Air Quality

Ambiant Air Monitoring Network & Review of LDAR By-law Amendment

Montréal

Black Smoke Era

- End of the XIX^{e} century
- Industrial coal heating
- Soot and particulate matter in the air
- In 1872 = Rule 56
- First canadian city to adopt a by-law

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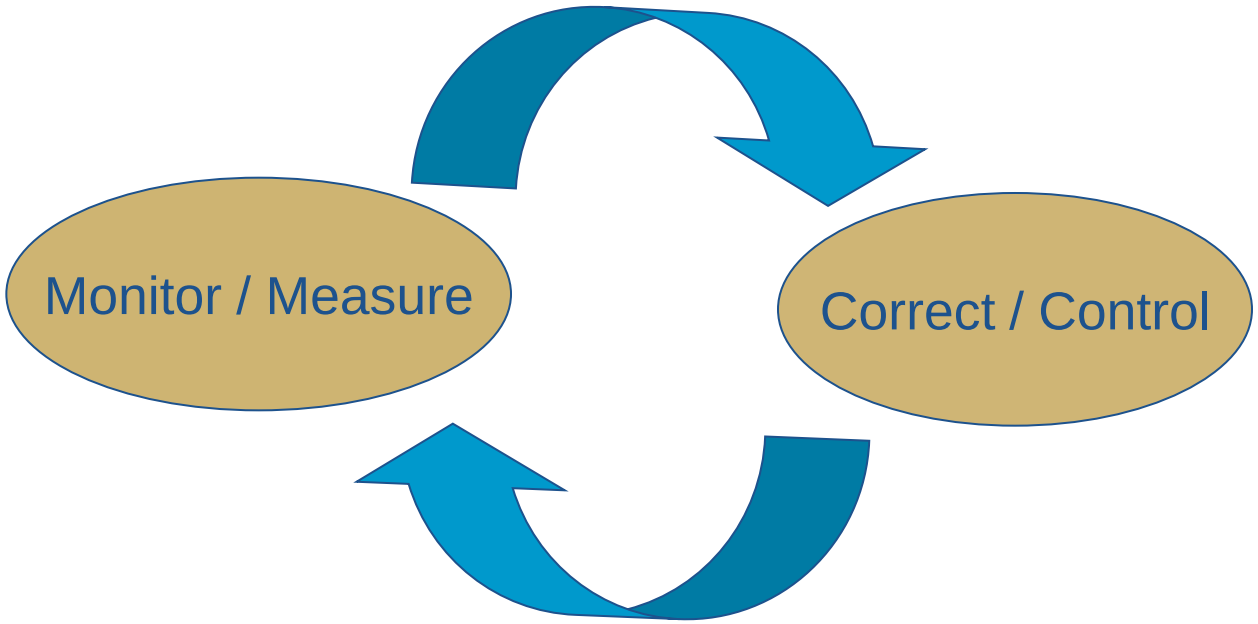
Industrial Boom

- More industries in urban centers
  - 1950-1980
  - Many pollutants
- Tighter pollution control
- In 1979 = By-law 44
  - Emission standards for industrial control and ambient air standards (>300 substances)
- Up date in 1987 = By-law 90
  - subsequent amendments
- Became By-law 2001-10
- LDAR rules adopted in 2001

