

The Cost of Water Reuse: **An Economic Perspective**

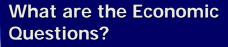


USF Workshop II: Engineering, Ecosystem Impacts & Financial Considerations

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What are the Economic **Questions?**

- What are the benefits?
- What is the direct cost?
- What is the indirect cost?
- What is the opportunity cost?
- What are the unknowns?



• What are the benefits?

- Is this less strain on ecosystems, natural systems that support existing water supply and economy?
 To the extent that less raw water is depleted as a result of reuse
 Conceptual only, as existing supply plans locally are designed to support healthy ecosystems
 Greater flexibility in economic growth
 Area that the superint that a constraint is removed

- Again, to the extent that a constraint is removed
- If new water permits = more costly new development
 In AU, developers have to bring water
 Or don't bring development plan
 Lower cost source water?

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What are the Economic **Questions?**

- What is the direct cost of reuse as indirect potable use? - As components of a mix of sources; i.e., not consumer's cost
- At least equal to Reverse Osmosis costs in spectrum of treatment costs, if not R.O. + Aquifer Recharge

| | \$/1,000 Gallons | | |
|--|------------------|------|------------|
| | Min | Max | |
| Current Potable Uses | | | |
| Conservation: Public | 0.05 | 4.76 | |
| Conservation: Utilities | 0.05 | 0.35 | |
| Fresh groundwater | 1.24 | 2.25 | |
| Alternative Surface Water | 4.70 | 7.80 | |
| Desal (Reverse Osmosis) | 5.66 | 7.61 | |
| Surface water | 6.56 | 9.08 | |
| Brackish groundwater | 7.91 | 8.20 | |
| Current Nonpotable uses | | | |
| Reuse: Agricultural/Industrial uses* | 0.69 | 0.96 | |
| Reuse: Aquifer Recharge | 4.39 | 7.06 | 57 |
| Reuse: Residential Irrigation* | | 1.35 | The second |
| * Incremental distribution costs only (does not include treatment co | st) | | Balmoral |
| Sources: PBS&J 1999, Manatee Utilities 2009, Black & Veatch 200 | 18 | | Group |



What are the Economic **Questions?**

- What is the indirect cost?
 - Potential cost: managing increased salinity and heavy metals
 - Direct costs include treatment for most of the pollutants, piping
 - Energy draw

What are the Economic **Questions?**

What is the opportunity cost?

- What could you do otherwise?
 1958 UN: "No higher quality of water, unless there is a surplus, should be used for a purpose that can tolerate a lower grade"
- Can the public tolerate a lower grade?
 - Conceptually, treatment of reuse provides water as clean or cleaner than raw water
- Uncertainty
 Can other options achieve the same result at lower cost? Conservation
 - Requires political will, change in lifestyle

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What are the Economic **Questions?**

- What are the unknowns?
 Long-term effects of emerging pathogens, endocrine disruptors, antibiotic resistance
 Potentially, are also present in other source waters
 Uncertainty is difficult to quantify
 Indirect potable use is occurring
 Opportunity to quantify effects based on history of others' experience
 Drinking water standards were intended for water obtained from conventional, relatively uncontaminated sources of tresh water, not for reclaimed water
 Requires analysis
 Vulnerable to political suasion
 Toowoomba AU "You'll grow breasts" campaign

Summary

- Economic costs are relatively straightforward
 - Requires Analysis
 - Opportunity Costs are subjective and vulnerable to politics
 - Uncertainty requires place-specific analysis to quantify
- Public perception is expensive
 - Political capital



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