



National Environment
and Planning Agency

Air Quality Measurements in Jamaica

Regional Workshop on Metrology and Technology Challenges of Climate Science and Renewable Energy

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Managing and protecting Jamaica's land, wood and water

Presentation

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- **Emmission trends GHGs**
- **Limitations**
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Background

- Natural Resources Conservation Authority(NRCA) Air Quality Regulations Promulgated July 2006
- Major and Significant facilities require APD licence under Regulations
- First Air Pollutant Discharge Licence issued December 2009
- National Environment and Planning Agency (NEPA) developed strategies to monitor compliance of facilities with licence conditions.
- Strategies were to be implemented under the Jamaica Air Quality Management Programme(JAQMP).

OVERVIEW JAQMP

The JAQMP seeks to address the compliance issues surrounding licensed entities and to satisfy some of the gaps that existed in the management of air quality in the country through a culmination of Agencies, stakeholders and the communities, steered by the Air Quality Evaluation Committee (AQEC)

Some Goals of JAQMP:

- Control emission of criteria air pollutants, GHGs and other priority pollutants
- Expansion Jamaica's ambient air monitoring network for measurement of gases and particulates .
- Provide accurate and reliable data and information to guide policy development and decision making.
- Ensure compliance with environmental requirements
- Comply with Government's obligations regarding International Agreements.

Issues in meeting JAQMP goals:

- Need for improved reporting and data collection from licensed facility.
- Need for capacity building for operators of Ambient Monitoring stations (AMS)
- Need to eliminate data gaps on emissions eg. from vehicular traffic and other minor sources.
- Need to establish link between energy usage and air emissions.
- Need to bring more air polluters under the licensing system.

Management Strategies under Regulations

Main strategies used to manage air quality in Jamaica include:

- Ambient Air Quality Monitoring
- Air dispersion modelling
- Emissions Monitoring
- Limit placed on sulphur content in fuel used by licensees

Ambient Air Quality Monitoring

Under regulations licensed facilities are required to conduct ambient air quality monitoring when:

- the maximum predicted ground level concentration (based on air dispersion modelling) of an emitted pollutant plus the background pollutant concentration is greater than or equal to 75% of the applicable national ambient air quality standard.

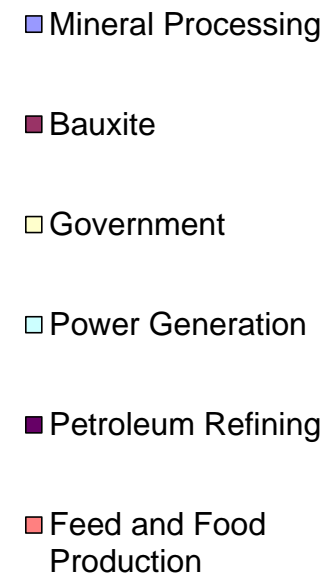
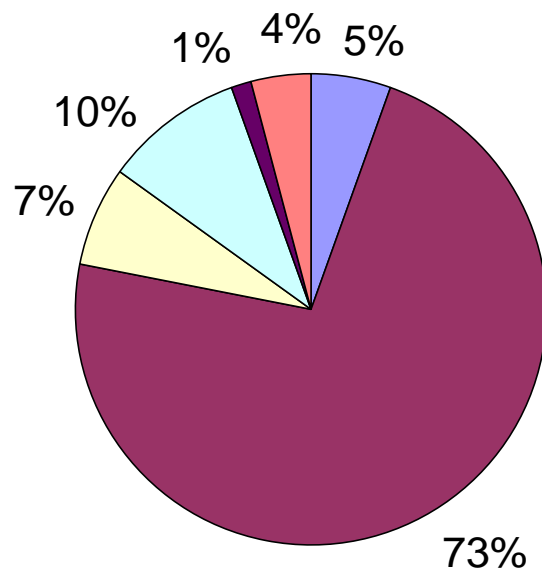
Jamaica has developed ambient air quality standards for criteria air pollutants since 1996

National Ambient Air Quality Standards

Pollutant	Averaging Time	Standard ($\mu\text{g}/\text{m}^3$)	Min. monitoring frequency
Total Suspended Particulates (TSP)	Annual 24 hr	60 150	Every six days
PM ₁₀	Annual 24 hr	50 150	Every six days
Lead	Calender Quarter	2	Every six days
Sulphur Dioxide	Annual 24 hr 1 hr	80 primary; 60 secondary 365 primary; 280 secondary 700	Continuous
Photochemical Oxidants (ozone)	1 hr	235	Continuous
Carbon Monoxide	8 hr 1 hr	10,000 40,000	Continuous
Nitrogen Dioxide	Annual	100	Continuous

