Key Challenges for Seawater Desalination in California

Heather Cooley, Energy Water Nexus Summit 4

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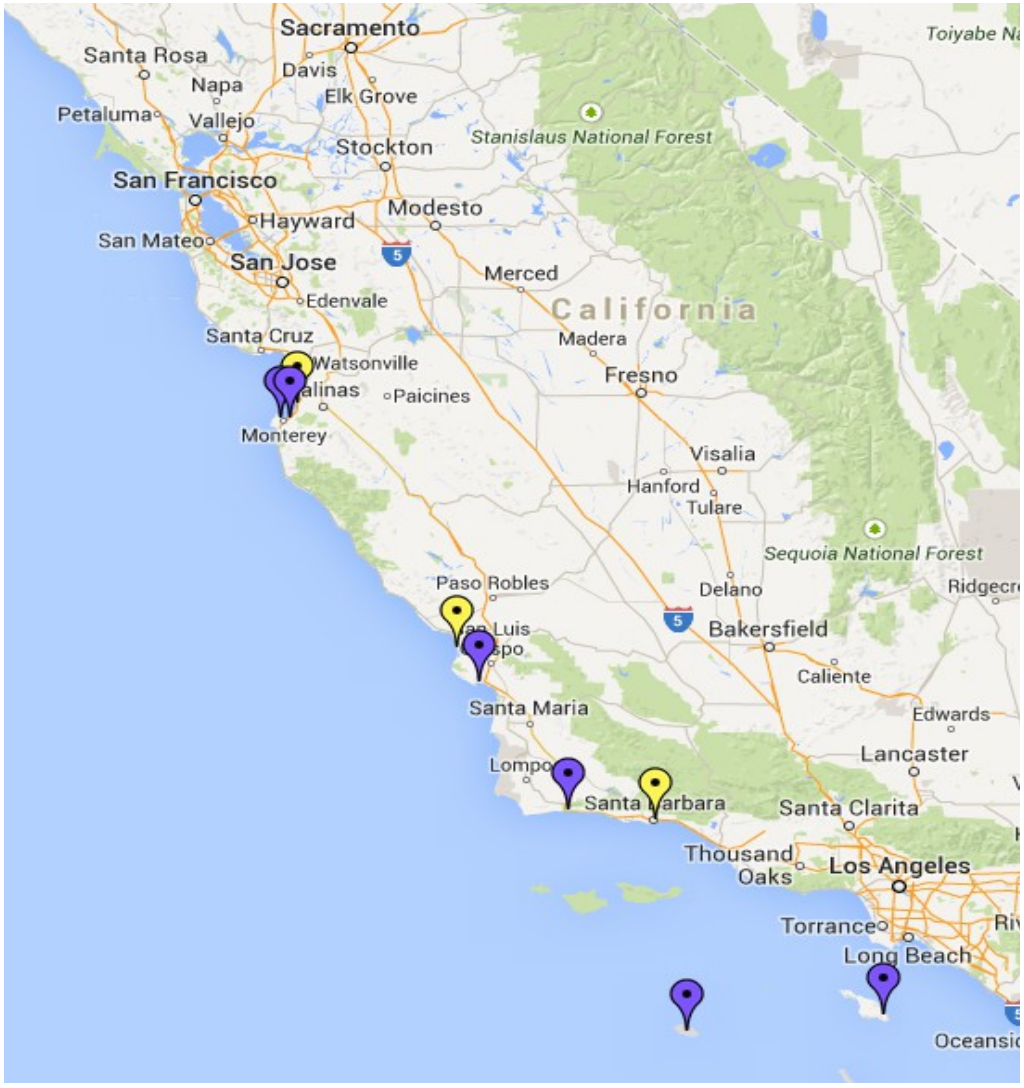
Existing Seawater Desalination Plants



