

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com





**RES-
INTEL**

Business Intelligence for Smart Utilities

DSM Prescriptive Analytics

Using Business Intelligence to Improve the Cost-Effectiveness of Residential Water Conservation Programs

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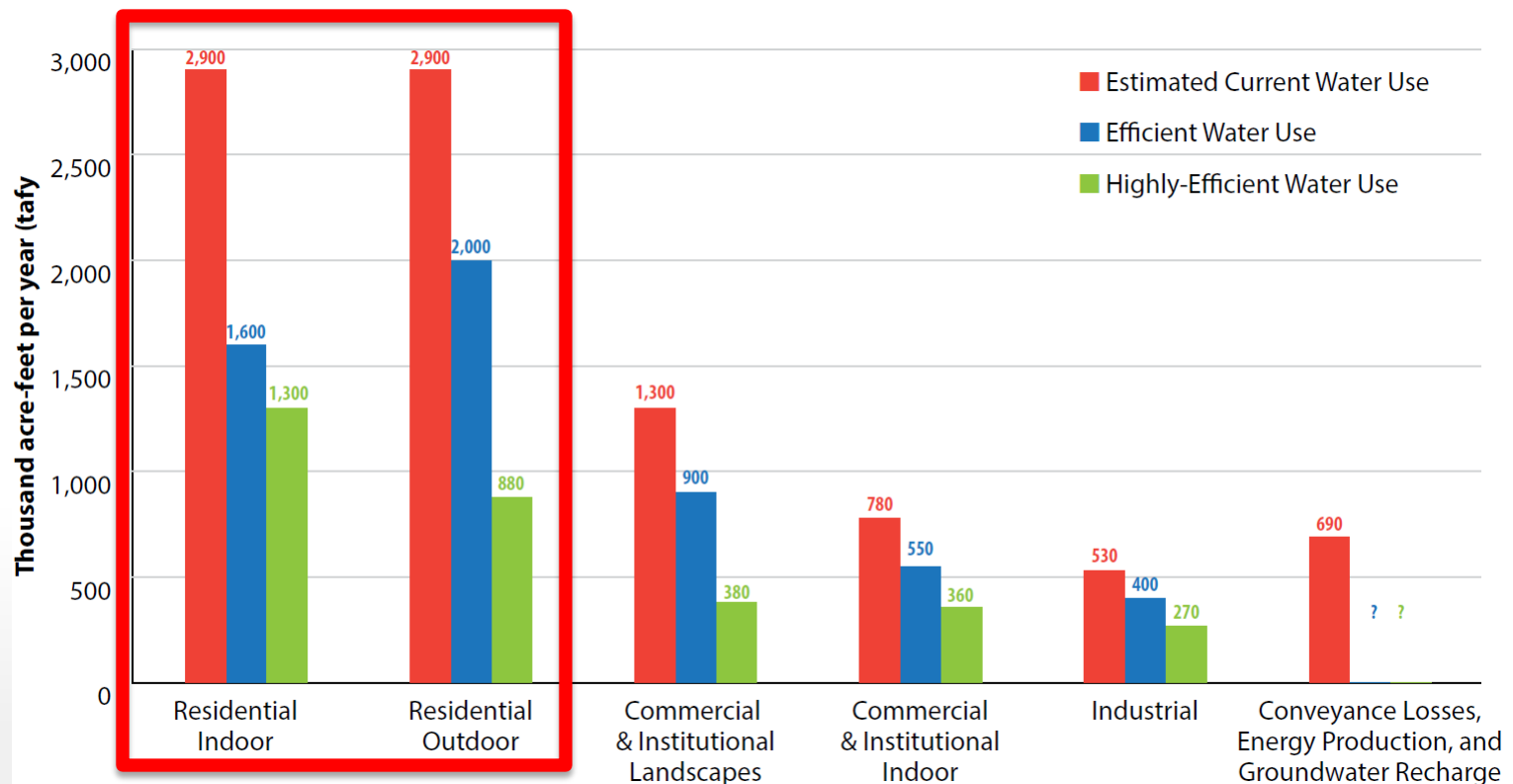
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Our Challenge

