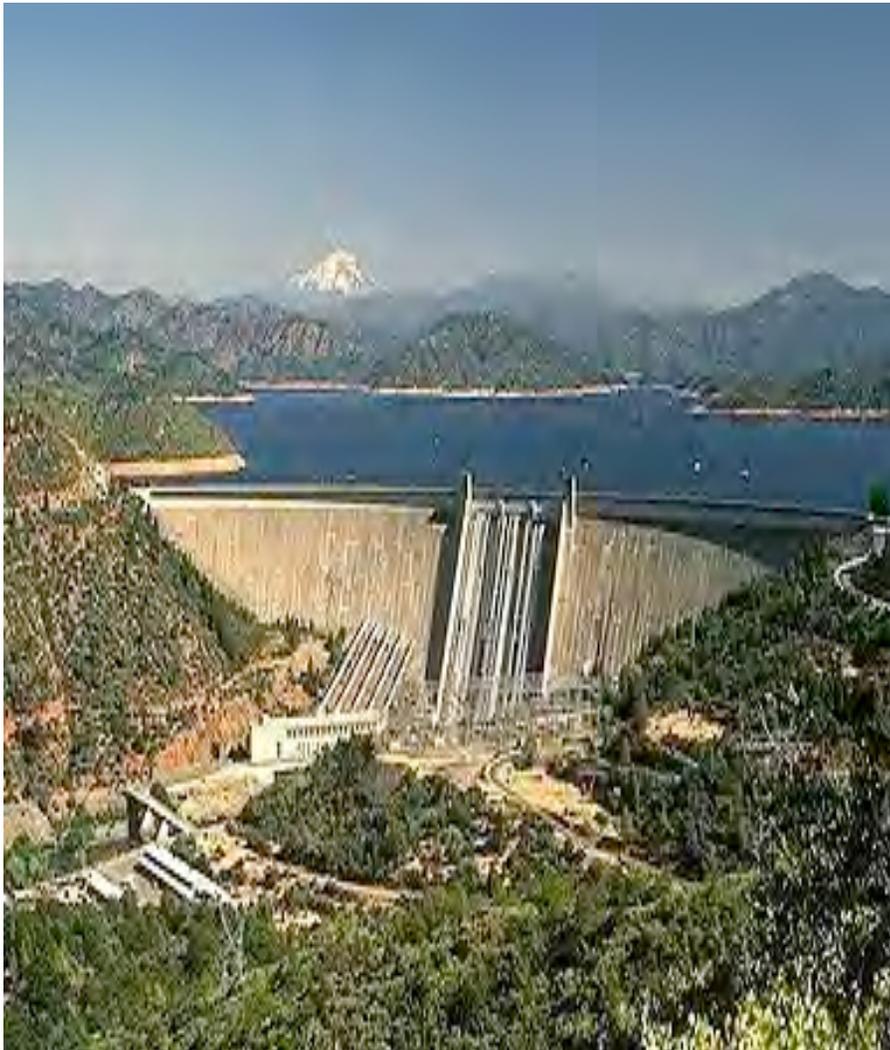


A Statewide Perspective on Water-Related Energy Use (WREU)



