Monitoring Insights

Part 75 Monitoring Methodologies

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Power Plants are required by the Clean Air Act to monitor and report emissions.

Part 75 is found in Volume 40 of the Code of Federal Regulations (CFR) and was originally published in January of 1993. The regulation's purpose was to promulgate continuous emission monitoring and reporting requirements to support EPA's Acid Rain Program (ARP) —Title IV of the Clean Air Act Amendments of 1990. The ARP generally regulates electric generating units that burn fossil fuels such as coal, oil, and natural gas, and that serve a generator greater than 25 megawatts.

Part 75 allows several options of monitoring methods.

Facilities have different monitoring methodologies available to them based on the fuel burned, unit type, and the status of the unit (e.g., peaking unit or low mass emitter).

The most common methodologies include:

- Monitoring pollutants exiting through the stack (i.e., stack level monitoring).
- Monitoring fuel going into the electricity generating unit and calculating pollutant output (i.e., fuel level monitoring).
- Monitoring operating parameters, including operating time, and correlating pollutant output to those parameters.

EPA

Table 1: What are the monitoring methods?

Methodology	Description	Attributes
Stack Level Monitoring (CEMS)	Consists of all the equipment needed to sample, analyze, measure, and provide a permanent record of the emissions. Measurements are taken as pollutants exit through the stack.	• Highly accurate • Rigorous quality assurance[1] • Can be used solely or in combination with other methodologies
Fuel Monitoring (Appendix D and E to Part 75)	Methodology for estimating SO_2 mass emissions, NO_X emission rate, CO_2 mass emissions, and heat input. The fuel entering the electricity generating unit is measured and used to calculated pollutant output. Requires heat input monitoring (fuel consumed) and fuel quality sampling for SO_2 and CO_2 mass emissions estimations.	• Only for oil and gas units • Can be used in combination with other methods • NO_X emission rate only available to peaking units—units that run infrequently at high electricity (peak) demand
Operating Time Records (low mass emitters)	Emissions are estimated using conservative fuel-specific default emission rates ("emission factors"). Hourly heat input is either estimated from records of fuel usage or it is reported as the maximum rated heat input for each unit operating hour.	• Only available to oil and gas units with very low total emissions • Very conservative and likely to overestimate • If chosen, this method must be used for all parameters

[1] For more information on the QA/QC performed for CEMS refer to the Relative accuracy (RA) in EPA CAMD's Power Sector Emissions Data (pdf) or the Plain English Guide to Part 75 (PDF)

