



P.O. Box 43020 • Phoenix, AZ 85080-3020  
23636 North Seventh Street • Phoenix, AZ 85024  
623-869-2333 • [www.cap-az.com](http://www.cap-az.com)

**The Navajo Generating Station  
White Paper  
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Regulation of Nitrogen Oxides

The Navajo Generating Station (NGS) is essentially the sole source of power for pumping CAP water. A little over 24 percent of the output of NGS is dedicated to CAP operations. The Colorado River Basin Project Act, the CAP authorizing legislation, authorized the United States to participate in a coal-fired power plant on the Navajo Reservation as an alternative to building additional dams in the Grand Canyon to supply CAP pumping power requirements. The United States' acquisition of a 24.3 percent entitlement to the output of NGS, the single largest share held by any NGS participant, was the result.

The CAP needs and uses large amounts of energy to pump CAP water, most of which is supplied by NGS. The CAP diverts Colorado River water from Lake Havasu, on the Colorado River, and transports it across the desert to central and southern Arizona by means of a 336-mile long water conveyance system that includes 15 pumping plants, concrete-lined canals, inverted siphons, tunnels, pipelines and a regulatory storage reservoir. The CAP is the largest single source of renewable water supplies in the State of Arizona and the largest single end-user of power in the State. The CAP uses about 2.8 million megawatt hours of energy to pump about 1.6 million acre-feet of water each year from the Colorado River for delivery to thirsty cities, towns, private water companies, irrigation districts and Indian communities situated throughout its service area.

NGS power not needed for CAP pumping is sold pursuant to federal law and policy to help repay the construction costs of the CAP and fund the costs of Indian water rights settlements in Arizona. This is authorized specifically by Congress.

NGS is critical not only to CAP operations and the ability of the CAP to meet its statutory purposes, but is also critical to CAWCD's finances and to the fulfillment of commitments made in numerous Indian water rights settlements to which the United States is a party.

EPA is evaluating Best Available Retrofit Technology (BART) limits on nitrogen oxide (NO<sub>x</sub>) emissions from NGS. CAWCD supports the conclusions and analyses contained in the BART study submitted to EPA by Salt River Project (SRP) in December 2008. The participants in NGS (which include the United States Bureau of Reclamation) have already installed state-of-the-art controls for sulfur dioxide and are achieving high levels of particulate matter emissions control. They are voluntarily installing low-NO<sub>x</sub> combustion technology, at a cost of over \$40 million, to reduce NO<sub>x</sub> emissions to levels that are even lower than the applicable, presumptive BART limit. However, CAWCD understands that EPA is also evaluating selective catalytic reduction (SCR) as the potential basis for a BART limit for NGS's NO<sub>x</sub> emissions. According to SRP's analysis, the use of SCR would require over \$660 million in additional capital expense (over and

above the cost of low-NO<sub>x</sub> combustion technology), over \$13 million in additional annual operation and maintenance expense, and the importation of as many as two tanker trucks (about 31 tons) of anhydrous ammonia, a day to support the control equipment. SRP's study also shows that SCR would produce no perceptible improvement in visibility in the region over that achievable with low-NO<sub>x</sub> combustion technology alone. This level of expenditure (and related operational difficulty and risk) would raise significant concerns about increases in the cost of power from NGS and about the operational reliability of NGS. Substantial increases in power costs and detriments to station reliability could severely affect CAP water users, including Indian communities served by the CAP.

CAWCD has urged EPA to propose and promulgate BART limits for NGS NO<sub>x</sub> emissions based on the low-NO<sub>x</sub> combustion technology that is being installed currently and that satisfies the presumptive limit established by EPA's rules. Once all three units at NGS are retrofitted with this technology and operating at the lower emission rate, the remaining visibility impact of NGS's NO<sub>x</sub> emissions, if any, may be evaluated as part of EPA's comprehensive "reasonable progress" review for the next planning period under the Agency's visibility program, and any additional control options may be assessed in that review at that time.

#### Greenhouse Gas / Climate Change Legislation

On Earth Day, President Obama called for "comprehensive legislation to move toward energy independence and prevent the worst consequences of climate change." On May 21st, the House Energy and Commerce Committee took an important step toward accomplishing this by passing the American Clean Energy and Security Act, HR 2454. This bill, written by Chairman Henry Waxman (D-CA) and Representative Ed Markey (D-MA), would place an economy-wide cap on carbon pollution that would require reductions in emissions of GHGs by 17 percent by 2020 and 83 percent by 2050 and require utilities to generate about one fifth of all energy from renewable sources by 2020. The bill contains emission allowances for most electrical utilities that will reduce or delay the cost impact of the legislation for most utilities. Unfortunately, because of the way eligible utilities are defined, it appears that none of these allowances will be available for the CAP share of NGS. This must be corrected as the legislation moves forward.

While it isn't known how much carbon emissions controls might eventually cost, the impact of climate change legislation on CAP water rates and the ability to sell the Navajo Surplus to help repay the cost of the CAP and fund Indian water rights settlements could be substantial. In round numbers, NGS emits about one ton of carbon dioxide (CO<sub>2</sub>) for each megawatt hour of energy produced. CAP uses about two megawatt hours of energy for each acre-foot of water delivered. So, a rough estimate of the impact of the cost of CO<sub>2</sub> controls on our per acre-foot water delivery charges can be obtained by multiplying the cost per CO<sub>2</sub> allowance by two. For example, if CO<sub>2</sub> allowances cost \$100 per ton of CO<sub>2</sub> emitted, that would increase the cost per megawatt hour by \$100 and increase CAP water rates by about \$200 per acre-foot.

Today, CAP's energy costs are about \$50 per acre-foot of water delivered. A \$200 per acre-foot increase in CAP energy rates would represent a 400% increase to our water users. A \$100

increase in the cost of a megawatt hour could make the Navajo Surplus uneconomic and unsalable during most hours of the year, resulting in even higher increases in water rates and a huge loss of funds for Indian water rights settlements. Correcting the legislation to allow the CAP share of NGS (including the Navajo Surplus) to receive emission allowances in the same manner as the other utility owners of NGS would ameliorate but not eliminate such cost impacts.