

Is Desal Worth the Expense?

An Economic Framework for Evaluating Desal and Reuse Projects

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2005 National Salinity Management
and Desalination Summit
Albuquerque, NM
December 8, 2005



Overview

- ▶ Financial versus Economic perspectives
 - Financial: revenues and costs (cash flows)
 - Economics: benefits ↔ value (social)
- ▶ Key types of benefits (values) to consider
- ▶ Evidence of the size of some benefits values



Core Issue: Are “New Water” Supplies Worth the Relatively High Cost?

- ▶ From a **financial** cash flow perspective, desal or reuse projects may not seem fiscally sound
 - High costs mean high cash outflow
 - Revenue stream limited (net revenues < 0?)
- ▶ From **economic** perspective, are there benefits that might outweigh the costs?
 - Economic benefits are not the same as revenues
 - Embracing a broader, “social cost” perspective
 - Reflects full “value” of desal or reuse options



Why the **Financials** May Look Unfavorable

Revenues from desal or reuse projects often limited

- ▶ Pricing strategies and other constraints
 - Reuse often priced to sell water at below cost of potable supplies
 - Potable supplies often under-priced (e.g., average vs. marginal costs, infrastructure)
- ▶ Rate Shock a concern for desal if full cost recovery used as basis for pricing



Why Look at the **Economic** Perspective?

- ▶ For many desal or reuse projects, the benefits (i.e., value) to society may outweigh the costs
 - Broad range of benefits (e.g., instream ecosystems)
 - Large and diverse set of beneficiaries
- ▶ Where benefits shown to outweigh costs:
 - Identify benefits and beneficiaries who might not be ratepayers (outside of service area)
 - Positive externalities become a valid basis for seeking broad cost sharing and/or subsidies



The Challenge

- Desal can generate many important types of benefits, but often the full range of benefits are not well recognized
- ▶ Some benefits are dispersed across political or district jurisdictional boundaries
 - Not all beneficiaries engaged in the deliberations
 - Disconnect between who benefits and who pays
 - ▶ Important benefits may be obscure and/or hard to quantify & value (“full social cost accounting”)



The Challenge (cont.)

- ▶ Distribution of benefits rarely the same as the distribution of costs
 - Real or perceived equity issues
 - “Externalities” (beneficiaries outside rate base)
- ▶ Mistrust of benefit-cost analysis: some view as:
 - Incomplete (missing benefits or costs)
 - Biased (generating predetermined outcomes)



Defining the Baseline

- ▶ A critical key to a good economic analysis is to ensure proper definition of the baseline
 - Intent is “*without project*” versus “*with project*”
- ▶ Defining the baseline can be real challenge
 - Complex issue of where alternative water supply would come from, and what it would really cost
 - Or, baseline = what happens if more water is not added to the community supply portfolio
- ▶ Stakeholder baselines may reveal disagreement over core assumptions or goals (e.g., growth)



Some Key Sources of Value (Benefits) of Desal or Reuse

- ▶ Portfolio management and supply reliability
 - Diversifying risk across water supply options
 - Avoiding periodic water use restrictions
 - Accommodating economic growth
- ▶ Positive externalities (enviro & social benefits)
 - Preserve & enhance freshwater stream flows
 - Wetland restoration or creation
 - Recreation use, habitat, wildlife, other values



Other Key Benefits or Values of Reuse and Desal

- ▶ Improved quality of source water bodies
 - Higher instream flows & related benefits
 - Groundwater improvements (e.g., avoided subsidence, pumping costs, salt water intrusion)
- ▶ More local control
 - Desal or Reuse as “local” water source
 - Not subject to whims of imported water
- ▶ Increased availability of traditional source waters for other users and uses



Some Potential Desal Costs to Consider

- ▶ Coastal zone and other enviro impacts
 - Impingement and entrainment, brine disposal
 - Opportunities to mitigate or offset impacts (e.g., via equivalent habitat restoration)
- ▶ Energy intensity and associated risks
 - Cost levels, price volatility, and grid reliability
 - Offset long-distance pumping of source waters
 - Opportunities to decouple “tomorrow’s water” from “yesterday’s energy”?



How large might some values be?

Increased reliability of water supply: Desal and reuse are drought-insensitive

- ▶ Part of “portfolio management” approach
 - Minimizing covariance between supply options
 - Perhaps 50% “premium” for reclaim v. river source (better w/ reuse even if pay more \$/AF)
- ▶ Households willing to pay considerable amounts to avoid drought-related water use restrictions
 - Perhaps \$100 per year or more per household
 - Translates to perhaps \$4000 / AF (or higher)



How large are some of these values? (cont.)

Instream flows and/or wetland preservation

- ▶ Recreational uses may account for \$ millions per year
 - Instream whitewater boating and fishing
 - Wetland area and near-stream visitation
- ▶ Ecological services, critical habitat, special status species preservation (“nonuse values”)
 - Can be \$ millions per year
 - Bay Delta water – \$1000 / AF ?



Conclusions

- ▶ Desal and reuse often are relatively expensive, but ...
- ▶ They typically provide some relatively unique yet important types of values
 - These benefits can provide very high values
- ▶ When speaking of the “value” of desal, reuse, or similar water supply assets
 - Financial analysis perspective is too limited
 - Need to adopt a broad economic perspective



Acknowledgements

- ▶ WaterReuse Foundation: **Economic Framework for Water Reuse** (on-going)
- ▶ Bureau of Reclamation: **Net New Water Supply Study: Portfolio Theory** (on-going)
- ▶ Cal DWR and UC Santa Cruz: **Benefit-Cost Tool to Guide State and Local Desal Planning** (starting soon)
- ▶ Awwa Research Foundation: **Value of Water** (now in print)



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