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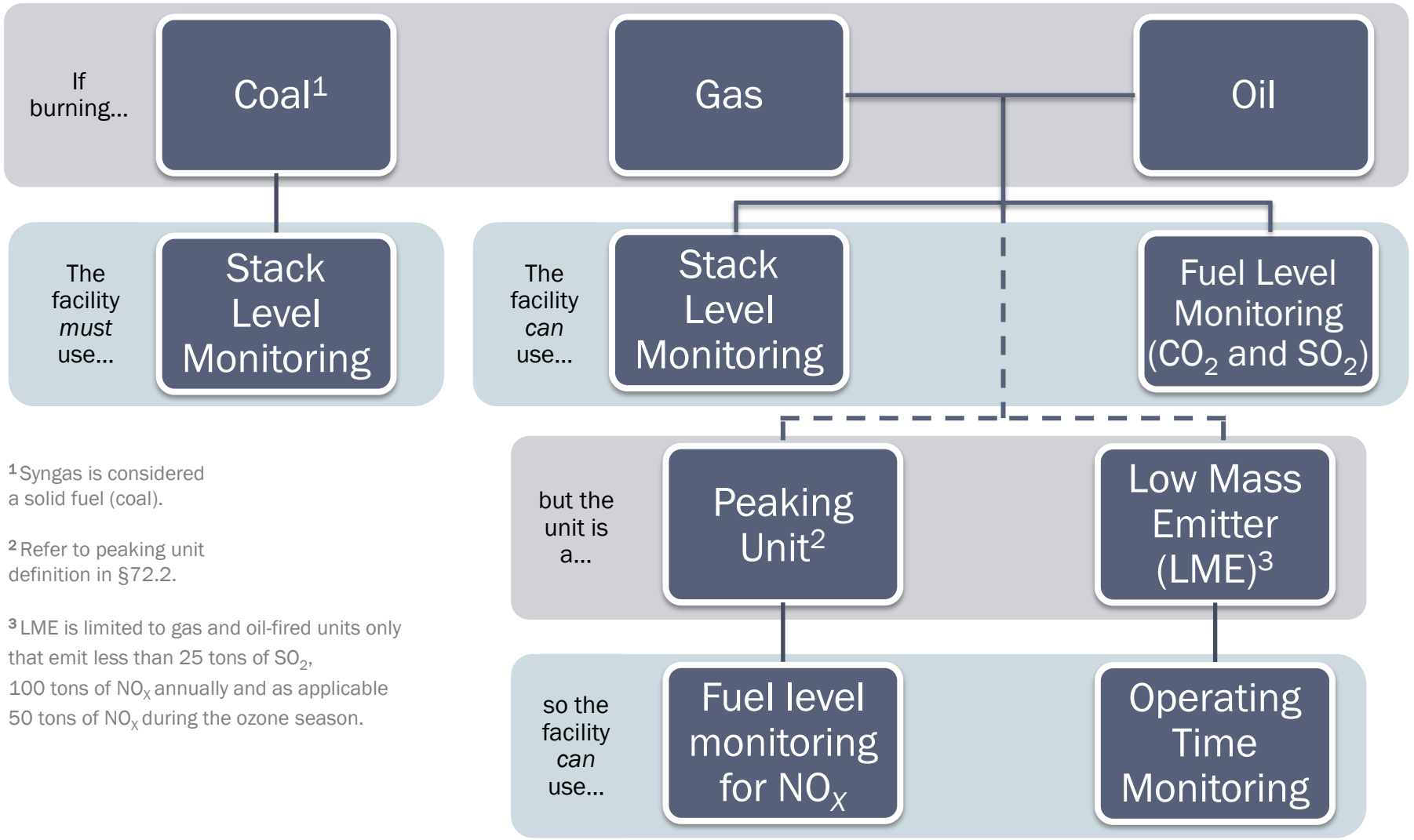
What types of units can use each monitoring method?



[1] Syngas is considered a solid fuel (coal).

[2] Refer to peaking unit definition in §72.2.

[3] LME is limited to gas and oil-fired units only that emit less than 25 tons of SO_2, 100 tons of NO_X annually and as applicable 50 tons of NO_X during the ozone season.