A handful of small plants, mostly for industrial purposes

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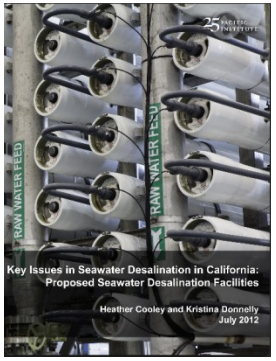
Proposed Seawater Desalination Plants

15 proposed seawater desalination plants along the CA coast

and

2 in Mexico



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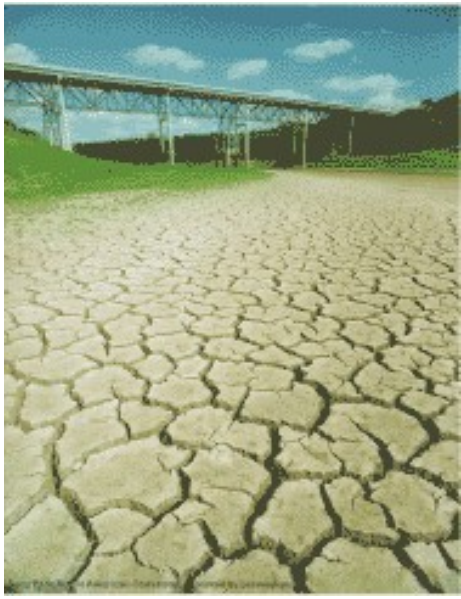
Water Supply Diversity and Reliability

- Seemingly abundant new supply of water
- Largely independent of weather conditions, e.g., drought, climate change
- Source diversity
- Local control

Source: DWR website



Source: USGS website

Key Outstanding Issues

- Energy use and greenhouse gas emissions
- Cost and financing
- Marine Impacts
  - Intakes
  - Brine discharge

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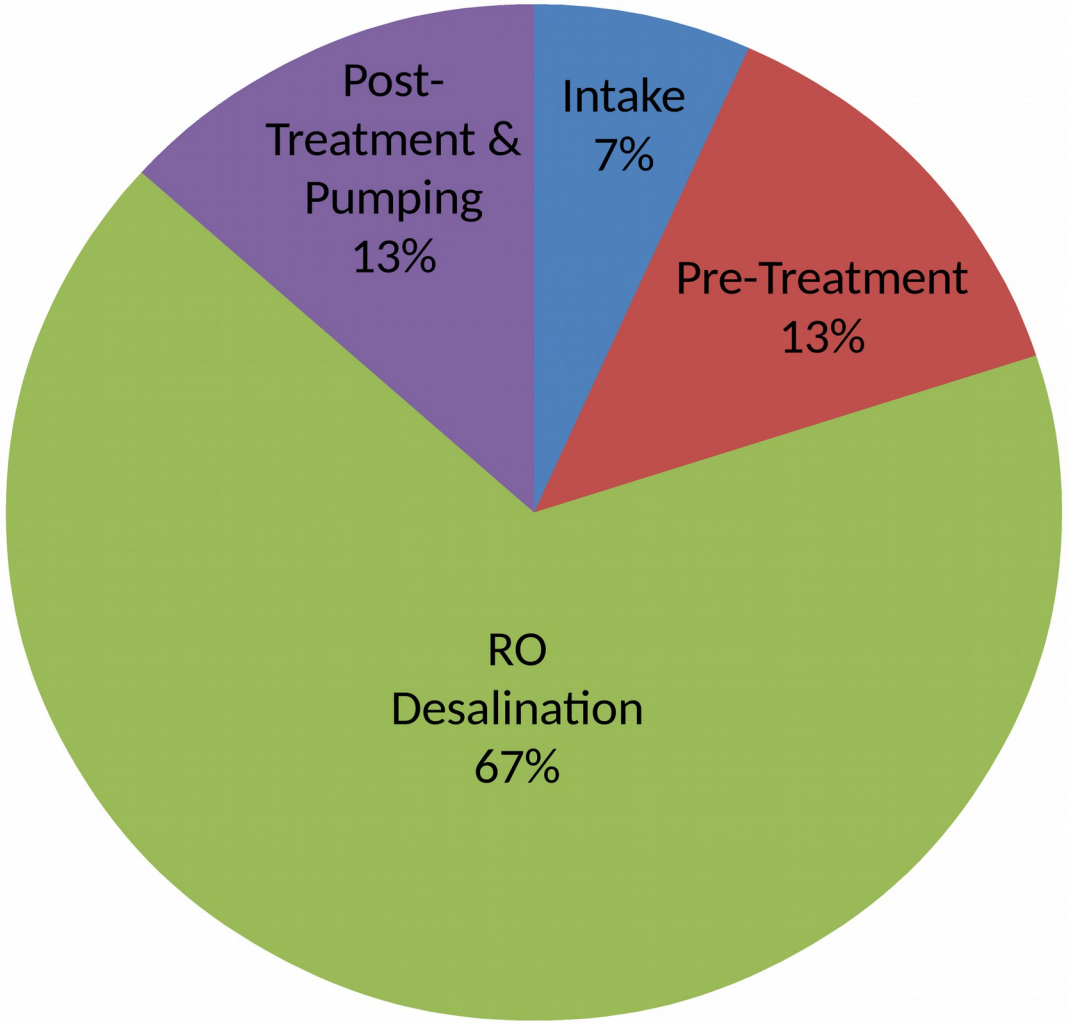
Key Issue: Energy Use and GHG Emissions



