CAP
CENTRAL ARIZONA PROJECT

INFORMATION BRIEF
BOARD OF DIRECTORS

Agenda Number 9.

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MEETING DATE: February 2, 2017

AGENDA ITEM: Report on Navajo Generating Station and Related Power Issues

LINKAGE TO STRATEGIC PLAN, POLICY, STATUTE OR GUIDING PRINCIPLE:
2016 CAWCD Board of Director Strategic Plan
- Effectively communicate financial issues to the Board, customers and stakeholders
- Maintain existing generation resources until appropriate alternatives are available
- Prepare for eventual replacement of NGS through implementation of the Post-NGS Power Strategy

PREVIOUS BOARD ACTION/ACTIVITY:
October 17-18, 2013 – Board of Directors Energy Retreat
June 24, 2014 – Board of Directors Scenario Planning Workshop
April 16, 2015 – Finance, Audit, and Power Committee Presentation
September 17, 2015 – Finance, Audit, and Power Committee Presentation
October 1, 2015 – Board of Directors approved Post-NGS Power Strategy
December 3, 2015 – Board update on status of NGS
January 7, 2016 – Energy Market Report
August 4, 2016 – Power Market Report

ISSUE SUMMARY/DESCRIPTION:
Please see the attached white paper.

SCHEDULED FOR BOARD ACTION:
The timing of any future decisions regarding NGS remains uncertain.

Attachment.

Navajo Generating Station and the Central Arizona Project

Background

The 1968 Colorado River Basin Project Act directed the Secretary of the Interior to study and recommend the most feasible plan for satisfying the power needs of the Central Arizona Project. The Act expressly authorized the Secretary to enter into agreements with non-federal interests proposing to construct a thermal generating power plant, if that was the option chosen.[1] In 1969 the Secretary determined that the most feasible plan to supply CAP power requirements and to provide revenue to the Lower Colorado River Basin Development Fund was to participate with Los Angeles Department of Water and Power (LADWP), Nevada Power Company (now NV Energy), Tucson Gas and Electric Company (now Tucson Electric Power), Arizona Public Service Company (APS) and the Salt River Project (SRP) to construct the Navajo Generating Station and its associated transmission system.[2]

The Navajo Generation Station (NGS) consists of three coal-fired supercritical steam electric generating units with a total net capacity rating of 2,250 megawatts (MW). Unit 1 began commercial operation in 1974; Units 2 and 3 followed in 1975 and 1976. SRP is the plant operator.

The United States holds 24.3% of NGS—547 MW of capacity—for the benefit of the CAP. The US entitlement is about one-third larger than what is needed for CAP pumping. The additional capacity was intended to provide a revenue source to assist with CAP repayment.

In recent years, NGS has provided more than 90% of the energy used to pump CAP water. Energy from the U.S. share of NGS that is not needed for CAP pumping (referred to as "Navajo Surplus") is sold by the Western Area Power Administration. The net proceeds of those sales are deposited in the Development Fund and applied against CAP's annual repayment obligation.

Navajo Surplus Marketing Before October 1, 2011

Section 107 of the Hoover Power Plant Act of 1984[3] directed the Secretary of the Interior, after consultation with the Secretary of Energy, the Governor of Arizona and CAWCD, to adopt a plan for marketing Navajo Surplus that would optimize the availability of Navajo Surplus and provide financial assistance for CAP repayment.

The Secretary of the Interior adopted the first Navajo Power Marketing Plan in 1987. Three years later Reclamation and the Western Area Power Administration entered into a contract with SRP for the sale of 200 MW of Navajo Surplus. In 1991 SRP executed a second contract for an additional 150 MW of Navajo Surplus. The 1990 and 1991 contracts required SRP to pay an Additional Rate Component that provided a total of $25.2 million per year in Navajo Surplus revenue. Those revenues were pledged in their entirety to repayment of bonds issued by CAP to fund construction of New Waddell Dam. The $25.2 million was paid directly to the bond trustee and was not available to offset CAP's annual repayment. Those two Navajo Surplus contracts were in effect through September 30, 2011, which was also the term of the CAP bonds.

