

GreenHouse Gas Inventory Preliminary Outcomes of 2015 study

2015 Greenhouse Gas Inventory for Msunduzi Municipality

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ICLEI IS THE WORLD'S LEADING NETWORK OF OVER 1,000 CITIES, TOWNS AND METROPOLISES COMMITTED TO BUILDING A SUSTAINABLE FUTURE. BY HELPING OUR MEMBERS TO MAKE THEIR CITIES SUSTAINABLE, LOW-CARBON, RESILIENT, BIODIVERSE, RESOURCE-EFFICIENT, HEALTHY AND HAPPY, WITH A GREEN ECONOMY AND SMART INFRASTRUCTURE, WE IMPACT OVER 20% OF THE GLOBAL POPULATION.

1 Introduction

ICLEI Africa, through funding provided by the Clean Energy Solutions Centre (USA) was appointed to undertake a Greenhouse Gas Inventory (GHGI) for the Municipality of Msunduzi, Kwazulu Natal, South Africa. The Municipality had expressed interest in completing a Baseline Inventory in order to commence the process of greenhouse gas emission identification, mitigation and reduction. The Inventory would also form part of their submission to the Compact of Mayors which they signed up for in late 2017.

On invitation by the Environment Department, ICLEI traveled to Msunduzi during the first half of 2017 to undertake training with the department as well as various other departments' staff whose input is required to successfully complete a GHG Inventory. Training was hosted at the municipal offices, however a number of vital departments did not attend. The project continued to receive poor uptake by external departments and after several months the only data obtained from the Municipality was for solid waste, data on two crucial areas: energy and transport was, and still have not been received.

2 Methodology

The Greenhouse Gas Protocol's *Global Protocol for Community Scale Greenhouse Gas Emission Inventory*¹ (commonly known as the GPC) is the accepted methodology used for completion of GHGI within ICLEI as well as the only accepted methodology to be used for reporting to the Compact of Mayors. The GPC allows for municipal scale emission reporting on two levels:

- BASIC – provides the opportunity to report on the three highest contributing sectors to GHG emissions:
 - Stationary Energy (includes industry energy use and more)
 - Transportation
 - Waste
- BASIC+ refines the inventory further by including further sectors including:
 - Industrial Process and Productive Use (IPPU)
 - Agriculture, Forestry and other land use (AFOLU)
 - Other

As this was the first attempt in completing an inventory and considering data availability for Msunduzi, the BASIC level was selected.

3 Data

Due to the unresponsiveness of specifically the energy and transport departments within the municipality, data had to be sourced elsewhere and extrapolated with certain assumption being made.

We would therefore stress that the data below is not considered an accurate representation of the 2015 GHG emission for Msunduzi, but an approximation.

Data sources and quality is highlighted below:

Sector	Data Source	Data Quality
Energy	National Energy Regulator of South Africa (NERSA)	Low

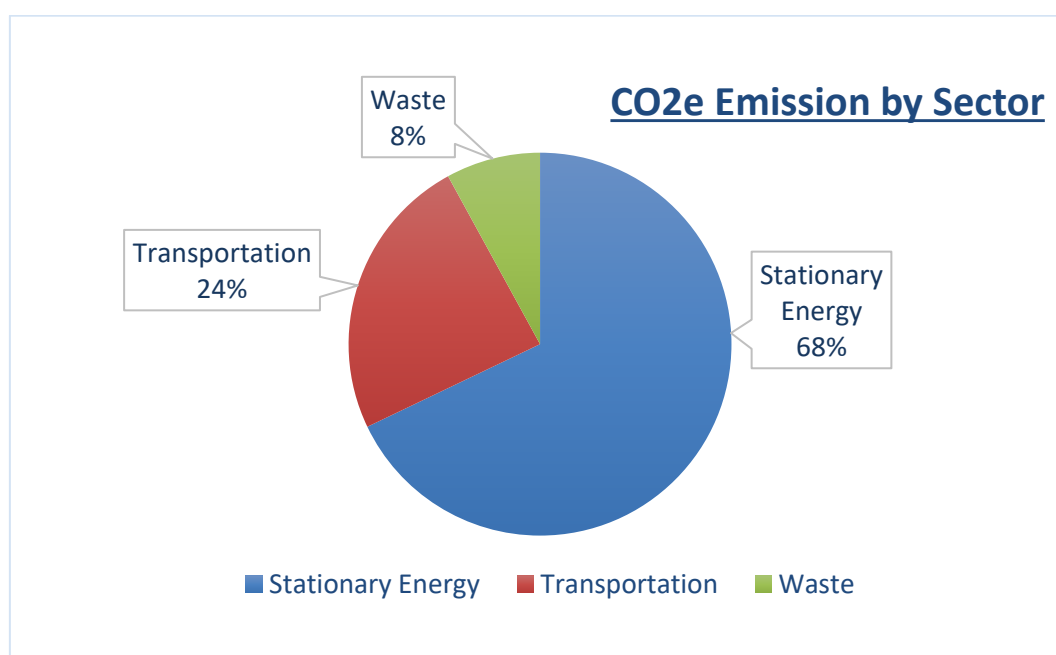
¹ <http://www.ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities>