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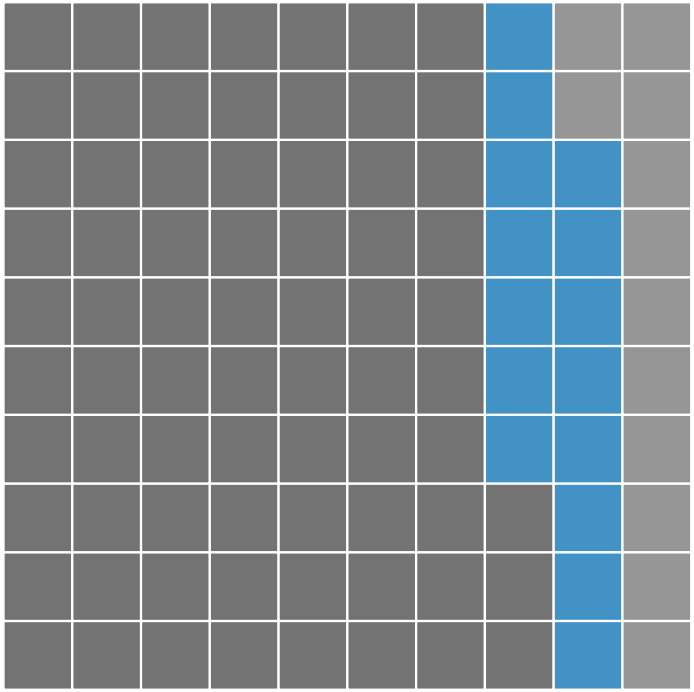
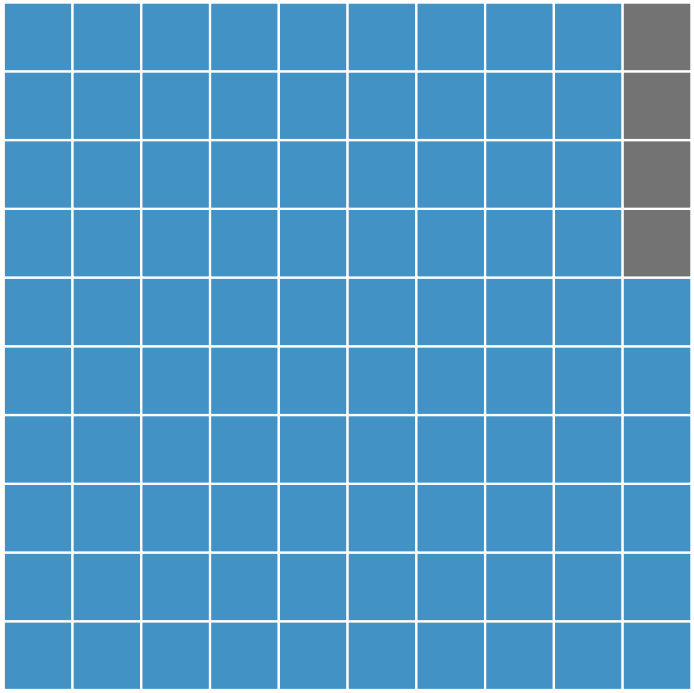
Most units reporting SO_2 use fuel monitoring, but most emissions are monitored at the stack level

SO2 Monitoring Methods by Percent of Units



SO2 Monitoring Methods by Percent of Emissions



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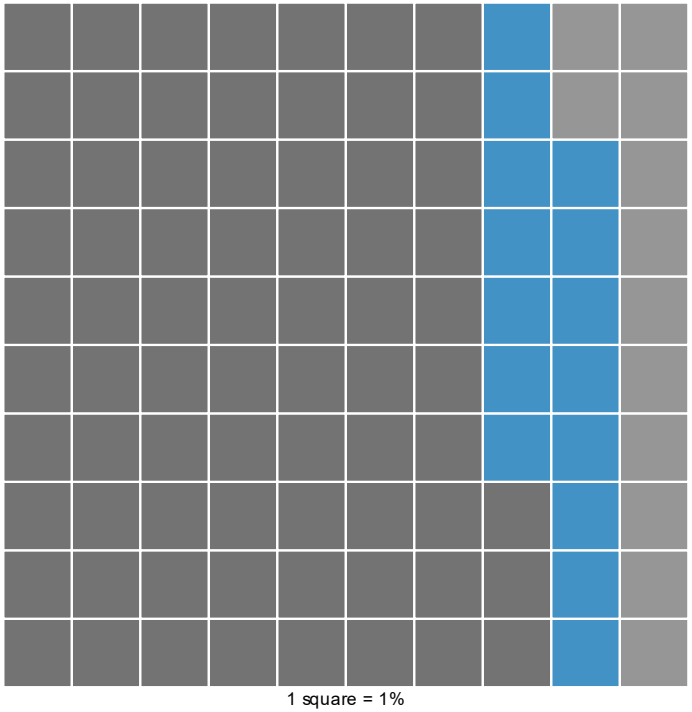
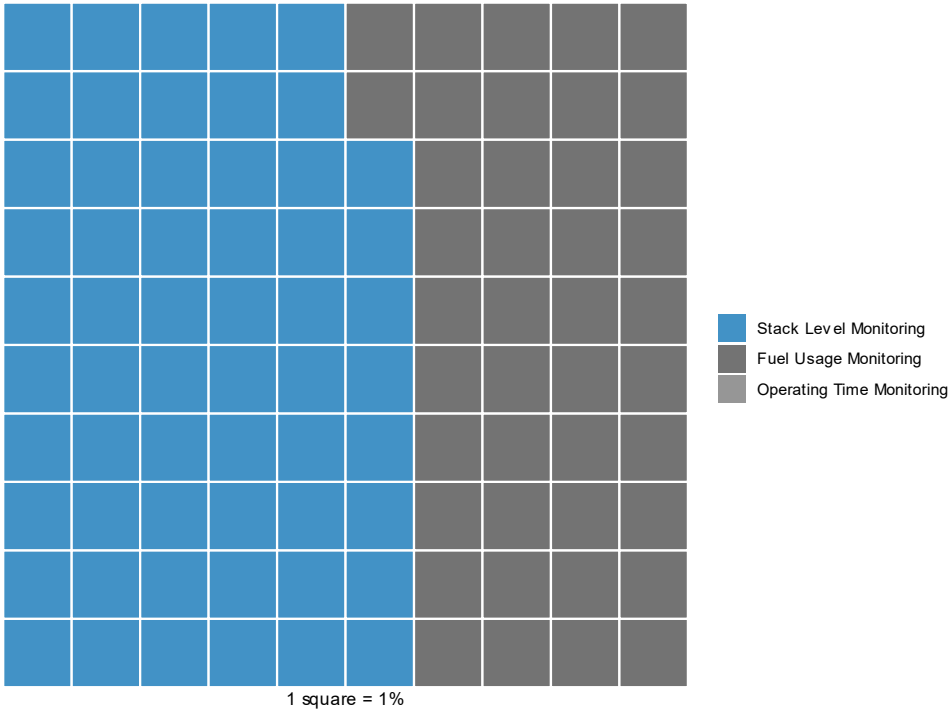
CO_2 follows a similar trend: most emissions are monitored at the stack level while most units use fuel monitoring

