Carbon Footprint of Canada

A project report by Group J

Table of Contents

Project Description:

Canada is the world's 10th largest emitter of greenhouse gases. While it has an extensive network of hydroelectric dams and nuclear plants providing the majority of its power, it has been slow to adopt other forms of low-carbon energy and cut its transport emissions.

This project report will highlight the key aspects of Canada's carbon footprint from 1990 to 2017 with a detailed description of emission sources, measures and relative performances of provinces towards GHGs.

What are Greenhouse gas emissions:

Climate change is one of the most important environmental issues of our time. Climate change is caused by the increase in concentrations of greenhouse gases (GHGs) in the atmosphere. These increases are primarily due to human activities such as the use of fossil fuels or agriculture. The indicators in the report estimates of Canada's emissions of greenhouse gases.

There are several types of GHGs—including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—each with different capacities to retain atmospheric heat. To simplify comparisons, and calculate the aggregate impact of all different types of GHGs, GHG emissions are typically measured in terms of CO_2 equivalence (CO_2e). This is the amount of CO_2 emissions that the GHG emissions are equivalent to, in terms of the amount of heat they trap in the atmosphere.

Most GHG emissions come from fossil fuel combustion, and so monitoring energy consumption is key for tracking contributions to climate change. The main challenge is to make economic growth depend less on energy use, by improving energy efficiency and by developing and using cleaner fuels and low-emitting electricity sources.

Summary of Visualizations:

- In 2017, the most recent annual dataset in this report, Canada's GHG emissions were 2,974,990 kilotonnes of carbon dioxide equivalent (kt CO2 eq), a net decrease of 111 Mt or 3.60% from 2005 emissions

- Emission trends since 2005 remain consistent, with emission increases in the Oil and Gas and Transportation sectors being more than offset by decreases in other sectors, notably Electricity and Heavy Industry

- Since 2009, when emissions were at their lowest in the latest decade, emission increases are driven by growth in Oil and Gas Extraction (34 Mt); in the number of light-duty gasoline trucks (8.4 Mt) and heavy-duty diesel vehicles in operation (6.8 Mt); in the consumption of halocarbons, SF6 and NF3 (5.8 Mt) and in the application of inorganic nitrogen fertilizers (3.9 Mt).

- Recent year fluctuations in emissions are due to the combined effect of the growing use of non-emitting sources of electricity, economic factors impacting industrial production, as well as variability in winter weather and resulting heating demands

- Emissions vary significantly by province as a result of population, energy sources and economic structure.

- In 2017, the top 5 emitters (Alberta, Ontario, Quebec, Saskatchewan and British Columbia) together released 91% of Canada's national total GHG emissions

- In 2017, the combined emissions from Alberta and Ontario, the largest emitters, represented 60% (32.79% and 26.65%, respectively) of the national total

