

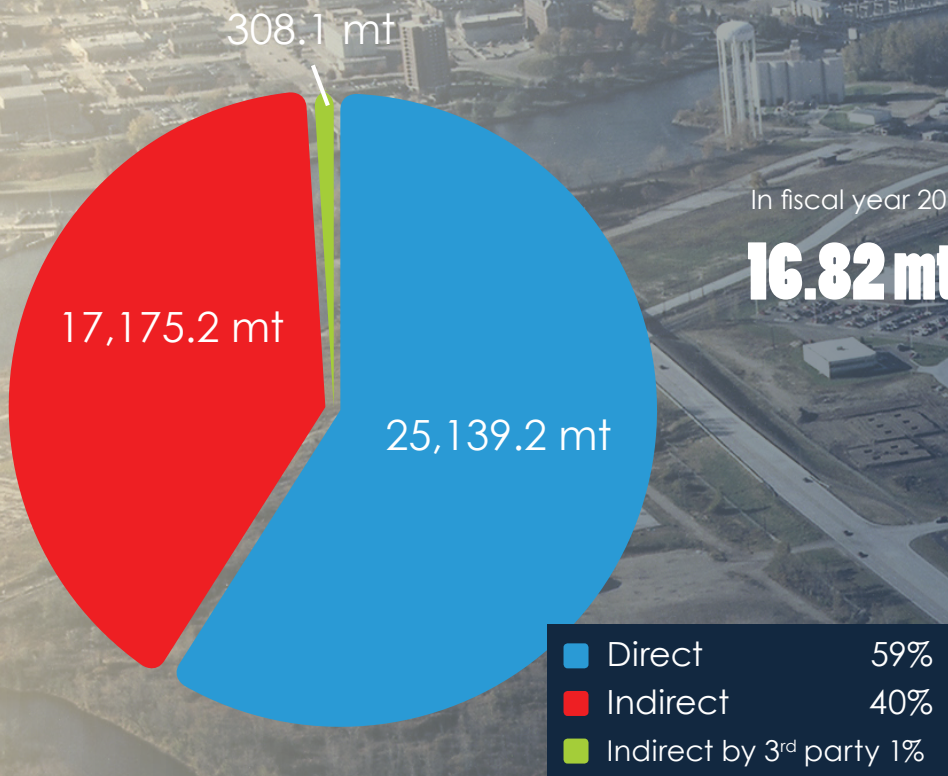


MICHIGAN DEPARTMENT OF TRANSPORTATION Greenhouse Gas Inventory Report

Fiscal Year 2011

In 2011, MDOT initiated a program to quantify its GHG emissions funded through its Research Administration. To that end, it funded a research project through its Research Administration Section. The risk of climate change to governmental operations is not yet fully understood; however, it is changing the way organizations think about the impact of their operations on the environment. MDOT will address this issue by balancing a variety of forces: State of Michigan priorities, regulations, social responsibility, cost, and customer needs and expectations. The purpose of this GHG Inventory is to provide baseline information that allows MDOT to make informed and effective policy decisions.

MDOT CO₂e Emissions



In fiscal year 2011, MDOT's **LANE MILE** equaled 27,437

16.82 mt CO₂e/LANE MILE

A Lane Mile is a measure of road length, which represents the number of miles in every driving lane. It is calculated by multiplying the number of lanes with the number of miles in each lane. For instance, 10 miles of a 4-lane highway is equal to 40 lane miles.

In fiscal year 2011, MDOT's **FTE** equaled 2,534

16.82 mt CO₂e/FTE



mt = metric tons; which is equal to 1,000 kilograms – or approximately 2,204.6 pounds.

CO₂e= All GHGs are calculated separately and converted to CO₂e on the basis of their global warming potential (GWP). For instance, the GWP for N₂O is 21 times that of CO₂, and the GWP of CH₄ is 310 times that of CO₂. All GHGs are presented as their CO₂e value.



FTE = Full Time Equivalent; a measure of the number of MDOT employees during the reporting period.

WHAT IS A GREENHOUSE GAS INVENTORY?

