



YOUR WATER. YOUR FUTURE.

Water Security from the Ground Up: Native American Perspectives

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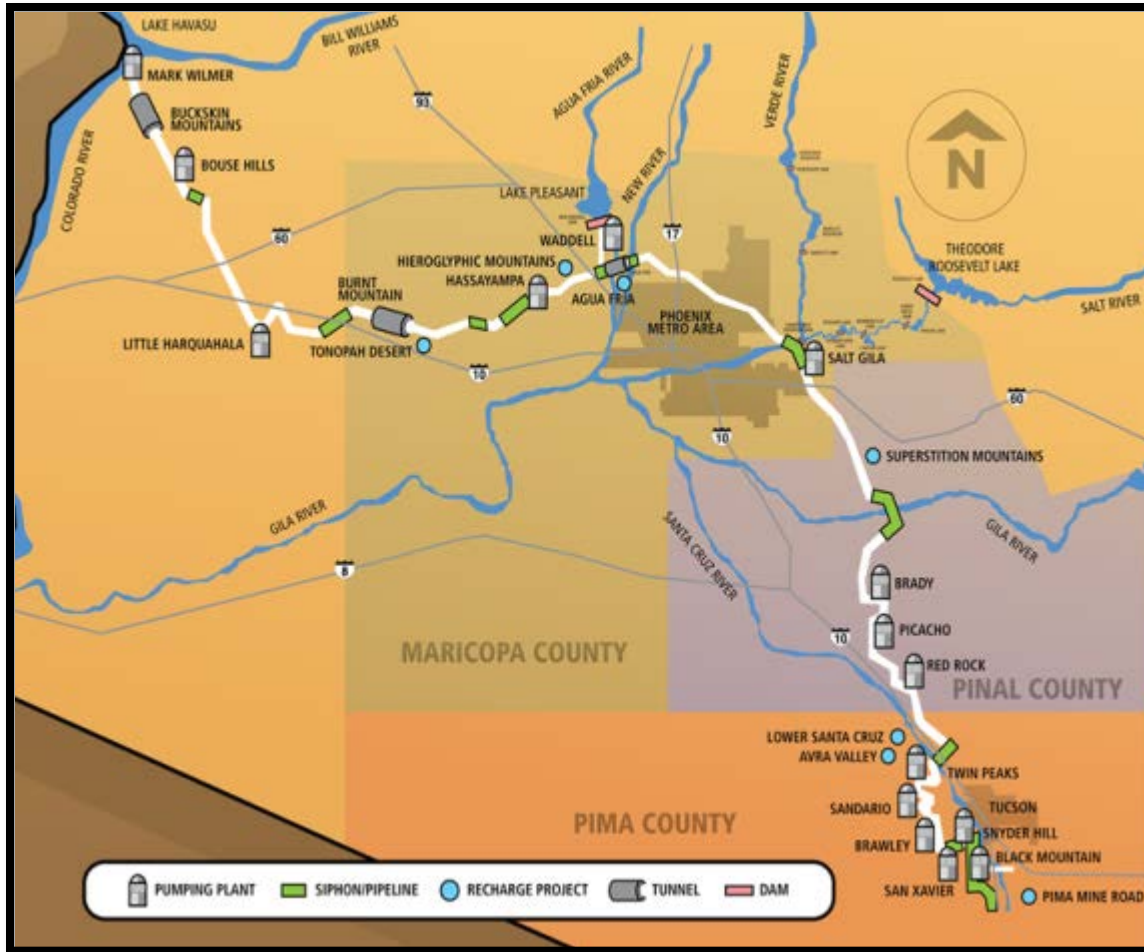
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**Water Resources Research Center
Annual Conference
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Tribal Water Security

- CAP and Where CAP water goes
- Climate Change & Tribal Vulnerabilities
- Management of Uncertain Tribal Supplies/Water Rights Connection
- Tribal Water/Energy Nexus Issues
- Tribal Expertise & Training/Succession Issues
- **Water quality issues will not be discussed but create significant challenges for tribal water planning and management*