An Introduction to the Issue

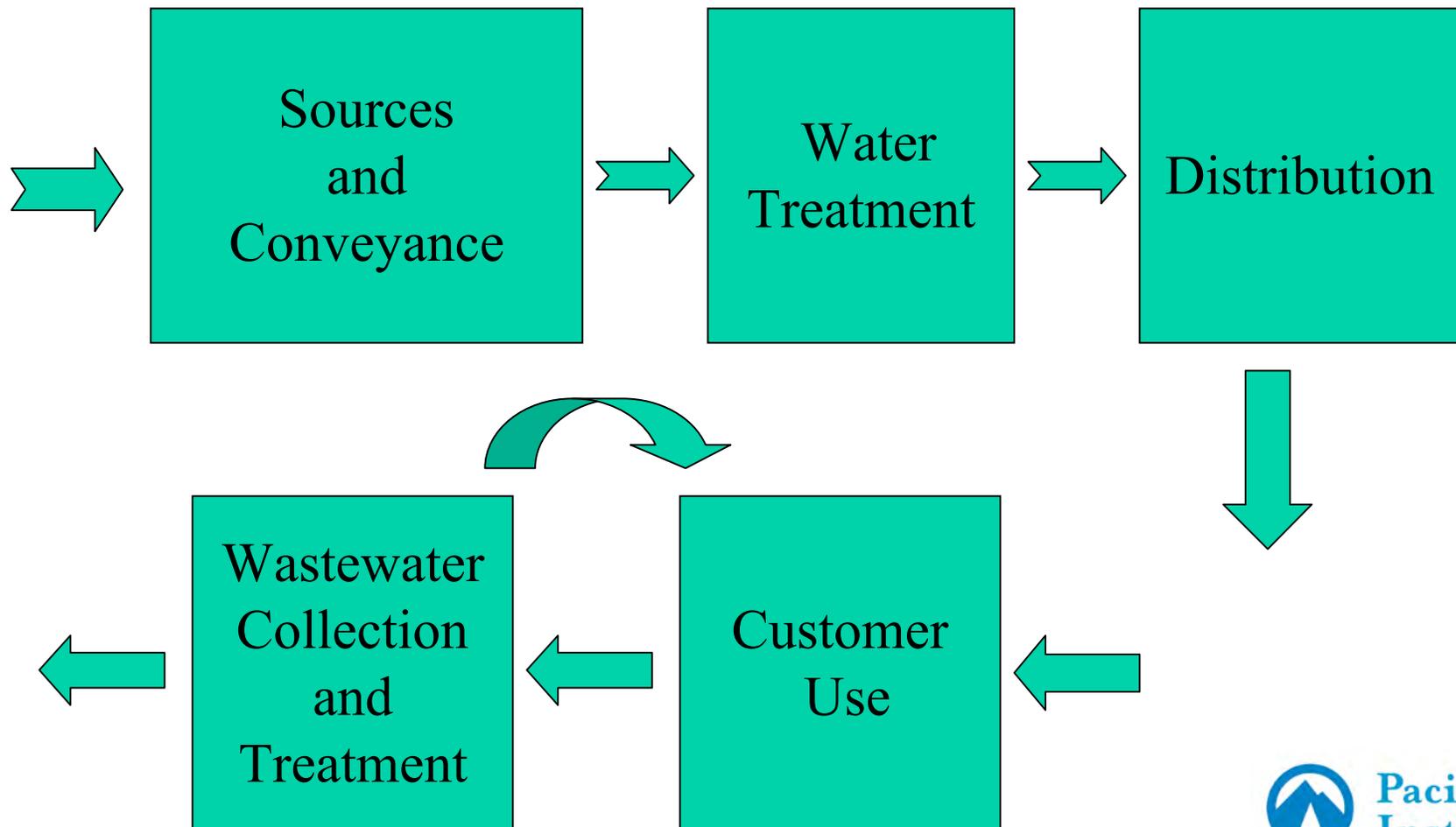
Gary Wolff, P.E., Ph.D.
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