4,000 - 6,000 kWh per acre-foot

Theoretical minimum for RO is around 3,400 kWh per million gallons for 40% recovery (for RO process only).

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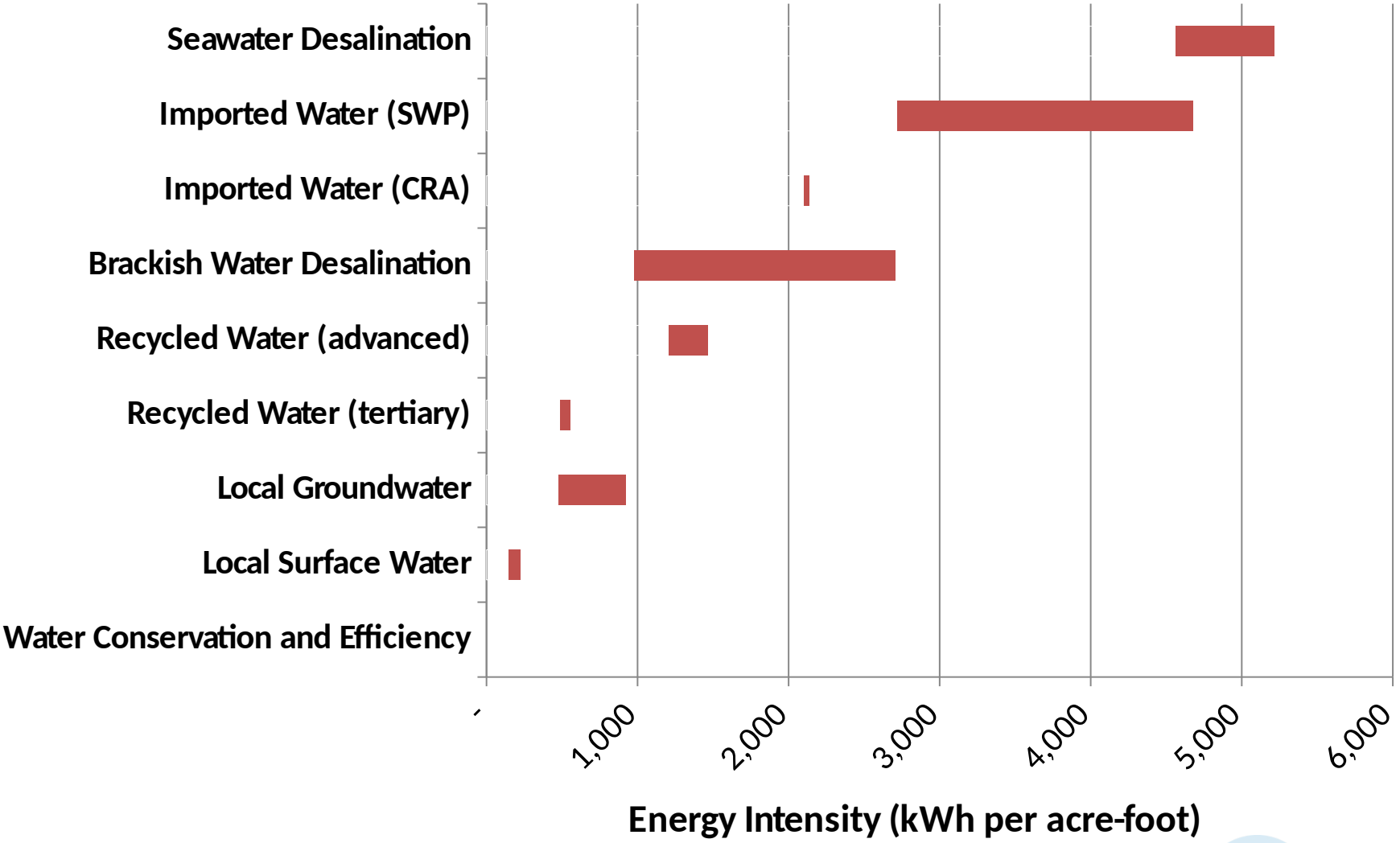
Key Issue: Energy and GHG Emissions