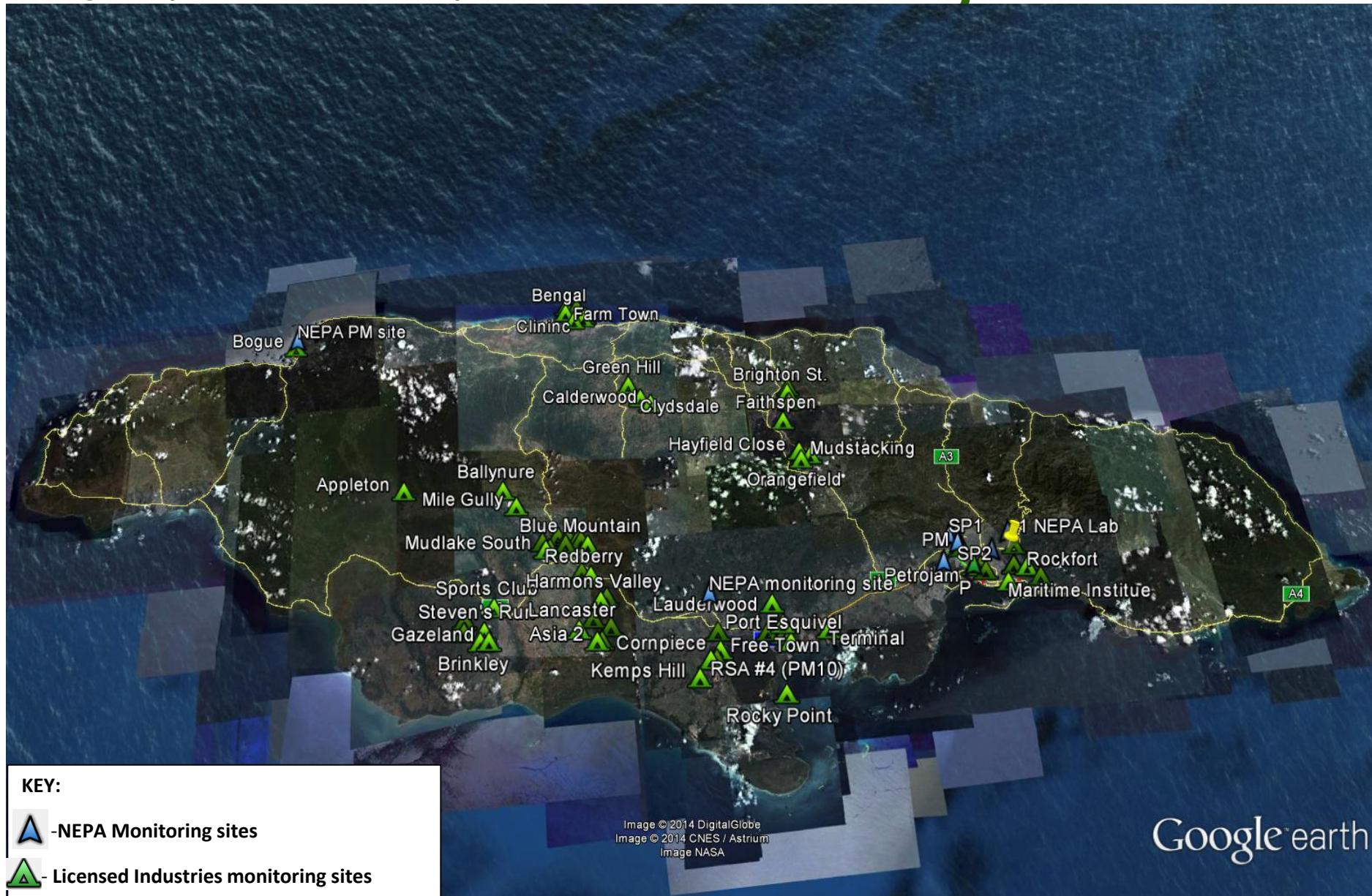
Jamaica's Ambient Monitoring Network

Chart showing Breakdown of monitoring network by sector



- The country currently benefits from 62 monitoring sites
- Continuous and daily monitoring is done for TSP, PM₁₀, SO₂, NO₂, CO and O₃

Jamaica's Ambient Monitoring Network



Methods used for ambient monitoring

The Methods for sampling and testing were adopted from the list of USEPA reference methods.