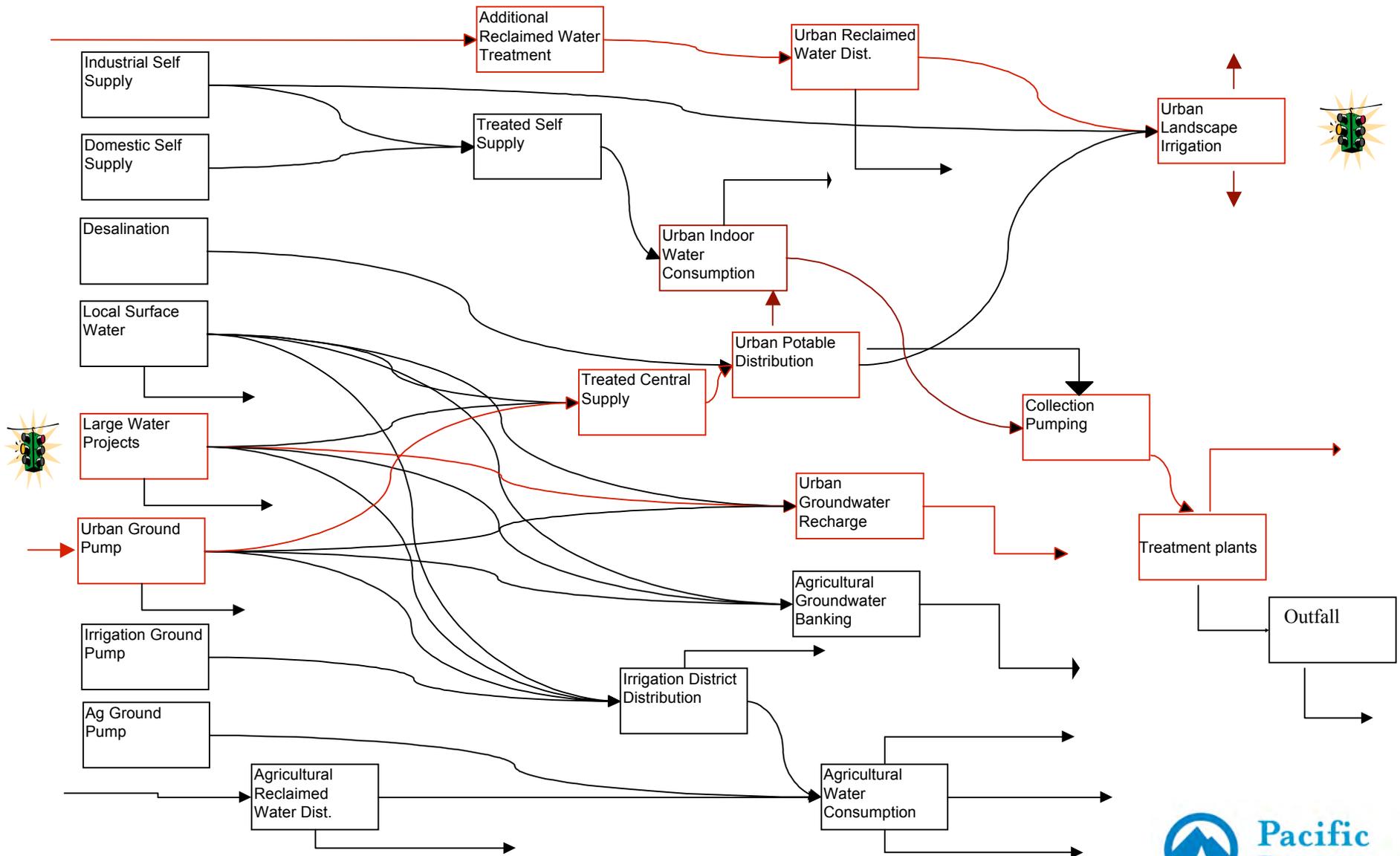
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Methodology for “Energy In Water”



