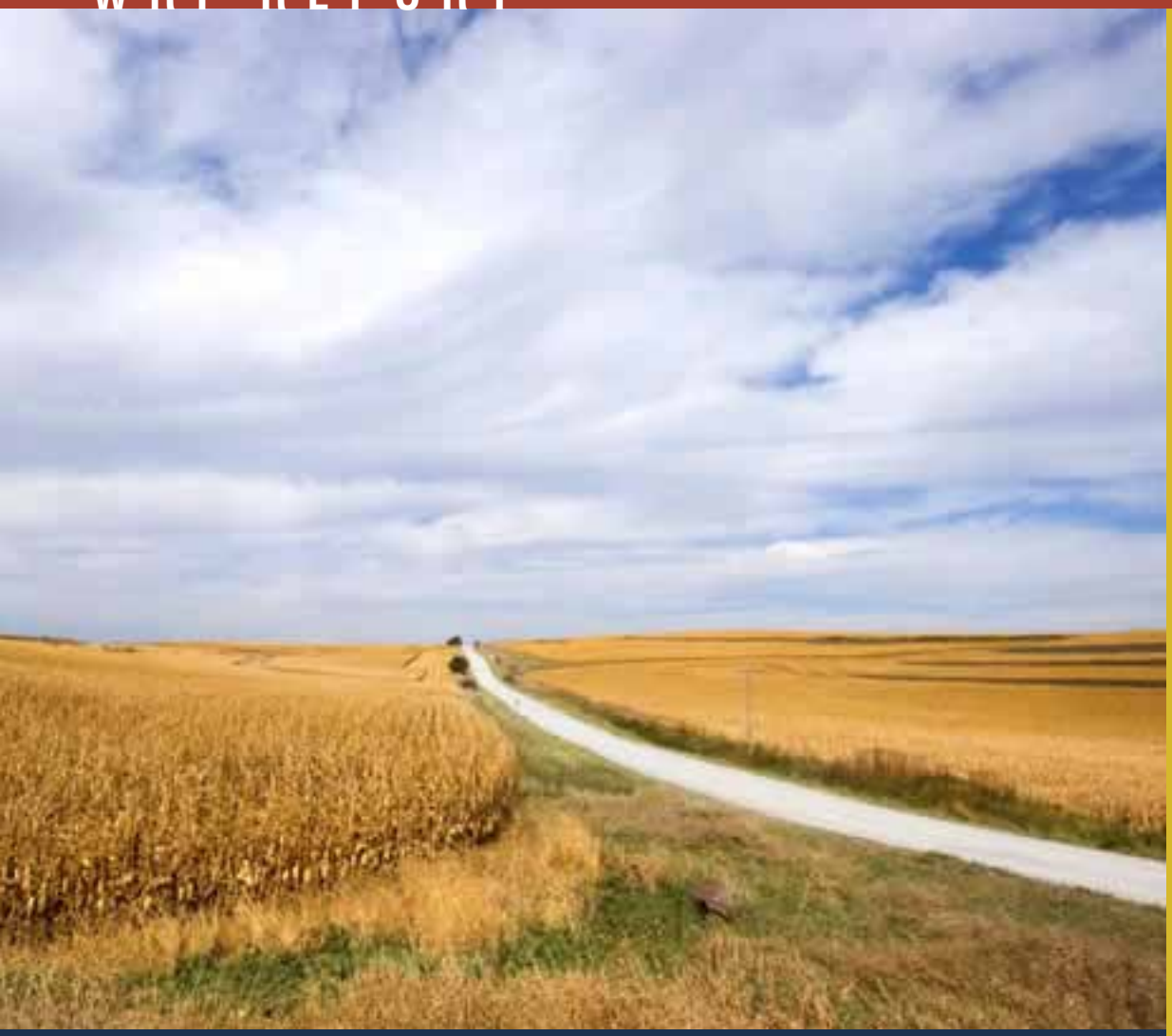
WORLD RESOURCES INSTITUTE

WRI REPORT



ILLINOIS

INDIANA

IOWA

MICHIGAN

MINNESOTA

MISSOURI

OHIO

WISCONSIN

CHARTING THE MIDWEST

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

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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.

