

Category: Water Conservation

Indicator: Water Efficiency in Electricity Generation

Methodology

Water Efficiency in Electricity Generation is an indicator of water use efficiency in power production in Texas. It is measured as the gallons of water used per kilowatt hour of energy produced by power plants. Two units of water use are considered: withdrawal gallons and consumptive gallons, and these data are mapped for individual power plants and summarized at river basin and aquifer levels.

The Texas Bureau of Economic Geology provided data (Scanlon et al. 2013) on the water use (withdrawal and consumptive) and energy production of power plants across Texas for 2010, as well as their location by latitude and longitude. Gallons of water used per kilowatt hour (GPkWh), a metric of water use efficiency at each plant, was calculated by dividing the gallons of water use (withdrawal or consumptive) by the kilowatt hours of energy generated. This data is mapped in the Explorer web viewer as the individual power plant-level maps.

We then calculated basin-wide averages by dividing the total gallons of water used (consumptive and withdrawal separately) and total kilowatt hours of energy produced by all power plants in each basin. These data were then joined to the basin shapefile to create maps of withdrawal and consumptive gallons of water used per kilowatt hour (GPkWh). We repeated this procedure for the major aquifers to create maps of withdrawal and consumptive gallons of water used per kilowatt hour (GPkWh). These layers are included in the Explorer web viewer as the river basin and aquifer level maps.

Data Sources

Scanlon, B.R., R.C. Reedy, I. Duncan, W.F. Mullican, III, and M.Y. Young. 2013. Controls on Water Use for Thermoelectric Generation: Case Study Texas, U.S. Env. Sci. & Tech. 47: 11326-11334. Data provided to TNC.

<http://pubs.acs.org/doi/abs/10.1021/es4029183>

Texas Water Development Board. Major River Basins shapefile and Major Aquifers shapefile modified to eliminate overlap of aquifer polygons.

<http://www.twdb.texas.gov/mapping/gisdata.asp>