

Industrial Water Demand

Introduction

The amount of water use varies from industry to industry. Industrial demand in Kansas includes water used for production of salt, fertilizer, chemicals and petroleum refining and food production, with meat packing and prepared meat making up the biggest share; manufacturing, including aviation and aerospace; poultry; aquaculture; mining, including production of sand, gravel, stone, oil, gas and coal; and hydro and thermoelectric uses, including cooling at fossil fuel and the state's nuclear power plants. Industrial water use is usually process oriented and is not significantly affected by seasonal precipitation or drought, with the exception of cooling water used for power production which can increase due to high temperatures and evaporation.

Amount and Sources of Industrial Water

Industrial water users can obtain water rights for surface water or groundwater wells. A few industries buy raw water from the state Water Marketing Program; others obtain their supply from a municipality. Water used by industrial customers from all sources in 2011 represented 3.45% (167,516 acre feet) of all water used (4,849,378 acre feet). Approximately 47% (58,042 acre feet) came from groundwater and 53% (66,475 acre feet) was from surface water.

Reported Industrial Water Use by Basin

For 2011, the basins with the highest annual water use reported for industrial purposes (including Water Marketing and municipally supplied) are the Lower Arkansas (37,424 acre feet), Neosho (35,517 acre feet), Kansas-Lower Republican (29,775 acre feet) and Upper Arkansas (20,149 acre feet). The basins with the highest percentages of reported industrial use in 2011 are the Neosho at 48% of total water used, the Verdigris at 42% of total water used and the Marais des Cygnes at 30%; the average industrial use in all other basins is two percent of total water use (Figure WD-03).

Municipally Supplied Industrial Use

Statewide, almost nine percent of municipal water diverted or purchased was reported as industrial in 2011. Water used by industries that obtain their supply from municipalities that have a water appropriation right is reported by the municipality as a monthly total, along with sales from bulk hauling stations and water sold to farmsteads using more than 200,000 gallons; individual industrial use is not

reported. (This amount is not included in the municipal GPCD determination discussed in the Municipal Demand Assessment). The use reported by public water suppliers for 2011 sold as industrial was 43,000 acre feet (14 billion gallons). By basin, municipally supplied industrial for 2011 varied from just over 88 acre feet (28 million gallons) in the Upper Republican, to over 8,300 acre feet (2.7 billion gallons) in the Missouri Basin.

Industrial Water Use from Kansas Water Marketing Program

Three major industrial water users have contracts for an industrial supply through the Water Marketing Program. They are: Wolf Creek Nuclear Generating Station (Neosho basin), Westar Energy's Jeffrey Energy Center (Kansas-Lower Republican basin) and Coffeyville Resources, LLC (Verdigris basin). These contract holders use water for cooling purposes for energy production.

Energy Production—The Energy/Water Nexus

Energy and water are inter-related and management of one requires consideration of the other. All three of the Water Marketing contracts for industrial uses discussed above are for power generation.

The largest water appropriation permit in Kansas is held by hydropower plant Bowersock Mills and Power Company, in Lawrence. Bowersock also holds the second largest and one of the oldest water rights in the state. The water authorized by the permit is for non-consumptive, flow-through water used to produce electricity.

Oil and Gas

Oil and gas production began in Kansas in the early 1900s. Water is used in drilling the well and in some oil fields, for "flooding", which essentially pushes more oil out of the formation by replacing it with water. Fracturing of wells has also long been used to increase well production. This process uses water, along with added chemicals. A more recent trend is [horizontal hydraulic fracturing](#). The increase in drilling pushed temporary water permits for oil and gas exploration in Kansas to a nearly 30-year high in 2011. The KDA-DWR received more than 600 applications for temporary water permits for oil and gas exploration in 2011 and approved all but two. Those were turned down because of a lack of sufficient water supply in the area.

Hydraulic fracturing uses between two and four million gallons of water to develop a new horizontal well. Indus-

tries are exploring opportunities to recycle production water for additional use before disposal.

Ethanol

As of September 2012, there were 12 existing ethanol plants in the state using about 1,600 acre feet of water per year (520 MGY). A growing trend in production was experienced during the first decade of the 2000s. Ethanol production takes three to four gallons of water to produce one gallon of ethanol. A 50-million gallon per year (MGY) ethanol plant, a common size for Kansas, uses about 600 acre feet (200 million gallons) of water. The majority of ethanol produced in Kansas uses corn, a water intensive crop, as the raw material. The U.S. Environmental Protection Agency (EPA) has recently designated sorghum (milo) as an eligible feedstock under the [Renewable Fuels Standards](#) for production of advanced biofuel. Kansas grows more sorghum than any other state in the country and prospects are good for increased production due to this designation.