

## **The Water Industry in Michigan**

The mix of water-using facilities in Michigan is complex, with withdrawals that range from small residential, to exceptionally large withdrawals in major sectors like thermoelectric power generation, self-supplied industrial, irrigation, agriculture, and public water supply. Michigan is also home to a wide range of companies that provide water solution technologies and services that facilitate the use, transport, treatment, conservation, and restoration of our water resources. Together, these water-related industries shape and support the commerce and character of the state.

Careful development and ongoing protection of the state's water resources are key elements of the state's economic future as Michigan seeks to modernize and advance existing industries as well as attract new, emerging technologies and businesses.

### **What defines Michigan's Water Sector?**

The water sector in Michigan encompasses the public utilities, private companies, researchers, and governmental organizations that provide technology, goods, and services related to the state's public freshwater resources, municipal, agricultural, and industrial waste water and storm water:

- Supply
- Treatment
- Distribution
- Storage
- Transport
- Recycling
- Rehabilitation, and/or
- Conservation

Michigan has a plentiful and varied set of water-dependent industrial, agricultural, commercial, and residential consumers. The state's diverse water resources and end users provide a unique opportunity for companies to test, develop, and perfect new products and technologies here that can eventually be applied and exported to markets throughout the United States and to the world.

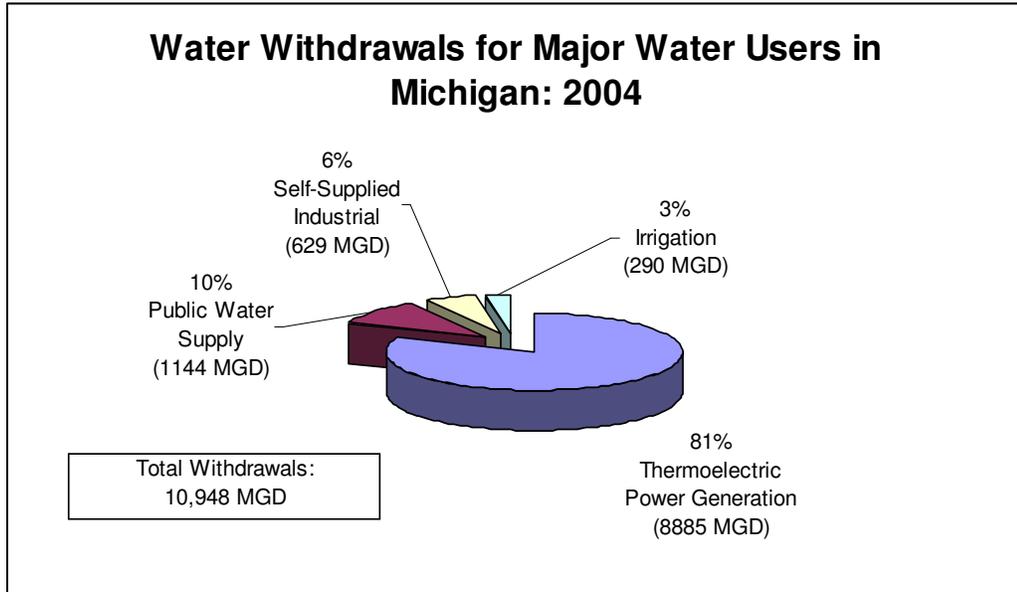
The water-energy nexus is also very important in Michigan. Without water, power plants can't generate electricity; industrial producers require a consistent intake of water for their energy-development needs; water and wastewater treatment and distribution are often highly energy-intensive. Other cross-cutting issues at the water-energy nexus include managing utility energy use, reducing the municipal carbon footprint, and the role of the energy sector in water conservation and efficiency. Water-related businesses that offer technologies, products, and services that incorporate aspects of renewable and alternative energy, energy efficiency, infrastructure repair and rehabilitation, conservation, recycling, and reuse will be particularly well-suited to seize business opportunities in Michigan.

