



One Water and Stewardship Committee

Update on Delta Conveyance Project – Cost Estimate & Benefit-Cost Analysis

Item 6a

June 10, 2024

Update on Delta Conveyance Project

Presentation Overview

- Introductory Remarks, Karla Nemeth
- Cost Estimate, Graham Bradner
- Benefit-Cost Analysis, Dr. David Sunding



Introductory Remarks

Karla Nemeth
Director

Department of Water Resources

Benefits Far Outweigh Costs:
\$1 Spent = \$2.20 Benefit

Permits On Track for 2026 Completion:
- Consistent Regulatory Coordination
- Committed to Settling Concerns

Costs Holding Flat:
Rigorous and Detailed Estimate

Flexibility and Affordability:
Trades, Transfers, Revenue Generation

Governor Newsom:
Full Support and Commitment

Pathway to Implementation

Extensive and Ongoing Community
Outreach and Engagement

Ongoing Design Improvements and
Value Engineering to Tighten Costs

\$200M Commitment to
Tangible Community Benefits

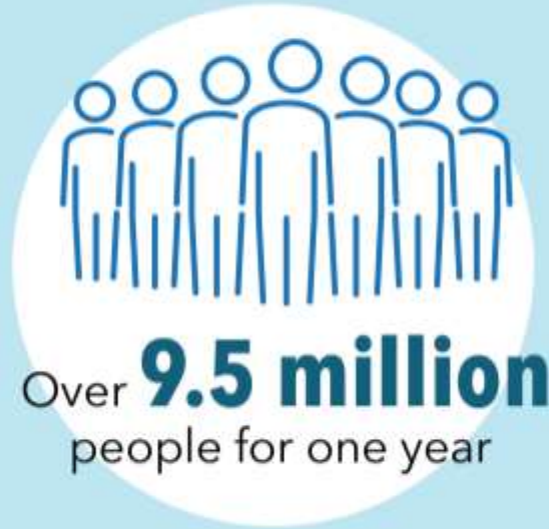
★ Next phase of design and planning work, in addition to CAMP4W, will provide MWD with data and information needed well prior to eventual implementation decision.

Modernizing California's Water Infrastructure



January 1, 2024 - May 23, 2024

909,000 acre-feet of water = enough water to supply:



or



Delta Conveyance Project





Cost Estimate

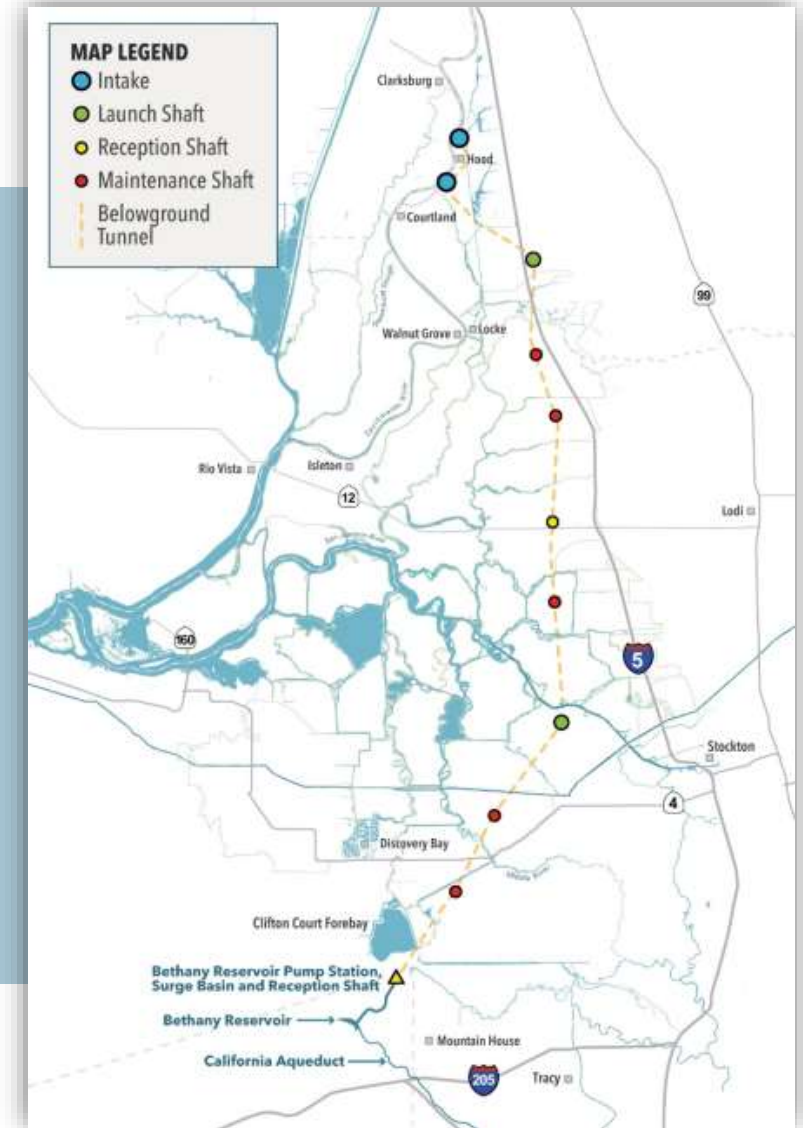
Graham Bradner
Executive Director

Delta Conveyance Design & Construction Authority

What did we estimate?



