of ARPA (defined in the AEDOS preliminary installation project)
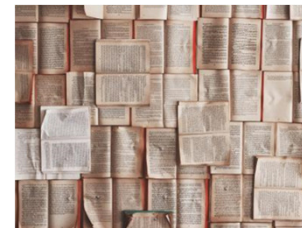
▶ Comply with CEMS regulations

... Owner actions

▶ Hardware maintenance

▶ In case of equipment failure, act quickly

▶ Continous Emission Monitoring System compliance check (according to EN 14181)

... Owner actions

Communication
between
Owners and ARPA
is very important !!!

CEMS data require continuous updating and control to be representative and reliable !

Future developments of CEMS Network

- ▶ Continuous updating of AEDOS configurations for connected plants

- ▶ Progressive adoption by the plants of the MODBUS protocol to replace the ADAM ASCII

- ▶ Owners portal: now under experimentation, it will allows operators to upload the data of the CEMS plant, send them via FTP, import them into the CEMS network both to fulfill legal obligations and to compare them with AEDOS data

- ▶ Creation of new reports for specific needs

For more informations ...

https://www.arpalombardia.it/Pages/Arpa-per-le-imprese/Autorizzazioni-e-Controlli/Progetto-rete-SME.aspx?firstlevel=FAQ%20sezione%201

info-retesme@arpalombardia.it

Thanks for the attention !