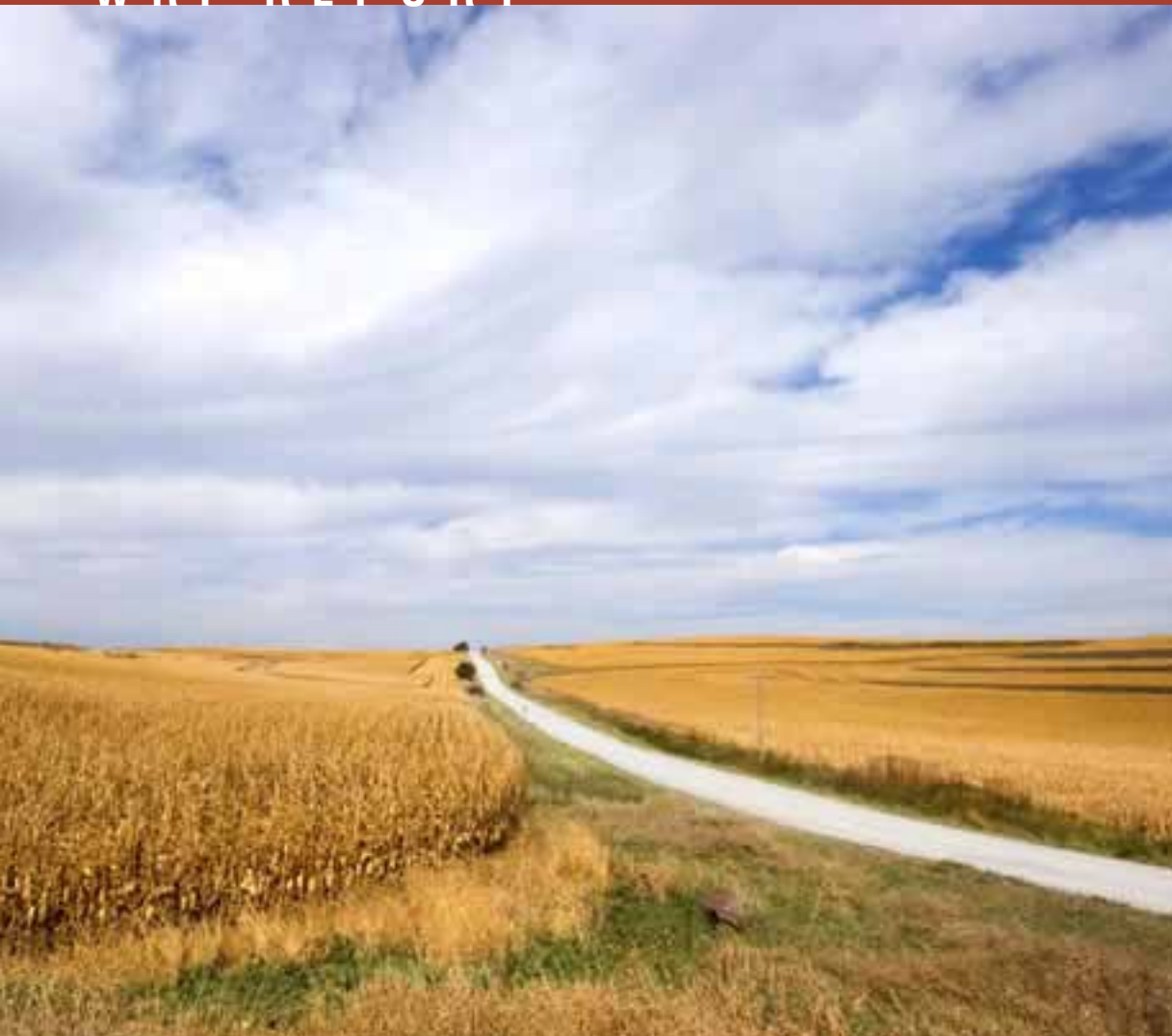


# W R I R E P O R T



## CHARTING THE MIDWEST

An Inventory and Analysis of  
Greenhouse Gas Emissions in  
America's Heartland

ILLINOIS

INDIANA

IOWA

**MICHIGAN**

MINNESOTA

MISSOURI

OHIO

WISCONSIN

JOHN LARSEN

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**Note**

WRI data utilized in this report uniquely provide a common methodological framework for readily comparing GHG emissions across U.S. states. However, it is not the intent of this report to serve as a substitute for emission estimates that might be available from state or local agencies, where complementary or higher-resolution data sets could provide additional information. The data contained in this report may differ from those reported by individual states, but is generally comparable. Disparities in estimates of emissions between WRI and state inventories are likely a result of one or more of the following: data availability, methodologies, and data values, which could include the activity data or emission factors used to calculate GHG emissions in a particular sector.