- **Bethany Reservoir Alignment – 6,000 cfs (~10% design)**
 - Two (2) new intakes in the North Delta
 - Conveyance tunnel: 45 miles of 36-ft ID single tunnel, 11 shafts
 - New pumping plant, aqueducts and discharge structure connecting directly to Bethany Reservoir
- Land acquisition, power supply & consumption, mitigation, Community Benefits Program, CCWD settlement
- Accounts for uncertainty w/ contingency and risk treatment costs



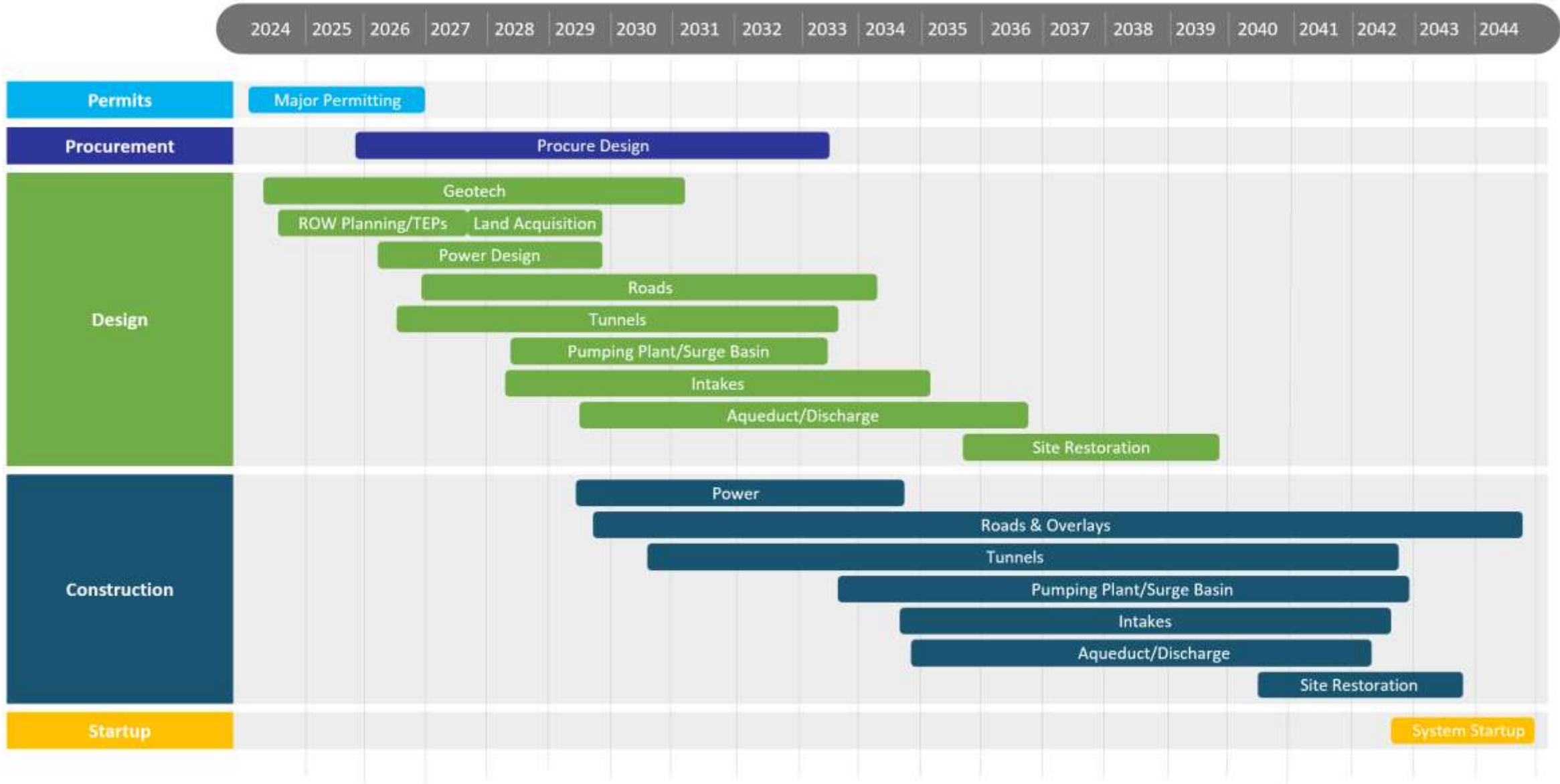


Estimate Methodology



- “Bottoms up” (deterministic, unit cost) estimating approach based on labor, equipment, materials, and schedule
- Estimate uses 2023 “real” undiscounted dollars
- Reconciliation process with independent cost estimating and resolution
- Mostly AACE Class 4 Estimate (accuracy +80% to -55%) with some Class 5 aspects
- Assumes Design-Bid-Build procurement