Role



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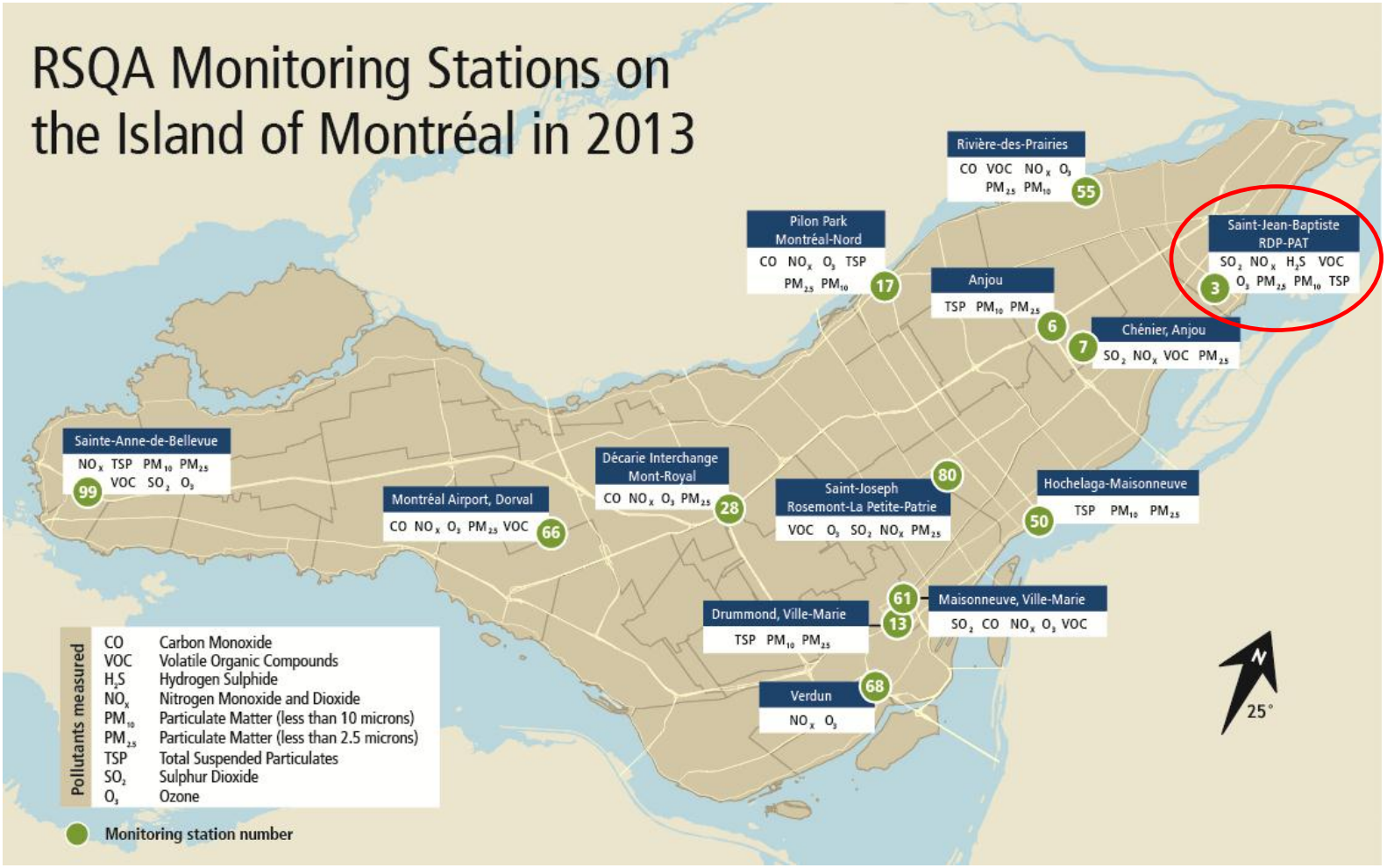
Role

- Measuring air quality in strategic locations
- Support interventions in partnership with the Industrial Emission Control Division
- Partner in Info-Smog program forecasting air quality
- Participate in various projects
- Member of the National Air Pollution Surveillance Network (NAPS)

Network



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The Station

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Location

- Refineries ~ 3 km south west
- Tanks
- Petro-chemical plants

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BTEX Analysis

	TO-14 Since 1989	AirmoBTX Since 2009
Sample	• 24 consecutive hours • From midnight to 23h59 • Canister collection 	• 19 hours and 12 min per day • 3 min excluded every 15 min • 2 internal calibration of 15 min per day • First sample doesn't start at midnight sharp (00h07)
Analysis	GC-MS	GC-FID
Frequency	Every six days according to NAPS calendar	Continuous measurements
Results	Delayed (++ months)	Real time data via DrDAS