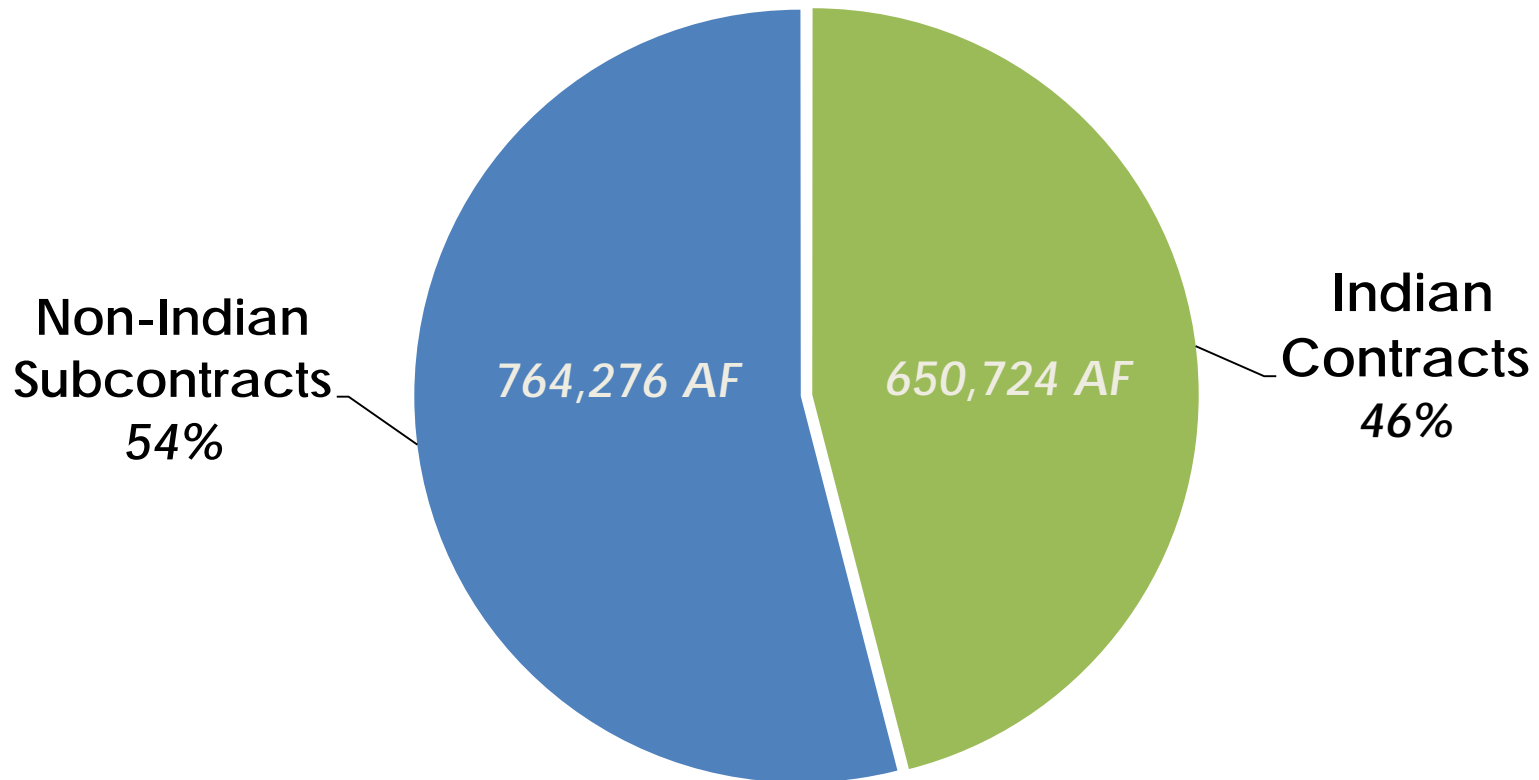
What is the Central Arizona Project?



- 336-mile aqueduct brings Colorado River water from Lake Havasu to Tucson
- 14 pumping plants lift water nearly 3000 feet
- 11 underground pipelines
- Lake Pleasant/New Waddell Dam
- Delivers 1.6 million acre-feet of Colorado River water annually (1 AF = 325,851 gallons)
- Federally authorized reclamation project
- Operated and maintained by CAWCD
- Powered primarily by a coal fired power plant-NGS