DCP Schedule Summary



2023 Cost Estimate Update



- **Completed reconciliations:**

- Independent construction est. prepared by DCA Design and Program Management teams – reconciled cost Δ ~2%
- Independent Soft Cost estimates, reconciled differences and aligned to Master Program Schedule
- Compared to the 2020 cost assessment corrected for inflation

- **Risk management**

- \$467M risk treatment costs included in construction est.
- Construction contingency = 30%
- Other Program Cost contingency = 0%, 15%, or 30% depending on item

| | BETHANY (2023) | % Construction Cost |
|---|-------------------------|---------------------|
| TOTAL CONSTRUCTION COSTS | \$15,012,000,000 | |
| Intakes | \$1,714,000,000 | -- |
| Tunnel and Shafts | \$6,353,000,000 | -- |
| Pumping Plant /Surge Basin/Aqueduct & Discharge | \$3,198,000,000 | -- |
| Utilities and Logistics (power included below) | \$283,000,000 | -- |
| Construction Sub-Total | \$11,548,000,000 | -- |
| Contingency (30%) | \$3,464,000,000 | -- |
| OTHER PROGRAM COSTS | \$5,108,000,000 | |
| Planning/Design/CM (Soft Costs) | \$3,328,000,000 | 22.2% |
| DWR Oversight | \$426,000,000 | 2.8% |
| DCA Program Management Office | \$668,000,000 | 4.4% |
| DCA Engineering (Design and CM Services) | \$2,167,000,000 | 14.4% |
| DCA Permits and Agency Coordination | \$67,000,000 | 0.4% |
| Other Costs | \$1,780,000,000 | -- |
| Land Acquisition | \$158,000,000 | -- |
| Mitigation Program | \$960,000,000 | -- |
| Power | \$415,000,000 | -- |
| CCWD Settlement | \$47,000,000 | -- |
| Community Benefits Program | \$200,000,000 | -- |

