The Role of Nuclear Power
in the Great Lakes Region /
September 2015

DRIVING ECONOMIC GROWTH & KEEPING THE AIR CLEAN

Bruce Power™

CGLR
COUNCIL OF THE GREAT LAKES REGION

PROVINCIAL BUILDING & CONSTRUCTION TRADES COUNCIL OF ONTARIO

Nuclear Power in the Great Lakes Region

The Great Lakes Region consists of eight states and two provinces, many of which rely on nuclear energy to power their economies and keep the air clean. The members of the Great Lakes Region combine to rely on nuclear for 30 per cent of their electricity and 50 per cent of their non-emitting electricity supply. Nuclear power has zero carbon emissions and generates no greenhouse gases, which improves the air we breathe while generating the same reliable and affordable baseload power of other energy sources.

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EXECUTIVE SUMMARY

The Great Lakes Region, which includes eight U.S. states and two Canadian provinces, is the economic engine of North America, accounting for over 30 per cent of both economic and employment activity between the two countries.

If it were a country it would be the third largest economy in the world, behind only the U.S. and China. Despite its economic might, it hasn't been without its challenges since the global downturn of 2008 and '09. Additionally, there is a collective understanding in this region, reflected in both national and subnational government policies, of the importance of reducing greenhouse gases that contribute to climate change.

Given the interconnectedness of the region's economy, it's important to consider all factors when seeking to grow the economy through jobs and investment. The environmental impact of economic growth is a challenge for all jurisdictions, and one people, businesses and governments of the Great Lakes Region look to balance.

While a wide range of policy factors will be needed to achieve these goals, one positive contributor to the region's economy and keeping the air clean is nuclear energy. Nuclear power generates nearly 30 per cent of the electricity for the entire region and about 50 per cent of the emissions-free electricity generated in the Great Lakes Region, making it an essential source of reliable, affordable and clean electricity for families and businesses.

This emissions-free electricity annually avoids 250 million metric tonnes of CO_2 in the air, which is the equivalent of removing over 52 million passenger cars from the road.

While playing this important role in keeping the air clean, the nuclear industry is also a major source of jobs and economic activity. The 55 nuclear units operating across the Great Lakes Region employ 80,000 people through direct and indirect employment. The nuclear industry also combines to inject $10 to $12 billion a year into the economy through direct and indirect spending in operational equipment, supplies, materials and labour income. Over 90 per cent of this spending is done within each facility's own region, creating a positive impact on local and state/provincial economies.

Nuclear power is a reliable source of affordable, clean electricity for families and businesses across the Great Lakes Region. It powers the economy through jobs and investment and keeps the air we breathe clean.

Moving forward, nuclear energy will play an important role in the Great Lakes Region's modern, balanced electricity system, while governments continue to focus on policies that will grow their economies and reduce greenhouse gas emissions.

Given the interconnectedness of the region's economy, it's important to consider all factors when seeking to grow the economy through jobs and investment. The environmental impact of economic growth is a challenge for all jurisdictions, and one people, businesses and governments of the Great Lakes Region look to balance.

PARTNERS

Bruce Power, the Council of the Great Lakes Region and the Provincial Building and Construction Trades Council of Ontario share a common belief in a clean and reliable electricity system that benefits the economies of its member states and provinces.

BRUCE POWER

Bruce Power is the world's largest operating nuclear generating facility and is the source of roughly 30 per cent of Ontario's electricity. The company's site in Tiverton, ON, is home to eight CANDU reactors, each one capable of generating enough low-cost, reliable, safe and clean electricity to meet the annual needs of a city the size of Hamilton. Formed in 2001, Bruce Power is an all-Canadian partnership among Borealis Infrastructure Management (a division of the Ontario Municipal Employees Retirement System), TransCanada, the Power Workers' Union and the Society of Energy Professionals. A majority of Bruce Power's employees are also owners in the business.

COUNCIL OF THE GREAT LAKES REGION

Established in 2013, the Council of the Great Lakes Region (CGLR) is an independent, non-profit corporation that was created to think strategically about the Great Lakes-St. Lawrence Region as a bi-national economic region. It mobilizes business leaders, lawmakers, government executives and policy specialists, academia and advocates from non-governmental organizations in accelerating regional economic growth safely and sustainably. The Council achieves this mandate by building innovative partnerships, convening thought-provoking events that stimulate conversations and ideas, conducting insightful research and generating sensible policy solutions. The CGLR also provides impartial advice to governments and legislatures.

PROVINCIAL BUILDING & CONSTRUCTION TRADES COUNCIL OF ONTARIO

The Provincial Building and Construction Trades Council of Ontario is an umbrella organization that represents 13 craft unions in the construction sector, totalling 150,000 workers throughout the province. The mission of the Council is to give construction workers a collective voice in the workplace, to help ensure they are well-trained to meet industry needs safely, and to promote healthy and safe work conditions with decent wages, pensions and benefits. Part of the Council's success stems from the effective partnerships that have been established with signatory contractors and owner-clients who work with affiliates to achieve public private infrastructure needs. The Provincial Building and Construction Trades Council of Ontario works with provincial government ministries and agencies to ensure the construction industry is well-regulated, competitive, well-resourced and safe.

THE GREAT LAKES REGION

The Great Lakes-St. Lawrence Region includes eight U.S. states (New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota) and two Canadian provinces (Ontario and Quebec), which border the Great Lakes and/or the St. Lawrence Seaway.

ECONOMIC STRENGTH

The Great Lakes-St. Lawrence Region contains much of the economic might of the two countries, if not North America, especially in the manufacturing sector. With economic output of US$5.8 trillion in 2014, the region accounts for 30 per cent of combined Canadian and U.S. economic activity and 31 per cent of employment, ranking it as the third largest economy in the world if it were a country, behind only the U.S. and China.

The region also plays an extremely important role within the broad North American employment market, supplying 51 million jobs in 2014. That represents nearly 31 per cent of the combined Canadian and U.S. workforce. The region's highly diverse economy supports employment across a wide range of manufacturing and service industries. While traditionally considered the manufacturing heartland, factory-sector employment now makes up just over 10 per cent of the region's workforce, down from about 15 per cent a decade ago.

The Great Lakes-St. Lawrence Region is a critically important North American trading hub. The region's states were the origin of roughly a quarter of total U.S. merchandise exports in 2013, while Ontario accounted for 40 per cent of Canadian shipments. Transportation equipment and machinery are the major drivers, but agricultural and food products, metals and chemicals are also important exports. For example, the Great Lakes states are Ontario's largest trading partner, accounting for nearly C$170 billion of total trade in 2013. That represents a sizeable 36 per cent of the province's total international imports and exports.

Historically, the major industries in the Great Lakes region have been driven by the manufacturing sector, including the production of steel, paper, chemicals, automobiles and other goods. The auto sector and steel production continue to be the primary manufacturing industries in the region.

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ELECTRICITY SUPPLY

The massive economic and geographical footprint of the region requires huge amounts of energy in order to operate. While some states and provinces, notably Illinois, Ontario and Pennsylvania, generate the majority of their energy from carbon-free nuclear power, most others still rely on carbon-emitting technologies like coal and natural gas for their electrical baseload. Most commercially competitive hydroelectric resources in this region have also been fully developed. The energy consumption for the Great Lakes area has fluctuated between 1990 and 2008. In 1990, the total population within the Great Lakes was over 86 million with a total energy consumption of 7.4 billion megawatt-hours (MWh), and its per capita usage was 87 MWh per person, per year. Though the region's population grew by 10.8 per cent between 1990 and 2008, the energy usage per capita declined by 3.4 per cent, to 84 MWh per person, per year. What's clear when looking at the region as a whole is that this was primarily impacted by the global economic down-turn in 2008.

The overall trends in energy consumption by sector were quite similar throughout the region. In Ontario, the total secondary energy consumption by the four sectors (industrial, transportation, residential and commercial/institutional) in 2008 was over 763 million MWh. The transportation sector accounted for the largest end-user percentage of energy consumption at 32 per cent. Energy consumption in the other three sectors was as follows: residence, 21 per cent; commercial/institutional, 18 per cent; and industrial, 30 per cent.

Total secondary energy consumption by the four sectors in the eight U.S. Great Lakes states in 2008 was 7.48 billion MWh. For the Great Lakes states, the industrial sector was the largest consuming sector with 30 per cent in 2008. The remaining three sectors account for 70 per cent of the total, as follows: transportation and residential, 25 per cent each, and the commercial/institutional sector, 20 per cent.

The vast majority of electricity generated in April 2015 in the U.S. Great Lakes states came from coal (39 per cent), nuclear (30 per cent) and natural gas (20 per cent). In Ontario, 62 per cent of electricity was provided by nuclear power while 83 per cent of electricity generation in Quebec was from hydroelectric (based on 2013 data).