### **Who are Michigan's Water Users?**

Water-using industries of particular relevance in Michigan include manufacturing, mining, agriculture, pulp and paper, food processing, primary metal production, power generation, chemical manufacturing, and recreation.

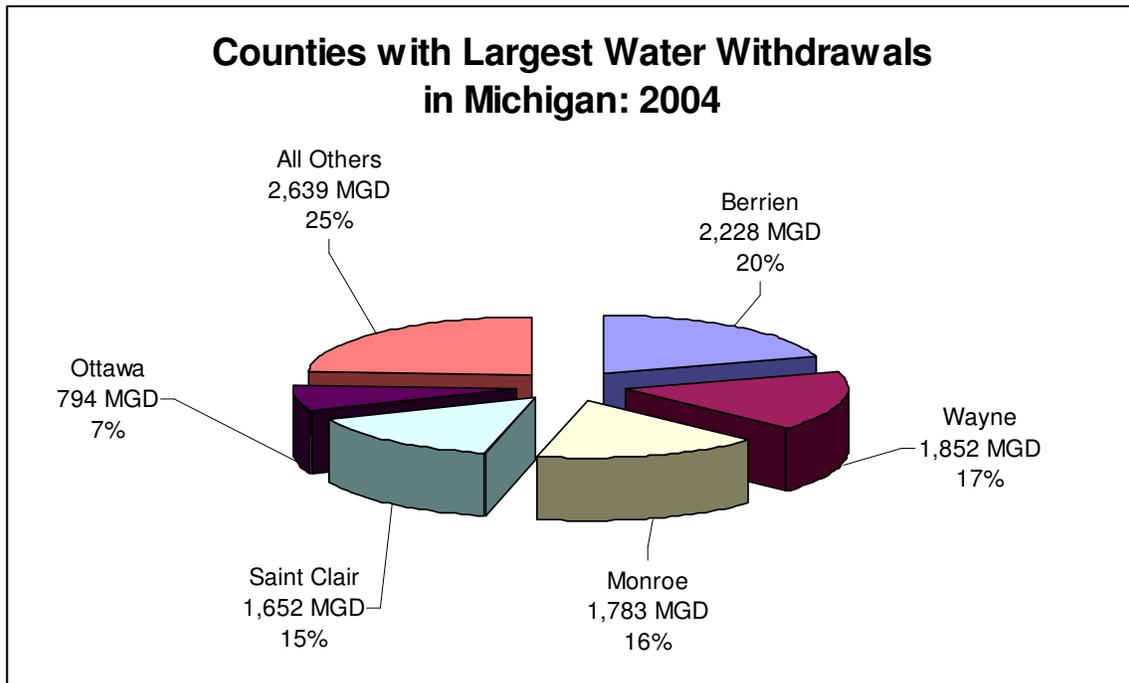
The Michigan Department of Environmental Quality (MDEQ) Water Bureau compiles data for the major water use sectors in Michigan including thermoelectric power generation, self-supplied industrial, irrigation and the public water supply.

While there are many other types of water uses that occur, it is estimated that these four categories account for over 95 percent of the total water withdrawals in the state.



Data Source: Michigan DEQ Water Withdrawal Reports

In the most recent MDEQ reports, Berrien County reported the largest water withdrawals in the state, accounting for 20%, or 2,228 Million Gallons per Day (MGD) of the total water withdrawn. Michigan's largest power generation facility, the Donald C. Cook nuclear plant, is located in Berrien County. The next largest water use counties were Wayne, Monroe, Saint Clair, and Ottawa. Together, facilities in these counties accounted for 56% of the water withdrawn statewide.



Data Source: Michigan DEQ Water Withdrawal Reports

### Thermoelectric Power Generation

This sector is defined as water withdrawn for use by fossil fuel plants (using coal, oil, or natural gas) and nuclear plants (water supplied to thermoelectric power plants by public water supply systems is not recorded in this sector, but rather are included in Public Water Supply). The largest water withdrawals in Michigan are made for thermoelectric power generation.

