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Avoided Cost of Water

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Benefit & Cost Analysis

- Comprehensive approach – include lifecycle cost analysis
- Reasonable and equitable assumptions
  - Discount rates
  - Cost of water supply
  - Lifespan of infrastructure
  - Technological advancements
- Benefits and costs that are hard to quantify
  - Ratepayer trust
  - Employee morale

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Benefits

- Water saved
- Energy saved
  - CO2 emissions associated with the energy saved
- Reduce risk of large breaks
- Ratepayer trust
- Extended infrastructure life
- Reduce apparent losses
- Avoided cost

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Costs

- Leak detection equipment/technology
- Labor cost (including training)
- Communications & outreach
- Ratepayer backlash
- Meter replacement
- Infrastructure replacement
  - Overall replacement rate
  - High traffic areas
  - Coordination with other street and utility repair and installation schedules

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Cost of Water

- Rising quickly relative to inflation
  - Climate change
  - Regulatory drivers
    - Treatment standards
    - SGMA
- Source dependent
- Significant uncertainty

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Avoided Cost

- Includes avoided and delayed investments and expenses
- Examples include:
  - Purchased water
  - “New” supplies such as recycled water and desalinated water
  - Additional treatment capacity
- Requires assumptions about future conditions
- Can be a large benefit

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California Public Utilities Commission

NAVIGANT

GEI Consulting Engineers and Scientists

Avoided Water Capacity Cost Model

DRAFT: Version 1.04

Released: September 2015

Detailed Output - Annual Avoided Cost			
Technology	Recycled - Tertiary + Disinfection	Chlorine Disinfection	Wastewater Treatment
Year	Water Supply	Potable Treatment	Wastewater Treatment
2014	$ 0.42	$ 0.02	$ 2.64
2015	$ 0.42	$ 0.02	$ 2.64
2016	$ 0.42	$ 0.02	$ 2.64
2017	$ 0.42	$ 0.02	$ 2.64
2018	$ 0.42	$ 0.02	$ 2.64
2019	$ 0.42	$ 0.02	$ 2.64
2020	$ 0.42	$ 0.02	$ 2.64
2021	$ 0.42	$ 0.02	$ 2.64
2022	$ 0.42	$ 0.02	$ 2.64
2023	$ 0.42	$ 0.02	$ 2.64
2024	$ 0.42	$ 0.02	$ 2.64
2025	$ 0.42	$ 0.02	$ 2.64

Input Selection

Select Hydrologic Region

South Coast

	Water Supply	Potable Treatment	Wastewater Treatment
Water System Component Costs	Recycled - Tertiary + Disinfection	Chlorine Disinfection	Wastewater Treatment
Capital Cost per Unit ($M/MGD)	$ 3.19	$ 0.06	$ 17.98
Marginal Fixed O&M Cost per Unit ($M/MGD)	$ 0.09	$ 0.01	$ 0.70
Financial Assumptions			
Ownership Entity Type	IOU	Other	Municipality
Inflation Rate	3.0%	#N/A	3.0%
Working Capital	0.0%	#N/A	0.0%
Depreciation Life			
Straight Line	40	40	24
MACRS	20	10	15
Capital Costs			
Year to Capital Outlay	2	2	2
Cost of Equity	9.9%	#N/A	0.0%
Percentage of Cap Structure - Equity	58.2%	#N/A	0.0%
Cost of Debt	6.9%	#N/A	4.5%
Percentage of Cap Structure - Debt	41.8%	#N/A	100.0%
Debt Amortization Period	40	40	24
Tax Inputs			
Federal Income Tax Rate	35.0%	#N/A	0.0%
State Income Tax Rate	8.0%	#N/A	0.0%
Composite Tax Rate	40.2%	#N/A	0.0%
Value Added Tax Rate	0.0%	#N/A	0.0%
Payments In Lieu of Taxes (PILOTs)	0.0%	#N/A	5.0%
Property Tax Rate	0.0%	#N/A	0.0%
Basis for Property Tax Rate	Depreciated Cost	#N/A	Depreciated Cost

Region	Ocean Water Desalination Plant Costs ($M/MGD)		Brackish Water Desalination Plant Costs ($M/MGD)		Recycled Water Plant Costs – Tertiary Plus Disinfection ($M/MGD)		Recycled Water Plant Costs – Membrane Treatment ($M/MGD)		Groundwater Facility Costs ($M/MGD)		Contaminant Removal Plus Disinfection Plant Costs ($M/MGD)	
Water Supply - Default Input Recommendations											Potable Treatment	
	Capital	Fixed O&M	Capital	Fixed O&M	Capital	Fixed O&M	Capital	Fixed O&M	Capital	Fixed O&M	Capital	Fixed O&M
North Coast	$33.38	$0.79	$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
San Francisco Bay	$33.38	$0.79	$5.77	$0.47	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
Central Coast	$33.38	$0.79	$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
South Coast	$16.23	$0.42	$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
Sacramento River			$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
San Joaquin River			$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
Tulare Lake			$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
North Lahontan			$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
South Lahontan			$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06
Colorado River			$6.45	$0.48	$3.19	$0.09	$7.15	$0.27	$3.25	$0.01	$4.23	$0.06

	Water Supply			Potable Treatment		
	IOU	Municipality	User Defined	IOU	Municipality	User Defined
Inflation Rate	3.00%	3.00%	<input>	3.00%	3.00%	<input>
Working Capital	0.00%	0.00%	<input>	0.00%	0.00%	<input>
Capital Costs:						
Year to Capital Outlay (Enter On Selection Tab)						
Cost of Equity	9.86%	0.00%	<input>	9.86%	0.00%	<input>
Percentage of Cap Structure - Equity	58.22%	0.00%	<input>	58.22%	0.00%	<input>
Cost of Debt	6.93%	4.51%	<input>	6.93%	4.51%	<input>
Percentage of Cap Structure - Debt	41.78%	100.00%	<input>	41.78%	100.00%	<input>
Tax Inputs						
Federal Income Tax Rate	35.00%	0.00%	<input>	35.00%	0.00%	<input>
State Income Tax Rate	8.00%	0.00%	<input>	8.00%	0.00%	<input>
Composite Tax Rate	40.20%	0.00%	<input>	40.20%	0.00%	<input>
Value Added Tax Rate	0.00%	0.00%	<input>	0.00%	0.00%	<input>
Payments In Lieu of Taxes (PILOTs)	0.00%	5.00%	<input>	0.00%	5.00%	<input>
Property Tax Rate	0.00%	0.00%	<input>	0.00%	0.00%	<input>
Basis for Property Tax Rate	Depreciated Cost	Depreciated Cost	Depreciated Cost	Depreciated Cost	Depreciated Cost	Depreciated Cost

Threshold Questions

- Geographic scale for marginal water supply: statewide vs. regional vs. utility-specific
- Assumptions about increases in the cost of imported supplies
- Assumptions about frequency and duration of future droughts

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Next Steps

- Finalize contract for economic analysis support
- Solicit input on key assumptions
- Share findings
  - Workshops
  - Formal regulatory documents
- Use benefit-cost analysis to inform development of performance standards

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