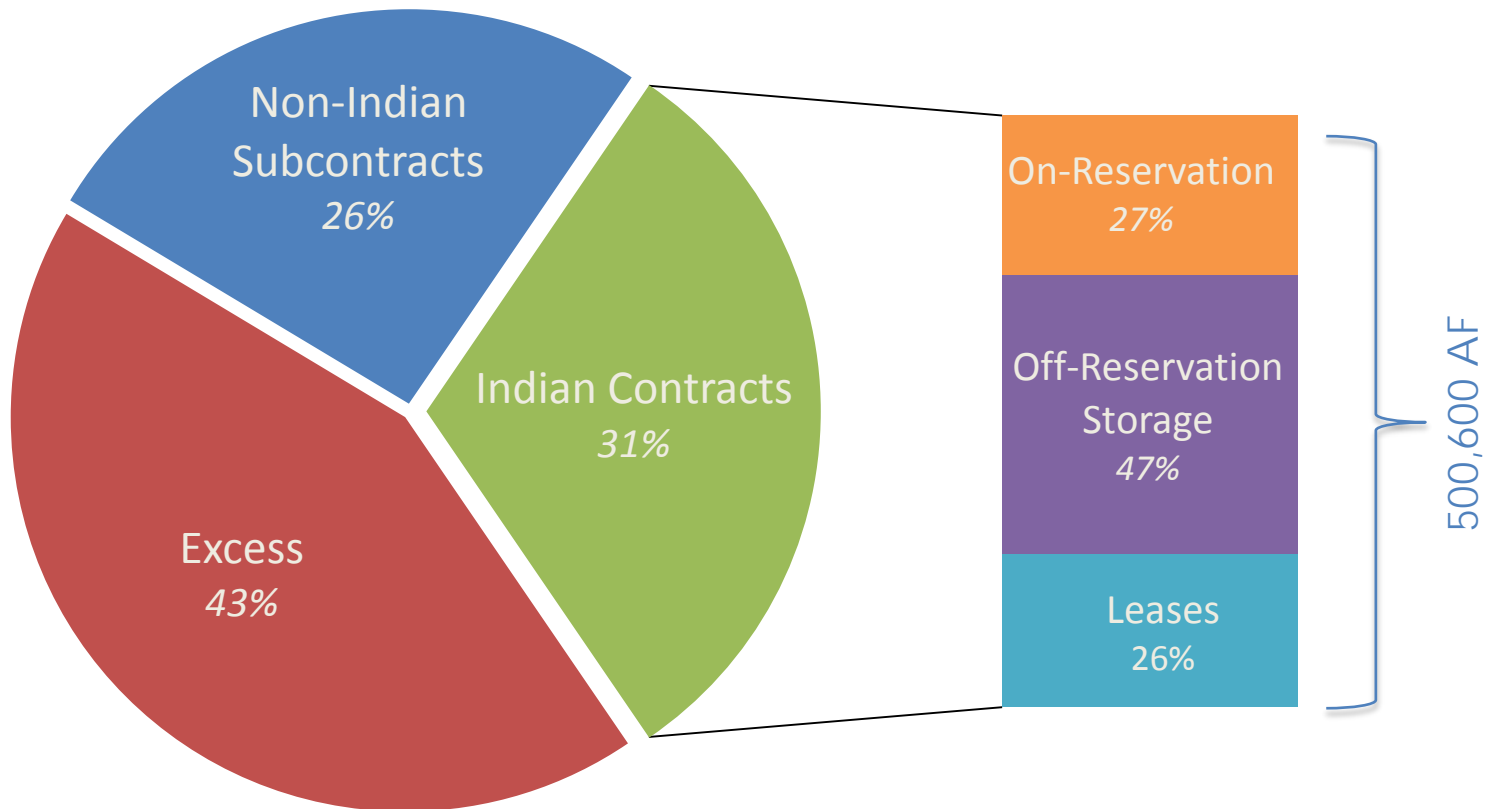
Where CAP Water Goes: Long-Term CAP Contracts