Includes extraction, conveyance, and treatment

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Key Issue: Energy and GHG Emissions

- Total energy costs are high, leading to increased exposure to short-term and long-term energy price variability.
- Short-term variability: energy prices higher during a drought
- Long-term trends: 2% - 6% per year over the next 20-30 years

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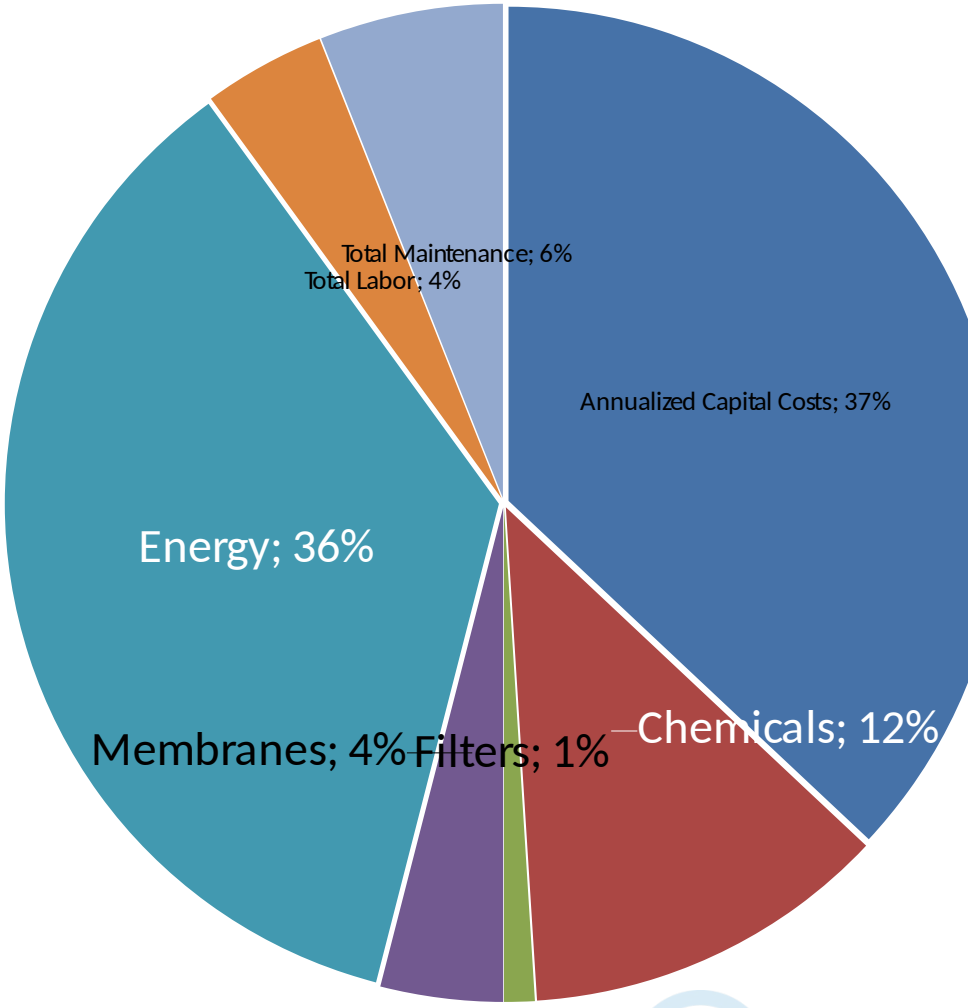
Key Issue: Cost and Financing