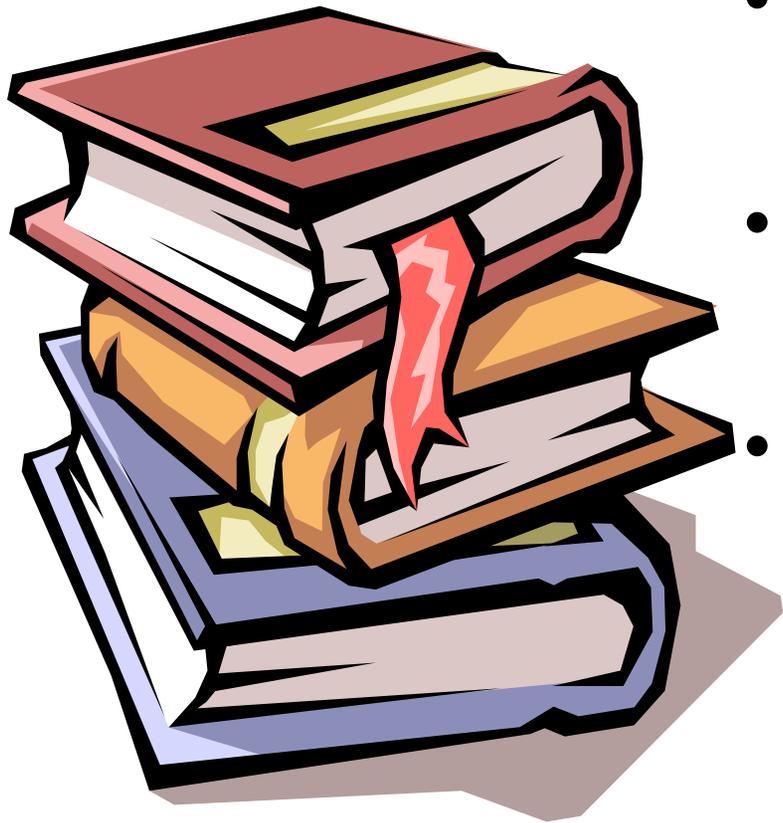
A More Detailed Diagram



Studies Developing and Using This Methodology

- Wilkinson (2000)
- Energy Down the Drain (2004)
- PI Water-to-Air Models (2004)
- Statewide Assessment of Energy Used to Manage Water (Underway)
- Utility Case Studies Including Application of the W-to-A Models

Other Studies Are Underway



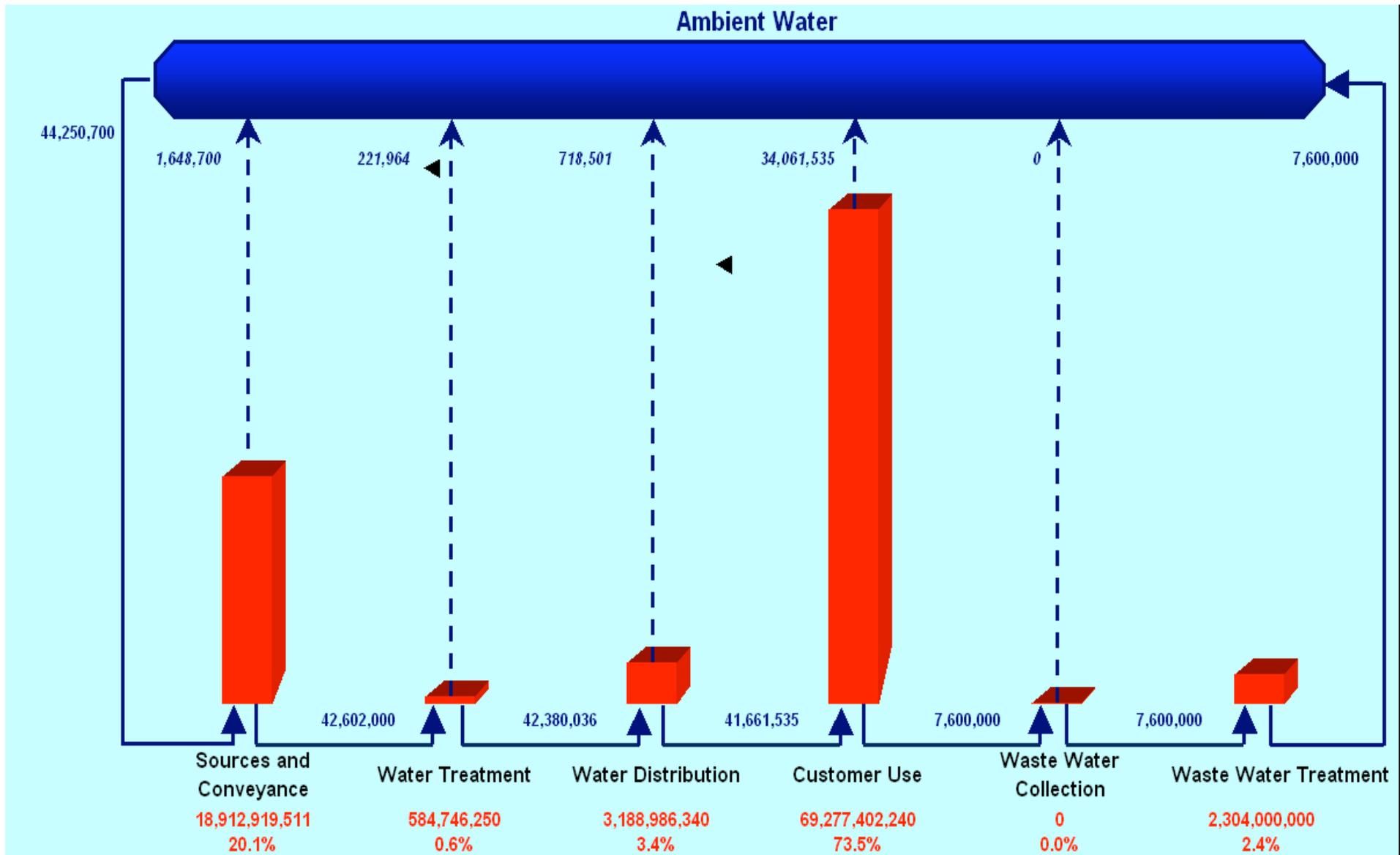
- DOE National Labs Road-Map
- PIER Collaboration With Other Research Organizations
- Peak Use Reduction (Lon House Using Data From Energy IOUs & ACWA)

