



Evaluation of the Costs and Benefits of Implementing Ocean Water Desalination as a Local Drinking Water Supply

Chapter V
Wholesale Drinking Water Rate Analysis
West Basin Municipal Water District

Final Report
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Submitted by

in association with





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1. Introduction

1.1 Scope and Purpose

Chapter V of the *Evaluation of the Costs and Benefits of Implementing Ocean Water Desalination as a Local Drinking Water* (the Study) includes:

- An analysis of various pricing options for desalinated ocean water to determine the most appropriate rate option for the West Basin Municipal Water District (the District) to charge its Retail Customer Agencies (Retail Agencies).

The Study commenced in March 2019 and was completed in July 2021. It was undertaken in a five-stage process as covered in five Chapters of this Report (plus an Executive Summary):

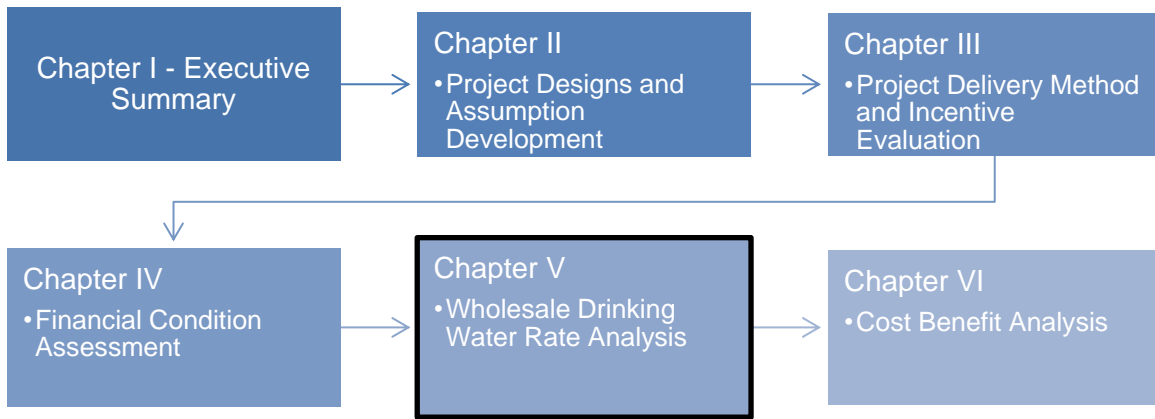


Figure V-1 Structure of this Study: Evaluation of Cost and Benefits of Implementing Ocean Water Desalination as a Local Drinking Water Supply

The Chapter should be considered in the context of the detailed discussion included in the supporting Chapters as well as the assumptions, constraints and limitations of this Study.

1.2 Guiding Principles

The primary factor in determining an appropriate desalinated ocean water pricing methodology is ensuring that it meets the District’s needs. The guiding principles were developed based on discussion with District staff and were used as criteria in order to determine the appropriate methodology for pricing desalinated ocean water. The following guiding principles, expressed by District staff, are shown in no particular order below:

- **Ease of Administration.** It is important to District staff that any pricing option be easy to implement and administer. The desired pricing option will minimize the need for additional staff time and costly information technology (IT) implementations. The District’s billing system currently has the capacity to bill customers for various types of charges, which include a fixed charge by retailer and a Tier 1 rate by acre-feet (AF) of water use, including Metropolitan Water District of Southern California (MWD) pass-through costs and the District’s Reliability Service charge.



- **Minimizes Impact to Retail Agencies to the Extent Possible.** The ideal pricing option will minimize cost impacts to the District’s Retail Agencies. This can be achieved by reducing costs associated with administration and implementation but also as a function of the selected rate option. In addition, the implementation of certain rate changes can cause “rate shock,” which can increase cost impacts to all or some Retail Agencies, depending on the rate structure that is ultimately selected.
- **Evenly Spreads the Cost of Desalinated Ocean Water.** The District communicated to Raftelis that all Retail Agencies benefit from the additional water supply reliability that comes as a result of the construction of the Ocean Water Desalination Project (OWDP). District staff expressed interest in spreading the costs of desalinated ocean water evenly and equitably across all Agencies so that no single entity is overburdened.

1.3 Limitations, Exclusions and Assumptions

Limitations and Exclusions pertaining to the Study overall are included in Chapter I and apply here.

1.4 Reference Documents

Reference Documents listed in Chapter I and IV of this Study are foundational to this Chapter.