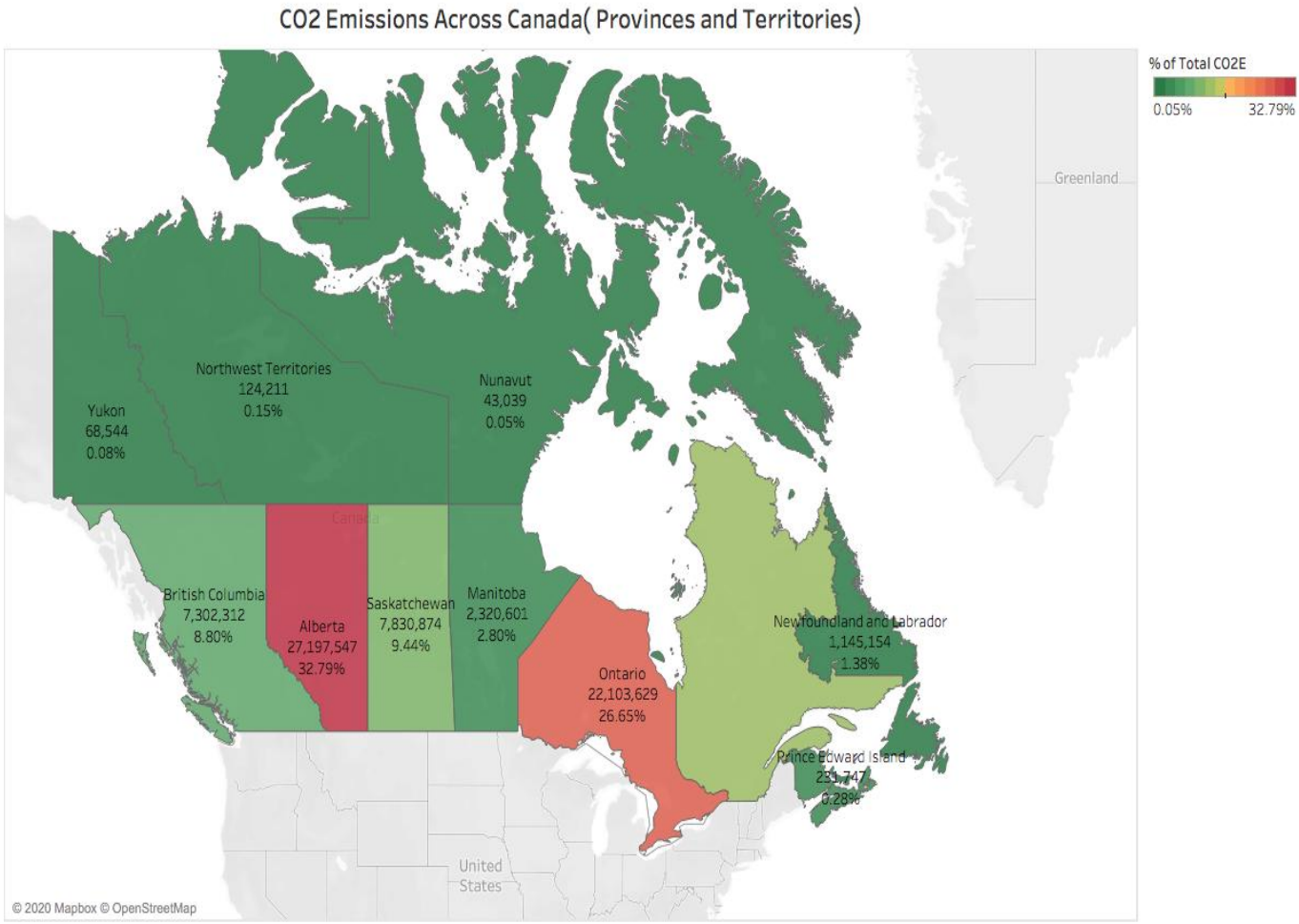
- Alberta's emissions subsequently surpassed Ontario's, with an increase of 58% since 1990, primarily due to the increase in the oil and gas industry.

- Ontario's emissions decreased between 1990 and 2017 primarily because of the closure of coal-fired electricity generation plants.

- The majority of the CO2 emissions in Canada result from the combustion of fossil fuels. CH4 emissions in 2017 amounted to 6% of Canada's total.