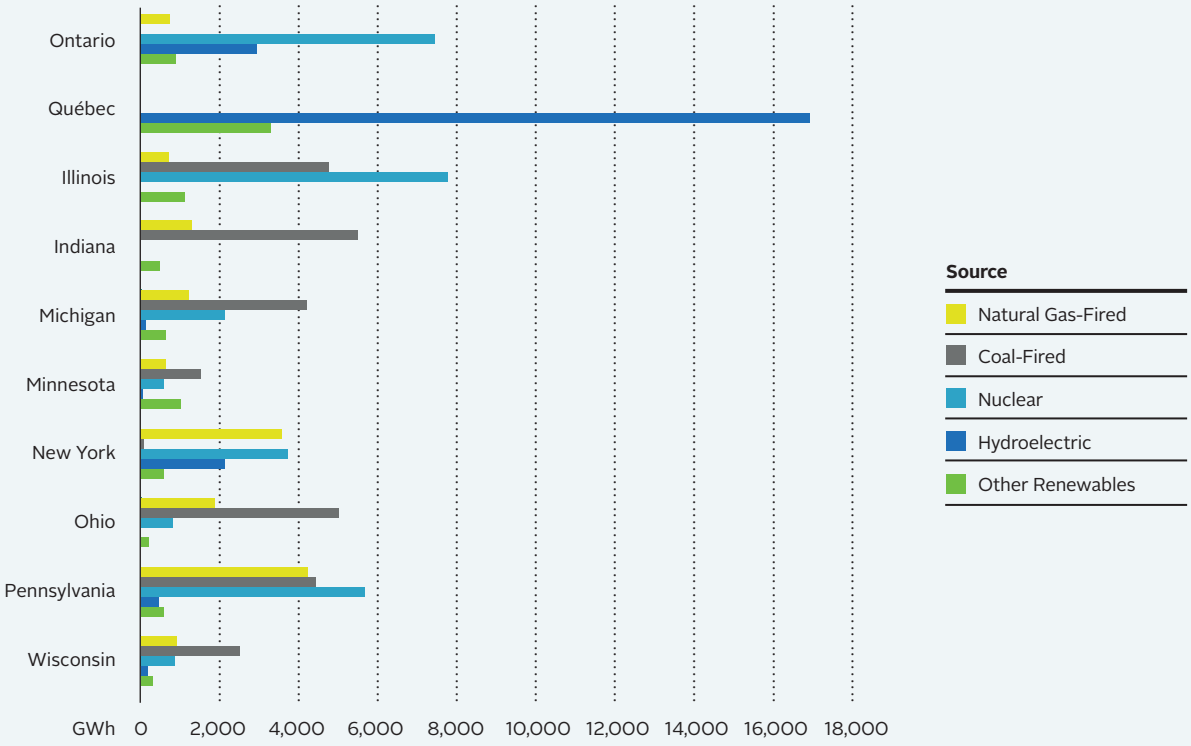
ENERGY CONSUMPTION AND POPULATION WITHIN THE GREAT LAKES REGION

State/Province	Total Energy Consumption within the Great Lakes Region (1990)	Population within the Great Lakes Region (1990)	Total Energy Consumption within the Great Lakes Region (2008)	Population within the Great Lakes Region (2008)
Ontario	653,166,666	10,085,000 (1991)	763,472,222	12,932,300
Québec	425,411,111	6,895,963 (1991)	426,214,444 (2010)	7,929,400
Illinois	1,055,466,152	11,430,602	1,198,279,684	12,842,954
Indiana	738,685,632	5,544,159	837,421,275	6,388,309
Michigan	832,058,075	9,295,297	855,269,304	10,002,486
Minnesota	407,456,708	4,357,099	580,016,955	5,230,567
New York	1,099,309,583	17,990,455	1,168,826,041	19,467,789
Ohio	1,125,979,052	10,847,115	1,155,286,158	11,528,072
Pennsylvania	1,085,505,936	11,881,643	1,142,889,252	12,566,368
Wisconsin	432,103,986	4,891,769	548,815,561	5,627,610

Source: United States Energy Information Administration (EIA) 2010. Natural Resource Canada – Office of Energy Efficiency 2010.

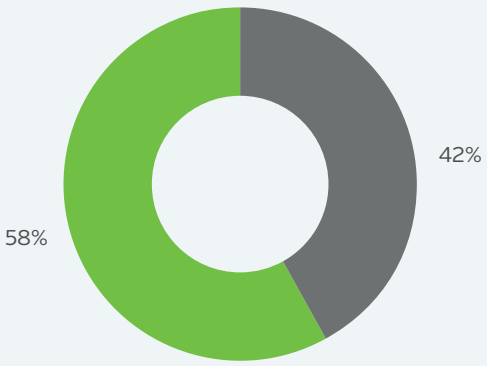
NET ELECTRICAL GENERATION BY SOURCE

GWh



CARBON EMITTING VS NON-EMITTING SOURCES IN THE GREAT LAKES REGION

GWh

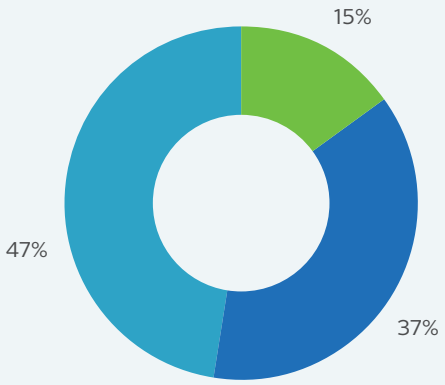


Non-Emitting	58%
Nuclear	28%
Hydroelectric	22%
Other Renewables	9%

Carbon Emitting	42%
Petroleum-Fired	0%
Natural Gas-Fired	15%
Coal-Fired	27%

NON-EMITTING SOURCES IN THE GREAT LAKES REGION

GWh



Non-Emitting Supply Mix	
Nuclear	47%
Hydroelectric	37%
Other Renewables	15%

SUMMARY BY JURISDICTION

ONTARIO • QUEBEC • NEW YORK
PENNSYLVANIA • OHIO • MICHIGAN
INDIANA • ILLINOIS • WISCONSIN
MINNESOTA

ONTARIO

Population (2014)
13.7 million
Gross Domestic Product (2013)
C$695.7 billion
Net Electrical Generation (April 2015)
12,052 GWh

Ontario is Canada's second largest province, covering more than one million square kilometres (415,000 square miles). Ontario is bordered by Quebec to the east, Manitoba to the west, Hudson Bay and James Bay to the north, and the St. Lawrence River and the Great Lakes to the south.

There are about 120 generating stations connected to Ontario's power grid – with nuclear, hydroelectric, gas, wind and bioenergy comprising the supply mix.

Together, these stations are capable of generating about 35,000 MW of electricity. Ontario's nuclear plants have a capacity of about 11,000 MW, the 70 hydroelectric generating stations have a capacity of over 7,900 MW and Ontario now has more than 1,000 wind turbines with a capacity of more than 2,000 MW, making it the Canadian leader in wind power.

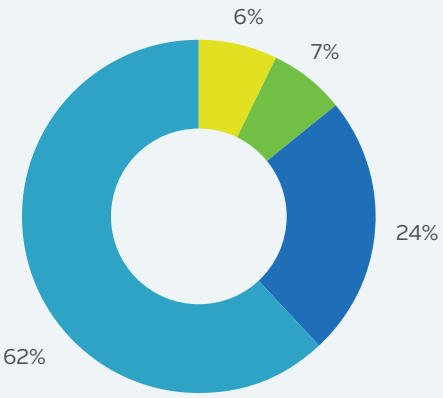
Ontario lies in the core of the North American Free Trade area, which includes more than 460 million people and generates a combined gross domestic product of more than C$18 trillion (purchasing power parity, current international dollars). In 2011, more than C$1.4 billion crossed the Canada-U.S. border each day and Ontario-U.S. trade accounted for C$716 million of that amount.

FACTS

- Ontario's Long-term Energy Plan (LTEP), developed in 2013, is designed to balance cost-effectiveness, reliability, clean energy, community engagement and provide an emphasis on conservation and demand management before building new generation.
- Ontario was the first jurisdiction in North America to end its use of coal-fired electricity when it closed the Thunder Bay Generating Station in April 2014. According to a 2005 Ministry of Energy report, phasing out coal could avoid 25,000 emergency room visits, 20,000 hospital admissions and 8.1 minor illness cases, which would result in a financial benefit of C$2.6 billion annually.
- The elimination of coal-fired electrical generation in Ontario is the single largest greenhouse gas reduction measure in North America. Refurbishing four of Bruce Power's dormant nuclear reactors over the past decade provided 70 per cent of the energy the province needed to achieve this clean-air goal.

ONTARIO NET ELECTRICITY OUTPUT

April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	6%
Coal-Fired	0%
Nuclear	62%
Hydroelectric	24%
Other Renewables	7%

Note: Electricity output from month of April 2015. Output fluctuates from month to month.

QUÉBEC

Population (2014)
8.2 million
Gross Domestic Product (2013)
C$362.8 billion
Net Electrical Generation (April 2015)
15,817 GWh

Québec is the largest province in Canada. Its territory represents 15.5 per cent of the surface area of Canada and totals more than 1.5 million km2. Québec shares borders with Ontario, New Brunswick and Newfoundland. The province also neighbours on four American states – Maine, New Hampshire, Vermont and New York.

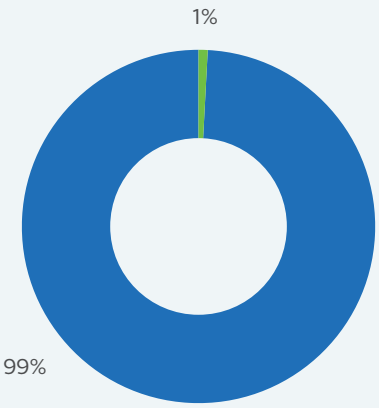
The principal industries in Québec are manufacturing, generation of electric power, mining and pulp and paper. The Québec manufacturing sector represents 25 per cent of the Canadian total. Five groups of industries account for 65 per cent of the factories and over 50 per cent of the manufacturing jobs – clothing and textiles, food and beverages, paper and related products, and metal and wood products.

Québec is the largest producer of electricity in Canada. Its installed generating capacity is 36,068 MW, or more than 30 per cent of the Canadian total, and more than 99 per cent of the production is hydroelectric. Despite its significant generating capacity, Québec has many periods of the year when the system is tight for supply given the high demand in the winter. Québec's energy production is expected to increase by 1,550 MW when the Romaine complex in the Côte-Nord region becomes active in 2020.

FACTS

- Hydro-Quebec generates 99 per cent of its electricity from hydroelectric power.
- Quebec supports development of other technologies such as wind energy and biomass.
- Thermal (fossil-fuelled) generating stations account for 0.2 per cent of total power output. The emissions can vary significantly from one year to the next depending on the use of power plants that operate with fossil energy, especially to satisfy heating needs during extremely cold weather.
- The Hydro-Quebec generating fleet comprises 61 hydroelectric generating stations and one thermal generating station, representing assets worth C$28.9 billion and installed capacity of 36.5 GW. It also includes 27 large reservoirs with a combined storage capacity of 176 TWh, as well as 668 dams and 98 control structures.
- While Quebec has a large volume of generating resources, it has high demand for electricity in many key periods of the year, such as the winter, and requires its full capacity to meet its own electricity needs during this period.