Total = 1.415 Million Acre Feet Per Year



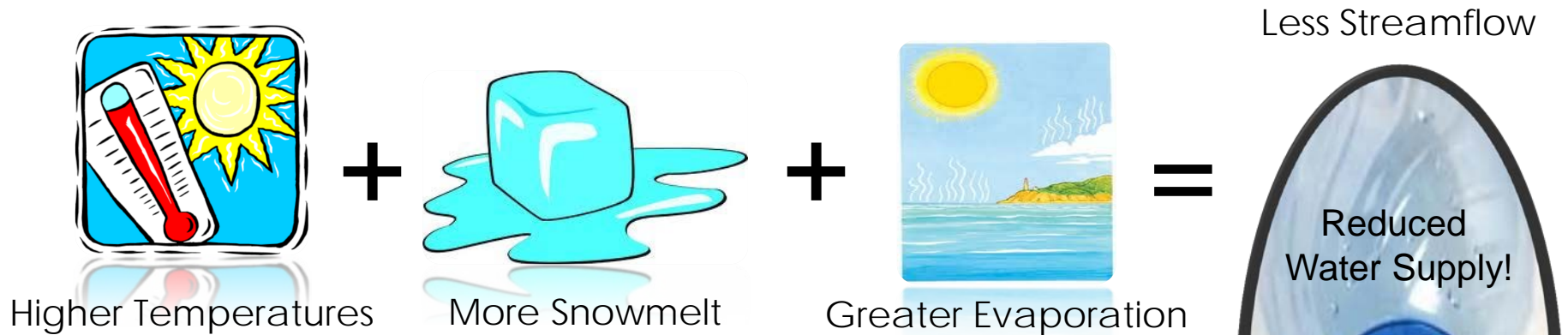
Where CAP Water Goes: Deliveries in 2011

Total = 1.620 Million Acre Feet



Climate Change Risk

Warming Trends



Cooling Trends



Tribal Vulnerability to Climate Change

- Tribes are more vulnerable to climate change impacts than non-tribal communities
- Reservations established typically located in extreme environments
- In Southwest, tribes are in semi-arid regions with lower rainfall and limited water supplies
- Defined and permanent residency force indigenous communities to live sustainably under the stress of encroaching urban growth and short- and long-term climate change
- Lack and need for
 - Access to clean water
 - Management of water resources
 - Water infrastructure
 - Defined Indian water rights
 - Protection of springs and water sources that are spiritually and culturally important



Tribal Vulnerability to Climate Change

- Have a culture, tradition, and self-identity based on the land and sacred places
- Water/environment is sacred and have many water-based/environment based religious practices
- Livelihoods and cultural resources based on environment



Management of Uncertain Tribal Supplies: Water Rights Connection

How do you manage water and impending shortages if you don't know how much you have to manage or whether it is yours to manage?



Why Don't All Tribes Have Wet Water?

General Indian Water Rights 101

- **Most tribes have water rights or claims:**
 - Claims regarding quantity
 - Claims regarding quality
 - Claims regarding priority dates (West of the Mississippi-Prior Appropriation Doctrine)
- **It can take decades or centuries for tribes to validate their claims in courts.**

The Legacy of Westward Expansion



The Legacy of Westward Expansion

"Indian tribes possess substantial claims to water to support viable reservation homelands and, in some cases, off-reservation stream and river system ecosystems necessary to support fishing, hunting, gathering, ceremonial and cultural rights specifically reserved by tribes as part of 19th Century treaty negotiations...

During the same historical era as the treaty and reservation era, the United States also enacted laws and implementing policies in the 19th century and early 20th century to encourage the settlement of arid western lands and the development of the scarce water resources in what became "former" Indian territory. . . These laws were silent on their effect on prior, pre-existing Indian tribal rights to the use of water, and such rights cannot be abrogated without express consent of Congress...

Thus, the United States created the conflict over the development and use of western water resources and the recognition and respect of reserved Indian water rights."

-Testimony of John Echohawk, Executive Director, Native American Rights Fund, before the Senate Committee on Indian Affairs, March 15, 2012



Litigation v. Settlement

- Expensive
- Divisive
- Can take a century or more
 - No water means socio-economic barriers
 - Uncertainty means poor water management
- Courts give paper rights NOT “wet” water
- No flexibility
- Winners and losers
- Requires collaboration
- Provides certainty
 - Improves water management
- Promotes the federal trust responsibility
- Improves relationships and cooperation between neighbors
- Provides flexibility
- Provides access to wet water and infrastructure
- Provides certainty
 - Improves water management



Recent Trend Toward Settlements

- In the last Congress, **four** Indian water settlements (including White Mountain Apache, Crow, and five Pueblos) totaling more than \$1 billion approved.
- 27 settlements to date



Status of Arizona Indian Water Settlements

Adjudicated Rights in Arizona v. California (781,994 afy):

- Cocopah
- Colorado River Indian Tribes
- Fort Mohave Tribe
- Fort Yuma/Quechan Tribe