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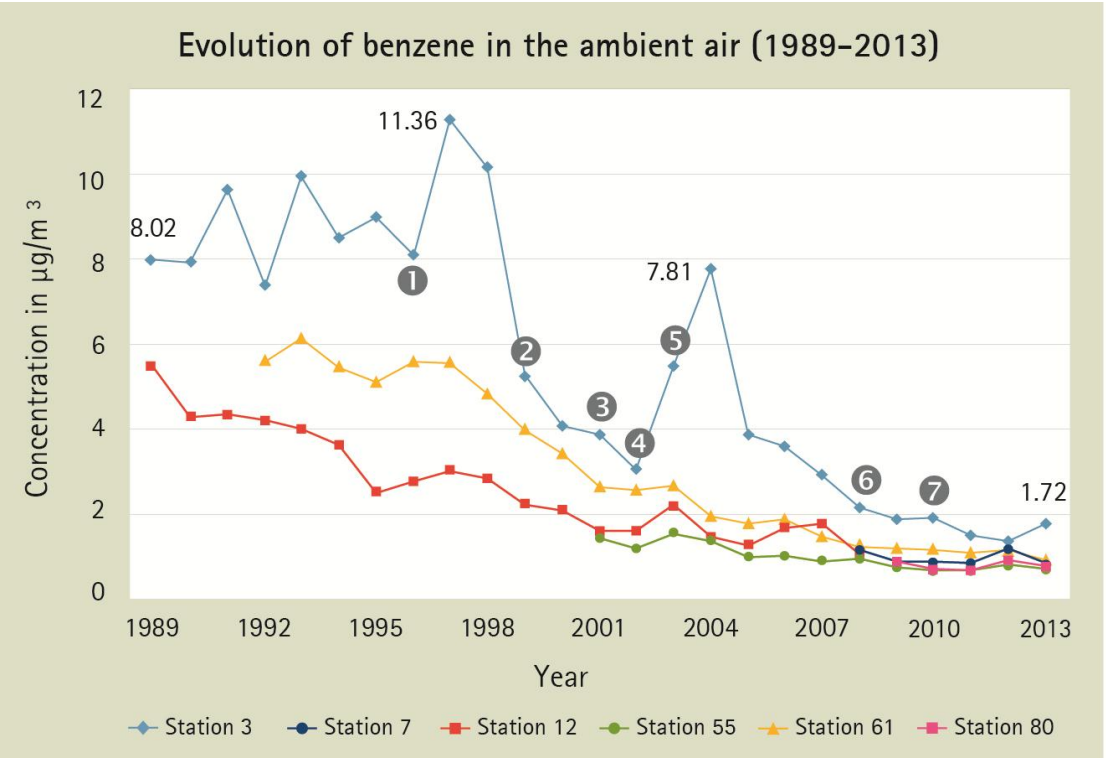
Benzene history

- Highest mean and maximum levels of benzene in Canada during the periods of 1989-1993 and 1989-1998 respectively (Germain, Rousseau and Dann, Issues related to benzene, 2001)