TOTAL \$20,120,000,000

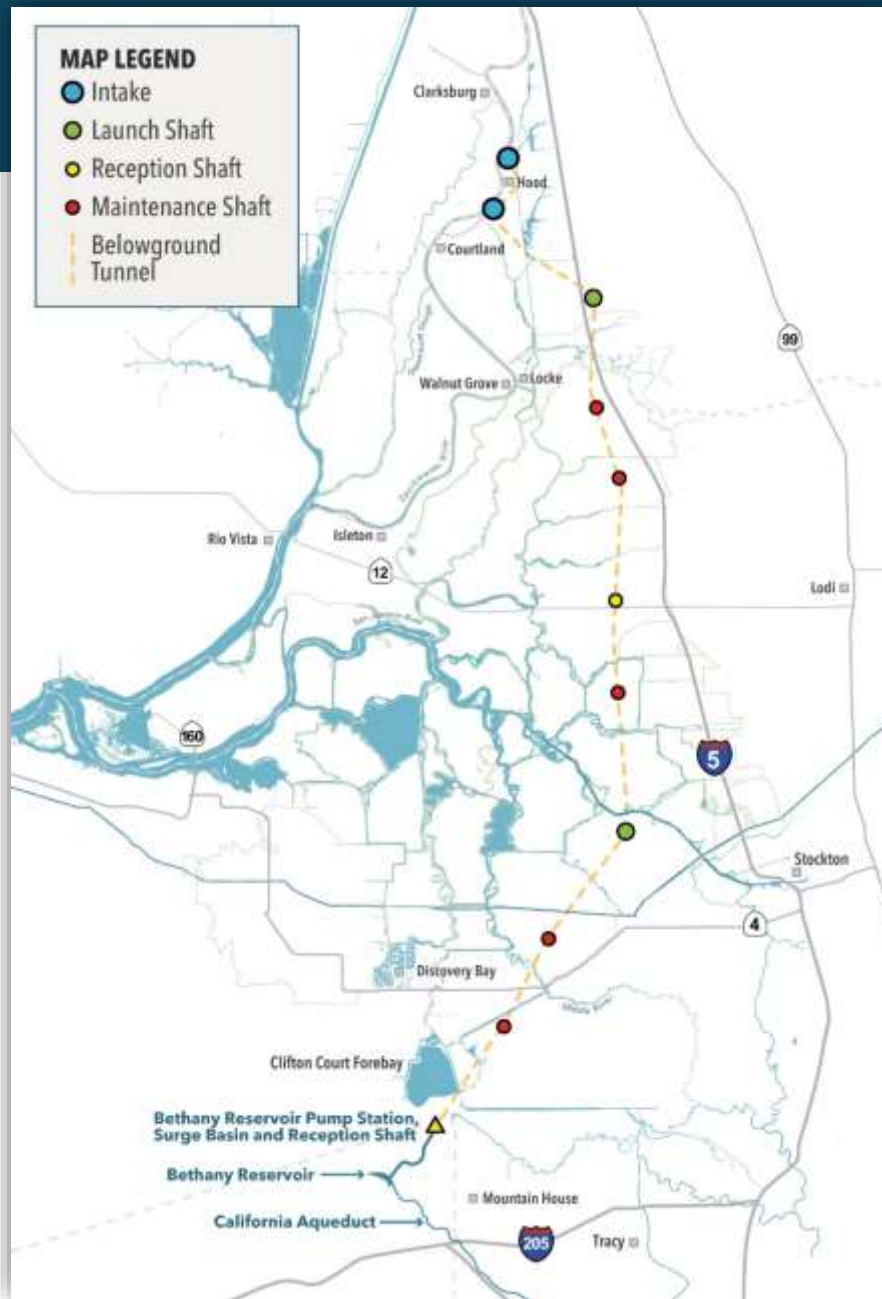
Comparison to 2020 Cost Assessment



| | BETHANY (2023) | % Const Cost | 2020 Assessment | % Const Cost | *2020 in \$2023 |
|--|-------------------------|--------------|--------------------------|--------------|-------------------------|
| TOTAL CONSTRUCTION COSTS | \$15,012,000,000 | | \$ 12,101,000,000 | | \$15,346,000,000 |
| Two Intakes | \$1,714,000,000 | -- | \$ 1,448,000,000 | -- | \$1,836,000,000 |
| Tunnel and Shafts | \$6,353,000,000 | -- | \$ 4,473,000,000 | -- | \$5,672,000,000 |
| Bethany Complex / Southern Complex Facilities (Forebay) | \$3,198,000,000 | -- | \$ 2,326,000,000 | -- | \$2,950,000,000 |
| Utilities, Power and Logistics (Power for Bethany Below) | \$283,000,000 | -- | \$ 522,000,000 | -- | \$662,000,000 |
| Construction Sub-Total | \$11,548,000,000 | -- | \$ 8,769,000,000 | -- | \$11,120,000,000 |
| Contingency (30% / 38%) | \$3,464,000,000 | -- | \$ 3,332,000,000 | -- | \$4,226,000,000 |
| Other Program Costs | \$5,108,000,000 | | \$3,800,000,000 | | \$4,827,000,000 |
| Planning/Design/CM (Soft Costs) | \$3,328,000,000 | 22.2% | \$3,080,000,000 | 25.5% | \$3,906,000,000 |
| DWR Oversight | \$426,000,000 | 2.8% | \$ 180,000,000 | 1.5% | \$228,000,000 |
| DCA Program Management Office | \$668,000,000 | 4.4% | \$ 420,000,000 | 3.5% | \$533,000,000 |
| DCA Engineering (Design and CM Services) | \$2,167,000,000 | 14.4% | \$ 2,420,000,000 | 20.0% | \$3,069,000,000 |
| DCA Permits and Agency Coordination | \$67,000,000 | 0.4% | \$ 60,000,000 | 0.5% | \$76,000,000 |
| Other Costs | \$1,780,000,000 | -- | \$720,000,000 | -- | \$921,000,000 |
| Land Acquisition | \$158,000,000 | -- | \$ 320,000,000 | -- | \$416,000,000 |
| Mitigation Program | \$960,000,000 | -- | \$ 400,000,000 | -- | \$ 505,000,000 |
| Power | \$415,000,000 | -- | included above | -- | included above |
| CCWD Settlement | \$47,000,000 | -- | \$0 | -- | \$0 |
| Community Benefits Program | \$200,000,000 | -- | \$0 | -- | \$0 |
| TOTAL | \$20,120,000,000 | | \$15,901,000,000 | | \$20,173,000,000 |

* 2020 Dollars Escalated to 2023 Dollars based on USBR CCT = 26.8%

What are Innovations?