QUÉBEC NET ELECTRICITY OUTPUT
2013 (GWh)



Supply Mix	%
Natural Gas-Fired	0%
Coal-Fired	0%
Nuclear	0%
Hydroelectric	99%
Other Renewables	1%

NEW YORK

Population (2014)
19.7 million
Gross Domestic Product (2013)
US$1.3 trillion
Net Electrical Generation (April 2015)
10,129 GWh

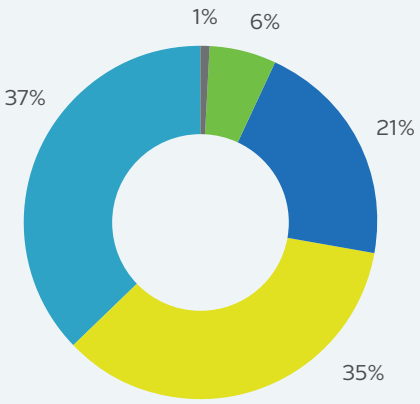
New York State stretches from the Great Lakes to New England and from Canada to the Atlantic Ocean. It includes the densely populated New York City metropolis, rolling agricultural lands, and rugged mountains. Because of its large population, New York's total energy consumption ranks among the highest in the nation, but its energy intensity and per capita energy consumption are among the lowest. The state's energy efficiency results in part from the New York metropolitan region's widely used mass transportation systems.

More than half the state's energy is supplied from other states and Canada. New York has developed a state energy plan to maintain energy reliability while reducing costs and environmental impacts. Among the plan's strategies are developing in-state resources, including renewables and natural gas, and increasing energy efficiency. State emissions from electricity generation have declined since 2000 because of increased natural gas use and compliance with the Regional Greenhouse Gas Initiative, a program to reduce power plant emissions in nine northeastern states. In 2012, New York had the lowest carbon dioxide emissions per capita in the nation.

FACTS

- More than half of New York's energy is supplied by other states and Canada. In 2014, New York had the fourth-highest average electricity prices in the U.S.
- To curb air pollution, New York became the first northeastern state to require all heating oil be ultra-low sulfur diesel.
- The NY-Sun initiative aims to install 3,000 MW of solar photovoltaic facilities by 2023.
- The state also has Clean Cities Coalitions, which include Albany, Syracuse, New York City, Rochester, Buffalo and Greater Long Island (plus their surrounding areas).
- Total emissions: 154 million metric tons of CO_2. Electricity power industry emissions: 35.6 million metric tonnes of CO_2, 30,818 metric tons of SO_2 and 40,269 metric tons of NOx (2012).
- The state's energy efficiency results are in part from the widely used mass transportation systems.
- Emissions from electrical generation have declined since 2000 due to increased natural gas use and compliance with Regional Greenhouse Gas Initiative – a program to reduce power plant emissions in nine northeastern states.
- In 2012, New York had the lowest carbon dioxide emissions per capita in the U.S.
- New Yorkers per capita are among the lowest electricity users in the U.S.

NEW YORK NET ELECTRICITY GENERATION BY SOURCE
April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	35%
Coal-Fired	1%
Nuclear	37%
Hydroelectric	21%
Other Renewables	6%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

PENNSYLVANIA

Population (2014)
12.8 million
Gross Domestic Product (2013)
US$644.9 billion
Net Electrical Generation (April 2015)
15,420 GWh

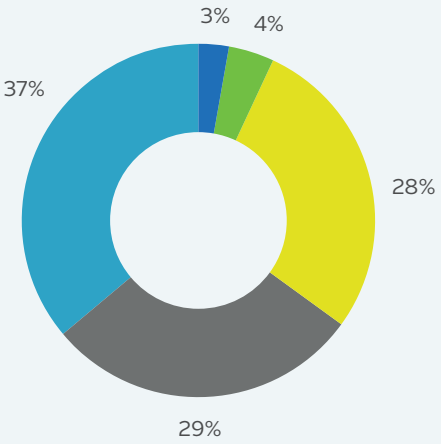
Pennsylvania is a leading east coast supplier of coal, natural gas, nuclear power and refined petroleum products to its own industries and the nation. The Appalachian Mountains have rich coal resources and run southwest to northeast through Pennsylvania, dividing the Ohio River Valley in the west from the Susquehanna River and Delaware River Valleys in the east. The Marcellus Shale, the largest U.S. natural gas field, underlies about 60 per cent of the state in an arc reaching from the southwest to the northeast.

Pennsylvania's gross domestic product ranked sixth among the states in 2013. The state is among the Top 10 consumers of coal, natural gas, petroleum products and electricity, but its total energy consumption per capita is in the lower half of states nationwide. The industrial sector leads energy consumption in the state. Major energy-consuming industries include agriculture, mining, aluminum, steel and related heavy manufacturing, forestry products and tourism.

FACTS

- Greater Philadelphia and Pittsburgh are part of the Clean Cities Coalition.
- Total emissions: 233 million metric tons of CO_2. Electric power industry emissions: 109.9 million metric tons CO_2, 240,386 metric tons of SO_2 and 132,776 metric tons NOx (2012).
- Pennsylvania is a leading east coast supplier of coal, natural gas, nuclear power and refined petroleum products to its own industries in the U.S.
- Pennsylvania is not only a major producer of coal (and only state producing anthracite coal), it is also among the highest consumers in the U.S.
- In the Top 3 of electricity generating states in the U.S. The state's five nuclear plants have provided more than one-third of net electricity generation in recent years.
- Pennsylvania's Alternative Energy Portfolio Standards require 18 per cent of electricity sold by 2021 to come from approved renewable or alternative sources. In 2014, this accounted for four per cent of Pennsylvania's net electricity generation.

PENNSYLVANIA NET ELECTRICITY GENERATION BY SOURCE
April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	28%
Coal-Fired	29%
Nuclear	37%
Hydroelectric	3%
Other Renewables	4%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

OHIO

Population (2014)
11.6 million
Gross Domestic Product (2013)
US$565.3 billion
Net Electrical Generation (April 2015)
8,054 GWh

Named after the river that forms its southern border, Ohio is a Great Lakes state, bordered on the north by Lake Erie. The Appalachian Plateau, part of the larger Appalachian Basin, crosses the eastern part of Ohio and contains considerable reserves of coal, as well as many crude oil and natural gas fields. The state also has additional natural gas and crude oil resource potential from shales and coalbeds. Lake Erie influences Ohio's weather and provides an important offshore wind energy resource. Ohio's rolling plains have some of the most fertile farmland in the nation and mark the beginning of the 'corn belt,' which extends westward across the Midwest. Corn produced in the state feeds Ohio's ethanol plants.

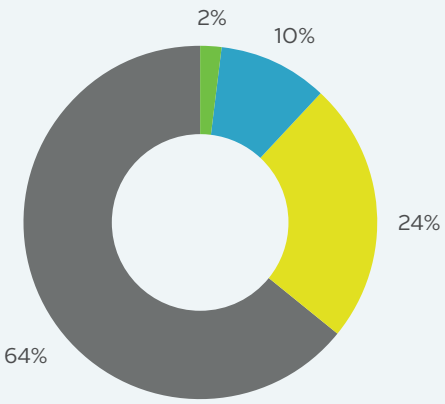
Ohio's primary economic activity is manufacturing. With its large population, heavy industrial economy and highly variable climate, Ohio is among the Top 10 states in total energy consumption. The industrial sector is the largest energy-consuming sector in the state. Most of Ohio's manufacturing is related to the transportation sector, but the state also has strong metals and chemical production industries. The transportation sector is the second-largest energy-consuming sector, followed closely by the residential sector. Despite Ohio's strong industrial base, per capita energy consumption in the state is only slightly above the national average.

FACTS

- Clean Cities Coalitions – Clean Fuels Ohio, Northeast Ohio Clean Transportation (Cleveland).
- Total emissions: 213 million metric tons CO_2. Electricity power industry emissions: 95.5 million metric tons CO_2, 354,795 metric tons of SO_2 and 90,986 metric tons of NO_x (2012).
- With its large population, heavy industrial economy and variable climate, Ohio is among the Top 10 states in total energy consumption.
- Eight of 10 power plants are coal-fired. Ohio's net generation does not meet state demand – electricity is provided by other states.
- In August 2003, a transmission failure in Ohio led to the largest blackout in North America, affecting an estimated 50 million people in the northeastern U.S. and Canada for days.

OHIO NET ELECTRICITY GENERATION BY SOURCE

April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	24%
Coal-Fired	64%
Nuclear	10%
Hydroelectric	0%
Other Renewables	2%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

MICHIGAN

Population (2014)
9.9 million
Gross Domestic Product (2013)
US$432.6 billion
Net Electrical Generation (April 2015)
8,492 GWh

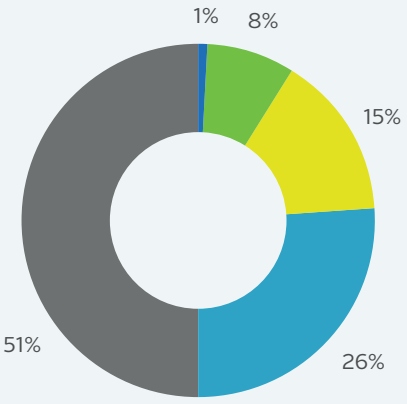
Michigan, known as the Great Lakes State, has within its boundaries portions of four of the five Great Lakes. The state has more shoreline than any other except Alaska, and vessels that transit the Great Lakes-St. Lawrence Seaway arrive and depart from Michigan's many ports. The northern ends of Lake Michigan and Lake Huron divide the state into two distinct sections – the Upper Peninsula, which is lightly populated and heavily forested, and the Lower Peninsula, where most of the state's population lives, and all of the major cities, manufacturing industries and commercial agriculture are located.