CO2 Monitoring Methods by Percent of Units



CO2 Monitoring Methods by Percent of Emissions



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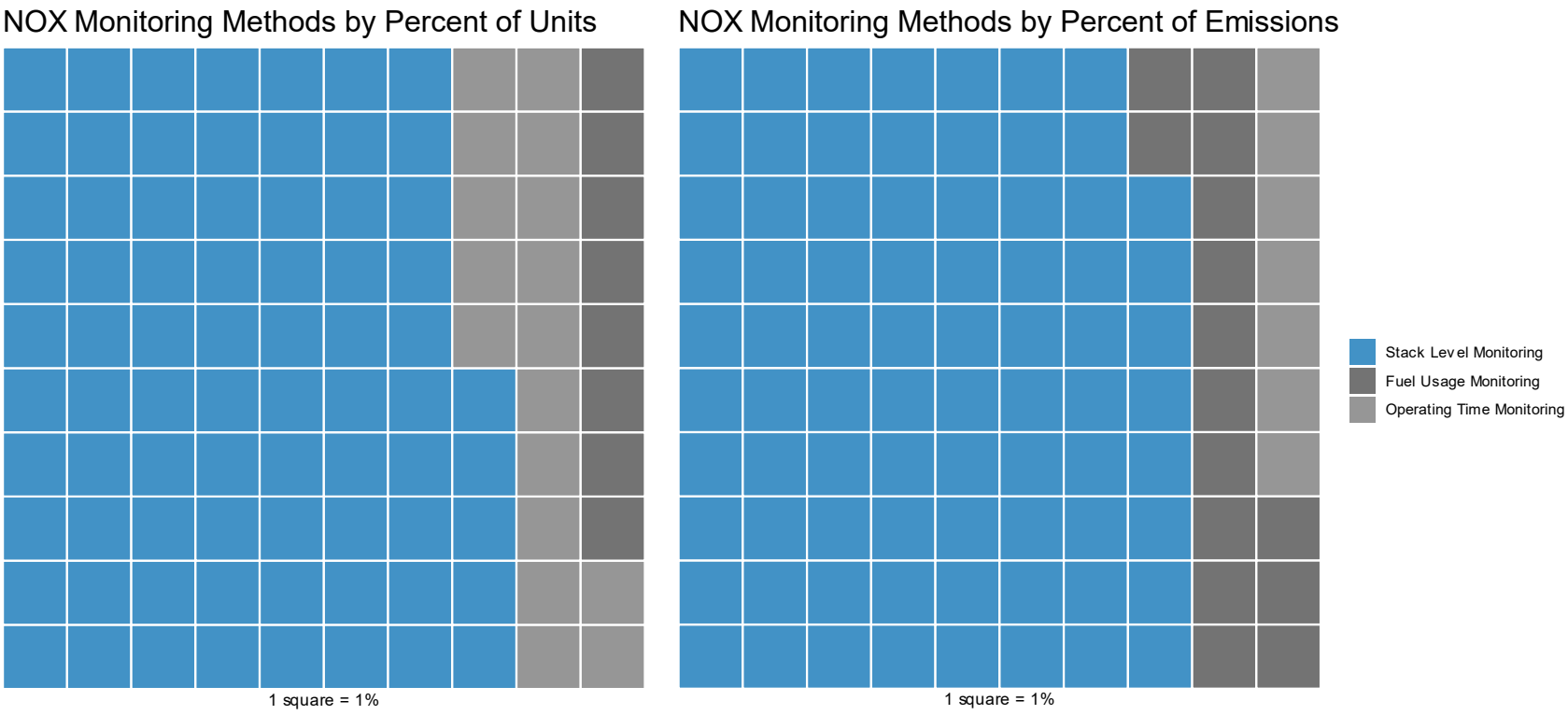
NO_X does not follow the same trend: most units and emissions come from stack level monitoring.