WISCONSIN

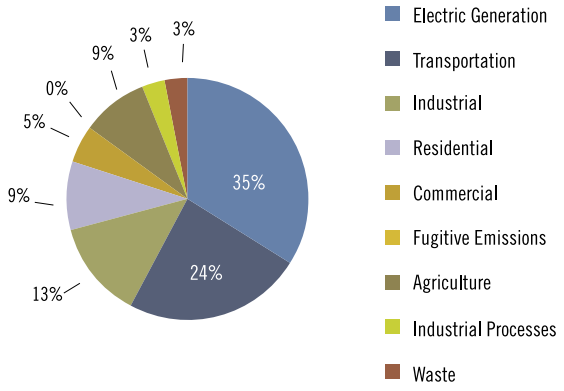
• In 2003, Wisconsin GHG emissions totaled 123 $MtCO_2e$, representing 8 percent of Midwest emissions and 2 percent of U.S. emissions.

• Wisconsin's top-emitting sectors include electric generation, transportation, industrial energy use, and agriculture.

• GHG emissions from electric generation increased by 29 percent between 1990 and 2003, representing the fastest growth among economic sectors in Wisconsin; this value was greater than both the Midwest and national averages.

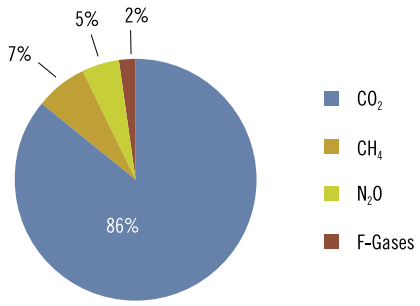
• GHG emissions from energy use in Wisconsin's commercial sector increased by 25 percent between 1990 and 2003, approximately 3 times the Midwest average. Emissions from industrial energy use increased by 37 percent between 1990 and 2000, but declined by 21 percent between 2000 and 2003.

Figure 4.22 | **Wisconsin GHG Emissions by Economic Sector: 2003**



Source: WRI, CAIT-US (2007).

Figure 4.23 | **Wisconsin GHG Emissions by Gas: 2003**



Source: WRI, CAIT-US (2007).

Wisconsin is the sixth largest GHG emitter in the Midwest, and the 21st largest in the nation in terms of absolute emissions. The state's GHG emissions account for approximately 8 percent of the Midwest's emissions and 2 percent of U.S. emissions. Wisconsin's emissions profile is less GHG intensive than the broader Midwest's profile: state per capita emissions are about 12 percent lower than the Midwest regional per capita emissions average.

Approximately 72 percent of Wisconsin's GHG emissions are produced by the major energy sectors: electric generation (35 percent), transportation (24 percent), and industrial energy use (13 percent). At about 11 $MtCO_2e$, or 9 percent each, emissions from agriculture and residential energy use also constitute considerable portions of total GHG emissions (Figure 4.22). All other GHG-emitting sectors in Wisconsin account for 5 percent or less of total emissions. As with all other Midwest states where agriculture emissions contribute more than 8 percent of total emissions (i.e., Iowa, Minnesota, and Missouri), Wisconsin's agricultural emissions account for more than 70 percent of all CH_4 and N_2O emissions from the state. However, Wisconsin is the only state in the Midwest

Table 4.10 | **Wisconsin GHG Emissions and Trends by Economic Sector: 1990–2003**

SECTOR	1990 EMISSIONS ($MtCO_2e$)	2003 EMISSIONS ($MtCO_2e$)	1990–2003 EMISSION TRENDS		
			WISCONSIN% CHANGE	MIDWEST % CHANGE	U.S. % CHANGE
Energy Sectors	*87*	*106*	*21*	*14*	*14*
Electric Generation	33	43	29	25	24
Transportation	25	30	19	20	19
Industrial	15	16	9	-11	-3
Residential	9	11	11	8	12
Commercial	5	6	25	9	7
Fugitive Emissions	--	--	--	-40	-35
Agriculture	13	11	-14	-8	0
Industrial Processes*	1	3	37	-5	8
Waste	5	3	-34	-21	-9
Total*	***106***	***123***	***14***	***11***	***13***

Source: WRI, CAIT-US (2007).