The transportation sector is the leading energy consumer, followed closely by the industrial and residential sectors. Michigan's most valuable manufactured products are transportation equipment, including automobiles, trucks, buses, airplanes and boats. Energy-intensive industrial activities in the state include not only automotive manufacturing, but also machinery manufacturing, fabricated metal products, chemicals, oil and gas extraction, and petroleum refining.

FACTS

- Clean Cities Coalitions – Ann Arbor, Detroit, Greater Lansing.
- Total emissions: 150 million metric tons of CO_2. Electric power industry emissions: 67.8 million metric tons of CO_2, 214,979 metric tons of SO_2 and 80,818 metric tons of NO_x (2012).
- Michigan has more shoreline than any other state in the U.S. other than Alaska, with almost 40,000 square miles of the Great Lakes within its borders.
- Michigan is serviced by two major interstate electricity grids – Lower Peninsula and Upper Peninsula.
- Half of the electricity generated in Michigan is produced by coal-fired plants.
- In 2014, Michigan's three nuclear power plants (four reactor units) provided 30 per cent of the state's net electricity generation.

MICHIGAN NET ELECTRICITY GENERATION BY SOURCE
April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	15%
Coal-Fired	51%
Nuclear	26%
Hydroelectric	1%
Other Renewables	8%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

INDIANA

Population (2014)
6.6 million
Gross Domestic Product (2013)
US$317.1 billion
Net Electrical Generation (April 2015)
7,479 GWh

Indiana is on the eastern edge of the nation's Interior Plains. Using corn as a feedstock, Indiana has become a major ethanol-producing state.

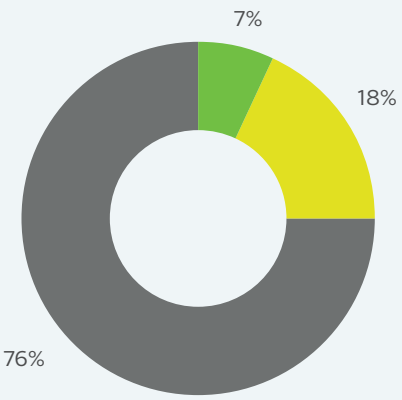
The industrial sector is the state's largest energy consumer with industrial activities that include the energy-intensive chemical, petroleum, transportation equipment and steelmaking sectors. The state consumes more energy than it produces.

Nearly 80 per cent of Indiana's energy comes from coal-fired generation, while another nine per cent is from natural gas. Seven per cent of its energy is produced by renewables such as wind, biomass and a small amount of solar. Indiana also uses nuclear power imports from other states when necessary, which can account for nine per cent of its energy supply mix, though it has no in-state nuclear plants.

FACTS

- Clean Cities Coalitions – Greater Indiana, South Shore
- Total emissions: 192 million metric tons of CO_2. Electric power industry emissions: 99.7 million metric tons of CO_2, 259,601 metric tons of SO_2 and 107,337 metric tons of NOx (2012).
- Indiana consumes more energy than it produces.
- Nine of the state's 10 largest power plants are coal-fired. Indiana does not have any nuclear power plants.
- Indiana is a major producer of ethanol – more than 1.2 billion gallons/year as of January 2014.

INDIANA NET ELECTRICITY GENERATION BY SOURCE
April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	18%
Coal-Fired	76%
Nuclear	0%
Hydroelectric	0%
Other Renewables	7%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

ILLINOIS

Population (2014)
12.9 million
Gross Domestic Product (2013)
US$720.7 billion
Net Electrical Generation (April 2015)
14,465 GWh

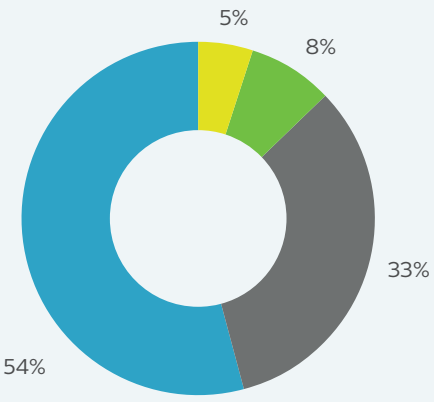
Located in the centre of the U.S., Illinois is the most densely populated and prosperous Midwestern state, ranking fifth in the nation in both population and gross domestic product. Because of its central location and its access to major waterways and rail and aviation hubs, Illinois plays an important role in the nation's economy. The state has fossil fuel resources that include substantial coal reserves and some crude oil. Despite its large urban population, Illinois has more than 26 million acres of farmland and ranks seventh among the states in the market value of agricultural products sold. Corn is the most important crop in Illinois, and it supplies the state's ethanol plants, making Illinois one of the top ethanol-producing states in the nation. The state is also a leading biodiesel manufacturer and has substantial wind-powered electricity generating capacity. Illinois has the nation's only facility that converts raw uranium yellowcake into uranium hexafluoride, a step in making nuclear fuel.

Although Illinois is a major energy-consuming state, its per-capita energy consumption is slightly below the national average. Industry is the state's largest energy-consuming sector, followed by the transportation and residential sectors, which consume almost equivalent amounts of energy.

FACTS

- Clean Cities Coalitions – Chicago Area
- Total emissions: 212 million metric tons of CO_2. Electric power industry emissions: 94.4 million metric tons of CO_2, 172,478 metric tons of SO_2 and 60,950 metric tons of NO_x (2012).
- Most densely populated and prosperous Midwestern state.
- Illinois is a leading biodiesel manufacturer and has substantial wind-powered electricity generating capacity.
- Illinois leads the U.S. in electricity generation from nuclear power (about one-eighth of the country's nuclear power generation) and over half of all net generation in Illinois. Most of the rest of electricity generated in Illinois is from coal-fired plants.
- Top producer of ethanol – 1.5 billion gallons/year.

ILLINOIS NET ELECTRICITY GENERATION BY SOURCE
April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	5%
Coal-Fired	33%
Nuclear	54%
Hydroelectric	0%
Other Renewables	8%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

WISCONSIN

Population (2014)
5.8 million
Gross Domestic Product (2013)
US$282.5 billion
Net Electrical Generation (April 2015)
4,749 GWh

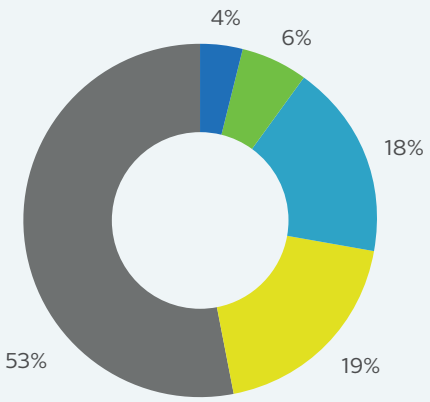
Wisconsin's green, rolling hills and plains provide the state with significant renewable resources. The state's fertile soil and rich agricultural economy make it a leader in the market value of its agricultural products. Wisconsin's corn and other crops feed the state's ethanol refineries. Wisconsin is the second-largest dairy state, after California, and manure from the state's one million cows is converted into energy in anaerobic digesters. The heavily wooded northern highlands that occupy one-third of the state provide an ample biomass resource, and dams throughout Wisconsin supply hydroelectric power. Wind resources are being developed on the ridges in eastern Wisconsin near Lake Michigan and in the state's Western Uplands region.

Wisconsin's industrial base includes several energy-intensive industries, including the manufacture of machinery, metals and food products. An important dairy state, Wisconsin produces about one-third of the cheese made in the nation. Beer is the state's most valuable processed beverage product.

FACTS

- Clean Cities Coalition – Wisconsin Southeast Area
- Total emissions: 88 million metric tons of CO_2. Electric power industry emissions: 41.2 million metric tons of CO_2, 97,602 metric tons of SO_2 and 39,312 metric tons of NOx (2012).
- Until 2013, when they were shut down, two nuclear power plants supplied about one-fifth of Wisconsin's electricity generation. Wisconsin imports electricity to meet demand.
- In 2013, coal provided 62 per cent of the state's net electricity generation.

WISCONSIN NET ELECTRICITY GENERATION BY SOURCE
April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	19%
Coal-Fired	53%
Nuclear	18%
Hydroelectric	4%
Other Renewables	6%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

MINNESOTA

Population (2014)
5.5 million
Gross Domestic Product (2013)
US$312.1 billion
Net Electrical Generation (April 2015)
3,804 GWh

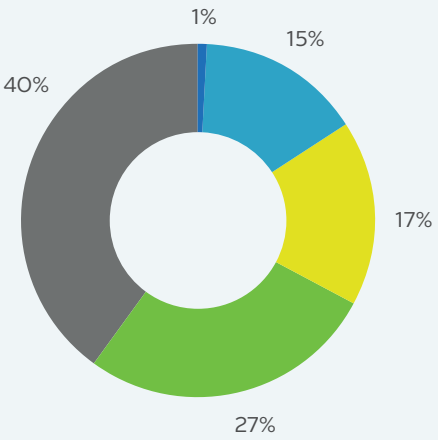
Located at the northern edge of the central plains, Minnesota is the largest of the Midwestern states. It has significant renewable resources, including open prairies that provide an unobstructed wind energy resource. Minnesota's rolling plains are covered by fertile topsoil, giving the state some of the richest farmland in the nation, which, along with 17 million acres of forest lands, provide ample biomass potential. The state's abundant cornfields produce Minnesota's most valuable crop and provide feedstock for the state's many ethanol plants. With more inland waters than any other state except Alaska, Minnesota's fast-flowing streams and rivers are a hydropower resource.

The industrial sector, which includes the energy-intensive petroleum refining and food processing industries, leads the state in energy consumption. The transportation sector consumes about 75 per cent as much energy as the industrial sector and is the second-largest energy-consuming sector in Minnesota.