2. Desalination Pricing Options and Evaluation

2.1 Option 1: Blended Rate

A first option for desalinated ocean water pricing is to develop a blended rate that includes both the cost of desalinated ocean water and imported water from MWD. The blended rate is based on the proportionate supply mix between desalinated and imported water. For example, the District's expected water supply mix once the OWDP is functional is approximately 80% imported water and 20% desalinated ocean water. This results in a blended rate that is equal to 80% of the MWD rate per AF plus 20% of the desalinated ocean water rate per AF. Each Retail Agency would pay the same rate per AF of water use, which recovers the costs related to both desalinated and imported water.

Some considerations for this option include the following:

- **It is easy to administer.** The District's existing billing system already has the capacity to charge this type of rate and thus requires very few additional resources beyond what is already available to the District. The blended rate is charged by AF of water use and is the same for all Retail Agencies. This type of rate is often easier for staff to administer and implement.
- **It communicates that desalinated ocean water is a benefit to all Retail Agencies.** By having all Retail Agencies participate in desalinated ocean water pricing through the blended rate, the District is communicating that desalinated ocean water benefits all customers equally. The benefit to all customers is increased water supply reliability. The costs of desalinated ocean water are recovered from all Retail Agencies proportionate to the amount of water each Agency purchases from the District.
- **It spreads cost impacts evenly.** Since the costs of desalinated ocean water would be blended with the costs of imported water from MWD, the incremental cost of desalinated ocean water is spread evenly across the entire supply mix and minimizes the risk of rate shock or sudden price shifts for any individual Agency.

2.2 Option 2: Tiered Approach

A second option for desalinated ocean water pricing is to adopt a two-tiered rate option. Tier 1 would include costs associated with purchasing imported water from MWD, and Tier 2 would reflect the incremental costs of desalinated ocean water. This option places the costs of producing desalinated ocean water on Retail Agencies that purchase larger amounts of water from the District.

Some considerations for this option include the following:

- **The District would need to determine the appropriate Tier 1 allocation for each Retail Agency.** Determining the Tier 1 allocation can be challenging given potential reductions or annual fluctuations in water demand. It could also require the District to calculate rates more frequently since the allocation between each Retail Agency can potentially change from year to year, which can significantly increase administrative costs.
- **The impact of the desalinated ocean water cost could be significant to certain customers.** Since the volume of desalinated ocean water use (in this instance, Tier 2 use) would vary by customer, the cost impacts would also vary more widely. It is likely that a smaller group of customers, especially those purchasing large volumes of water from the District each year, would bear a larger burden for desalinated ocean water costs.



- **It would create an incentive for retail customers to minimize water usage in order to stay within Tier 1.** An inclining tiered rate structure is often used to incentivize higher volume users to conserve water. In this instance, customers are then incentivized to reduce water demand to avoid additional costs associated with desalinated ocean water production. However, this could mean that the need for additional desalinated ocean water could be minimized or eliminated. Alternatively, this could also mean that the incremental costs of desalinated ocean water are recovered from a small number of Agencies that cannot reduce their water use.

2.3 Option 3: Fixed and Variable Option

A third option for desalinated ocean water pricing is a hybrid fixed and variable rate structure. The costs of producing desalinated ocean water must be broken out between fixed and variable costs. In this way, the portion of fixed costs would be recovered through a fixed charge to each Retail Agency (similar to the existing fixed service charge, based on each Agency's proportion of three years of historical demand), while the portion of variable costs would be recovered through a variable rate based on AF of water use.

Some considerations for this option include the following:

- **The District would need to determine how to allocate desalinated ocean water costs between fixed and variable components.** The majority of desalinated ocean water costs are fixed, such as debt service, fixed operations and maintenance, and capital refurbishment and replacement. Variable costs, such as variable operations and maintenance and energy costs would need to be translated into a rate per AF of water use.
- **An increase in the fixed charge could cause uneven rate impacts across Retail Agencies.** The District first implemented the fixed service charge within the past three years and has already increased this rate component to enhance revenue stability. The higher proportion of fixed costs for desalination would require a significant increase to the existing fixed service charge. Further increasing the fixed charge to include desalinated ocean water costs will impact the Retail Agencies and may not spread costs evenly among them, since the District's current fixed charge is based on three years of historical demand by Retail Agency.

2.4 Option 4: Take or Pay

A fourth pricing option for desalinated ocean water involves each Retail Agency paying for a specific share of desalinated ocean water capacity. Customers would be allowed to opt in or out, but once opting in, each Agency would be responsible for the costs of desalinated ocean water proportionate to the amount of capacity purchased. Agencies could use desalinated water up to the amount of capacity they have purchased. Conversely, Agencies will pay for this benefit regardless of whether they use their entire capacity allotment.