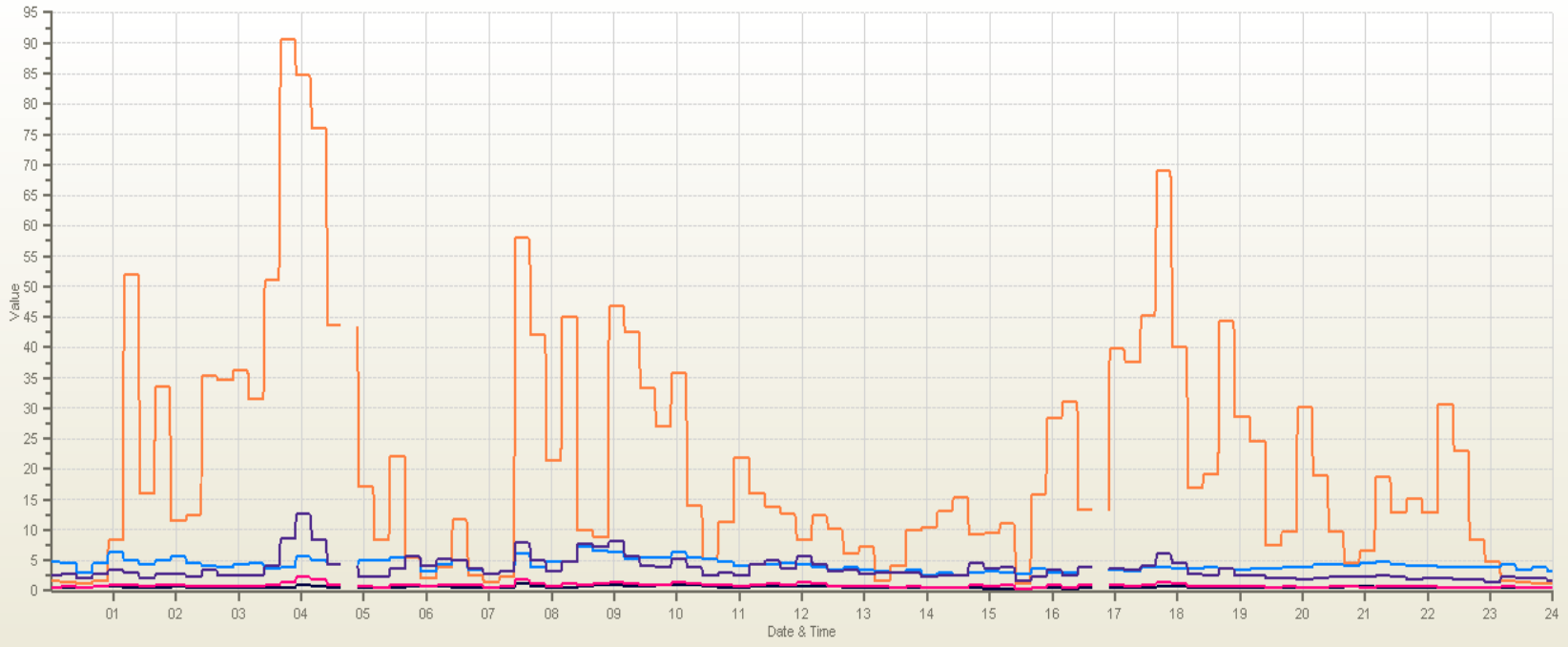


Events that influenced the quality of ambient air in the east end of Montréal

1. Recovery of oil vapours in 1996: Bylaw 90-3
2. Decrease of the benzene content in gasoline in 1999
3. Measurement and corrective measures for leaks (equipment) in 2001: Bylaw 90-6
4. Recommissioning in 2002 of Pétrochimie Coastal, now Chimie Parachem
5. Commissioning in 2003 of Interquisa, now Cepsa
6. Closure of Pétromont in 2008
7. Closure of the Shell refinery in 2010

Partnership

Station: 03 Daily: 23/01/2014 Type: AVG 1 Min. [1 Min.]



Benzene[ug/m3L] Toluene[ug/m3L] Ethylbenzene[ug/m3L] M,P-Xylene[ug/m3L] O-Xylene[ug/m3L]

Reference date of display

< January 23, 2014 > --> Today <--

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Role

- Enforcing air quality and waste water quality by-laws for the Montreal agglomeration
- Environmental permiting, inspections and industrial sampling
- Environmental complaints