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Although most units report with fuel monitoring, most emissions are monitored at the stack level—the most accurate and quality assured monitoring method.

96% of SO_2 emissions are monitored at the stack

Units that run more frequently or release more tons of SO_2 (like units that burn coal) are monitored at the stack level with the most accurate methodology. Low levels of SO_2 in natural gas account for the difference.

58% of CO_2 emissions are monitored at the stack

CO_2 follows a similar trend to SO_2. However, since burning natural gas emits almost exclusively CO_2, and because the majority of natural gas units report with fuel monitoring, fuel monitoring accounts for a greater percentage of CO_2 emissions than SO_2. Even so, most CO_2 emissions are monitored at the stack level.

78% of NO_X emissions are monitored at the stack

Most units report with, and emissions are monitored with, stack level monitoring. This is because a unit must qualify as a peaking unit to measure NO_X at the fuel level. As a result of this qualification, fewer units monitor NO_X at the fuel level and instead measure NO_X emissions with highly accurate stack level monitoring.

Analytical methodology

This analysis was completed in R. If you would like to review the code or source data, contact Stacey Zintgraff. To complete this analysis, we took the following steps:

1. Using unit level emissions data and monitoring plan data, start by separating data by parameter (i.e. NO_X, CO_2, or SO_2).
2. Calculate the percent of units using each monitoring method for each pollutant.
3. Calculate the percent of each of the emissions measured by each monitoring method.
4. Create the waffle charts.

By the numbers

SO_2 Monitoring Method

- **73%** of units report with fuel monitoring
- **15%** of units report with stack level monitoring

CO_2 Monitoring Method

- **73%** of units report with fuel monitoring
- **15%** of units report with stack level monitoring

NO_X Monitoring Method

- **8%** of units report with fuel monitoring
- **75%** of units report with stack level monitoring

For more information about the data or this analysis…

EPA's part 75 monitoring and reporting program

- 40 CFR part 75—Continuous Emission Monitoring
- Plain English Guide to Part 75 (PDF)
- EPA CAMD power sector programs—progress reports

Power Sector Emissions Data

- CAMD's Power Sector Emission Data
- CAMD's Power Sector Emissions Data Guide (PDF)

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