In 1994, Reclamation, Western, SRP and CAP entered into the so-called "4-Party Agreement" under which SRP purchased all remaining Navajo Surplus. That agreement also gave SRP the right to schedule the entire energy output from the US share of NGS, plus CAP's Hoover energy and New Waddell generation. In return, SRP agreed to supply energy to meet CAP pumping needs, up to a specified annual limit (commonly referred to as the "threshold") that increased over time. If CAP needed additional pumping energy in any year, it had to purchase "over threshold" energy on the open market.

Under the 4-Party Agreement, SRP paid $21.75 million per year to the Development Fund. Those funds were applied each year against CAP's annual repayment obligation. The 4-Party Agreement also expired on September 30, 2011.

<u>NGS and CAP Repayment</u>

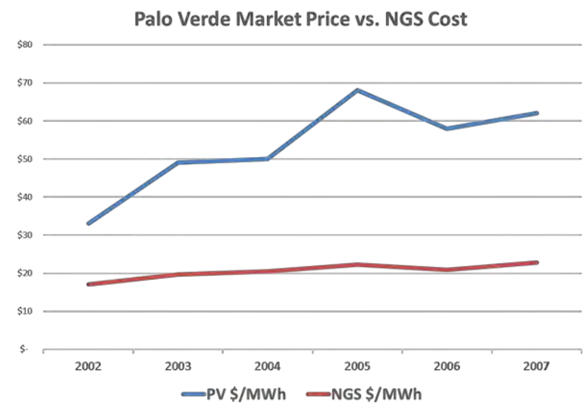
As discussed above, the US share of NGS was sized to provide energy for CAP pumping as well as surplus energy that would be sold to generate revenues for CAP repayment. The latter aspect is referred to as the "commercial power" function of CAP. Under the master repayment contract, CAWCD is responsible for 100% of the costs allocated to commercial power, and that portion of the CAP repayment obligation is interest-bearing.

In the 1993 cost allocation that was used to initiate CAP repayment, Reclamation allocated $765,574,750 to commercial power out of a total of $2,465,637,860 deemed reimbursable by CAWCD. Interim revenues reduced CAWCD's net obligation to $2,202,539,860, of which $549,483,000 was attributed to commercial power.

Reclamation performed another cost allocation in 1996 as the Regulatory Storage stage of CAP was declared substantially complete.[4] In that study, Reclamation allocated $919,361,000 to commercial power. After application of interim revenues, commercial power accounted for $691,642,000 of the $2,333,959,910 that Reclamation asserted was owed by CAWCD.

CAWCD and the United States disagreed over the amount of the CAP repayment obligation, leading to lengthy litigation. That dispute was eventually settled, primarily by shifting CAP water entitlements from non-federal to federal uses, which had the effect of lowering the CAP repayment obligation by reducing the reimbursable costs allocated to the water supply function.[5]

The parties' expectations regarding future Navajo Surplus revenues played a key role in how the CAP repayment settlement was structured. As this chart shows, as the CAP repayment settlement and related agreements were being developed in the early 2000s, the cost of generating electricity at NGS was significantly less than the prevailing market price for electricity in the southwest. That led all parties to believe that future sales of Navajo Surplus would likely provide substantial revenues for CAP, perhaps even more than enough to cover CAP's entire annual repayment obligation.[6] That belief was reflected in the provisions related to use of Development Fund revenues in the CAP repayment stipulation and the Arizona Water Settlements Act (AWSA).



Both the stipulation and the AWSA provide that if Development Fund revenues in any year exceed CAP's repayment obligation for that year, then the excess amount will be available for various specified uses, in order of priority. These uses differ somewhat from the uses specified for Development Fund revenues that are credited against CAP's annual repayment.[7]

To facilitate the creation of future Development Fund revenues, the repayment stipulation required the Secretary of the Interior to adopt a new plan to govern the marketing of Navajo Surplus after September 30, 2011. The Amended Navajo Power Marketing Plan was adopted on September 18, 2007.

Navajo Surplus Marketing After September 30, 2011

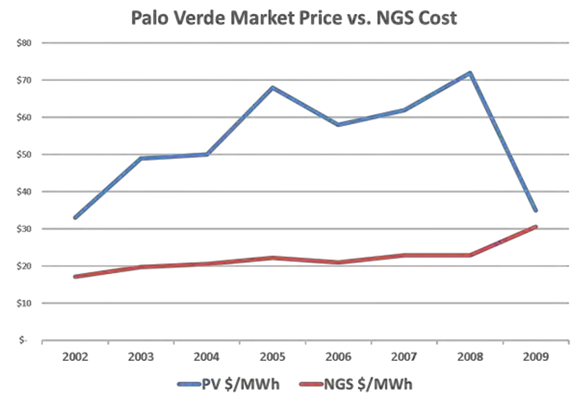
Shortly after the Amended Navajo Power Marketing Plan was adopted, Western entered into a new long-term Navajo Surplus sales contract with SRP. While the contract was executed in September 2007, it did not take effect until October 1, 2011. That contract expires on September 30, 2031.