Fully Resolved Claims Settlements

- Ak-Chin Indian Community
- Salt River Pima Maricopa Indian Community
- Fort McDowell Indian Community
- Yavapai Prescott Indian Tribe
- Zuni Tribe
- Gila River Indian Community
- White Mountain Apache Tribe (pending full enactment)

Partially Resolved

- San Carlos Apache (Salt, Black and San Pedro River claims resolved)
- Tohono O'odham (San Xavier, Schuck Toak, and Gila Bend Districts resolved)

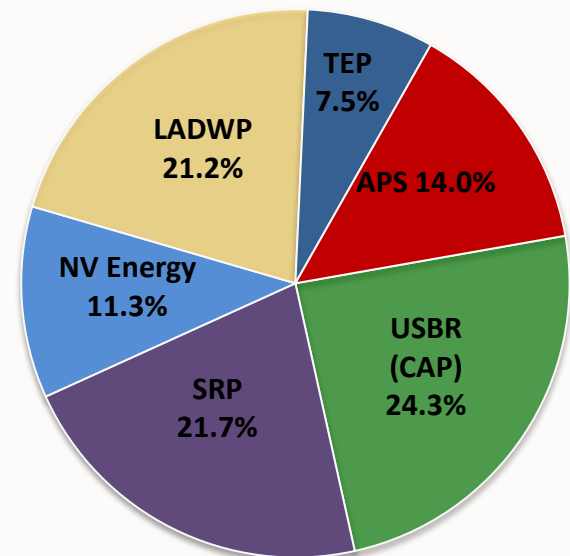
Outstanding/Unresolved

- Havasupai Tribe
- Hopi Tribe
- Hualapai Tribe
- Kaibab Band of Paiute Indians
- Navajo Nation
- Pascua Yaqui Tribe
- San Juan Southern Paiute
- Tonto Apache
- Yavapai-Apache Nation

**Only CAP volume remaining for these settlements: 37,107 af*

Tribal Water/Energy Nexus: Navajo Generating Station

- Constructed in the early 1970s on the Navajo Reservation near Page, AZ, to provide power to the CAP as an alternative to two additional dams in the vicinity of the Grand Canyon
- 3 coal-fired units, total net output of 2,250 megawatts (MW), utilizing Navajo and Hopi coal (plant and associated mine provide estimated \$140M/yr to the Navajo Nation and \$12M /yr to the Hopi)
- Operated by the Salt River Project (SRP) on behalf of six participants
- Provides over 90% of power required by CAP
- Surplus power from the BOR's share of NGS is sold to help fund CAP repayment, which in turn funds Indian water rights settlements



EPA Proposed Federal Implementation Plan for NGS

- Based on the five BART factors, EPA proposes that BART is a plant-wide average NO_x limit of 0.055 lb/MMBtu
- Emissions limit would most likely require SCR on all units at NGS by 2018
- In recognition of other significant issues facing NGS, EPA proposes a BART alternative that takes into account NO_x reduction associated with early installation of LNB/SOFA:
 - Alternative 1 achieves lower total NO_x emissions than proposed BART over the 2009-2044 time period (satisfies “better than BART” criteria)