- There are 44 thermoelectric facilities across the state that extract 8,885 MGD
- Power plants accounted for 81% of total major end-user withdrawals and collectively withdrew four times more water than community public water supply systems, self-supplied industries, and irrigators combined.
- Water is primarily drawn from the Great Lakes vs. inland surface or groundwater (95% from the Great Lakes)
- Total water volume used by thermoelectric facilities is of nearly four trillion gallons a year, enough to cover the entire state with about four inches of water.
- It is estimated that over 90% of the thermoelectric water withdrawals are returned to the Great Lakes, inland lakes and streams, and ground water after use

Additional data on thermoelectric power generation water use is available on the MDEQ's [Water Withdrawal Information](#) page.

### Self-Supplied Industrial

Self-supplied industrial is defined as water withdrawn for use in manufacturing and mining. "Self-supplied" means the business has a permit or authorization to withdraw water from inland lakes, the Great Lakes, groundwater, rivers or streams – separate from receiving water from the public supply system. (Water supplied to industrial facilities by public water supply systems is not recorded in this sector, but rather included in Public Water Supply.)

Nearly all industries utilize water as an essential production material, including large-volume users producing steel, automobiles and transportation equipment, chemical and allied products, paper and allied products, mining resources, and petroleum refining. Of the industrial self-supplied users, the top water users by Standard Industrial Classification (SIC code) are as follows (2004 data):

1. 3300 Primary Metal Industries - 254.26 MGD
2. 2600 Paper and Allied Products - 127.57 MGD
3. 2800 Chemicals and Allied Products - 104.26 MGD
4. 1400 Mining and Quarrying - 55.67 MGD
5. 1000 Metal Mining - 19.08 MGD
6. 3200 Stone, Clay, and Concrete Products - 17.99 MGD
7. 2000 Food and Kindred Products - 15.55 MGD
8. 7300 Business Services - 13.15 MGD
9. All remaining categories - 21.23 MGD

Self-supplied industrial withdrawals account for about 6% of the total major water withdrawals in the state. About 68% of the water withdrawn for these users came from the Great Lakes and their connecting waters. Another 18% was withdrawn from inland lakes and streams, with the remaining 33% withdrawn from ground water.

### Irrigation

Irrigation water is defined as water withdrawn and artificially applied on lands to assist in the growing of crops and pastures (agricultural irrigation) or in the maintenance of recreational lands such as golf courses (golf course irrigation). Water used for livestock is considered separately from water used for crops and pastures.

Approximately 2.7% of the major water withdrawals in Michigan are made by 2,187 facilities classified as agricultural and golf course irrigators. In contrast to thermoelectric power generation, irrigation water in Michigan is withdrawn primarily from groundwater sources (64% from groundwater).

Irrigation withdrawals generally fall into three categories:

- *Crops and Pastures* - MDEQ's estimates irrigation water withdrawals for crop and pasture operations is approximately 257 MGD. About 65% of the agricultural irrigation water withdrawn is from groundwater sources. The largest irrigated agricultural crop in Michigan is corn grown for grain or seed. This single crop accounted for nearly 40% of the total irrigated acreage in the state and 43% of the total irrigation water withdrawn. Limitations to utilizing irrigation as a management tool include the significant capital and energy costs for irrigation technologies, labor and maintenance requirements, and the availability of adequate water supplies.
- *Livestock* - water use is defined as water associated with livestock watering, feedlots, dairy operations, and other on-farm animal needs. Other livestock water uses include cooling of facilities for the animals and products, dairy sanitation and wash down of facilities, animal waste-disposal systems, and incidental water losses. All withdrawals were considered freshwater and self-supplied. The [USGS \[http://water.usgs.gov/\]](http://water.usgs.gov/) estimates Michigan uses 10.2 MGD of groundwater and 1.1 MGD of surface water for livestock purposes
- *Golf Course Irrigation* - there are 619 irrigated golf courses registered in Michigan. These courses withdraw nearly 34 MGD to irrigate 40,014 acres throughout the state. Over 58% of the water withdrawn for all golf courses in the state came from groundwater sources, with about 41% from inland lakes, streams, or other surface sources. Oakland County has the largest golf course irrigation water use, followed by Kent, Macomb, Wayne, and Kalamazoo counties.