Note: 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 period 1997–2003.

**While the 1990 total emission 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.

where CH_4 emissions from agriculture exceed N_2O emissions from agriculture, which is likely a result of the state's dairy industry (see Wisconsin State Spotlight). Consequently, total CH_4 emissions for the state comprise a larger percentage than N_2O emissions (Figure 4.23).

Between 1990 and 2003, Wisconsin's GHG emissions grew by 14 percent, which was approximately equal to the Midwest regional and U.S. rates of growth, although slightly higher. The emissions increase in the commercial energy use sector (25 percent) was approximately three times larger than the average growth in this sector regionally, and four times larger than the sector's growth nationwide (Table 4.10). GHG emissions from commercial energy use in Wisconsin accounted for approximately 6 $MtCO_2e$ in 2003.

Between 1990 and 2000, emissions from industrial energy use grew by 37 percent from approximately 15 $MtCO_2e$ to 20 $MtCO_2e$—the highest percentage increase during this period of any Midwest state. Since 2000, however, emissions from the industrial sector have declined, in step with the rest of the region, which was likely due to gains in energy efficiency and fuel switching (see Chapter 3). It is notable, however, that Wisconsin's economic output from manufacturing did not decline, but instead increased by 13 percent between 1997 and 2003 (BEA, 2007). Though total state GDP increased by approximately 15 percent between 1997 and 2003, on average, emissions remained fairly constant at about 125 $MtCO_2e$.

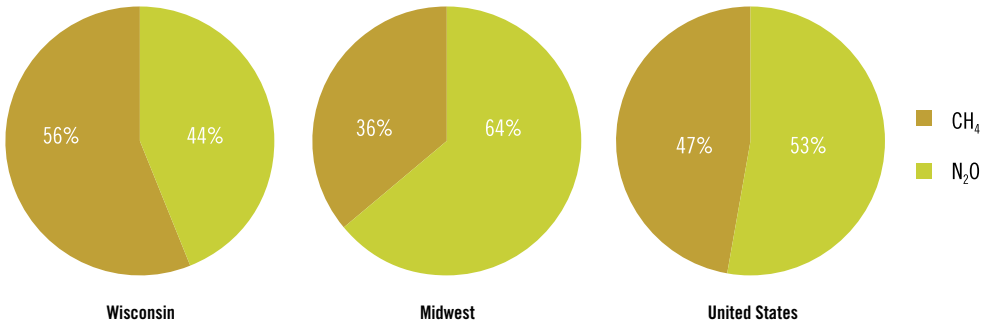
WISCONSIN STATE SPOTLIGHT: METHANE EMISSIONS FROM LIVESTOCK

All animals produce methane gas (CH_4) as a byproduct of digestion (a process known as enteric fermentation). However, animals such as cows, sheep, and goats have a special stomach, called a rumen, which allows them to break down coarse plants and grains. As a result, these so-called ruminant livestock end up producing (and emitting) more CH_4 than other animals. CH_4 is also produced as manure from these animals decomposes. Since CH_4 has a global warming potential that is 21 times that of CO_2 (IPCC, 1996), livestock can consequently represent an important source of GHG emissions.

According to the latest data available, Wisconsin has more than 1.2 million head of dairy cattle, a total greater than any other U.S. state except California, in addition to approximately 3.4 million head of nondairy cattle and calves. Wisconsin's dairy industry is a key component of the state's economy, generating upwards of three billion dollars in revenue annually from milk and other dairy products (USDA, 2007).

As a result, Wisconsin is also the only Midwest state where total CH_4 emissions constitute a larger percentage of agricultural emissions than N_2O emissions (Figure 4.24). A more detailed analysis of state GHG data reveals that emissions from enteric fermentation correlate well with the total number of heads of cattle: both indicators have generally declined since 1990 (WRI, CAIT-US, 2007; USDA, 2007). Conversely, emissions from manure management in Wisconsin have increased in recent years, after the state experienced declines in emissions from this subsector between 1990 and 1997.

Figure 4.24 | **Wisconsin, Midwest, and U.S. Agriculture Emissions by Gas: 2003**



Source: WRI, CAIT-US (2007).