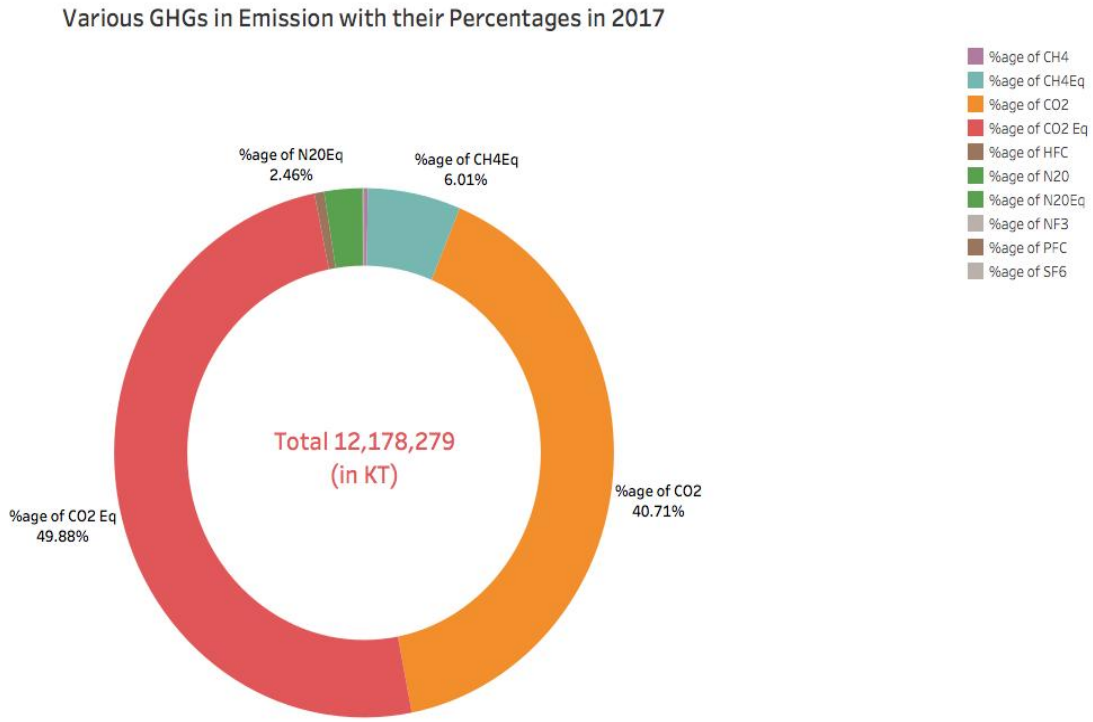
Charts with Data

1. Greenhouse gas emissions by province and territory



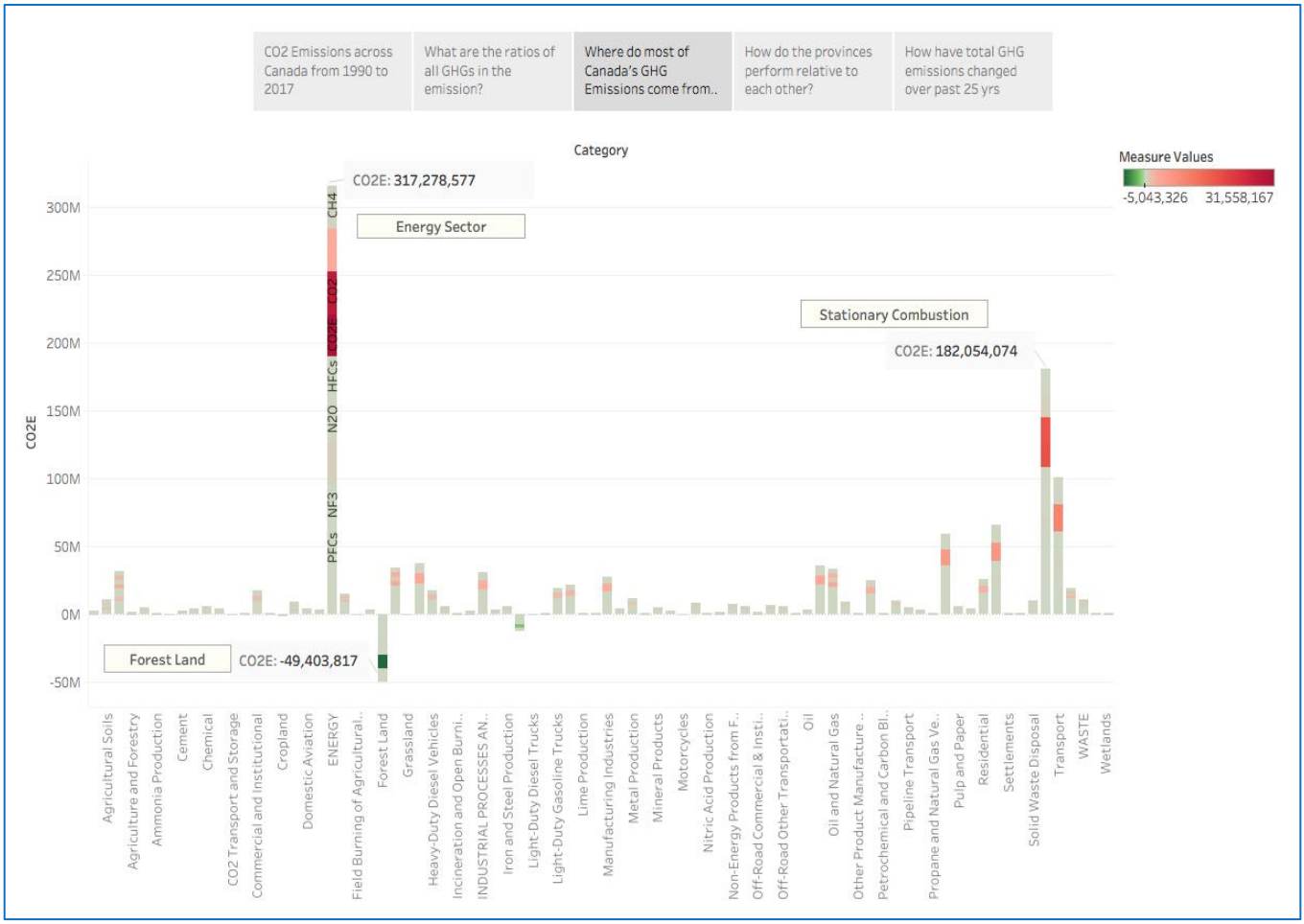
Map based on Longitude (generated) and Latitude (generated). Color shows % of Total CO2E. The marks are labeled by Province/Territory, sum of CO2E and % of Total CO2E. The data is filtered on Year, which ranges from 1990 to 2017. The view is filtered on Province/Territory, which excludes Canada and Northwest Territories and Nunavut.