Proposed Federal Implementation Plan

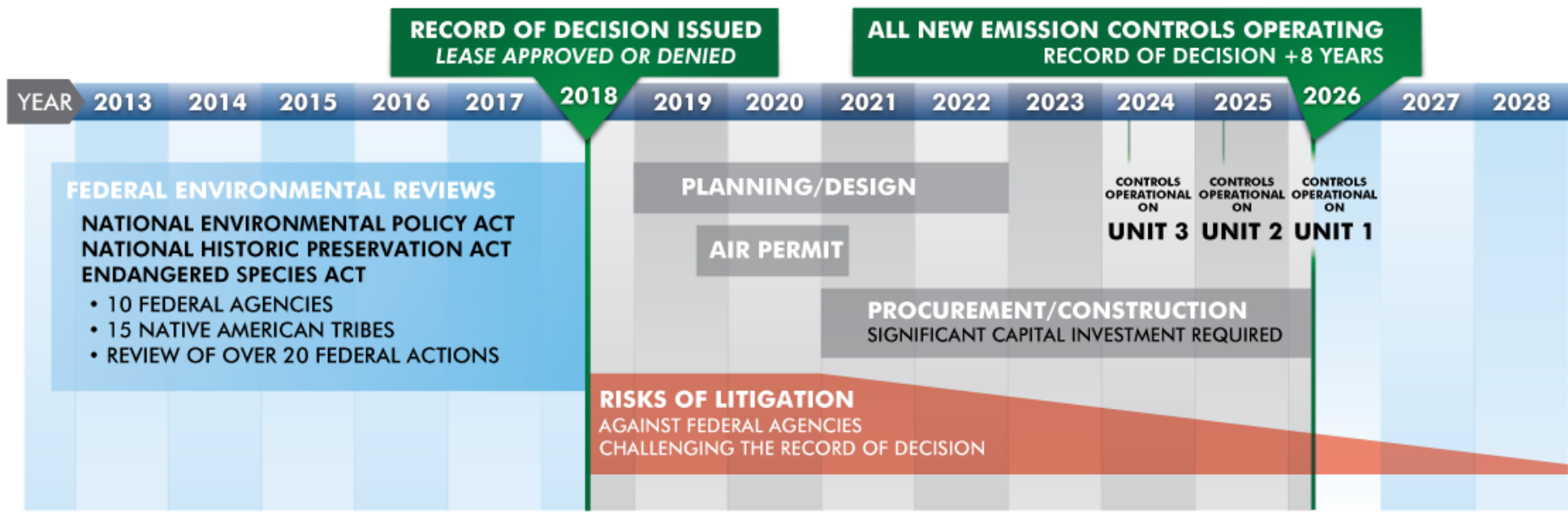
- BART Alternative 1:
 - NO_x limit = 0.178 lbs/MMBtu after 2021
 - NO_x limit = 0.117 lbs/MMBtu after 2022
 - NO_x limit = 0.055 lbs/MMBtu on and thereafter 2023
- Would most likely require installing SCR on one unit each year between 2021 and 2023
- Compliance schedule beyond 2018 is supported by the Tribal Authority Rule (TAR)
- EPA also proposes:
 - Alternative 2: Compliance extended to 2023-2025 if additional NO_x reductions can be developed
 - Alternative 3: Compliance extended to 2024-2026 if further NO_x reductions can be achieved