FACTS

- Clean Cities Coalitions – Twin Cities
- Total emissions: 85 million metric tons of CO_2. Electric power industry emissions: 28.5 million metric tons of CO_2, 33,235 metric tons of SO_2 and 35,837 metric tons of NO_x (2012).
- Coal provides nearly one-half of Minnesota's electricity. The two nuclear power plants provided 21 per cent of the state's electricity in 2013.
- Only one-sixth of Minnesota households use electricity for home heating.

MINNESOTA NET ELECTRICITY GENERATION BY SOURCE
April 2015 (GWh)



Supply Mix	%
Natural Gas-Fired	17%
Coal-Fired	40%
Nuclear	15%
Hydroelectric	1%
Other Renewables	27%

Source: Energy Information Administration, Electric Power Monthly
Note: Electricity output from month of April 2015. Output fluctuates from month to month.

REGIONAL CLIMATE CHANGE GOALS

Climate change alters the frequency, severity and duration of heat waves, precipitation and other meteorological factors that influence air pollutant accumulation. This occurs because the Earth's temperature is regulated by the energy it received from the sun and reflects back into space. The Earth is warming due to increasing concentrations of greenhouse gas (GHG) emissions, specifically carbon dioxide (CO_2) resulting from human activities, mainly the increased burning of fossil fuels.

"The Government of Canada is committed to addressing greenhouse gas (GHG) emissions while keeping the Canadian economy strong. We are achieving success – from 2005 to 2012, Canadian GHG emissions have decreased by 5.1 per cent while the economy has grown by 10.6 per cent."

www.climatechange.gc.ca

CANADA'S CLIMATE CHANGE GOALS

Since Canada's fifth national communication in 2010, progress has been made in implementing a sector-by-sector regulatory approach to address emissions. These actions are precedent-setting – for the first time, Canada has national regulations to reduce greenhouse gas (GHG) emissions.

The government has started with the transportation and electricity sectors – two of the largest sources of emissions in Canada. The Government of Canada has implemented regulations setting progressively more stringent standards for passenger vehicles and light-duty trucks, and has introduced proposed regulations to further improve fuel efficiency and reduce GHG emissions from model years 2017 and beyond. As a result of these regulations, model-year 2025 passenger cars and light-duty trucks will emit about 50 per cent less GHGs and consume up to 50 per cent less fuel than 2008 models.

The government has also taken action to regulate heavy-duty vehicles. In March 2013, the government released final regulations that establish progressively more stringent emissions standards for heavy-duty vehicles such as full-size pick-ups, semi-trucks, garbage trucks and buses.

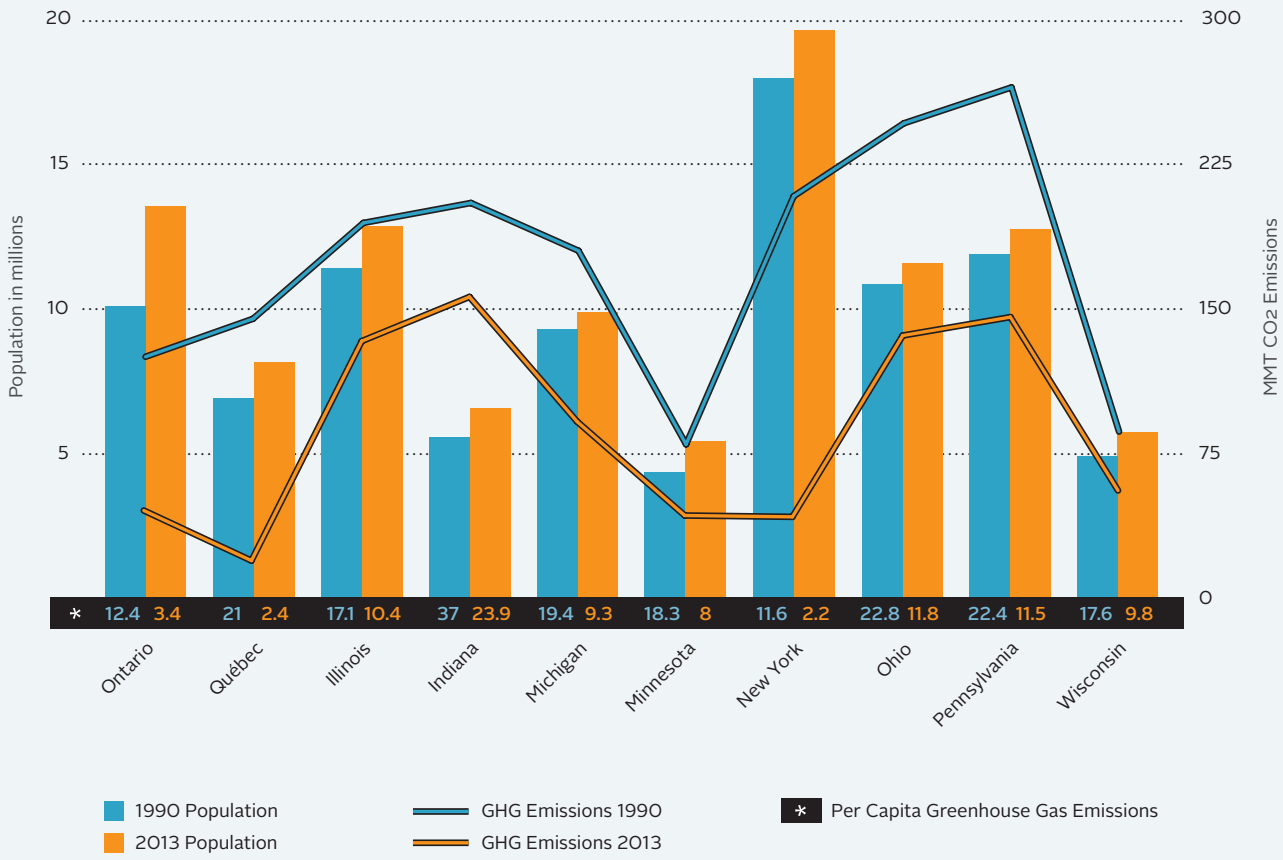
The government's coal-fired electricity regulations further strengthen Canada's position as a world leader in clean electricity production. With these regulations, Canada became the first major coal user to ban the construction of traditional coal-fired electricity generation units. Over the first 21 years, these regulations are expected to result in a cumulative reduction of about 214 megatonnes (Mt) of GHG emissions, equivalent to removing 2.6 million cars from the road per year over this period.

"While we can't say any single weather event is entirely caused by climate change, we've seen stronger storms, deeper droughts, longer wildfire seasons."

President Barack Obama, August 3, 2015

COMPARISON OF 1990 AND 2013 PER CAPITA GREENHOUSE GAS EMISSIONS

(energy sector)



Source: Environmental Canada. 2011. *National Inventory Report,* and United States Environmental Protection Agency. 2011. *State CO2 Emissions from Fossil Fuel Combustion 1990-2009.* Environment Canada and United States Environmental Protection Agency, *State of the Great Lakes 2011, Human Population*

www.factmonster.com/ipka/A0004986.html
www.epa.gov/ghgreporting/ghgdata/reportingdatasets.html
www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm

"Human activities are changing the climate in dangerous ways. Levels of carbon dioxide... are higher than they've been in 800,000 years; 2014 was the planet's warmest year on record. One year doesn't make a trend, but 14 of the 15 warmest years on record have fallen within the first 15 years of this century."

President Barack Obama, August 3, 2015

U.S. CLIMATE CHANGE GOALS

The Clean Power Plan (CPP), which President Barack Obama called, "The single most important step America has ever taken in the fight against global climate change," was released in August 2015. The plan will reduce carbon pollution from power plants, the largest source in the U.S., while maintaining energy reliability and affordability. These are the first nationwide standards that address carbon pollution from power plants.

"We limit the amount of toxic chemicals like mercury and sulfur and arsenic in our air or our water – and we're better off for it," Obama said. "But existing power plants can still dump unlimited amounts of harmful carbon pollution into the air. For the sake of our kids and the health and safety of all Americans, that has to change. For the sake of the planet, that has to change."

Carbon dioxide (CO_2) is the most prevalent greenhouse gas pollutant, accounting for nearly three-quarters of global greenhouse gas emissions and 82 per cent of U.S. GHG emissions. The CPP will put the U.S. on track to cut carbon pollution from power plants by 32 per cent by 2030 – nearly 870 metric tons below 2005 levels, while setting carbon pollution emission performance rates for coal- and gas-fired power plants.

"It's like cutting every ounce of emission due to electricity from 108 million American homes. Or it's the equivalent of taking 166 million cars off the road," Obama said.

The plan will also give states the power to customize a path to meet carbon pollution goals, while preserving a reliable and affordable electricity supply and maximizing flexibility and timing to achieve significant reductions.

The plan provides clean energy benefits that far outweigh the cost. By 2030, SO_2 emissions from power plants will be 90 per cent lower compared to 2005 levels, and NO_x emissions will be 72 per cent lower. This will harness clean energy trends that are already in business, cities and states across America.

"If we want to protect our economy and our security and our children's health, we're going to have to do more. The science tells us we have to do more," Obama said.

ONTARIO

Through Ontario's Action Plan on Climate Change, the government has set climate change goals to reduce GHG emissions from 1990 levels by six per cent by 2014, a target projected to have been achieved in the Environment Commissioner of Ontario's report 'Feeling the Heat, Greenhouse Gas Progress Report 2015'. This goal was believed to have been achieved when the provincial government shut down the final coal plant in Thunder Bay in April 2014. The elimination of more than 7,000 MW of coal-fired energy has helped the electricity sector reduce nearly 25 Megatons (MT) of GHG emissions per year, making it one of the largest climate change initiatives ever undertaken in North America.

With no coal-fired electricity for the first time last summer, the number of smog days plummeted from 53 in 2005 to zero in 2014. This initiative was made possible through the refurbishment of four previously laid up nuclear reactor units by Bruce Power. Returning these units to service replaced 70 per cent of the electricity that was lost by the closure of coal plants, while the remaining 30 per cent was gained through decreased demand, conservation and expansion of renewable sources.