A green house gas inventory is an accounting of greenhouse gases (GHGs) emitted to or removed from the atmosphere over a period of time. (Source: EPA)

CO₂e Emissions by Activity

MDOT operates facilities throughout the State of Michigan. The following infrastructure and activities are included in the FY2011 analysis:

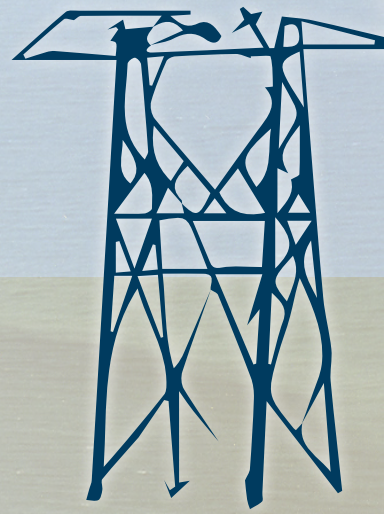
- Buildings – Offices, TSCs, Maintenance Garages, Warehouses, Welcome Centers, and Rest Areas
- Emergency Generator
- Fleet Vehicles
- Construction and Maintenance Signs
- Movable Bridges
- Lighting Infrastructure
- Pump Stations and Water
- Management Infrastructure

	CO ₂ (mt)	CH ₄ (equivalent) (mt)	N ₂ O (equivalent) (mt)	Total CO ₂ e Emissions (mt)
Electricity	15,063	6.0	78	15,147
Pump Station Electric	2,017	0.802	10.51	2,028.1
Natural Gas	5,246	2.1	3.1	5,251
Fleet - Gasoline/E-85	8,133	4.9	40	8,178
Fleet - Diesel	11,667	1.0	11	11,679
Fleet - Propane	22	0.04	1.2	23
Emergency Generators (except Natural Gas)	7.9	0.01	0.07	8.0
Acres Mowed (Contractor)	304.9	0.92	2.37	308.1
TOTAL	42,460	16	147	42,623

The MDOT Research Administration team elected not to include the following activities in the analysis:

- Snow Removal (neither contracted nor in-house)
- Street & Highway Lighting
- Road Painting/Striping
- Mackinaw Bridge, International Bridge, and Blue Water Bridge (operated by separate authorities)
- Road Construction & Maintenance (provided by Contractors)

ELECTRICITY
35.5%



FLEET (DIESEL)
27.4%



FLEET (GASOLINE E-85)
19.2%



NATURAL GAS
12.3%



PUMP STATION ELECTRIC
4.8%



FLEET (PROPANE)
0.7%



ACRONYMS & ABBREVIATIONS

CO₂ – Carbon Dioxide

CH₄ – Methane

N₂O – Nitrous Oxide

CO₂e – Carbon Dioxide Equivalent

GWP – Global Warming Potential

MDOT – Michigan Department of Transportation

PROTOCOL

MDOT followed the GHG emission inventory protocol established by the World Resources Institute and the World Business Council for Sustainable Development in the Greenhouse Gas Protocol: Corporate Accounting and Reporting Standard (WRI and WBCSD, September 2001) and further refined in the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition (WRI and WBCSD, August 2012), hereafter referred to as the GHG Protocol. Additional protocols from Greenhouse Gas Emission Inventory Methodologies for State Transportation Departments (AASHTO, July 2011), the Climate Registry, and the USEPA were used.

The 6 GHGs identified in the Kyoto Protocol are addressed in this inventory:

- Carbon Dioxide (CO₂)
- Methane (CH₄)
- Nitrous Oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF₆)

Of these gases, MDOT activities result predominately in emissions of CO₂, CH₄, and N₂O, which are released by the combustion of fossil fuels. The remaining gases in the Kyoto Protocol are man-made and are generally released through specific refrigeration and building cooling equipment as well as energy transmission activities.

MDOT used the most reliable data available and believes that these inventories fairly represent our GHG emissions; however, there are uncertainties associated with the emission estimates. Selected estimates, such as those for CO₂ emissions from energy-related activities, are considered to have low levels of uncertainty. For some other categories of emissions, such as the emissions from vehicle use (due to lack of data or details of the vehicle make/model), an increased uncertainty level is associated with the estimates presented. MDOT will continuously work toward improving the quality and accuracy of the data collected and used for future GHG inventories.

Thank You

THE TEAM MEMBERS RESPONSIBLE FOR PROVIDING INFORMATION AND DATA FOR THIS EFFORT INCLUDED:

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Emissions Calculations

Fishbeck, Thompson, Carr & Huber, Inc.