EPA Recognized Need for Flexibility

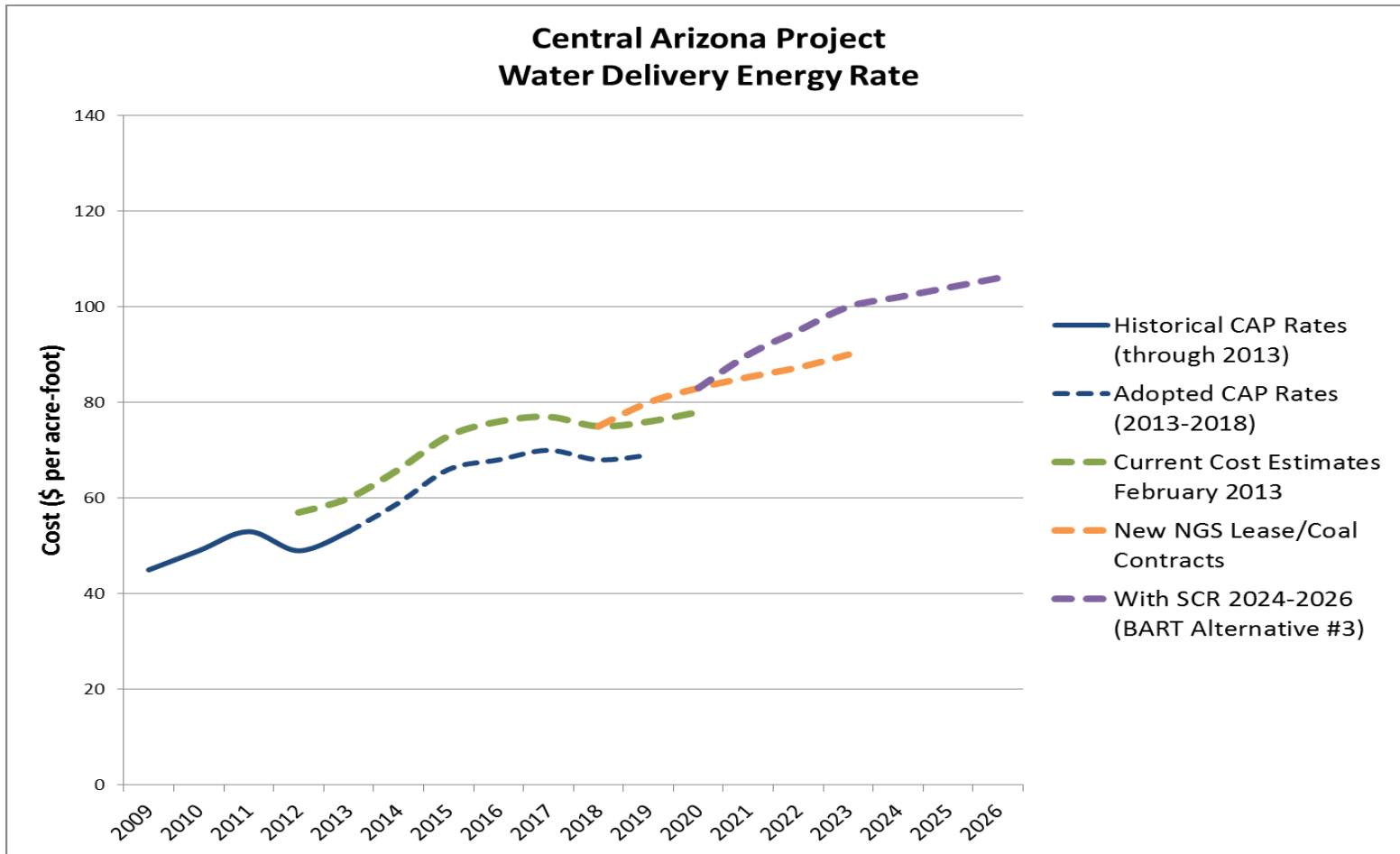
- Singular importance of NGS to the economies of the Navajo Nation, Hopi Tribe, and to water settlement agreements
- Uncertainties facing the plant owners: 2019 renewal deadline for lease, coal supply agreement, transmission rights-of-way agreements, etc. and need to transition LADWP's share in NGS to another entity
- Unusual requirement for NEPA review of the lease extension and other agreements – DOI estimates a 5-year process but could be longer
- Voluntary installation of LNB/SOFA over 2009-2011
- Time for federal agencies to explore options to avoid or minimize impacts to tribes, including seeking funding to cover federal portion of pollution controls



Timing Constraints



Potential Financial Impacts to CAP Users



Potential Financial Impacts to CAP Users

It is impossible to complete “BART Alternative #1” by the proposed deadline (SCR on all three units by 2023)



- Not enough time
- Overlapping activities – NEPA, BART design/permitting, BART construction
- “Alternative #1” would require substantial spending on BART while significant uncertainties relating to NEPA and potential legal challenges are unresolved
- Financing might not be available in this situation, resulting in BART having to be absorbed into CAP rates in the short term
- BOR share of BART is on the order of \$140 million (twice that if baghouses are required) – absorbing that amount into rates over 5 years would add ~\$20/acre-foot

Next Steps Relating to BART

CAP, tribal, and other stakeholders will continue to participate in the upcoming BART analysis activities:

- DOI/DOE/EPA joint agency task force and stakeholder process to develop a long-term roadmap for NGS
- National Renewable Energy Laboratory “Phase 2” NGS study, which will be initiated in 2013 to analyze a range of clean energy options for NGS