➤ **Particulates:**

Monitors are filter based and concentration determined by gravimetric analysis or beta- attenuation.

➤ **Gases:**

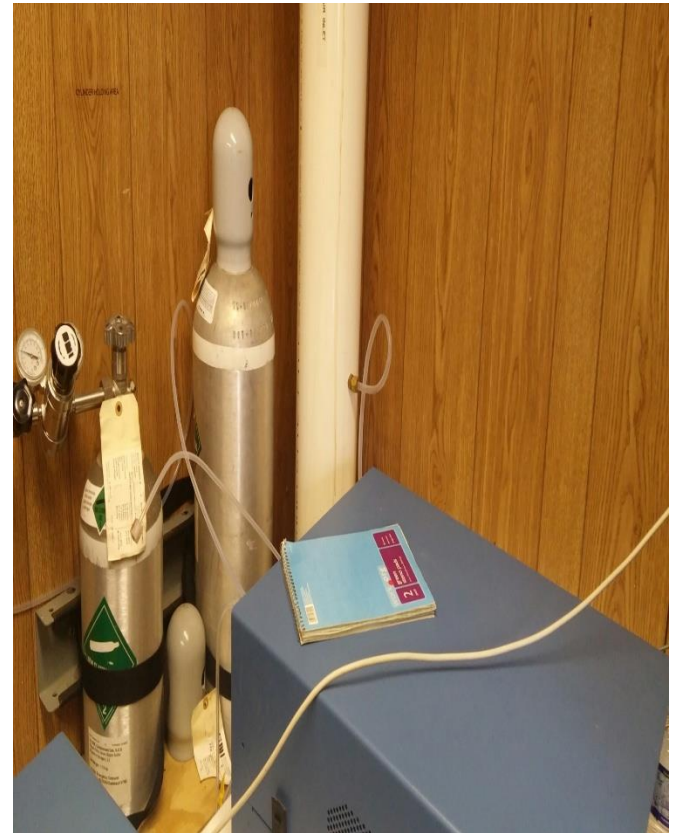
Analyzers determine concentration utilizing either fluorescence, chemiluminescence, ultraviolet photometry methods etc.

Particulate measurements



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Gas monitoring



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Gas monitoring (cont'd)



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Ambient Monitoring Data

The data obtain from monitoring network is validated and averaged yearly for comparison with the Jamaica Ambient Air Quality Standards (JAAQS)

Annual reports on Jamaica's ambient air quality published on NEPA's website.

www.nepa.gov.jm

Emissions Monitoring

Under the NRCA(Air Quality) Regulations licensed facilities are required to report to the NEPA annual emissions of criteria pollutants, priority pollutants and GHGs.

Annual emissions are determined based on data collected from:

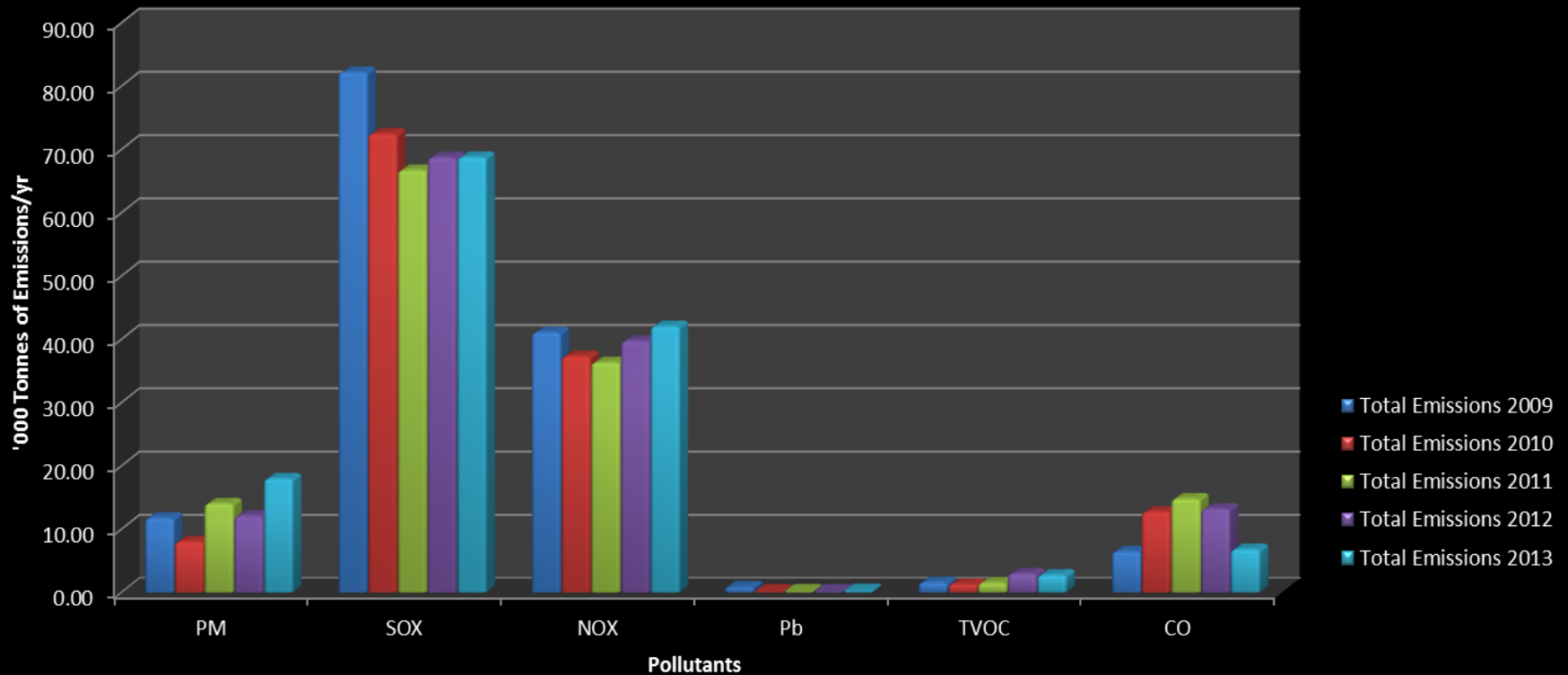
- Stack Testing
- Continuous emission monitors
- Mass Balance Calculations
- Emission Factors

NEPA verifies the data to ensure its accuracy and develops emissions inventory for regulated industry.

SECTORS	PM	SOX	NOX	VOC	CO	Pb	CO2	N2O	CH4	P.A.Ps	Hg
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Industrial Sources											
Aluminum Industry											
Alumina (Bauxite Refining)	12,290.47	29,754.59	5,042.59	157.82	1,838.62	0.13	1,663,186.45	31.16	26.57	160.09	0.00
Cement and Concrete Industry											
Cement Manufacture	232.59	109.24	1029.86	60.72	264.01	0.03	238,892.00	2.194223268	0.718112621	62.33	0.01
Asphaltic Cement Manufacture	19.67	10.81	16.80	5.01	48.33	0.00	2,119.94				2.22E-05
Lime Manufacture	132.25	28.27	42.97	-	27.96	-	23,063.13	0.47	0.89		
Grain Industries											
Beverage Manufacturing	13.81	77.52	9.54	0.25	1.0477869	-	4,903.86	1.07E-01	0.21	0.28	-
Petroleum Industry											
Ethanol Dehydration	10.27	158.73	21.30	0.50	1.98	-	9,581.33	0.34	0.38	0.58	-
Petroleum Refining											
Refined Petroleum Products Bulk Storage and Distribution	96.59	3269.84	176.08	916.71	11.73	0.0041	114,051.87	2.34	2.8240047	18.35	0.001033496
Other Industries											
Waste Oil Recycling	30.07	139.46	64.39	0.41	17.08		8,986.00		0.01	0.82	
Production											
Sugar Production	3,705.22	242.59	580.26	6.82	746.98	-	260,967.25	4.90	0.37	5.68	-
Distilleries	83.75	692.83	204.57	4.17	40.94	0.00238	108843.46	0.89	1.80	4.34	
Feed Production	48.62	40.26	16.74	0.24	2.15	0.00005	1,144.82	0.02	0.03	1.97	3.49E-06
Food Preparation	24.24	236.83	51.77	38.83	78.31	0.00040	20,289.00	0.14	1.91	38.92	0.00
Other (Other Industries)											
TOTAL INDUSTRIAL SOURCES	16,687.56	34,760.97	7,256.88	1,191.49	3,079.14	0.17	2,456,029.11	42.56	35.72	293.35	0.01
Non-Industrial Sources											
Commercial Fuel Combustion											
Electric Power Generation (Utilities)	1,262.55	33,980.03	34,771.68	1,553.37	3,715.37	0.07	2,996,383.98	26.52	148.62	1,567.38	0.00
TOTAL NON-INDUSTRIAL SOURCES	1,262.55	33,980.03	34,771.68	1,553.37	3,715.37	0.07	2,996,383.98	26.52	148.62	1,567.38	0.00
Incineration Sources											
TOTAL NATURAL SOURCES											
GRAND TOTAL	17,950	68,741	42,029	2,745	6,795	0.24	5,452,413	69	184	1,860.73	0.02