	http://www.nersa.org.za/ContentPage.aspx?PageId=558&PageName=Electricity	
Transport	Department of Energy http://www.energy.gov.za/files/media/media_SAVolumes.html	Medium
Waste	Municipal Waste Department	High
Emission Factors	ESKOM http://www.eskom.co.za/IR2016/Documents/Eskom_integrated_report_2016.pdf	Medium

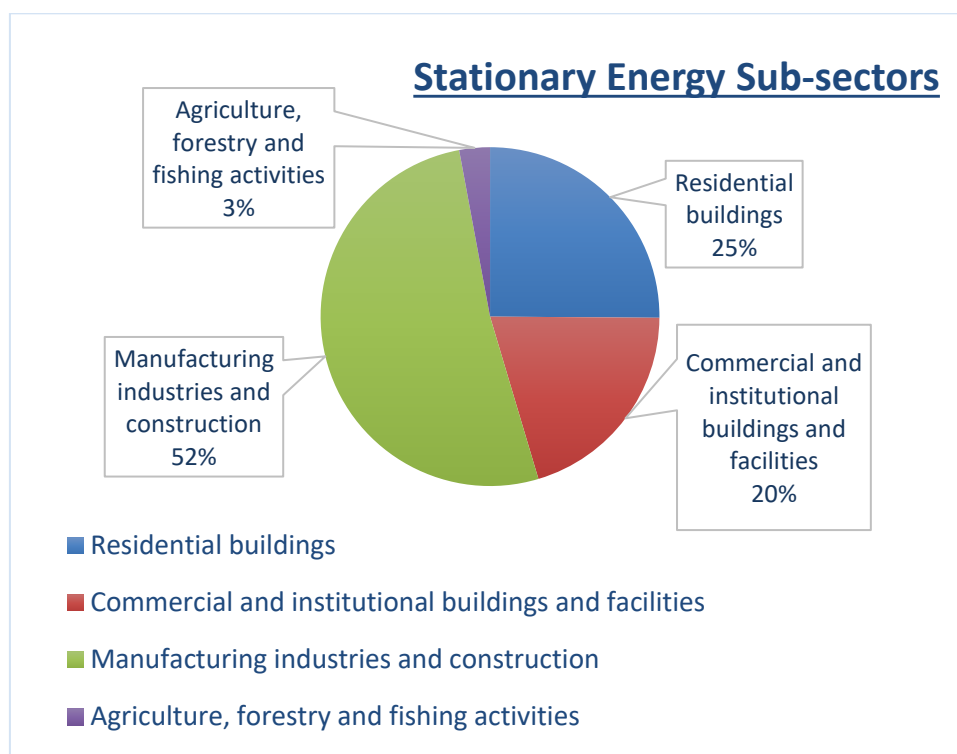
Data used to complete the 2015 GHGI is tabled below in Annex 1 alongside the corresponding GPC reference number. GPC subsections and line items for which no data was obtained is not shown.