2. Various GHGs in Emission and their percentage

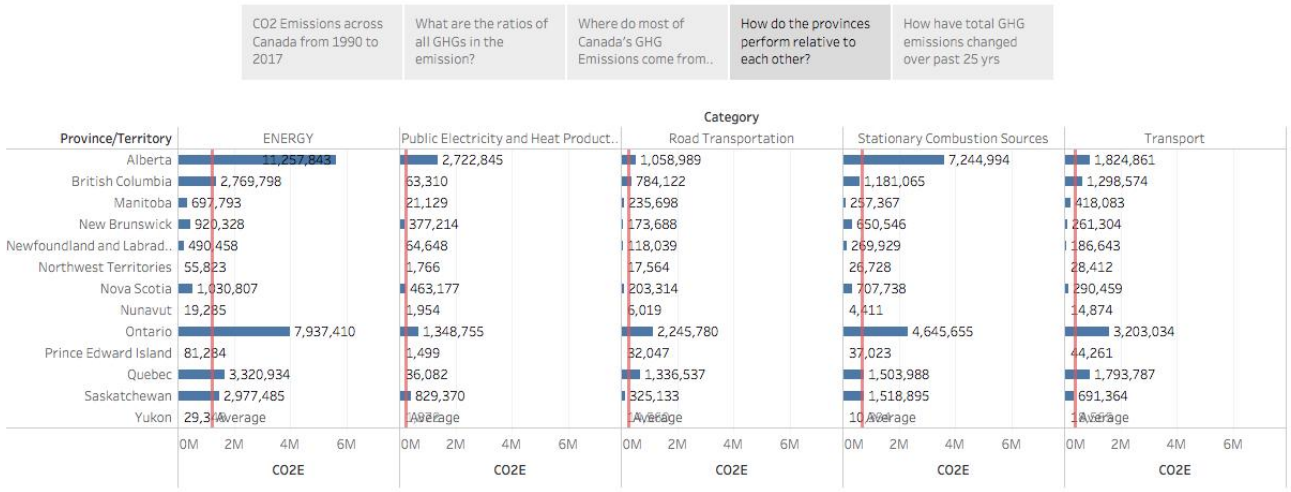


Sum of Total Emission and sum of Total Emission. For pane Sum of Total Emission: Color shows details about %age of CH4, %age of CH4Eq, %age of CO2, %age of CO2 Eq, %age of HFC, %age of N20, %age of N20Eq, %age of NF3, %age of PFC and %age of SF6. The marks are labeled by %age of CH4, %age of CH4Eq, %age of CO2, %age of CO2 Eq, %age of HFC, %age of N20, %age of N20Eq, %age of NF3, %age of PFC, %age of SF6, %age of CH4, %age of CH4Eq, %age of CO2, %age of CO2 Eq, %age of HFC, %age of N20, %age of N20Eq, %age of NF3, %age of PFC and %age of SF6. For pane Sum of Total Emission (2): The marks are labeled by sum of Total Emission. The data is filtered on Year, which ranges from 2017 to 2017.