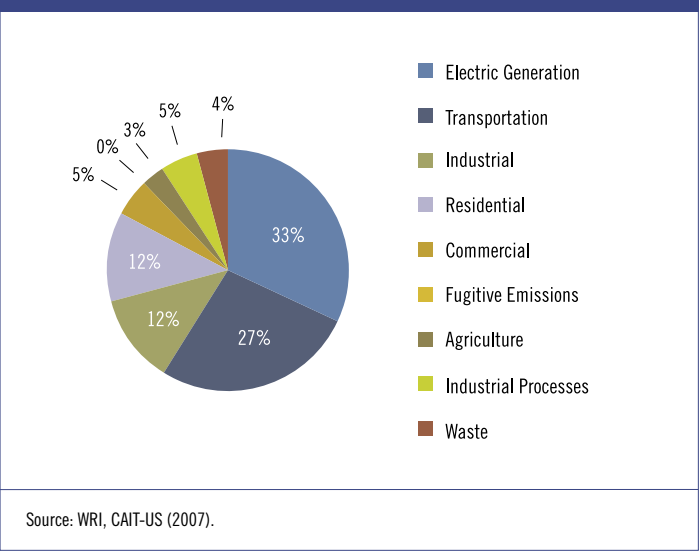
## MICHIGAN

- In 2003, Michigan GHG emissions totaled 212 MtCO<sub>2</sub>e, representing 14 percent of Midwest emissions and 3 percent of U.S. emissions.
- Michigan's top-emitting sectors include electric generation, transportation, industrial energy use, and residential energy use.
- Total GHG emissions in Michigan increased by 1 MtCO<sub>2</sub>e between 1990 and 2004, less than any other Midwest state. GHG growth in energy sectors was 1 percent, cumulatively, less than one-tenth the average percent increase observed for both the Midwest and the nation as a whole.
- Emissions from industrial energy use in Michigan declined by 27 percent, or approximately 9 MtCO<sub>2</sub>e, between 1990 and 2003. This was more than twice the average percentage decline in this sector for all other Midwest states combined, and nine times the national average.

Michigan is the fourth largest GHG emitter in the Midwest, and the ninth largest emitter in the nation in terms of absolute emissions. The state's GHG emissions account for approximately 14 percent of the Midwest's emissions and 3 percent of U.S. emissions. Michigan's emissions profile is less GHG intensive than those of both the Midwest and the nation as a whole. Its per capita emissions (21 metric tons of CO<sub>2</sub>e) are the lowest in the region (with Illinois)—approximately 20 percent below the Midwest regional average.

Michigan's relatively efficient GHG emissions profile is at least partly due to its electricity fuel mix, which is less reliant on carbon-intensive fuels than the rest of the region. Approximately 61 percent of Michigan's electricity is generated from coal, 25 percent from nuclear sources, and 10 percent from natural gas, compared with the region's 73 percent reliance on

Figure 4.11 | Michigan GHG Emissions by Economic Sector: 2003



coal, 21 percent on nuclear power, and 3 percent on natural gas. The percentage of natural gas is relevant in this discussion, since natural gas is a less carbon-intensive fossil fuel than coal.

Approximately 71 percent of Michigan's GHG emissions are produced by the major energy sectors: electric generation (33 percent), transportation (27 percent), and industrial energy use (12 percent). At over 25 MtCO<sub>2</sub>e—or 12 percent—of Michigan's emissions, residential energy use also comprises a significant portion of the state's emissions profile (Figure 4.11). This is unique to Michigan, as it is the only state in the Midwest where the residential sector is responsible for more than 10 percent of total emissions. This is likely due to a combination of Michigan's cooler climate (and, therefore, heating needs) and relatively large population (the third highest in the Midwest and eighth highest nationally). Only Illinois has a larger absolute emissions value for residential energy use. GHGs from waste also constitute an above-average percentage of total GHG emissions and account for approximately 75 percent of the state's total CH<sub>4</sub> emissions (Figure 4.12).