Results of the inventory can be summarized as follow:

Sector and Sub-sectors	CO2e
Stationary Energy Total	2 671 262
Residential	670 779
Commercial and Institutional	541 592
Manufacturing	1 380 852
Agriculture	78 040
Transportation Energy Total	949 212
Road Transportation	944 392
Aviation	4 820
Waste	313 785
Solid Waste	290 707
Waste Water Treatment	23 077



Stationary Energy can be further broken down into its specific sub-sectors:



4 Conclusion and next steps

Although data quality is not high, it is clear from the results obtained that stationary energy is the largest contributor to Msunduzi's GHG emissions. It would therefore be advisable to focus mitigation efforts within this sector although 'easy wins' can also be obtained from the other two sectors.

The data further show that within the stationary energy sector, manufacturing and industry is the largest contributor thus it may be advisable to investigate this sector further to identify options for mitigation activities.

The following next steps is recommended:

- **Obtain buy-in from the various municipal departments** – particularly energy and transport, **and Council**. It is vital to obtain buy-in from other departments to ensure high quality data is obtained to complete a further versions of the GHGI. Potential avenues to consider is obtaining council resolutions for completion of the Inventory and access to required data. As the Council has approved the joining of Compact of Mayors, a strong case can be made here.
- Once sufficient, and accurate data is obtained, a new inventory (for either 2015 or newer) can be developed with ICLEI assistance.
- Looking at the results obtained **mitigation efforts should be focused on stationary energy activities**. This should include dialogue with industry to identify potential mitigation and reduction actions.

Annex 1: Data used to calculate the 2015 GHGI for Msunduzi Municipality and CO2e results. Based on GPC BASIC modelling.

GPC Ref. No	Scope	GHG Emissions Source (By Sector and Subsector)	Fuel Type	Quantity	Unit	CO2	CH4	N2O	Total CO2e
I		STATIONARY ENERGY							
I.1		Residential buildings							
I.1.1	1	Emissions from fuel combustion within the city boundary	Paraffin	7 883 670	litres	19 862	3	0	19 971
I.1.2	2	Emissions from grid-supplied energy consumed within the city boundary	Electricity	650 807 617	kWh	650 808			650 808
I.2		Commercial and institutional buildings and facilities							
I.2.2	2	Emissions from grid-supplied energy consumed within the city boundary	Electricity	541 591 887	kWh	541 592			541 592
I.3		Manufacturing industries and construction							
I.3.1	1	Emissions from fuel combustion within the city boundary	Furnace Oil	3 753 052	litres	11 032	0	0	11 067
I.3.2	2	Emissions from grid-supplied energy consumed within the city boundary	Electricity	1 369 785 019	kWh	1 369 785			1 369 785
I.5		Agriculture, forestry and fishing activities							
I.5.2	2	Emissions from grid-supplied energy consumed within the city boundary	Electricity	78 039 563	kWh	78 040			78 040
		Stationary Energy Total							
									2 671 262
II		TRANSPORTATION							
II.1		On-road transportation							
II.1.1	1	Emissions from fuel combustion on-road transportation occurring in the city	Petrol		158 413 757 litres				
II.1.1	1	Emissions from fuel combustion on-road transportation occurring in the city	Diesel	211 433 301	litres	925 783	201	46	944 392
II.4		Aviation							
II.4.3	3	Emissions from transboundary journeys occurring outside the city, and T and D losses from grid-supplied energy use	Jet Fuel	2 134 185	litres	4 778	0	0	4 820

		Transportation Energy Total							949 211
III		WASTE							
III.1		Solid waste disposal							
III.1.1	1	Emissions from solid waste generated in the city and disposed in landfills or open dumps within the city	Waste	193 233	tons			13 843	290 707
III.4		Wastewater treatment and discharge							
III.4.1	1	Emissions from wastewater generated and treated within the city	Waste Water	646 715	population			655 30	23 077
		Waste Emissions Total							313 784
Estimated TOTAL CO2 equivalent emissions for 2015 for Msunduzi Municipality									3 934 259