Further climate change goals are to reduce GHG emissions by 15 per cent of 1990 levels by 2020 and 80 per cent by 2050. This is equivalent to 141.6 MT CO_2.

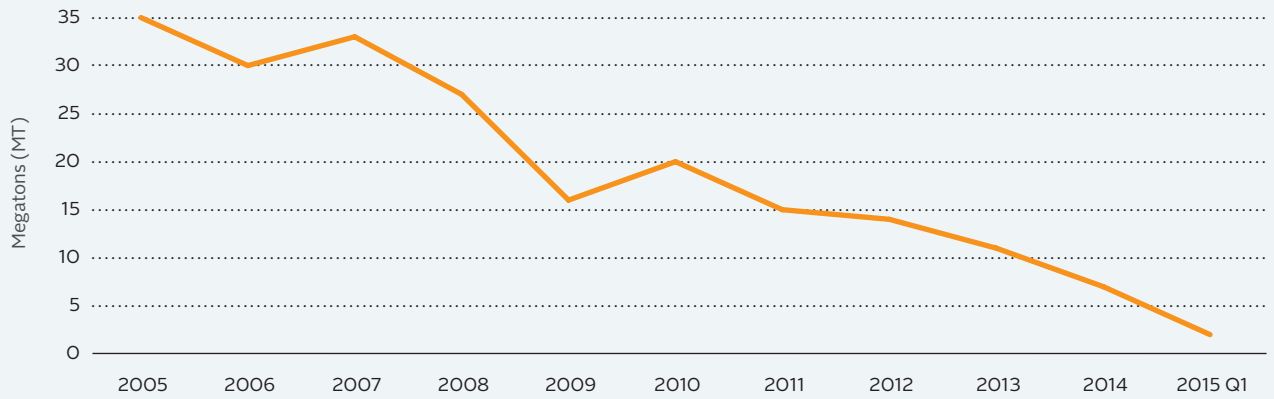
Ontario's updated Long-Term Energy Plan, 'Achieving Balance,' encourages conservation and lays out a plan for clean, reliable and affordable energy. As the province plans for Ontario's energy needs for the next 20 years, conservation will be the first resource considered.

The 2013 Air Quality Report marks 43 years of long-term reporting on the state of air quality in Ontario. Emissions of NOx, CO and SO_2 continue to decrease due in part to Ontario's air quality initiatives such as the phase out of coal-fired generating stations, emissions trading regulations, emissions controls at Ontario's smelters, and Drive Clean emissions testing, which supports the federal emission standards and lower sulphur content in transportation fuels.

Ontario also recently announced it will be designing a cap and trade program for its electricity and industry sectors that will align it with the California Western Climate Initiative. Linking will create access to a larger pool of low-cost abatement opportunities and a larger market that is more stable, allowing Ontario to realize savings from sharing implementation costs with other jurisdictions.

Ontario's program will cover large emitters (greater than 25,000 tons of CO_2) like industry, institutions, waste management, utilities, electricity generators and importers, liquid petroleum fuel distributors and importers, natural gas distributors, and emissions from chemical and physical reactions. An economy-wide cap decline between two and three per cent per year could put Ontario on track to meet its 2020 emissions target.

CO_2 EMISSIONS FOR THE ONTARIO ELECTRICITY SECTOR
(as of Q1)



QUÉBEC

In 2012, the Jean Charest government adopted a substantial climate change action plan with the goal of reducing greenhouse gas emissions by 20 per cent, compared with 1990 levels, by 2020. The Ministère's new mandate to combat climate change was formalized in 2014 when the department's title changed to include sustainable development and climate change.

One of the key measures in the action plan consists of establishing a GHG emission cap-and-trade system in the context of a North American carbon market. It leads to a price signal linked to carbon in the economy, which encourages GHG emission reductions. The sectors the market covers account for 85 per cent of Québec's emissions. It will also enable the government to benefit from substantial revenue generated by the sale of GHG emissions allowances. Such revenue is conservatively estimated at nearly C$2.7 billion by 2020.

The carbon market in Québec has been designed to achieve GHG emission reductions on the order of 20 per cent below the 1990 level on the North American market. The 30 priorities pinpointed in the Climate Change Action Plan (CCAP 2020) and the attendant initiatives mark the first phase of this open-ended plan. They should lead to reductions on the order of 6.1 megatons of the estimated 11.7 megatons required between 2013 and 2020 to achieve the GHG emission reduction target.

Québec is also a member of the California Western Climate Initiative, which is a group of American states and Canadian provinces that have decided to adopt a common approach toward addressing climate change, in particular by developing and implementing a North American system for capping and trading GHG emission rights.

In order to create a common carbon market, each WCI partner must first adopt a regulation establishing a GHG emissions cap-and-trade system on its territory. Once the cap-and-trade systems of all WCI partners are linked through intergovernmental recognition agreements, a regional North American carbon market will be born.

BREAKDOWN OF QUÉBEC'S GHG EMISSIONS IN 2009

(by industry sector)

Industry sector	Sector's share in 2009	Emissions (MT of CO2) equivalent
Transportation	43.5%	35.57
Industry	28%	22.93
Residential, tertiary	14%	11.42
Agriculture	7.9%	6.45
Residual materials	5.9%	4.8
Electricity	0.8%	0.61
Total	**100.0%**	**81.79**

NEW YORK

Regional Greenhouse Gas Initiative, Inc. (RGGI, Inc.) is a non-profit corporation created to support development and implementation of the RGGI, a cooperative effort among nine states – Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont – to reduce GHG emissions.

New York State invests RGGI proceeds to support comprehensive strategies that reduce global climate change and pollution through energy efficiency, renewable energy and carbon abatement technology. The strategic goals of RGGI investment in NY are five-fold: reducing New York's GHG emissions through energy efficiency and renewable energy projects, building the state's capacity for long-term carbon reduction, empowering communities to transition to cleaner energy, stimulating entrepreneurship and growth of clean energy companies in New York, and creating innovative financing to increase adoption of clean energy.

One way New York is advancing these goals is by empowering communities through programs like Cleaner, Greener Communities, Climate Smart Communities and Community Solar NY.

In 2002, the State Energy Planning Board released the State Energy Plan and Final Environmental Impact Statement, which established goals to reduce statewide GHG emissions to five per cent below 1990 levels by 2010, and 10 per cent below 1990 levels by 2020.

On August 6, 2009, New York Governor David Paterson issued Executive Order No. 24 (2009), setting a goal of reducing the state's greenhouse gas emissions 80 per cent from 1990 levels by 2050.

The New York State Climate Action Plan Interim Report was completed Nov. 9, 2010.

On June 28, 2012, New York state adopted an emissions performance standard that would limit carbon dioxide emissions from power plants with capacity of at least 25 MW and capacity additions of at least 25 MW at existing power plants. Unlike emissions performance standards in other states, the New York rule adopts carbon limits for not only baseload plants (925 lb per MWh or 120 lb per million BTU) but also for simple cycle combustion turbines (1,450 lb per MWh or 160 lb per million BTU).

PENNSYLVANIA

Governor Rendell signed the Pennsylvania Climate Change Act in 2008, which created the Climate Change Advisory Committee (CCAC). The CCAC established the goal of a 30 per cent reduction in GHG emissions below 2000 levels by 2020. It identified 52 recommendations that were expected to result in a 36 per cent reduction by 2020. These strategies were also expected to save the state about US$12 billion between 2009 and 2020.

The 2013 plan update reviewed progress. It noted increasing federal regulations and shale gas utilization as sources of displaced emissions from coal plants. It also described the success of the Alternative Fuel Incentive Grant, which provides vehicle rebates and a grant for installation of charging infrastructure.

The update also recommended nine legislative actions including resolving liability for leakage of geologically sequestered carbon, incentivizing coal mine methane capture and mandating energy use profiling for commercial buildings.

OHIO

Ohio has partnered with 10 other states to form the Midwestern Greenhouse Gas Accord to combat the dual threats of climate change and energy security. As part of this program, members of the Accord agreed to set regional GHG emission reduction targets and develop a multi-sector cap-and-trade system and complementary policies to help achieve these targets.

MINNESOTA

On May 25, 2007, Minnesota Governor Tim Pawlenty signed into law the Next Generation Energy Act, which established statewide GHG emission reduction goals of 15 per cent by 2015, 30 per cent by 2025, and 80 per cent by 2050, based on 2005 levels.

The 'Minnesota Climate Mitigation Action Plan' was completed in February 2008.

MICHIGAN

On July 29, 2009, Michigan Governor Jennifer Granholm issued Executive Directive 2009-4, which sets a goal to reduce the state's GHG emissions to 20 per cent below 2005 levels by 2025 and 80 per cent below 2005 by 2050.

In March 2009, the Michigan Climate Action Council (MCAC) released its Climate Action Plan. The MCAC recommends specific policies and actions to achieve greenhouse gas reductions within the state of Michigan, as well as several recommendations for federal climate policy, including the development of federal greenhouse gas targets. Among the recommended state policies are several initiatives to increase the use of distributed electric generation, facilitate the use of carbon capture and storage technology, and increase the use of nuclear energy. The MCAC also includes several recommendations to increase energy efficiency by, among other things, adopting more stringent building codes and creating a system that encourages utilities to adopt efficiency initiatives.

A total of 54 recommendations were included in the Plan, and 33 were able to be quantified for their emissions reductions. The MCAC determined that following the recommendations would decrease Michigan's emissions about 33 per cent below 2005 levels by 2025 with net cumulative savings of about US$10 billion.

ILLINOIS

On Feb. 13, 2007, Governor Rod Blagojevich of Illinois announced new GHG emission reduction targets of 1990 levels by 2020 and 60 per cent below 1990 levels by 2050.

Illinois completed its initial Climate Action Plan in June 1994. In July 2007 the Illinois Climate Change Advisory Group released its set of recommendations to the Governor.