Under the current Navajo Surplus contract, SRP pays the cost of generation (excluding capital costs) plus a premium (measured in $/MWh) for the Navajo Surplus energy it receives. The initial annual premium was $25 million and escalates by 3% per year for the first 10 years. The premium is to be adjusted in 2022 by comparing the then-current gas index to the comparable index in 2012.

In 2016 the Navajo Surplus contract with SRP produced $27.6 million in Development Fund revenues.

Regional Haze Rulemaking (BART) and NGS

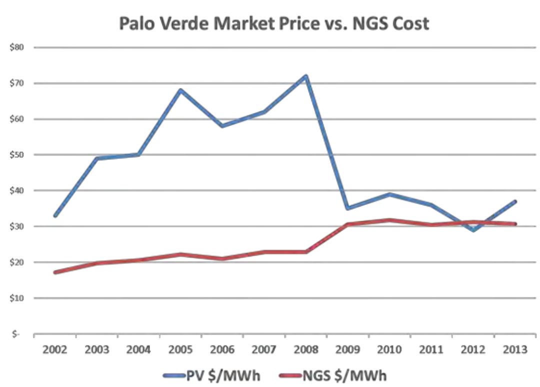
On August 28, 2009, EPA issued an Advanced Notice of Proposed Rulemaking indicating that NGS would likely be required to install expensive nitrogen oxide emission controls to reduce regional haze. EPA expressed the view that selective catalytic reduction or SCR was the Best Available Retrofit Technology (BART) for NGS. By some estimates, the installation of SCR technology at NGS would have cost $500 million to $1 billion or more and would have added significantly to annual O&M costs.



At that point, CAP was still operating under the 4-Party Agreement, receiving much of its energy needs from SRP at the NGS cost of generation but also buying over-threshold energy on the market. Navajo Surplus revenues remained fixed at $21.75 million per year.

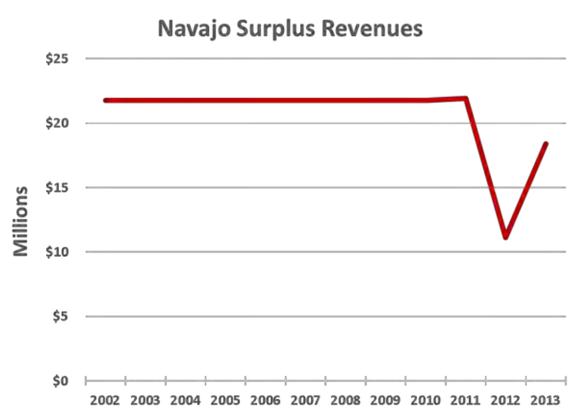
As shown here, the electricity market dropped along with the general economy in 2008, but the cost of generation at NGS in 2009 was still below market, insuring CAP a lower cost source of pumping energy and steady revenues from Navajo Surplus.

Over the next four years, CAP and other interested parties worked diligently to counter the potential financial impacts of the BART rulemaking—first through an SRP-led stakeholder process in 2010 and 2011, then later via the Technical Working Group (TWG).

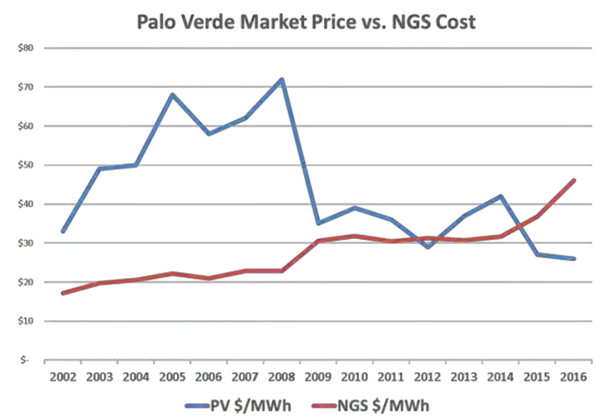


By the time the TWG submitted its "Reasonable Progress Alternative to BART" to EPA in 2013, it appeared that the electricity market was finally beginning to recover from the 2008 downturn. NGS still looked to be a lower cost source of pumping energy for CAP.