Criteria Air Pollutants from regulated industry 2009-2013

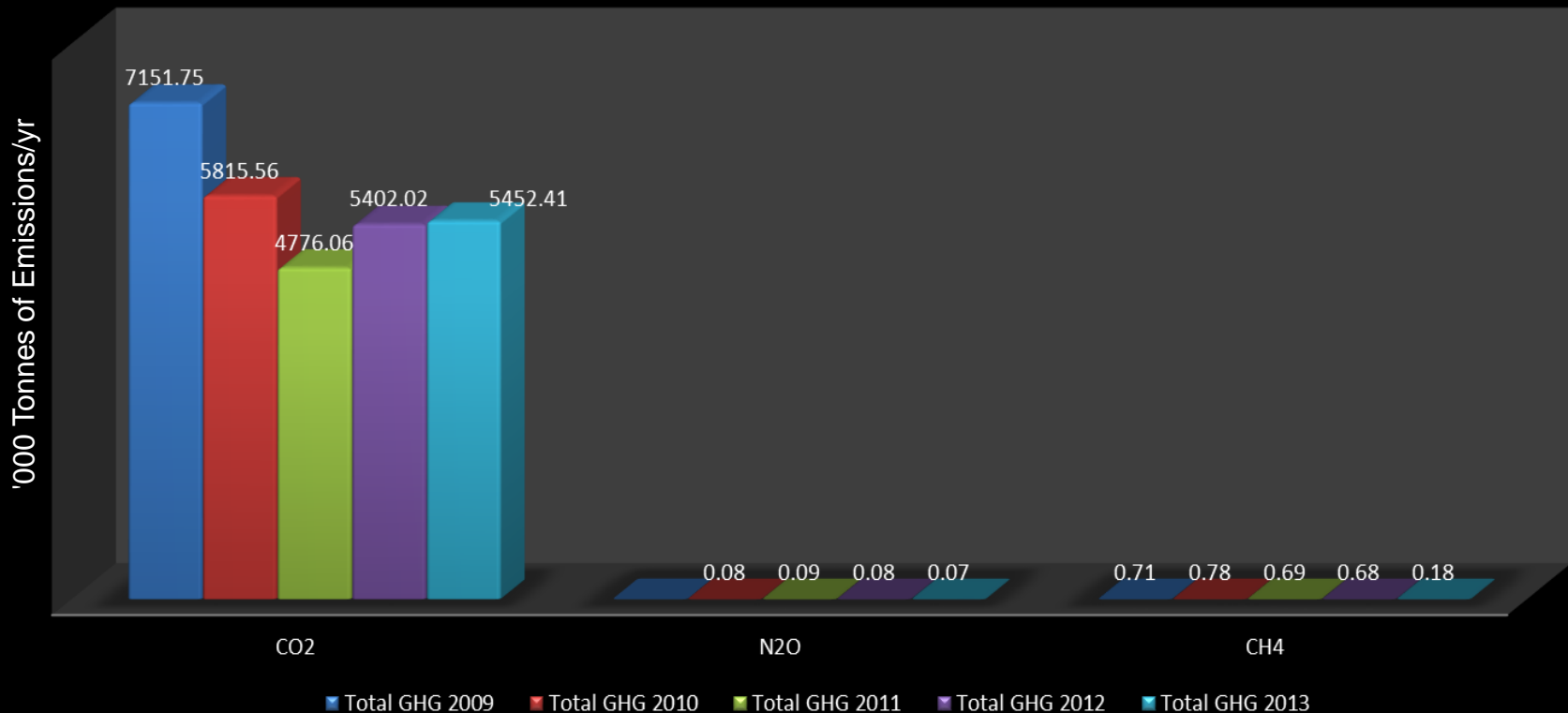
Criteria Air Pollutants produced by Industry 2009-2013