On Jan. 12, 2009, Gov. Blagojevich signed SB 1987, the Clean Coal Portfolio Standard Law. The legislation establishes emission standards for new coal-fueled power plants (power plants that use coal as their primary feedstock) that seek to be designated as Clean Coal Facilities. From 2009-15, new clean coal facilities must capture and store 50 per cent of the carbon emissions it would otherwise emit; from 2016-17, 70 per cent must be captured and stored; and after 2017, 90 per cent must be captured and stored. The law requires Illinois utilities and other retail electricity suppliers to purchase at least five per cent of their electricity from clean coal facilities in 2015 and beyond.

WISCONSIN

The Global Warming Task Force was created by Governor Jim Doyle on April 5, 2007. The assignments of the Task Force are to:

- Present viable, actionable policy recommendations to the Governor to reduce GHG emissions in Wisconsin and make Wisconsin a leader in implementation of global warming solutions.
- Advise the Governor on the ongoing opportunities to address global warming locally, while growing our state's economy, creating new jobs and utilizing an appropriate mix of fuels and technologies in Wisconsin's energy and transportation portfolios.
- Identify specific short- and long-term goals for reductions in GHG emissions in Wisconsin that are, at a minimum, consistent with Wisconsin's proportionate share of reductions that are needed to occur worldwide to minimize the impacts of global warming.

The Task Force recommends the following short- and long-term goals for reductions of GHG emissions to achieve Wisconsin's proportionate share of reductions needed worldwide to minimize the impacts of global warming:

- A return to 2005 levels no later than 2014
- A 22 per cent reduction from 2005 levels by 2022
- A 75 per cent reduction from 2005 levels by 2050.

THE ROLE OF NUCLEAR POWER

IN THE GREAT LAKES - ST. LAWRENCE REGION

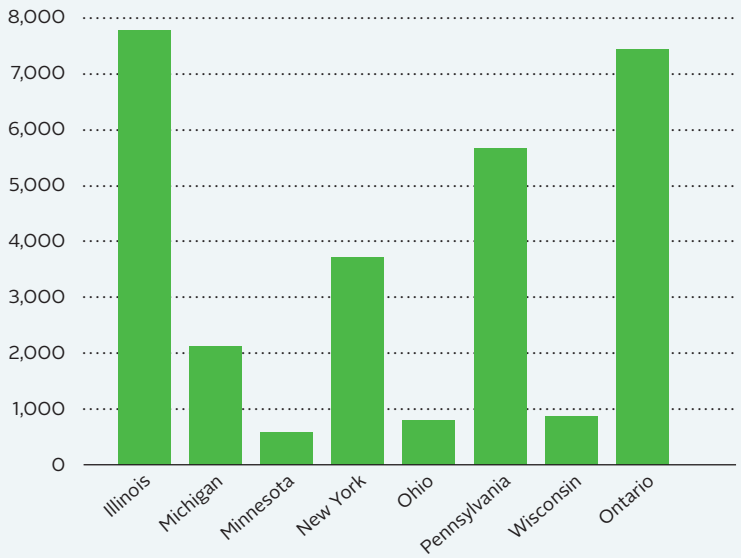
Nuclear power is the most efficient and reliable source of large-scale, around-the-clock electricity. Nuclear plants throughout this region maintain an average reliability of between 85 and 90 per cent, with many power plants routinely operating at 93-95 per cent capacity over extended periods.

"Because of its reliability, safety and zero greenhouse gas emissions, the government (of Ontario) is committed to ensuring that nuclear energy provides a significant portion of Ontario's electricity for generations."

Ontario's Long-Term Energy Plan, 2013

NUCLEAR ELECTRICAL GENERATION BY JURISDICTION

(GWh, April 2015)



ECONOMIC IMPACTS OF NUCLEAR POWER

IN THE GREAT LAKES REGION

There are currently 55 nuclear reactors operating in the Great Lakes Region, spread throughout seven states and one province. While they generate massive amounts of carbon-free and reliable electricity 24 hours a day, 365 days a year, they also provide significant economic benefits through jobs and investment.

These generators annually employ about 80,000 highly skilled people directly and indirectly through operations, manufacturing, support and contract work. These facilities also combine to inject an estimated $10 to 12 billion a year into the Great Lakes economies through direct and indirect spending in operational equipment, supplies, materials and labour income.

An estimated 90 per cent of nuclear spending is done within each facility's own region, making nuclear energy an invaluable part of economies across the Great Lakes Region. Given the quality of jobs in the nuclear industry, there is on average a multiplier effect of 2.5x for every base job.

ONTARIO

The Canadian Manufacturers and Exporters report that 15,600 people are employed in the operation and support of nuclear plants in Ontario, and 9,000 more would be employed for the refurbishment of the Ontario plants, for a total employment of about 25,000 people during the expected 20-year refurbishment period. The Organization of Canadian Nuclear Industries reports an additional 30,000 people are employed in the nuclear manufacturing, engineering, construction, consulting, fuel fabrication, research and development, and medical isotopes sectors, in support of domestic and offshore nuclear projects.

The nuclear industry generates C$2.5 billion in direct and secondary economic activity in Ontario every year.

The province's nuclear generating stations at Bruce, Darlington and Pickering have historically provided about half of the province's electricity supply. The 2010 LTEP forecast that new capacity would need to be built at Darlington, but the 2013 LTEP decided new nuclear capacity is not needed at this time because electricity demand has not grown as expected due to changes in the economy and gains in conservation and energy efficiency. The decision to defer new nuclear capacity helps manage electricity costs by making large investments only when they are needed.

Bruce Power

Operating reactors: Eight
Total output: 6,300 MW

Assuming the indicative refurbishment schedule in Ontario's LTEP, the Bruce Power site will continue providing electricity for the next 50 years, supplying two-thirds of Ontario's nuclear in the decades to come. By securing the future of the Bruce Power site, the long-term, annual economic impact of the facility will result in:

- 18,000 direct and indirect jobs annually.
- C$4 billion in annual Ontario economic benefit through the direct and indirect spending in operational equipment, supplies, materials and labour income.

There is no single, well-established project, facility or infrastructure project in the province that will have such a significant economic impact as the refurbishment of Bruce Power's nuclear fleet.

COMBINED ANNUAL ONTARIO ECONOMIC BENEFIT OF REFURBISHMENT AND OPERATIONS
2016 to 2031

	Total Operational Benefits	Total Nuclear Fleet Renewal Benefits	Total Overall Economic Benefit
Ontario Employment	18,492	5,226	23,755
Fuel Cost	$245 million	Not Applicable	$245 million
Ontario Purchased Equipment Materials and Supplies (includes staffing costs)	$3.77 billion	$1.7 to $2.3 billion	$5.5 to over $6 billion
TOTAL	**Over $4 billion**	**$1.7 to $2.3 billion**	**$5.5 to over $6 billion**

Over the next 20 years, as Bruce Power renews its fleet as outlined in Ontario's LTEP, the following additional annual economic impacts will benefit the province:

- Over 5,000 direct and indirect jobs annually.
- C$960 million to C$1.2 billion in labour income into Ontario economy annually.
- C$735 million to C$1.05 billion in annual economic benefit through equipment, supplies and materials both directly and indirectly.

There is no single, well-established project, facility or infrastructure project in the province that will have such a significant economic impact as the refurbishment of Bruce Power's nuclear fleet.

Most of the supply chain manufacturing, engineering and specialty companies that will support the refurbishment and operation of Bruce Power are located in Ontario – supporting jobs and economic growth across the entire province. Ninety per cent of Bruce Power's spending occurs in Ontario, while the Bruce Power site already spends about C$225 million annually on sustaining capital projects.

Ontario's Long-Term Energy plan has slated six Bruce Power reactors for refurbishment. This 20-year project would create 5,000 direct and indirect jobs and inject about $1 billion into the region's economy annually.

OPG – Pickering

Operating reactors: Six
Total output: 3,100 MW

OPG is planning for the continued operation of the Pickering station until 2020. The plan is a direct reflection of the positive Environmental Assessment and Integrated Safety Report, and the strength of the plant's condition. Continued operation during this time will ensure the electricity needs of Ontarians are met during the proposed Darlington nuclear refurbishment period.

OPG – Darlington

Operating reactors: Four
Total output: 3,512 MW

Located in the Municipality of Clarington in Durham Region, 70 km east of Toronto, Darlington provides about 20 per cent of Ontario's electricity needs, enough to serve a city of two million people.

Darlington's refurbishment will provide an additional 30 years of clean, affordable electricity, while at the same time producing over 100,000 person years of employment on the project.

NEW YORK

Operating reactors: Six
Total output: 5,264 MW

Nuclear energy facilities in New York employ more than 3,440 highly skilled direct employees with an annual payroll of US$274 million.

Facilities pay more than US$55 million in state and local taxes. More than US$463 million in materials, services and fuel are purchased annually from more than 1,600 New York companies.

PENNSYLVANIA

Operating reactors: Nine
Total output: 9,706 MW

Nuclear energy facilities in Pennsylvania employ more than 4,900 highly skilled direct employees.

Facilities pay more than US$45 million in state and local taxes, and more than US$1.8 billion in materials, services and fuel are purchased annually from more than 4,150 Pennsylvania companies.

OHIO

Reactors: Two
Total output: 2,150 MW

Nuclear energy facilities in Ohio employ more than 1,420 highly skilled direct employees.

Facilities pay more than US$24 million in state and local taxes, and more than US$194 million in materials, services and fuel are purchased annually from more than 1,350 Ohio companies.

MICHIGAN

Reactors: Four
Total output: 3,936 MW

Nuclear energy facilities in Michigan employ more than 2,900 highly skilled direct employees.

More than US$117 million of materials, services and fuel are purchased annually from more than 1,500 Michigan companies.

ILLINOIS

Reactors: Eleven
Total output: 9,722 MW

Nuclear energy facilities in Illinois employ more than 4,900 highly skilled direct employees with an annual payroll of US$400 million.