Some considerations for this option include the following:

- **There would be an additional administrative cost to the District.** This pricing option requires the District to coordinate with each Retail Agency to develop a "take or pay" agreement, which in turn requires additional staff costs for the negotiation and deliberation process. Depending on the agreement, this process can reoccur every couple of years.
- **Retail customers may have limited debt capacity.** Each Retail Agency, with differing financial situations, will have differing abilities to fund this option, regardless of water usage. Given the District's high credit rating, it may be more cost-effective for the District to issue debt on behalf of its Retail Agencies, but this would further increase the additional administrative burden noted above.



2.5 Recommendation

Raftelis has assessed each of the pricing options above against the guiding principles provided by the District. The option that best reflects these principles is Option 1, which involves implementing a blended rate that incorporates both the cost of desalinated ocean water and the costs of imported water from MWD based on their proportion of the water supply mix. This option minimizes the cost impacts of desalinated ocean water, spreads them evenly across Retail Agencies, and is the easiest for District staff to administer.



3. Glossary

Abbreviation	Meaning	Abbreviation	Meaning
@Risk	@Risk modelling software developed by Palisade Corporation	NOA	Notice of Availability
AF	Acre foot	NOP	Notice of Preparation
AFY	Acre Feet per Year	O&M	Operations and Maintenance
CAP	Continuous Application Program	OWDP	Ocean Water Desalination Project
CAPEX	Capital Expenditure	OPEX	Operations Expenditure
CARB	California Air Resources Board	PAB	Private Activity Bonds
CBA	Cost Benefit Analysis	PCC	Public Contract Code
CDP	Carlsbad Desalination Plant	PFAS	Poly-fluoroalkyl Substances
CEQA	California Environmental Quality Act	PFHxA	Perfluorhexanoic Acid
CRA	Colorado River Aqueduct	PFOA	Perfluorooctanoic Acid
CRCWSC	Cooperative Research Center for Water Sensitive Cities	PFOS	Perfluorooctane Sulfonate
CWSRF	Clean Water State Revolving Fund	POU	Point-of-use
DBB	Design-Bid-Build	PPCPs	Pharmaceuticals and personal care products
DBFOM	Design-Build-Finance-Operate-Maintain	PPP	Public-Private Partnership (also P3)
DBOM	Design-Build-Operate-Maintain	PPT	Parts per Trillion
DDW	Division of Drinking Water	R&R	Rehab and Replacement
(the) District	West Basin Municipal Water District	RDA	Redevelopment Agencies
DWSRF	Drinking Water State Revolving Fund	RO	Reverse Osmosis
EIFD	Enhanced Infrastructure Financing Districts	ROW	Right-of-way
EIR	Environmental Impact Report	RPS	Renewables Portfolio Standard
EPA	Environmental Protection Agency	SCAQMD	South Coast Air Quality Management District
ESGS	El Segundo Generating Site	SCE	Southern California Edison
FTE	Full-time Equivalents	SDCWA	San Diego County Water Authority
GHG	Greenhouse Gas	SPV	Special Purpose Vehicle
GO	General Obligation (Bonds)	SRF	(Drinking Water) State Revolving Fund
HAB	Harmful Algal Blooms	SWP	State Water Project
INFFEWS	Investment Framework for Economics of Water Sensitive Cities	TDS	Total Dissolved Solids
IO	Input-Output	TMs	Task Memorandums
IRR	Internal Rate of Return	UWMP	Urban Water Management Plan
kWh	Kilowatt Hour	VfM	Value-for-Money
LRP	Local Resources Program (a rebate program by MWD)	WBMWD	West Basin Municipal Water District
MCL	Maximum Contaminant Level	WIFIA	Water Infrastructure Finance Innovation Act
MGD (or mgd)	Million Gallons per Day	WIIN Act	Water Infrastructure Improvements for the Nation Act
MG/L	Milligrams per liter	WPA	Water Purchase Agreement
MMRP	Mitigation Monitoring and Reporting Program	WSAP	Water Supply Allocation Plan
MT/yr	Metric Tonnes per Year	WTP	Willingness-to-pay
MWD	Metropolitan Water District of Southern California		
NAD Bank	North American Development Bank		
NDMA	Nitrosodimethylamine		
NPC	Net Present Cost		
NPV	Net Present Value		

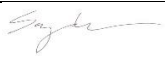
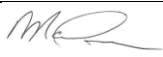


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