Table 4.5 | Michigan GHG Emissions and Trends by Economic Sector: 1990-2003

SECTOR	1990 EMISSIONS (MtCO <sub>2</sub> e)	2003 EMISSIONS (MtCO <sub>2</sub> e)	1990-2003 EMISSION TRENDS		
			MICHIGAN % CHANGE	MIDWEST % CHANGE	U.S. % CHANGE
<b>Energy Sectors</b>	184	187	1	14	14
Electric Generation	68	69	2	25	24
Transportation	50	56	14	20	19
Industrial	35	25	-27	-11	-3
Residential	22	25	13	8	12
Commercial	11	11	3	9	7
Fugitive Emissions	--	--	--	-40	-35
Agriculture	6	6	-11	-8	0
Industrial Processes*	3	12	-2	-5	8
Waste	9	8	-5	-21	-9
<b>Total**</b>	<b>202</b>	<b>212</b>	<b>1</b>	<b>11</b>	<b>13</b>

Source: WRI, CAIT-US (2007).

Notes: Totals exclude emissions from international bunker fuels and land-use change and forestry.

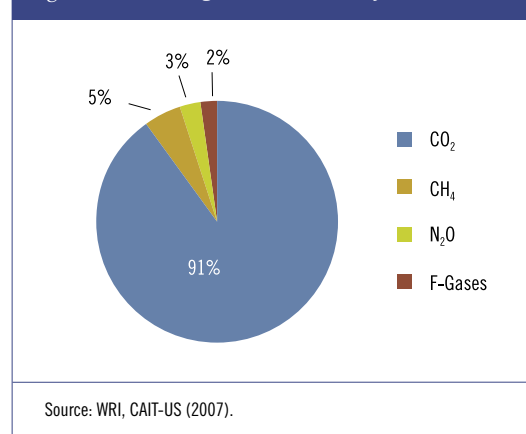
\*Due to inconsistencies in industrial processes emissions data prior to 1997, the 1990 emission value for this economic sector has been replaced with the 1997 estimate. Trend calculations for industrial processes reflect the time period 1997 to 2003.

\*\*While the 1990 total emissions value presented here includes industrial processes emissions for 1997 as noted above, calculations of total state, regional, and national emission trends do not include any industrial processes data in order to maintain consistency between 1990 and 2003.

Between 1990 and 2003, Michigan’s GHG emissions grew by approximately 1 percent. This growth rate was significantly slower relative to both the region (15 percent growth) and the nation (16 percent growth) during this period, and was the slowest among all eight Midwest states. Michigan’s declining emissions from industrial energy use and slow growth in emissions from the electric utility sector during this period contributed to its emissions growth rate (Table 4.5).

Between 1997 and 2003, state GDP and population increased by 9 and 3 percent, respectively. Although these values were below Midwest regional averages, they still represented positive trends in these indicators. Conversely, total GHG emissions in 2003 were 5 percent below 1997 totals, due in large part to Michigan’s unique decline in total emissions from the electric generation and industrial sectors in this period (see Michigan State Spotlight).

Figure 4.12 | Michigan GHG Emissions by Gas: 2003



## MICHIGAN STATE SPOTLIGHT: DECLINING TOTAL EMISSIONS

Between 1999 and 2003, Michigan's total GHG emissions decreased by approximately 6.5 percent. Although the national economic recession of 2000–2001 caused total emissions to decrease during that period in almost every Midwest state, other states within the region have since returned to a trend of increasing emissions; in contrast, Michigan has not (Figure 4.13). The long-term trend (1990–2003) analyzed in Table 4.5 includes Michigan's recent emissions decline. As a result, the magnitude of growth in emissions from electricity generation was substantially below that of both the Midwest and the nation. Similarly, emissions from industrial energy use declined by 27 percent, while only decreasing 11 percent and 3 percent regionally and nationally, respectively.

Michigan increased its percentage of electricity from nuclear sources and decreased the percentage of electricity produced using coal (EIA, 2007). Declines in total emissions from the industrial sector can be partly explained by efficiency improvements in this sector, since Michigan's economic output from manufacturing generally increased (see Chapter 3). Additional factors include Michigan's below-average increases in population and economic growth between 1999 and 2003, relative to the national average. Economic output most likely had the greatest impact on emission trends in the energy sectors; indeed, emissions from electric generation and industrial energy use (as well as transportation) all declined during the period.

A principal driver of the trend in the electric generation sector was a change in the state's fuel mix. Between 1999 and 2003,