Questions I'll Touch On (But Not Fully Answer)

- Energy To “Convey, Treat, Distribute?”
- Associated Energy Costs?
- Water Utility Costs For Energy?
- Some Important Knowledge Gaps?
- Impact of State Policies?
- Possible Future Policies?

Energy to Convey, Treat, and Distribute Water (Year 2000)

- At Least 21,000 Actual GWh
- Or About 8% of Electricity Use
- Plus About 100 million gallons of diesel fuel (= 1,500 Equivalent GWh)
- Most of This (About 80%) Is in Sources and Conveyance; About 3% Is Water Treatment; And About 17% Is Used In Distribution



Update Data

Total Energy

Energy Units

**Arrow Values represent
acre-foot per year

94,268,054,341

Equivalent kwh/yr

**%'s are of Total on 1st Level Graph

C+T+D Energy Costs?

- That Is a Very Difficult Question
- Consider:
 - CRA Electricity Costs \$0.01/ kwh
 - TOU and Demand Charges Apply
- Nonetheless, Perhaps \$2.3 Billion
(At \$0.10/ kwh & \$2 per Gallon)
- And Perhaps \$0.5 Billion More For
Carbon Dioxide Emissions (At \$50/Ton)

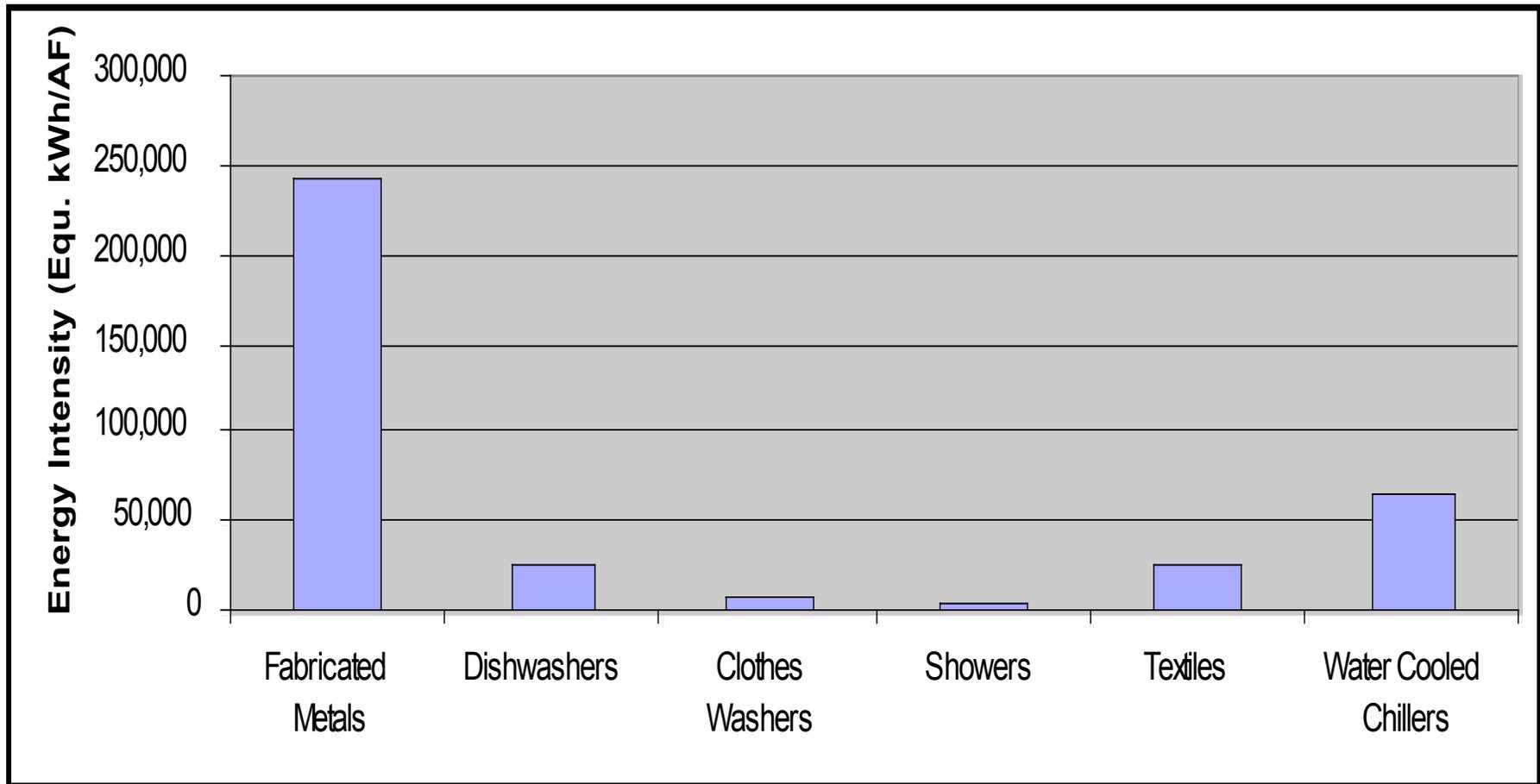
Water Utility Costs For Energy?

- Method 1:
 - The Previous C+T+D Number “Share” For Urban Water Utilities (12%)
 - Implies About \$275 Million Per Year
- Method 2:
 - Some Recent US-Wide Numbers
 - Imply About \$420 Million Per Year

Some Important Data Gaps?

- Statistically Significant, Energy Intensity Numbers for Utilities in CA
- In Particular:
 - **Local Surface Water Lift Vs. Gravity**
 - **Wastewater Collection System Lift**
- The Difference Between Water-Related & Water-Use-Dependent Energy Use On the Customer Side of the Meter

What Does High Estimated Energy Intensity in Customer Use Imply?



Impact of State Policies On Energy Use At Water Utilities?

- Others Will Address This in Detail, But:
- Think About Incomplete Information:
For Example, Hot Water Savings
- Think About Split or Perverse Incentives:
For Example, Reduced Profit for IOUs
And “External Costs” For All Utilities

Possible Future Policies?

- Again, Others Will Speak in Detail, But:
- Create Positive Financial Drivers For Water Utilities From Conservation
- Let Energy Utilities Conserve or Produce Energy Whenever Socially Desirable, Whether On- or Off-Customer Premises, etc.
- Encourage New BMPs or Programs Like Dual-Flush Toilet Requirements In High-Rise Buildings

Conclusions



**“Energy In Water” Is
Significant and Worth
Understanding**

**But No One Is Saying “Less
Energy Use is Always Better”**

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