### Public Water Supply

The public water supply is defined as water withdrawn by community public water supply systems that provide year-round service to at least 15 service connections or serve an average of at least 25 residents, including residential, public, commercial, and industrial water users.

As the sole source of water for the majority of water users in Michigan, public water supply systems are vitally important to the state.

- Michigan has 1,500 community public water supply systems
- Michigan's community public water supply systems provide over 390 billion gallons/year to residential, commercial, industrial, and public facilities – serving 7.6 million people
- Michigan has the ninth largest public water supply withdrawals, following California, Texas, New York, Florida, Illinois, Ohio, Pennsylvania, and Georgia.

- Nearly 90% of the manufacturing facilities in the state receive water from public water supply systems
- The Detroit Public Water Supply System (DWSD) is the largest in the state, and pumps over 675 MGD to more than 4 million people. The water distribution system includes about 770 miles of 24-inch and larger transmission mains and 2,700 miles of distribution mains owned by DWSD, plus ~ 9,000 miles of connected mains owned by wholesale customers.
- Michigan has over 1,080 Publicly Owned and private wastewater treatment plants

### Recreational and Other Water Users

Although this water user group is not defined by MGD water withdrawals, recreational water users and the native animal and plant species that depend on Michigan's water resources for survival are a vitally important and defining aspect of the state. In addition to the Great Lakes, Michigan has over 36,000 miles of streams, and more than 11,000 lakes and ponds that are critical to tourism, recreation, and wildlife habitats. These precious water resources and the economic, environmental, aesthetic, and public health/quality-of-life benefits they provide are dependent upon clean, abundant water resources; there are several business opportunities in Michigan related to maintaining and improving water quality, aquatic habitats, and wetlands.

### **Water and Sewer Costs in Michigan**

Since 2003, average surveyed water prices in the U.S. have increased by nearly 30 percent. The annual water pricing survey conducted by the NUS Consulting Group ([www.nusconsulting.com](http://www.nusconsulting.com)) found that the average price of water in the United States was \$2.81 per KGal, an increase of 7.3% between July 2007 and July 2008. When including related sewer charges, the survey found that the national average price rose to \$7.08 per KGal -- an increase of 6.8% from July 2007 to July 2008.

Michigan's water and sewer rates vary by location, user type, and volume used/discharged. In some areas, water and sewer rates are combined. Water and sewer rates are generally very competitive with national prices, making Michigan an ideal place to locate your water-dependent business.

Michigan is also an ideal place to locate a business related to reducing water use and improving water efficiency. The increase of drought events throughout the country, growing scarcity of freshwater resources in the south and southwestern regions, the need for enhanced security, public health, and environmental protection for our water supplies, and the much-needed upgrades to the country's aging water and sewer infrastructure will combine to have significant impact on the nation's water pricing – now and into the future. The rise of “full cost pricing” for water and wastewater services – one of four major themes under EPA's Sustainable Water Infrastructure Initiative – will also change the way we think about the cost of water and sewer services. (For more information on the EPA go to [www.epa.gov/waterinfrastructure/index.html](http://www.epa.gov/waterinfrastructure/index.html).)

Michigan welcomes companies with technologies and services that to help monitor and reduce water use and improve efficiency for domestic, municipal, commercial, and industrial users. There are ample opportunities to develop, test, and market such services, as well as chances to develop collaborative partnerships with university researchers, community water providers, and industrial water users.