Facilities pay more than US$117 million in state and local taxes, and more than US$932 million in materials, services and fuel are purchased annually from more than 6,500 Illinois companies.

WISCONSIN

Reactors: Two
Total output: 1,182 MW

Nuclear energy facilities in Wisconsin employ more than 700 highly skilled direct employees with an annual payroll of US$62 million.

Facilities pay more than US$5.7 million in state and local taxes, and more than US$57.5 million in materials, services and fuel are purchased annually from more than 750 Wisconsin companies.

MINNESOTA

Reactors: Two
Total output: 1,673 MW

Nuclear energy facilities in Minnesota employ more than 1,300 highly skilled direct employees.

More than US$315 million of materials, services and fuel are purchased annually from more than 1,150 Minnesota companies.

HOW NUCLEAR POWER

CONTRIBUTES TO CLEAN AIR IN THE REGION

Nuclear energy facilities are among the cleanest sources of electricity available. They produce virtually no carbon dioxide or air pollution while generating huge amounts of energy 24 hours a day, 365 days a year. Without nuclear power, Canada and the U.S. would not be able to meet clean energy or carbon reduction goals.

The production from the Bruce Power site annually avoids the equivalent of 31 million tonnes of CO2 were it replaced by coal-fired electricity. This is like taking six million cars off the road each year and almost equivalent to the air pollution released by coal plants in 2001.

ONTARIO

Ontario's electrical generating industry cut its greenhouse gas emissions from 43 million tonnes in 2000 to 14.5 million tonnes in 2012 during a period when the province's nuclear output rose from 59.8 TWh to 84.9 TWh, thanks to the refurbishment of four previously dormant nuclear reactors on the Bruce Power site, which provided 70 per cent of the energy needed to shut down Ontario's coal plants. The remaining 30 per cent was gained through decreased demand, conservation and expansion of renewable sources. With no coal-fired electricity last summer, the number of smog days plummeted from 53 in 2005 to zero in 2014.

The production from the Bruce Power site annually avoids the equivalent of 31 million tonnes of CO2 were it replaced by coal-fired electricity. This is like taking six million cars off the road each year and almost equivalent to the air pollution released by coal plants in 2001.

When the provincial government shut down the final coal plant in Thunder Bay in April 2014, this removed more than 7,000 MW of carbon-emitting energy sources, which has helped the electricity sector reduce nearly 25 Megatons (MT) of GHG emissions per year, making it one of the largest climate change initiatives ever undertaken in North America. *(Source: Delivering Value to Canadians, 2015 Sustainable Electricity Annual Report, Canadian Electricity Association)*

NEW YORK

More than 22 million metric tons of CO2 are prevented by nuclear facilities, which equals what would be released in a year by more than four million passenger cars.

2013 Emissions	Quantity Prevented in New York
Sulfur dioxide (SO_2)	10,813 short tons
Nitrogen oxide (NO_2)	11,936 short tons
Carbon dioxide (CO_2)	22.19 million metric tons

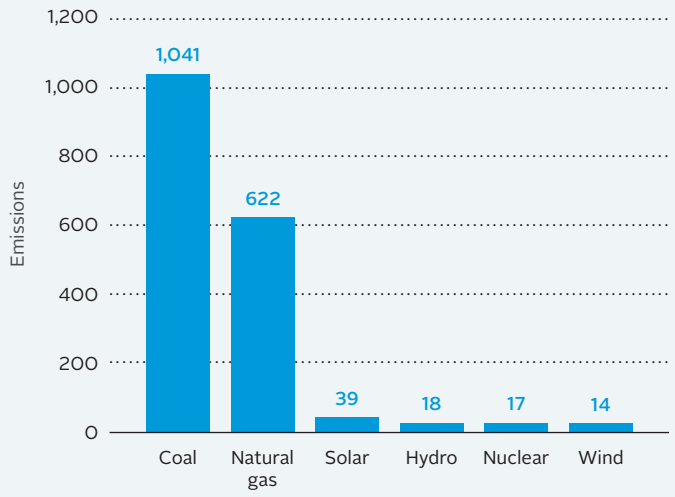
PENNSYLVANIA

More than 63 million metric tons of CO2 are prevented by nuclear facilities, which equals what would be released in a year by more than 12 million passenger cars.

2013 Emissions	Quantity Prevented in Pennsylvania
Sulfur dioxide (SO_2)	144,330 short tons
Nitrogen oxide (NO_2)	61,783 short tons
Carbon dioxide (CO_2)	63.73 million metric tons

COMPARISON OF LIFE-CYCLE EMISSIONS

(Tonnes of carbon dioxide equivalent per gigawatt-hour)



According to the International Energy Agency, nuclear energy has avoided the release of about 56 Gigatons of CO_2 since 1971.

OHIO

More than 15 million metric tons of CO_2 are prevented by nuclear facilities, which equals what would be released in a year by more than 2.9 million passenger cars.

2013 Emissions	Quantity Prevented in Ohio
Sulfur dioxide (SO_2)	35,289 short tons
Nitrogen oxide (NO_2)	12,957 short tons
Carbon dioxide (CO_2)	15.01 million metric tons

ILLINOIS

More than 79 million metric tons of CO_2 are prevented by nuclear facilities, which equals what would be released in a year by more than 15 million passenger cars.

2013 Emissions	Quantity Prevented in Illinois
Sulfur dioxide (SO_2)	175,524 short tons
Nitrogen oxide (NO_2)	74,208 short tons
Carbon dioxide (CO_2)	79.77 million metric tons

MINNESOTA

More than 10 million metric tons of CO_2 are prevented by nuclear facilities, which equals what would be released in a year by more than two million passenger cars.

2013 Emissions	Quantity Prevented in Minnesota
Sulfur dioxide (SO_2)	21,192 short tons
Nitrogen oxide (NO_2)	11,755 short tons
Carbon dioxide (CO_2)	10.54 million metric tons

MICHIGAN

More than 15 million metric tons of CO_2 are prevented by nuclear facilities, which equals what would be released in a year by more than 4.8 million passenger cars.

2013 Emissions	Quantity Prevented in Michigan
Sulfur dioxide (SO_2)	57,521 short tons
Nitrogen oxide (NO_2)	22,938 short tons
Carbon dioxide (CO_2)	24.95 million metric tons

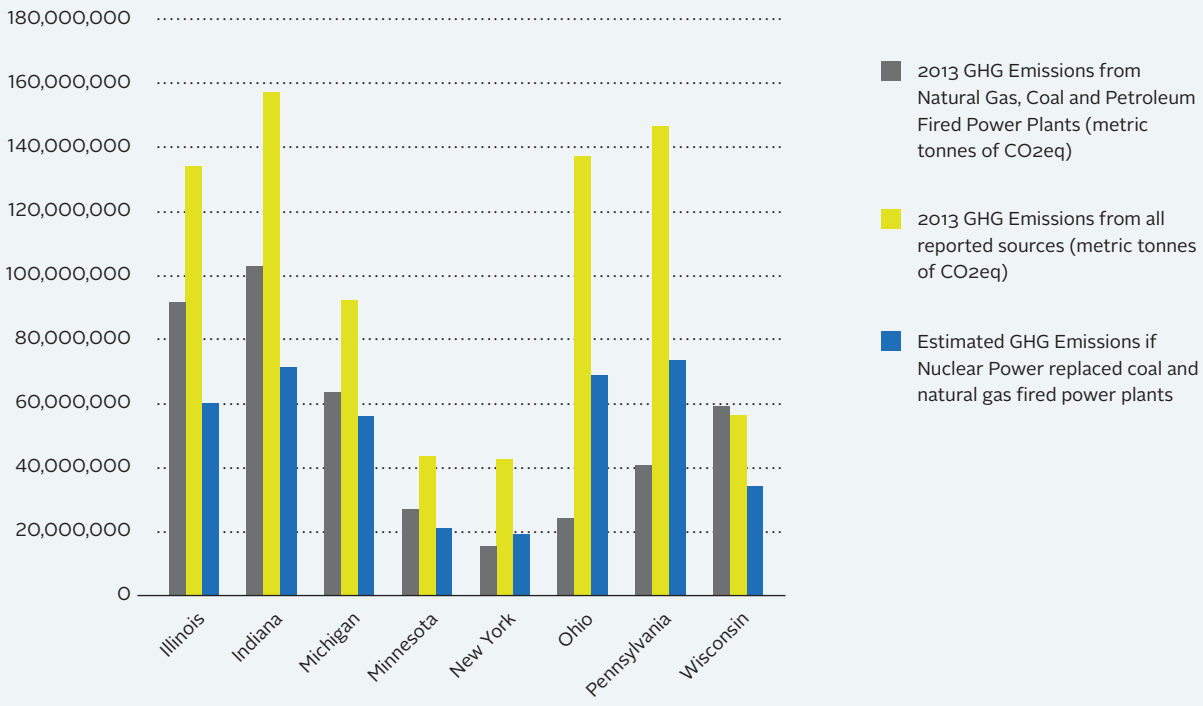
WISCONSIN

More than 11 million metric tons of CO_2 are prevented by nuclear facilities, which equals what would be released in a year by more than 2.1 million passenger cars.

2013 Emissions	Quantity Prevented in Wisconsin
Sulfur dioxide (SO_2)	25,193 short tons
Nitrogen oxide (NO_2)	9,893 short tons
Carbon dioxide (CO_2)	10.96 million metric tons

2013 REPORTED GHG EMISSIONS

(Metric tonnes of CO2eq)



The chart above shows the reported GHG emissions in 2013 from all sources (yellow) and from natural gas, coal or petroleum power plants (grey) in the eight U.S. states. If the natural gas and coal plants were replaced by nuclear power plants, GHG emissions would be cut in half for the eight U.S. states combined.

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"I am convinced that no challenge poses a greater threat to our future and future generations than a changing climate."

President Barack Obama, August 3, 2015

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