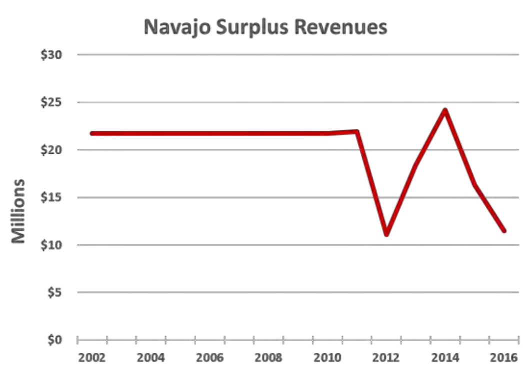
After the 4-Party Agreement terminated in 2011, Navajo Surplus revenues were no longer fixed from year to year. The new Navajo Surplus contract with SRP provided a known annual premium ($25.4 million in 2013), but the remaining Navajo Surplus energy was sold by Western at whatever price the market would pay. In 2012, when market prices dipped below NGS cost of generation, Western's Navajo Surplus sales lost $13.6 million; in 2013, the losses from Western's sales declined to $7 million.[8] When combined with the SRP premium, net Navajo Surplus revenues in 2013 were $18.4 million.



NGS in Today's Energy Market



Over the past few years, natural gas prices have dropped significantly, driven by the increase in supply due to fracking and horizontal drilling. Lower gas prices have driven the electricity market even lower. There is no sign that these market fundamentals are likely to change for some time. Meanwhile, the cost of generation at NGS has risen to the point where NGS energy today is more expensive than energy purchased on the market. That situation, in turn, has led NGS owners to curtail generation at increasing levels. That applies to the US share of NGS as well: Western curtails generation of Navajo Surplus when it cannot be sold for more than the variable cost of generation, and CAP curtails generation at NGS when it can purchase energy on the market for less than the NGS fuel cost. As a result, the capacity factor for NGS dropped from 87% in 2013 to less than 60% in 2016. That, in turn, increases the effective cost of the energy that is generated at NGS because fixed OM&R costs are spread over fewer units of energy.



This new market reality has greatly reduced Western's ability to sell Navajo Surplus. Losses on Western sales in 2016 were around $16 million. But the SRP contract continues to provide sufficient guaranteed revenue to offset Western's losses. Net revenues in 2016 were around $11.5 million, reducing the amount CAP would otherwise have had to collect for repayment.

What Lies Ahead

The cost of generating electricity at NGS will continue to increase in the coming years. The BART rule will require the closure of one unit after 2019, which will increase fixed OM&R costs on a per unit basis. New lease and coal supply agreements will also increase annual operating costs. And the withdrawal of LADWP and NV Energy from NGS will increase the ownership percentage for the remaining participants. (The United States would go from a 24.3% interest in a 2250 MW plant to a 36% interest in a 1500 MW plant.)

On the other hand, there are no signs to suggest that natural gas prices will increase significantly over the next several years, so market prices for electricity are expected to remain low.

In late 2016, the National Renewable Energy Laboratory (NREL) released a report describing baseline conditions that might affect federal decisions regarding NGS. NREL concluded that NGS is currently more expensive than electricity purchased on the wholesale spot market and could remain that way for many years, especially if natural gas prices remain low. As shown below, that was true for on-peak hours (left) and especially for off-peak hours (right).[9]