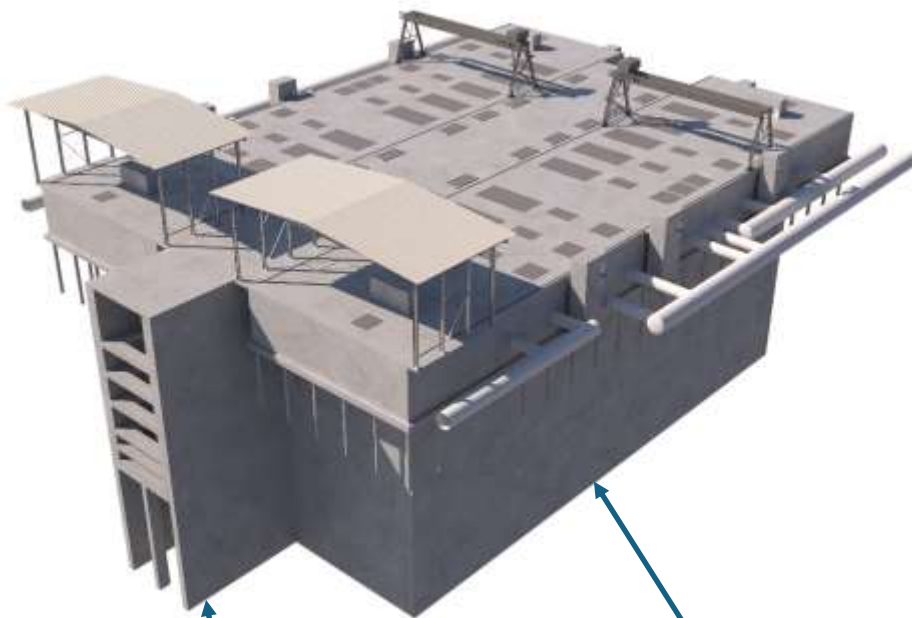


- Represent opportunities to reduce impacts, cost, schedule, and/or risk
- Indicate how the project could evolve through future value engineering
- Developed 19 innovations for secondary cost estimate - do not currently represent changes to the project description

Innovation Example – Bethany Reservoir Pumping Plant



Current EPR Design



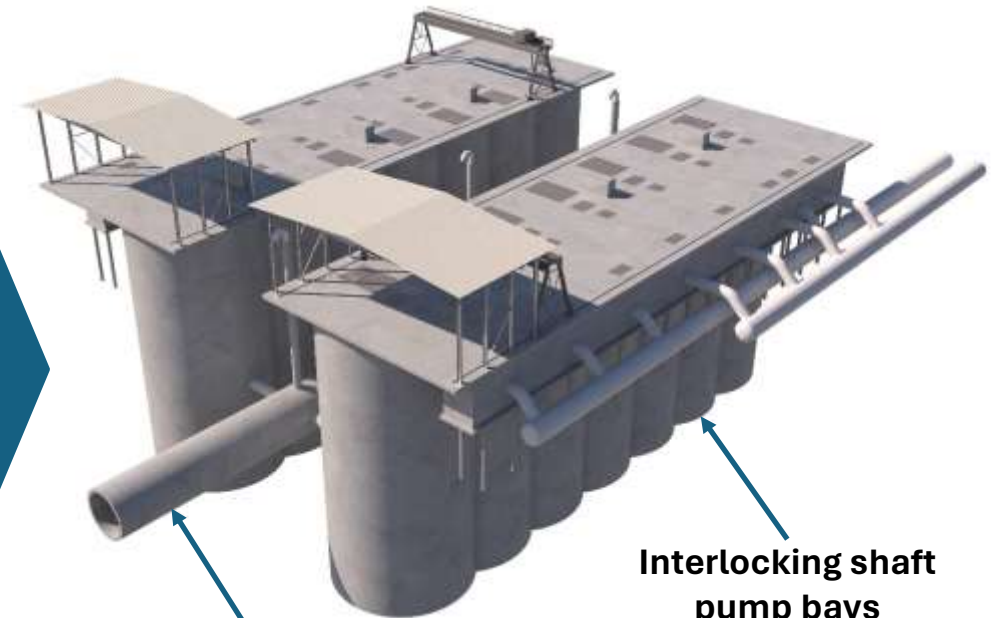
Rectangular concrete wet well and inlet conduit from tunnel

Rectangular concrete pump bays

INNOVATION ADVANTAGES

- Reduced quantities, saves:
 - 274,000 yd³ soil excavation
 - 84,000 yd³ concrete
 - 10,400 tons rebar
- Shortens construction schedule by 981 days
- Reduces direct construction cost by \$138,720,000
- No changes to above ground configuration or features

Innovation Design



Tunnel connection to pump bays

Interlocking shaft pump bays

Comparison of Costs w/ Innovations



- **Estimate Total Project Cost w/ Innovations using:**
 - proportion of risk treatment costs
 - contingency %, labor %
 - direct application of “other costs”
- **Does not account for cost benefits of risk or schedule reduction**
- **Does not account for Collaborative Delivery contracting**
- **Innovations reduce total project cost by \$1.23B , or 6% of total cost**