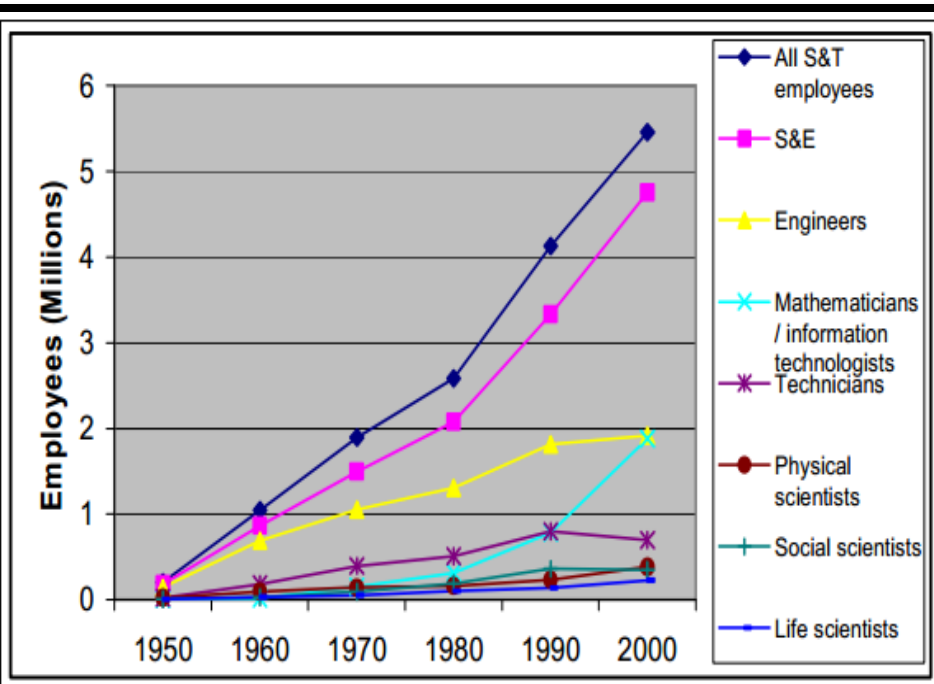
Types of Tribal Expertise Needed: Succession Issues

- **Engineers**
 - **Civil**
 - Water Resources/Hydraulic
 - Agricultural
 - Geotechnical
 - Surveying
 - Construction
 - **Environmental**
 - **Mechanical**
 - **Electrical**
 - **Structural**
- **Hydrologists**
- **Hydrogeologists**
- **Geologists**
- **Modelers**
- **Economists**
- **Chemists**
- **Biologists**
- **Agronomists**
- **Attorneys**



American Indians in Science and Engineering

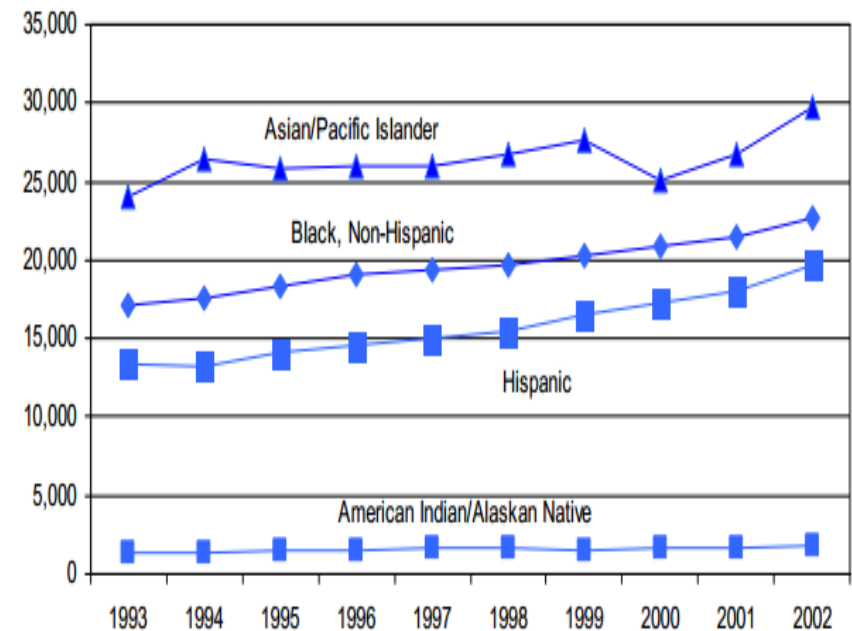
Figure: Science and technology employment:
1950-2000



Source: National Science Board, *Science and Engineering Indicators 2008*, Figure 3-1, (Arlington, VA: National Science Foundation, 2008) at <http://www.nsf.gov/statistics/seind08/pdf/c03.pdf>.

Note: S&T = science and technology. S&E = scientists and engineers. Data include bachelor's degrees or higher in science occupations, some college and above in engineering occupations, and any education level for technicians and computer programmers.

Graduate Enrollment in Science and Engineering by
Race/Ethnicity*, 1993 to 2002



*Includes only U.S. citizens and permanent residents.

Source: CPST, data derived from NSF, Graduate Students & Postdoctorates Survey

Demand for Experts Increasing



- HR experts note that in the next five years, 50% public utility employees will be eligible for retirement.
- The water industry is highly specialized.
- Who will become the new experts?

QUESTIONS?

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