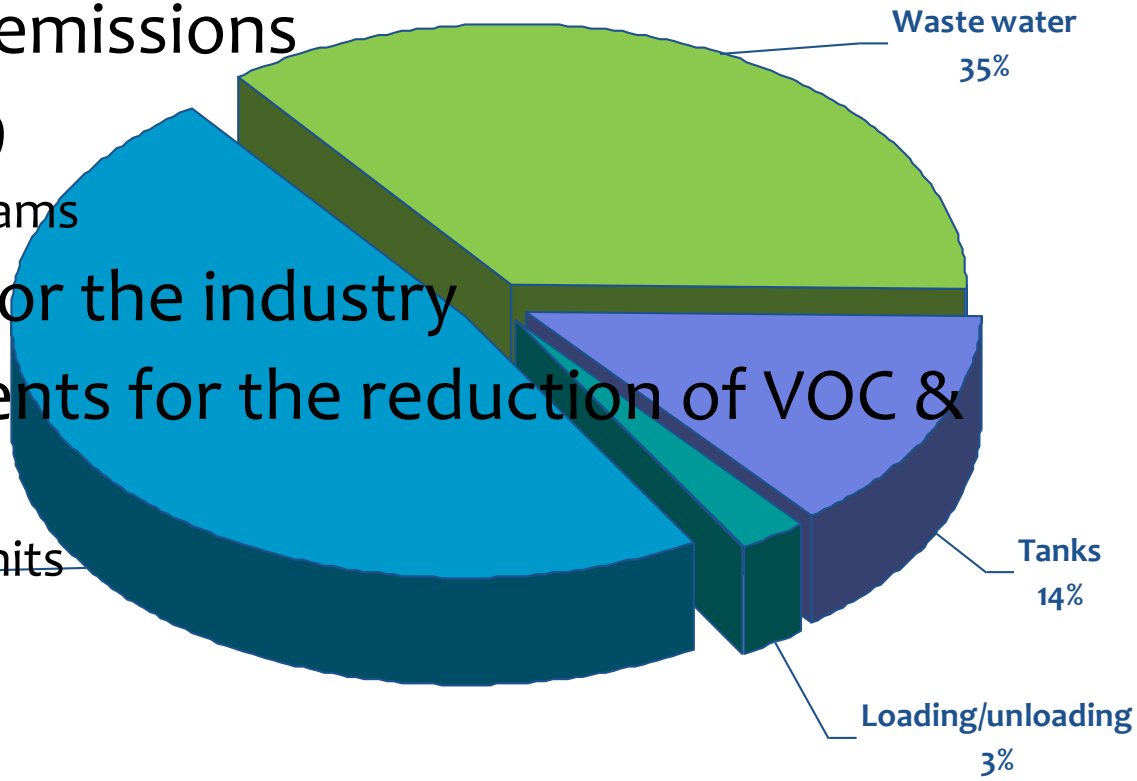
LDAR by-Law

Why adding a LDAR amendment to existing by-Law ?

- Need to reduce emissions
- Situation in 1999
  - Only 3 LDAR programs
- Harmonization for the industry
- Other requirements for the reduction of VOC & benzene
  - Vapour recovery units
  - Floating roof
  - Voluntary measure

Petroleum & Petrochemical industry emissions in 1999

Source	TOC (t/y)
Process fugitive	1900
Waste water	1400
Tanks	550
Loading/unloading	100



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By-Law 90 (Art. 7.11)

- Refineries
- Chemical and Petrochemical plants
- Petroleum terminals
  - > 250 Millions Litres / year

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By-Law 90 (Art. 7.11)

- Conditions :
  - Light liquids or gas
    - Vapour pressure ≥ 1 kPa @ 20°C
    - Valves
    - Pump, compressor and agitator seals
    - Open ended lines
    - Connectors and flanges (exception of terminals)
    - Nominal size ≥ 1,875 cm
  - Exceptions :
    - Equipment under vacuum
    - Insulated equipment
    - Equipment inaccessible or higher than 2 m from a permanent platform

By-Law 90 (Art. 7.11)

- Monitoring
  - Adapted from USEPA Method 21
  - Once every 3 months for pump, compressor and agitator seals
  - 24 hours after discharge for pressure relief valves (atm.)
  - Once a year for all other equipments
  - Reduced program (2% leak rate)
- Leak definition
  - 1000 ppmv if content ≥ 10% of benzene or 1,3-butadiene
  - 10 000 ppmv in all other cases

By-Law 90 (Art. 7.11)

- Repairs
  - 15 days if content ≥ 10% of benzene or 1,3-butadiene
  - 45 days for all other cases
  - Next Shutdown
- Reporting
  - Once a year
    - Summary of monitoring and repairs
    - Emissions
- Record keeping