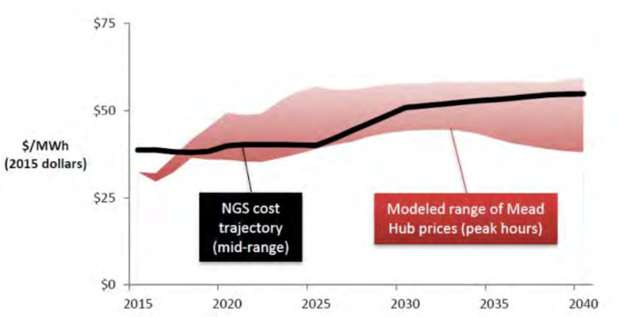


Figure ES-1. Projections for NGS generation costs, Mead Hub peak power prices

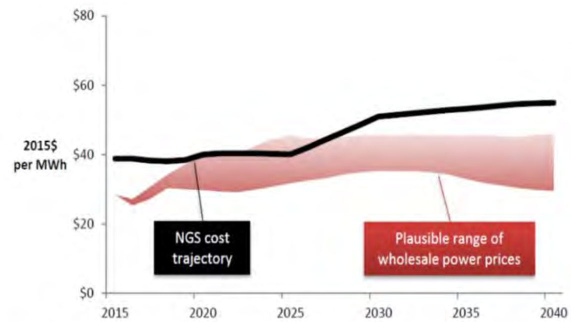
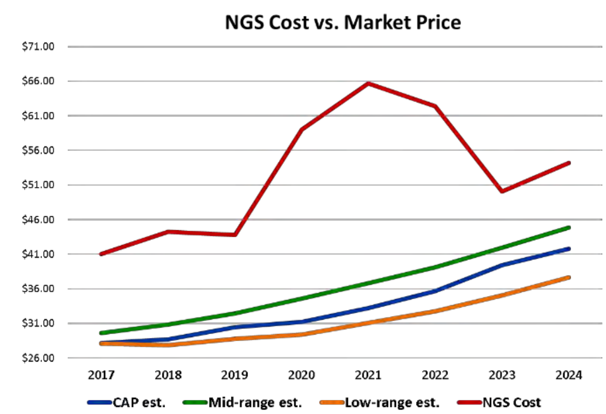


Figure 2-4. Mead Hub off-peak energy prices (2015 actual, projections for 2016–2040)

CAP's own estimates are even less optimistic. SRP anticipates significant capital improvements and overhaul work at NGS in 2020 and 2021—some of which has been deferred recently because of the impending withdrawal of two owners—that will drive costs even higher in the short term. New lease and coal supply agreements will compound that problem. At present, it does not appear likely that NGS would be competitive in the market until at least 2023.



As noted at the outset, NGS is two things for CAP: a source of energy for pumping CAP water and a source of revenue to assist in CAP repayment. Today, NGS provides CAP a reliable source of pumping energy, albeit at a higher cost than might be available from other sources, and a reduced, but still dependable, source of revenue for repayment.

For the plant's utility owners, however, NGS is merely one component of a resource portfolio. The utilities must weigh the costs of NGS against other generation alternatives. Those discussions are ongoing and a decision about whether to continue operation of NGS after the expiration of the current agreements in 2019 is expected in the very near future.

[1] 43 U.S.C. §1523.

[2] Letter from Assistant Secretary of the Interior James R. Smith to President Nixon, dated September 30, 1969.

[3] Pub. L. 98-381. While the plan was to be adopted by the Secretary of the Interior, the Act directed the Secretary of Energy to market Navajo Surplus. *Id.* §107(b).

[4] Reclamation performed two cost allocations in 1996, one in September and another in December. The results of the two allocations are similar. The values reported here are from the later, December allocation.

[5] This is discussed in more detail in "Understanding the CAP Repayment Obligation." http://www.cap-az.com/documents/departments/finance/Repayment-Obligation.pdf

[6] Recall that the sale of Navajo Surplus under the existing contracts with SRP, which had been in effect since the early 1990s, was already bringing in almost $47 million per year, although the majority was going toward bond obligations rather than CAP repayment. The view that Navajo Surplus revenues would be significantly greater after 2011 persisted for many years. See, e.g., CAP letter to EPA, dated Nov. 22, 2010.

[7] See § 107 of the AWSA, Pub. L. 108-451, codified at 43 U.S.C. §1543. The flow of funds in excess of the annual CAP repayment amount is sometimes referred to as the "second cascade."

[8] CAP, through the Development Fund, is charged the full fixed OM&R for the US share of NGS regardless of how much energy is generated by that capacity. So as long as Western can sell Navajo Surplus for more than the variable cost of generation (i.e., fuel cost), it makes sense to do so because some portion of that fixed OM&R cost is being covered. When market prices are less than the NGS fuel cost Western curtails generation of Navajo Surplus, but the Development Fund must still pay the fixed OM&R for NGS.

[9] http://www.nrel.gov/docs/fy17osti/66506.pdf