- Highly variable and site specific
- California: $1,900 to $3000+ per acre-foot



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What are Some of the Risks?

- Typical project risks - permitting, construction, operation, financial risk, etc.

- Demand risk
  - Santa Barbara, California
  - 4 of the 6 plants built in Australia since 2006
  - Tampa Bay, Florida

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Conclusions

- Seawater desalination is a small component of California's water supply portfolio, although there is considerable interest in some coastal communities.
- The technology is viable, i.e., it works.
- The key issues are its relatively high cost, energy intensity (and associated GHG emissions), and impacts on the marine environment – all of which must be balanced against the availability of other options.

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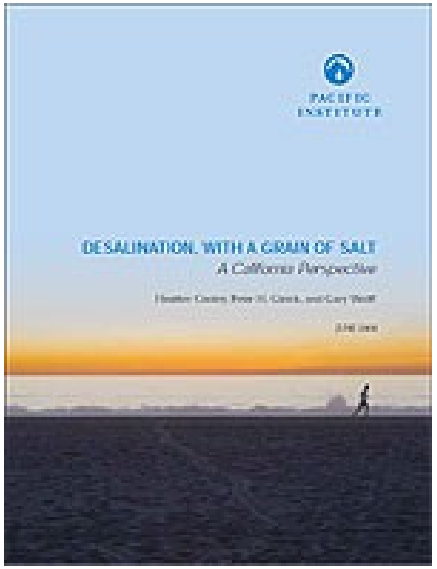
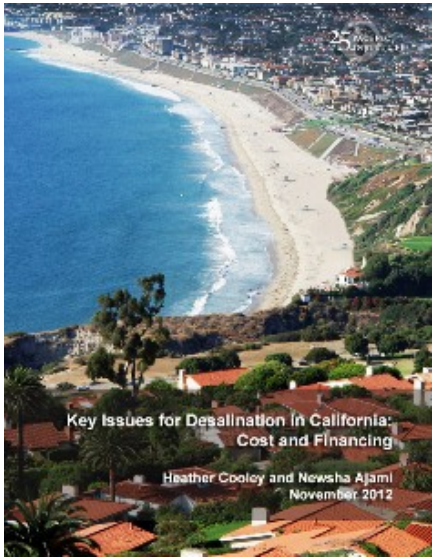
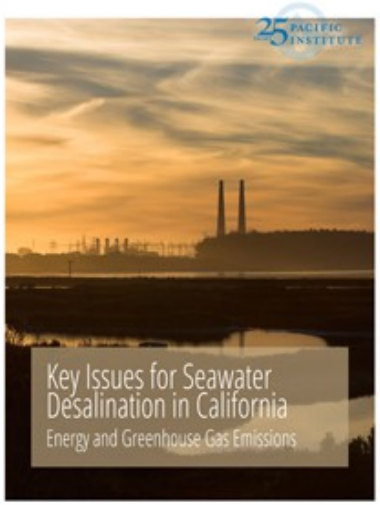
Thank you!







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