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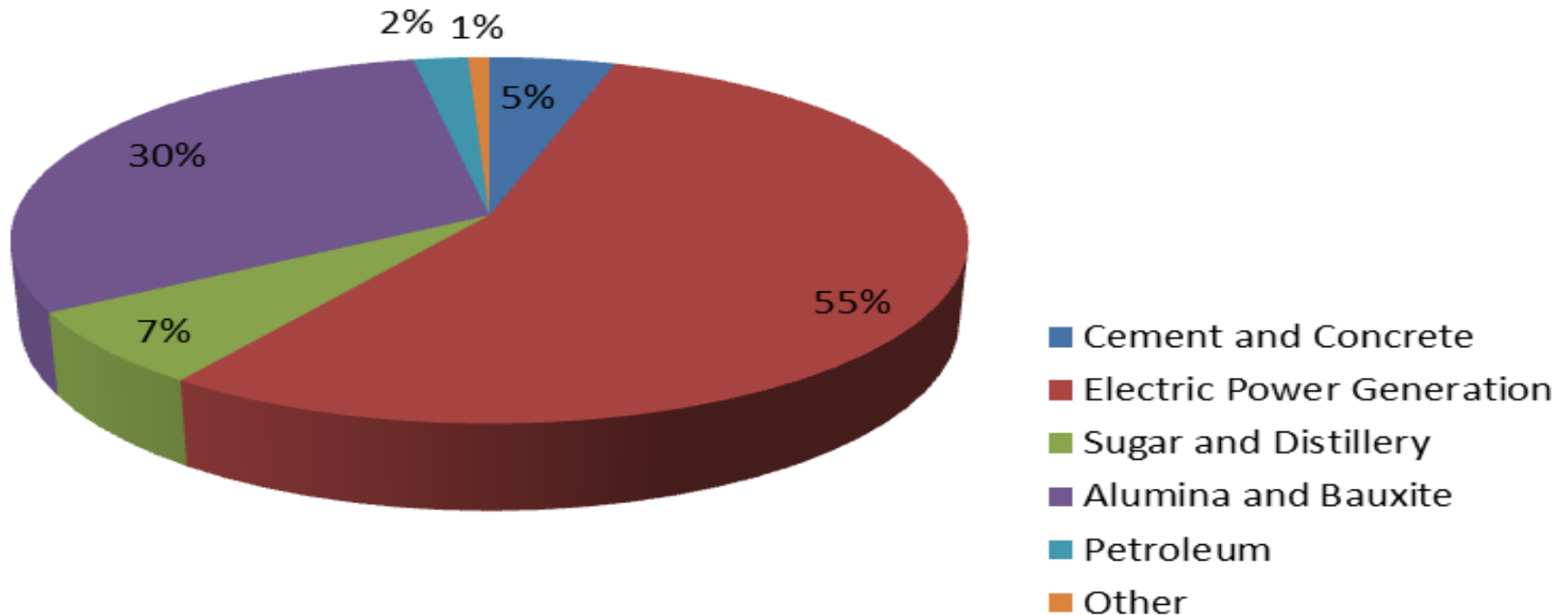
GHGs from regulated Industry during 2009 to 2013

Greenhouse Gas Emissions produced by Industry 2009-2013



Total Carbon Dioxide for 2013 by Sector

Carbon Dioxide by Sector 2013



Limitations:

- Current Legal framework excludes mobile sources and minor sources
- Tracking emissions from these sources is difficult since data is either limited or unavailable.
- Monitoring requires a lot of financial resources, financial constraints make it difficult to keep up with emerging trends.

Current Initiatives being undertaken by NEPA to fill data gaps

- Collaborating with other Agencies to implement Motor Vehicle Emissions standards and testing, as well recording data on Annual Vehicle Kilometres Travelled (VKMT).
- Scoping study for minor sources to determine whether current regulations can be amended to include minor sources or whether separate regulations are needed.
- Expanding the monitoring network under Urban Monitoring Plan to collect PM_{2.5} data to be used to develop standard and AQI.

THANK YOU FOR YOUR ATTENTION

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