| | Total Project Cost Estimate (\$2023) | % Const Cost | Total Project Cost w/ Innovations (\$2023) |
|---|--------------------------------------|--------------|--|
| TOTAL CONSTRUCTION COSTS | \$15,012,000,000 | | \$ 14,008,000,000 |
| Two Intakes | \$1,714,000,000 | -- | \$ 1,678,000,000 |
| Tunnel and Shafts | \$6,353,000,000 | -- | \$ 6,130,000,000 |
| Pumping Plant /Surge Basin/Aqueduct & Discharge | \$3,198,000,000 | -- | \$ 2,703,000,000 |
| Utilities and Logistics | \$283,000,000 | -- | \$ 264,000,000 |
| Construction Sub-Total | \$11,548,000,000 | -- | \$ 10,775,000,000 |
| Contingency (30%) | \$3,464,000,000 | -- | \$ 3,223,000,000 |
| Other Program Costs | \$5,108,000,000 | | \$4,838,900,000 |
| Planning/Design/CM | \$3,328,000,00 | 22.2% | \$3,106,000,000 |
| DWR Oversight | \$426,000,000 | 2.8% | \$ 398,000,000 |
| DCA Program Management Office | \$668,000,000 | 4.4% | \$ 623,000,000 |
| DCA Engineering (Design and CM Services) | \$2,167,000,000 | 14.4% | \$ 2,022,000,000 |
| DCA Permits and Agency Coordination | \$67,000,000 | 0.4% | \$ 63,000,000 |
| Other Costs | \$1,780,000,000 | -- | \$1,780,000,000 |
| Land Acquisition | \$158,000,000 | -- | \$158,000,000 |
| Mitigation Program | \$960,000,000 | -- | \$960,000,000 |
| Power | \$415,000,000 | -- | \$415,00,000 |
| CCWD Settlement | \$47,000,000 | -- | \$47,000,000 |
| Community Benefits Program | \$200,000,000 | -- | \$200,000,000 |
| TOTAL | \$20,120,000,000 | | \$18,894,000,000 |



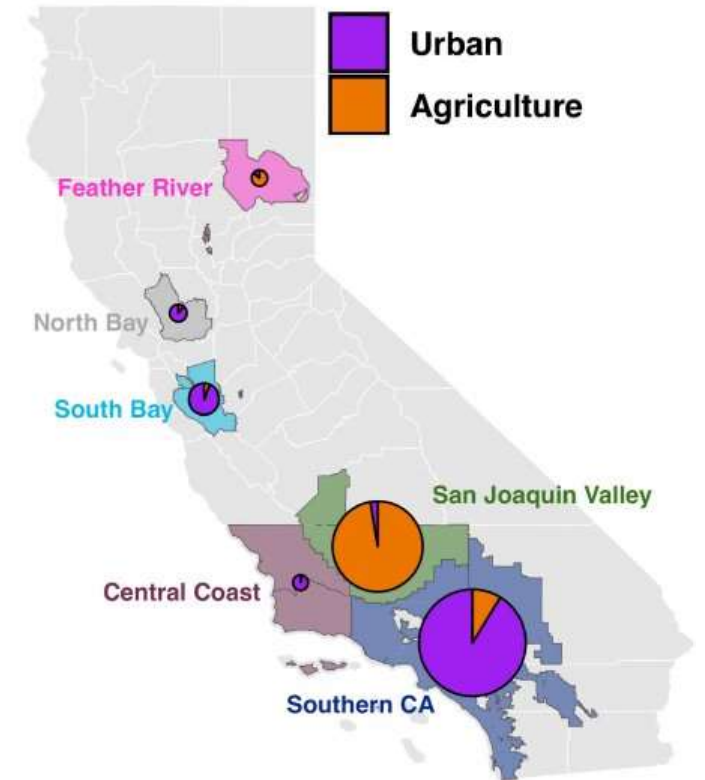
Benefit-Cost Analysis

Dr. David Sunding
Emeritus Professor
University of California Berkeley



The State Water Project

- **Service Area:**
 - 27 million people
 - GDP \$2.8 trillion, equivalent to the world's 8th largest economy
- **Current Water Supply:**
 - ~2.56 million acre-feet per year (MAF/yr) of deliveries to urban and agricultural customers
- **Future Challenges:**
 - Climate change and sea level rise expected to reduce deliveries by ~22% by 2070
 - Risk of extended disruption during seismic event





DCP Readily Passes the Benefit- Cost Test

- **Project Benefits:**

- **Water Supply Reliability and Quality:** Offset negative impacts of climate change on water deliveries
- **Seismic Reliability:** Maintain deliveries even after major seismic events

- **Project Costs:**

- DCA Cost estimate (discounted)
- + additional O&M costs and environmental impacts