Results

Evolution of Process Fugitive Emissions

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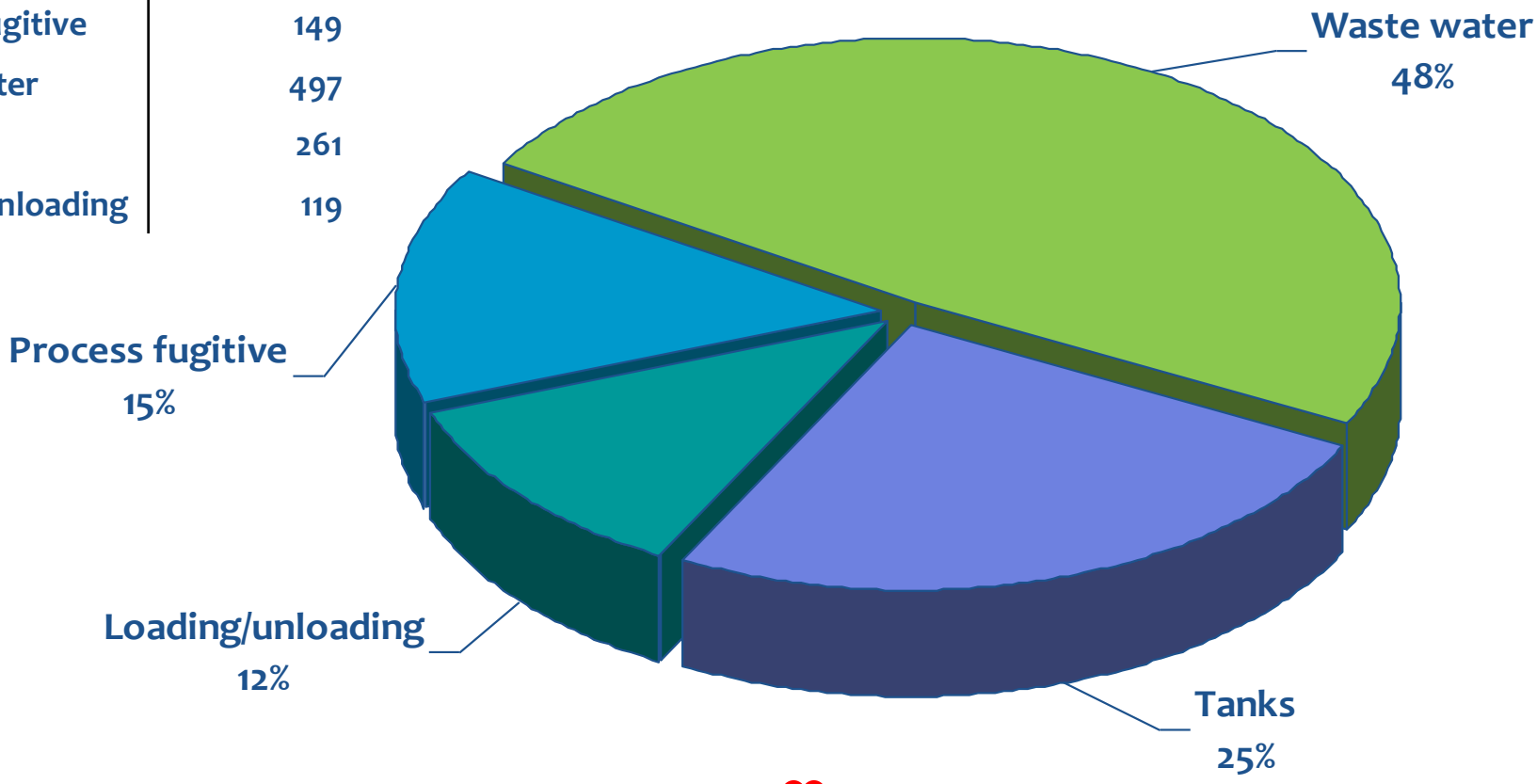
Situation in 2013

Petroleum & Petrochemical Industry Emissions in 2013

Source	TOC (t/y)
Process fugitive	149
Waste water	497
Tanks	261
Loading/unloading	119



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Conclusions

- Reduction of benzene emissions
- Part of annual review & inspections
- Part of maintenance program
- Better estimate of emissions
  - Implementation of regulation

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Contacts

QUESTIONS?

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