Let's Target Collaborative Water and Energy Conservation Actions?

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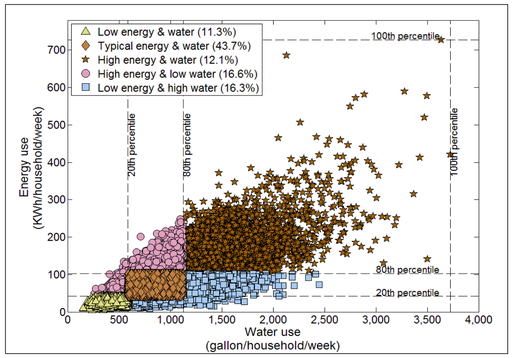
CI-WATER
A Utah-Wyoming water science and cyberinfrastructure collaboration

Motivation

- How can home owners jointly conserve water and energy?
- What conservation actions are cost effective and should cities synergically promote?

Previous Work

Residential water and energy uses are heterogeneous, skewed, and linked (Abdallah and Rosenberg, 2014)

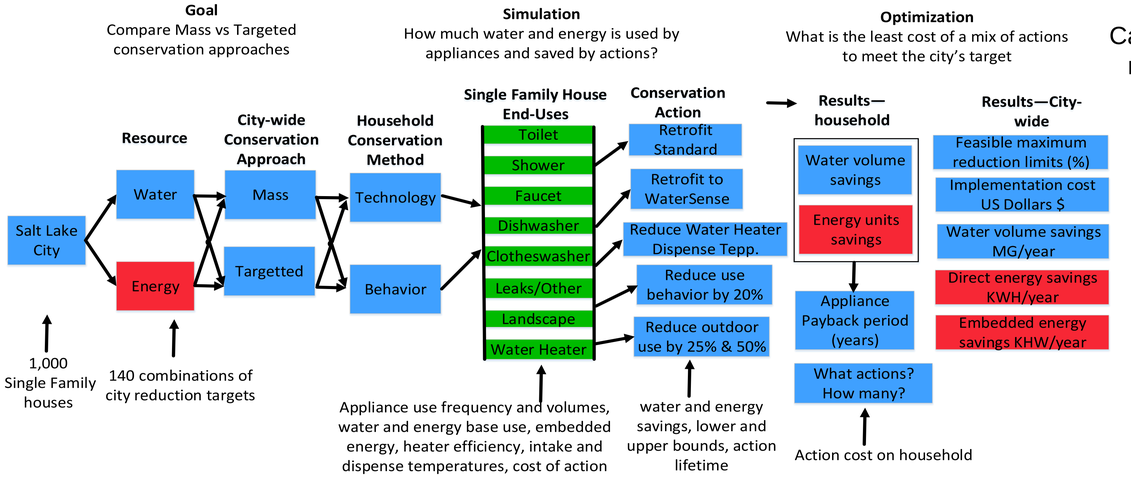


Conservation Programs

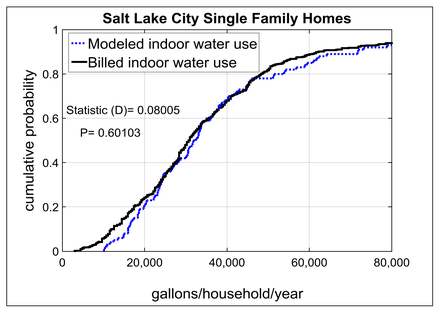
Targeted programs focus on high potential saving households

Mass-Applied programs consider households with uniform potential savings

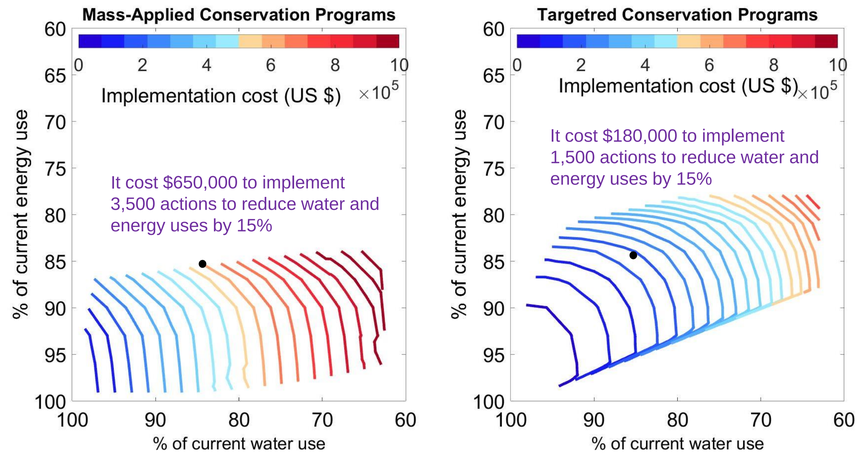
Modeling Methods



Calibrate the national water use simulation model to represent Salt Lake City, Utah



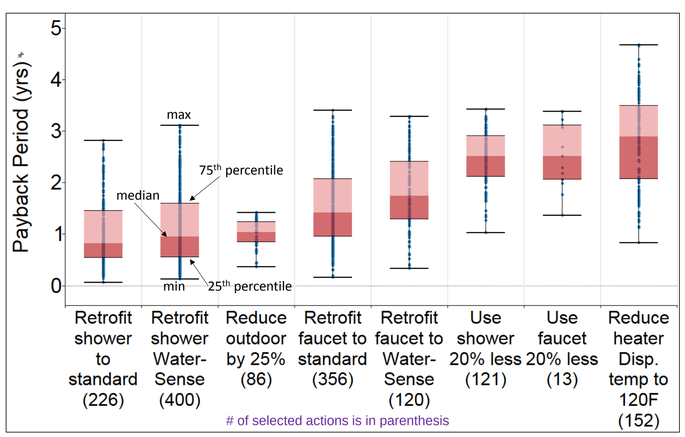
Results 1

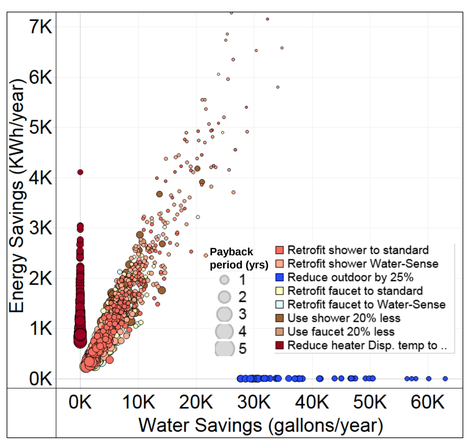


Targeted and collaborative conservation is cheaper and faster to meet targets

Results 2

- Retrofitting low efficient showers have the lowest payback period followed by reducing outdoor water use
- Actions have a wide range of payback periods due to household different water and energy savings





- Larger water and energy savings contribute to faster pay back the cost of actions
- Water and energy savings contribute to pay back the cost of actions except for outdoor and heater actions

Recommendations

- Profile customers using surveys and smart meters
- Cities and utilities should collaborate on synergistic conservation programs
- Rebate programs should target customers with high potential savings
- Educate customers on potential for short payback period

Further Work

- Work closely with the Department of Public Utilities of Salt Lake City (SLC) to tailor conservation actions of their interest
- Consider 40,000 single family houses in SLC
- Use High Performance Computing to run the Optimization Model in shorter times

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