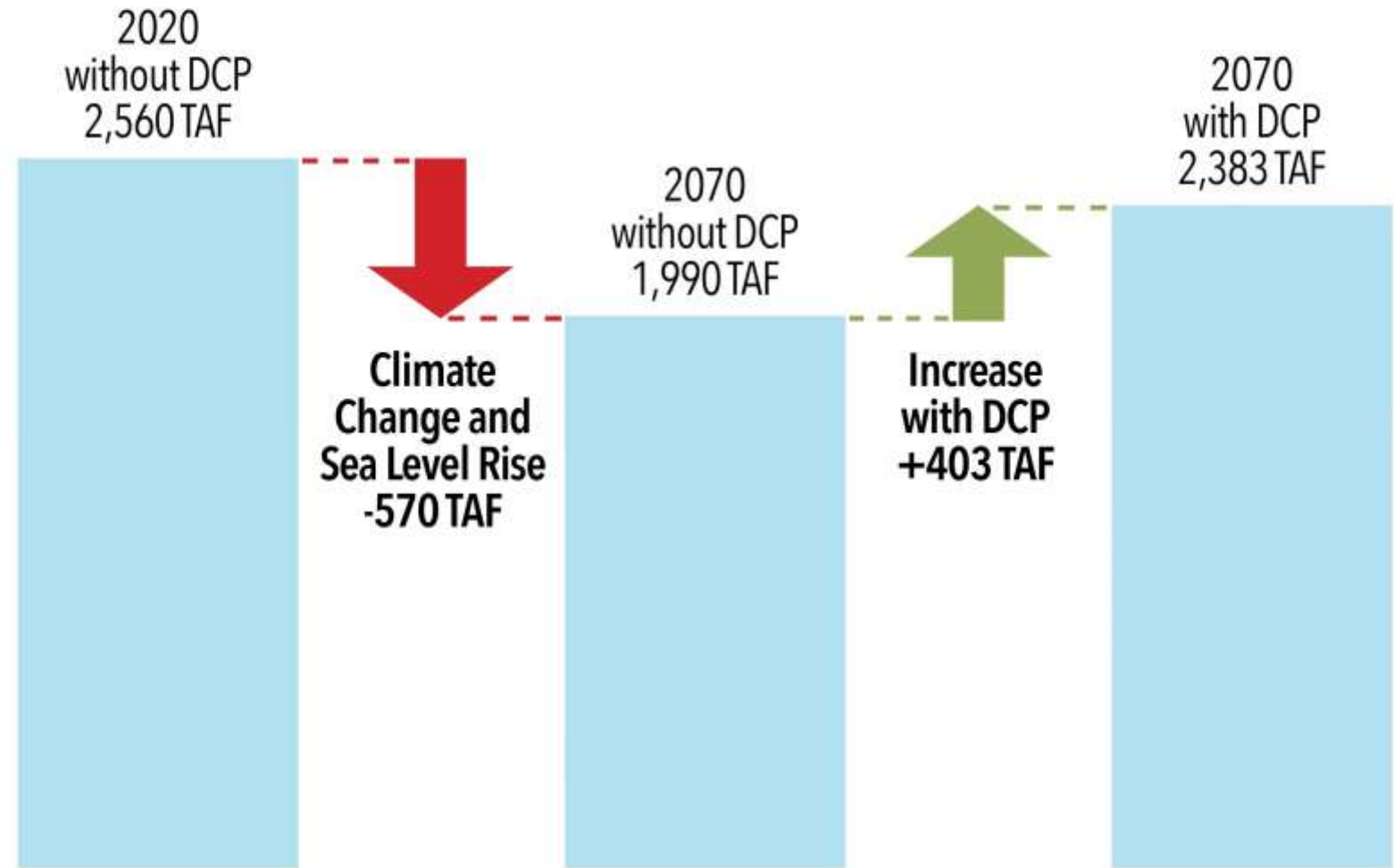
- **Benefit Cost Ratio: 2.20**

- Passes the Benefit-Cost Test
- **Every \$1 spent = \$2.20 gained**



Water Supply Benefits

State Water Project Deliveries:





Water Supply Benefits

- **More SWP deliveries allow** agencies to:
 - Fill storage more frequently
 - Enter drought periods with higher reserves
 - Impose fewer periods of mandatory rationing
 - Reduce severity and frequency of shortages
- **Urban:** measured as consumers' willingness to pay to avoid shortages
 - Shortages predominantly estimated by MWD
 - Economic impact based on peer-reviewed economic models
- **Ag:** based on widely-used SWAP model and water market transaction data



Water Quality Benefits

- **Benefits** of reduced salinity for SWP contractors **outweigh costs** of 'less than significant' increase in Delta salinity
- **Salinity Impacts:**
 - **Urban:** Reduces treatment cost, improves taste, useful life of appliances, cost of water softening
 - **Ag:** More efficient water use; reduces use of irrigation water needed to flush salts from root zones



Seismic Benefits

- **Avoiding disruption** to statewide water supply during potentially significant earthquakes **saves money and protects water quality**
- **Scenario Analyzed: Delta Flood Emergency Management Plan (2018) Scenario 1**
 - 500-year event, 50 levee breaches & 20 islands flooded
 - Economic impacts assessed with water supply reliability and water quality models for urban and agriculture