3. GHGs Emission by various Industries(1990-2017)



4. Top Sources for GHGs Emissions Across Provinces



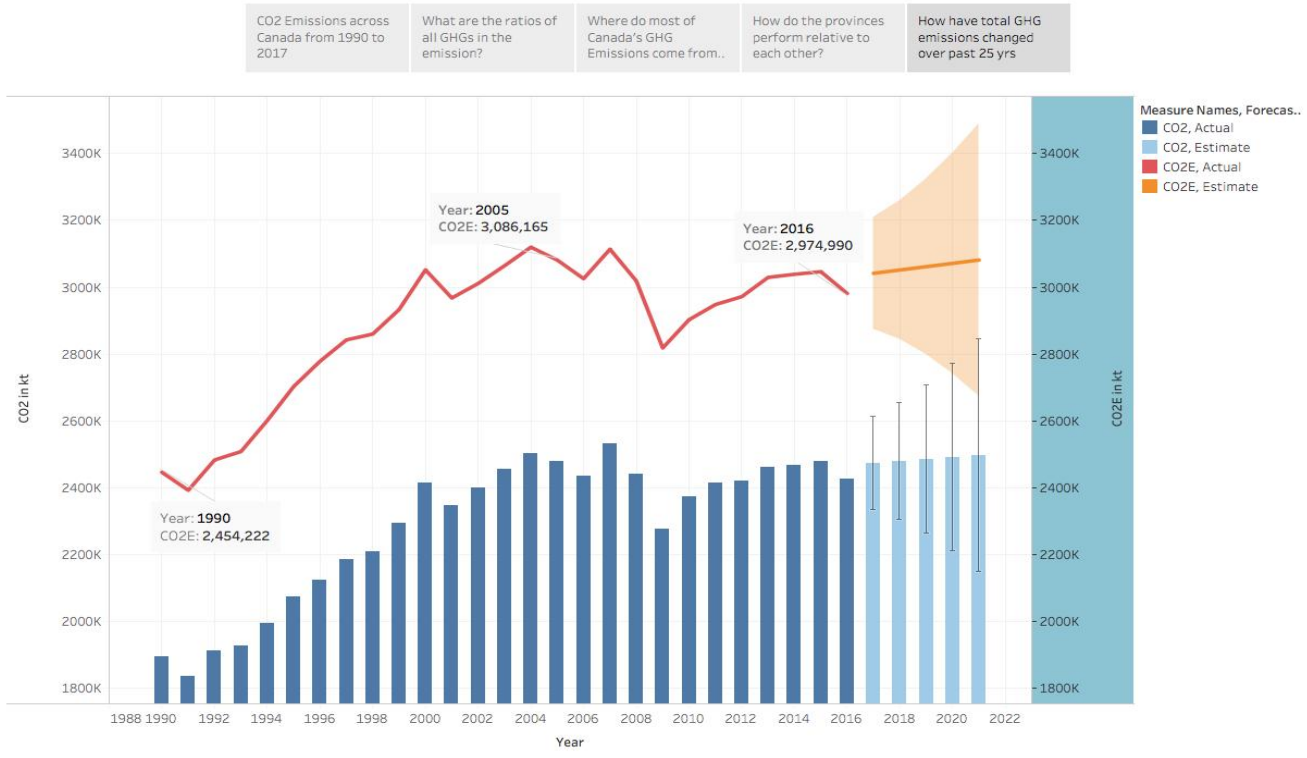
Highest CO2 Eq. emission province

Alberta- 11,257,843 kilotonnes of carbon dioxide equivalent

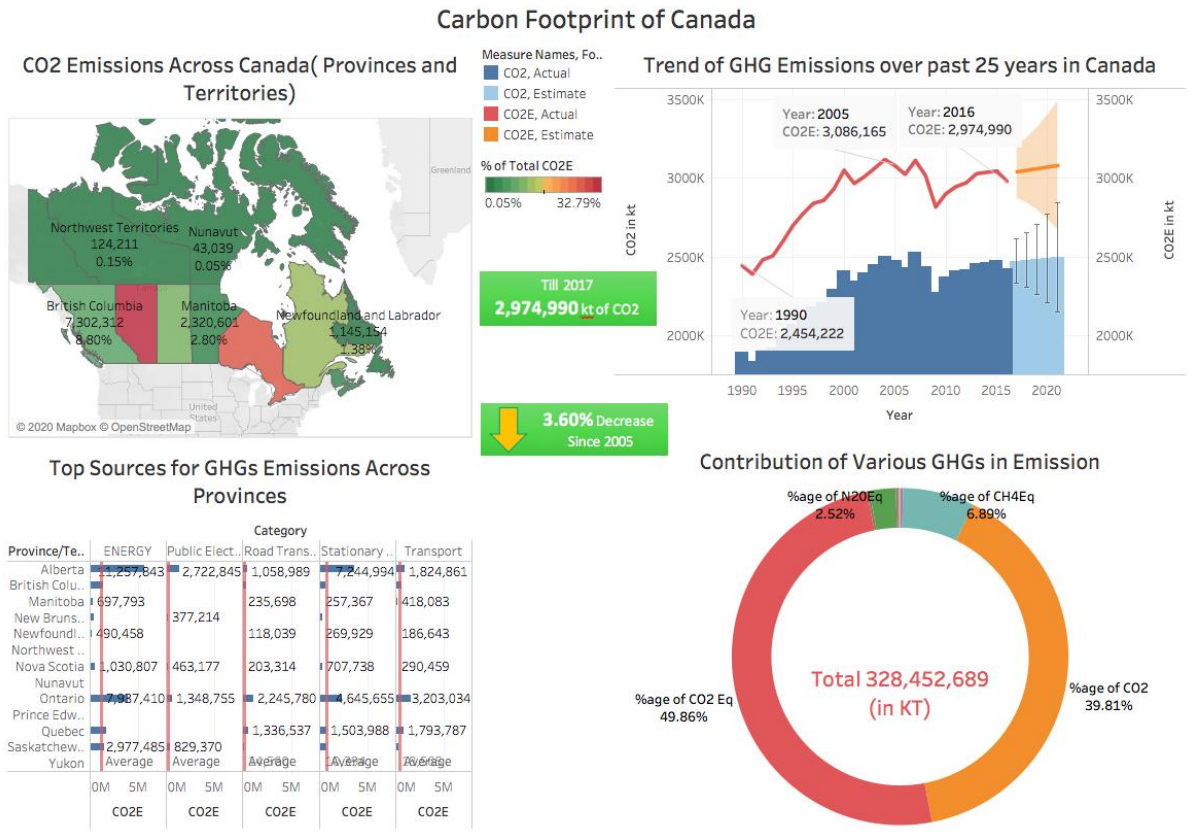
Highest Emission Source

Energy Sector

5. Trend of GHG Emissions over past 25 years in Canada



Dashboard:


Carbon Footprint of Canada
CO2 Emissions Across Canada(Provinces and Territories)
Measure Names, Fo..
CO2, Actual
CO2, Estimate
CO2E, Actual
CO2E, Estimate
% of Total CO2E
0.05%
32.79%
Northwest Territories 124,211 0.15%
Nunavut 43,039 0.05%
British Columbia 7,302,312 8.80%
Manitoba 2,320,601 2.80%
Newfoundland and Labrador 1,145,154 1.38%
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Till 2017
2,974,990 kt of CO2
Trend of GHG Emissions over past 25 years in Canada
Year: 2005
CO2E: 3,086,165
Year: 2016
CO2E: 2,974,990
Year: 1990
CO2E: 2,454,222
CO2 in kt
CO2E in kt
Year
3.60% Decrease Since 2005
Top Sources for GHGs Emissions Across Provinces
Category
Province/Te..
ENERGY
Public Elect..
Road Trans..
Stationary ..
Transport
Alberta
British Colu..
Manitoba
New Bruns..
Newfoundl..
Northwest ..
Nova Scotia
Nunavut
Ontario
Prince Edw..
Quebec
Saskatchew..
Yukon
CO2E
Contribution of Various GHGs in Emission
%age of N2OEq 2.52%
%age of CH4Eq 6.89%
%age of CO2 Eq 49.86%
%age of CO2 39.81%
Total 328,452,689 (in KT)