

Water Supply Reliability for Thermal Power Plants in California

- **For the first time ever, the Energy Commission has assembled statewide data on water and energy resources into a map that captures the key sources of water for thermal generation in California**

In response to California's drought and potential impacts on water sources for thermal power plant operations, the Energy Commission staff led an interagency team and developed this map identifying all 78 operating power plants 75 megawatt (MW) and larger under the Energy Commission's jurisdiction. It also includes an additional 22 non-jurisdictional power plants 75 MW and larger. These power plants are representative of the power generating fleet statewide with consumptive water use, and the water supplies they rely on for operation. Staff determined the location of these 100 thermal power plants and the water sources of each power plant as one of three categories: recycled or reclaimed water, surface water, or groundwater. These power plants represent about 45 percent of power from in-state sources and 30 percent from both in-state and imported. The map identifies the location of each power plant and areas of subsidence. It also includes a table with plant size, operations, and water sources. This map is a compilation of publicly available 2010 to 2013 information, and will be updated periodically to reflect changed circumstances.

- **The map shows that California power plants depend on a diversity of water sources, with no single water source providing the majority of cooling for California's thermal power plants**

Among the 100 thermal power plants listed on the map, 30 plants use surface water, 20 plants use groundwater, and the largest group of 50 power plants relies on recycled and degraded groundwater as their primary source of water. In addition, the plants using surface water are spread across 17 water districts, with no single water district having more than eight percent of the total operating capacity (megawatts) displayed on the map. The 20 plants using groundwater as a primary supply are spread across 13 different groundwater basins limiting the impact to any one groundwater basin. Only two plants are located in basins with significant overdraft and subsidence related to groundwater pumping. These plants represent about two percent of the operating capacity shown on the map.

- **The map demonstrates significant progress since the Energy Commission adopted a policy in 2003 to drive thermal power plant generation toward reducing water consumption and increasing recycled water usage. 50 of the 100 plants presented on the map use recycled water. The result is a fleet of thermal power plants in California that makes more efficient use of water and are more resilient to drought conditions.**

Every thermal power plant generates heat that must be removed to keep the plants running efficiently, whether for condensing steam or cooling lubricating oil. Since the 2003 Integrated Energy Policy Report, the Energy Commission has worked with applicants to build new power plants in California to push for reduced water consumption through use of recycled water and water efficient technologies such as dry cooling. These sources and technologies provide a more environmentally responsible option and make the associated power plants more resilient to drought conditions. Since 2004, nearly 9,000 MW of combined cycle projects have been built. About 85 percent of that operating capacity has been built using recycled water or dry cooling, which has significantly reduced freshwater demand – of the 85 percent, 40 percent are dry cooled and 60 percent use recycled water.