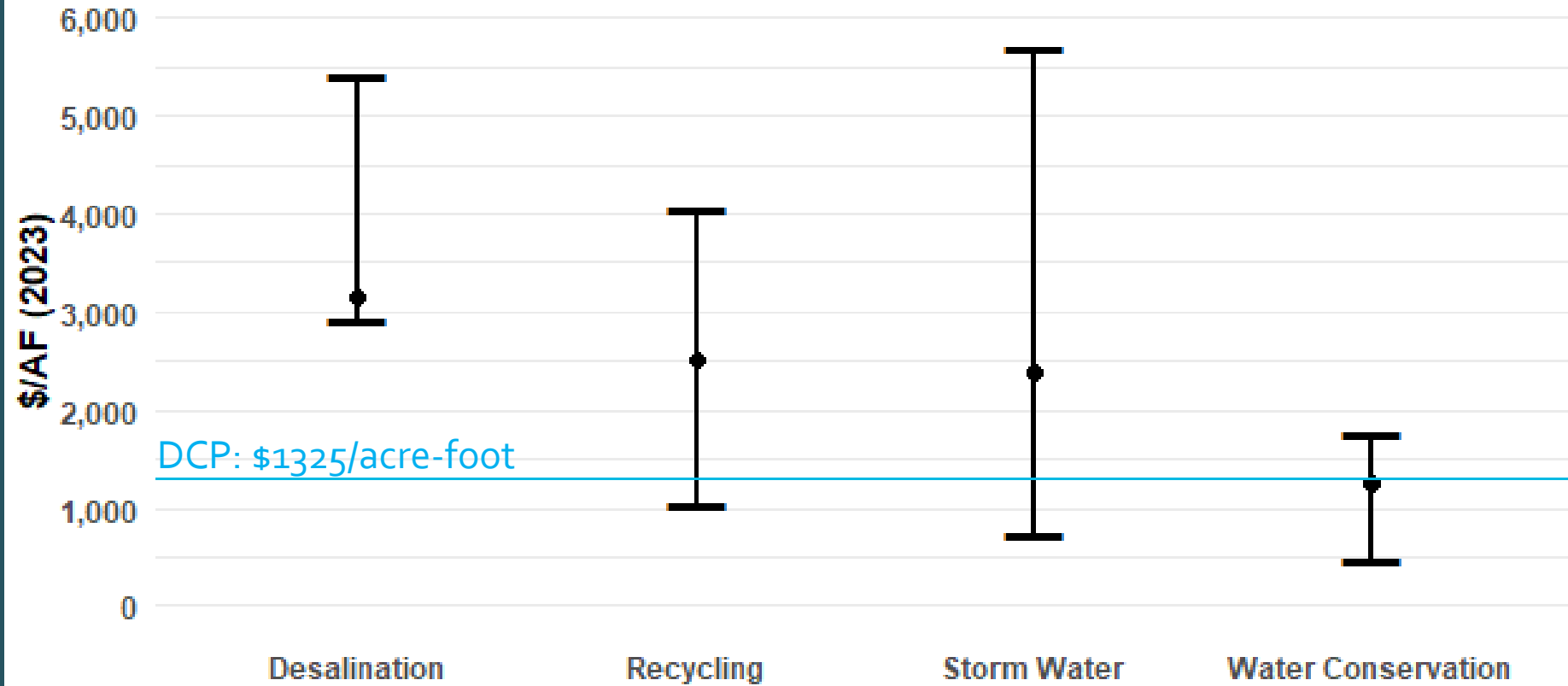
Positive Benefit-Cost Ratio Across All Climate Scenarios

Sensitivity Analysis

| | Main Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 | Scenario 5 |
|--------------------|----------------------|-----------------------------------|----------------------|-----------------------------------|----------------------|--------------------------------|
| | 2070 Median 1.8' SLR | 2070 Median 1.8' SLR & mitigation | 2070 Median 3.5' SLR | 2070 Median 3.5' SLR & mitigation | 2040 Median 1.8' SLR | 2040 Central Tendency 1.8' SLR |
| Benefit-Cost Ratio | 2.20 | 2.20 | 2.63 | 2.45 | 1.78 | 1.54 |



Comparison to Alternative Supplies



Source: Sunding, Browne, Zhu (2023) The Economy of the State Water Project
Constructed using data from previous studies by the Pacific Institute, PPIC and CPUC and updated for inflation
DCP cost does not include South-of-Delta conveyance



Cost of Doing Nothing

- **Cost of Inaction on Climate and Seismic Risk**
 - 22% reduction in deliveries by 2070 (570,000 AF/yr)
- **Direct impacts** of climate change and seismic risk:
 - **Reduced reliability** and flexibility for SWP operations
 - **Water shortages** and mandatory restrictions
 - Ongoing risk of **major seismic disruption**
 - Expensive **alternative supplies**
- **Indirect Impacts** (not evaluated):
 - **Higher rates** for local agencies
 - Impacts on **employment and economic activity** for agricultural economies in Central Valley and urban development in SoCal
 - Higher **food prices**
 - Depletion of **groundwater resources**
- **The cost of inaction** on climate and seismic risk **exceeds the \$38B in project benefits**

Bethany Cost Estimate



Benefit Cost Analysis



Stay Informed



DWR: deltaconveyanceproject.com

DCA: dcdca.org



DWR: DeltaConveyance@water.ca.gov

DCA: info@dcdca.org



Multilingual Project Hotline

866.924.9955



Questions?