- Overcome the market failures of customer information deficits and lack of capital to improve residential water efficiency

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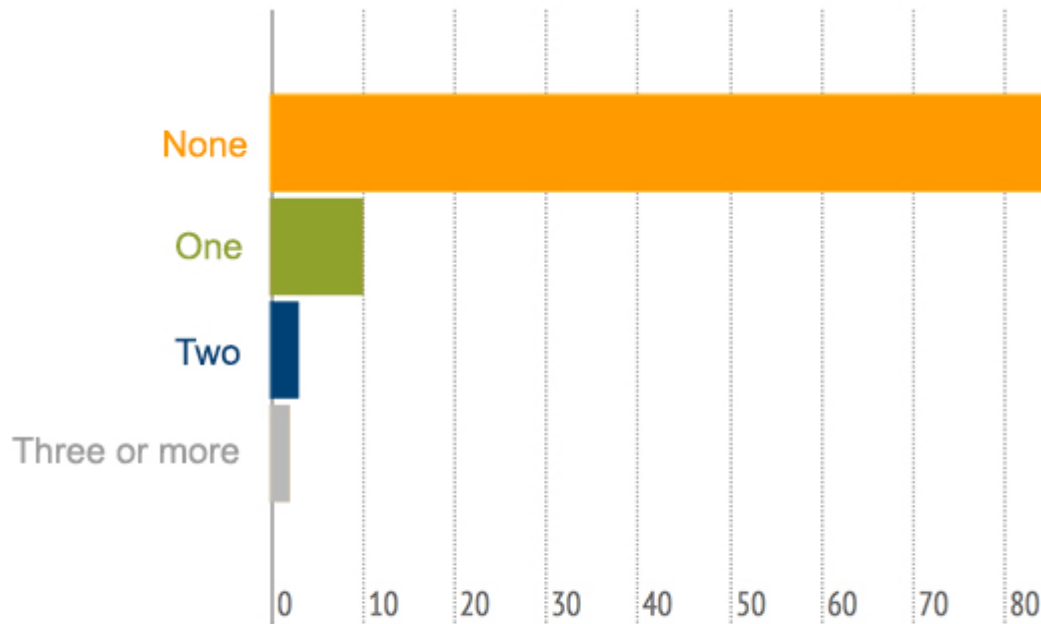
- Overcome the market failures of customer information deficits and lack of capital to improve residential water efficiency



Pacific Institute and NRDC. 2014. Urban Water Conservation and Efficiency Potential in California. June.

Our Challenge

- Customer participation in utility conservation programs is extremely low



From 2009 to 2011, only 15% of households stated they had participated in at least one energy efficiency program in the previous 12 months.

Implication

- Eliminate the need for customer-supplied data for Demand Side Management (DSM) activities
 - Improve the cost effectiveness of new and existing utility DSM programs
 1. Benchmark all utility customers in a service territory
 2. Lower the cost of saved water for direct installs by geo-targeted marketing customers with appropriate incentives
 - Business Intelligence (BI) with prescriptive analytics to systematically integrate external data with utility data.

Goal of BI

- Leverage utility and external data sources to provide actionable insights to
 - Increase utility profitability
 - Improve customer satisfaction
 - Improve operational effectiveness
- Go beyond information dashboards and data summaries
 - Customized recommendation that prescribe cost-effective DSM for each single family residence!

Status Quo Customer Targeting

- Which Single Family Residence (SFR) is a better candidate for targeted marketing for turf replacement rebates?

Candidate 1:

Climate Zone 9
10 CCF / month
summer usage

Candidate 2:

Climate Zone 9
10 CCF / month
summer usage

1. Benchmarking

- #1 has a higher water-use intensity
- But, #2 has a larger cost effective outdoor supply
- Normalized metric of water demand for analysis:

CCF / ft² lot area

Candidate 1:

Built in 2010

8 Occupants

5,000 ft² lot

2.0 CCF / 1,000 ft²



Candidate 2:

Built in 1955

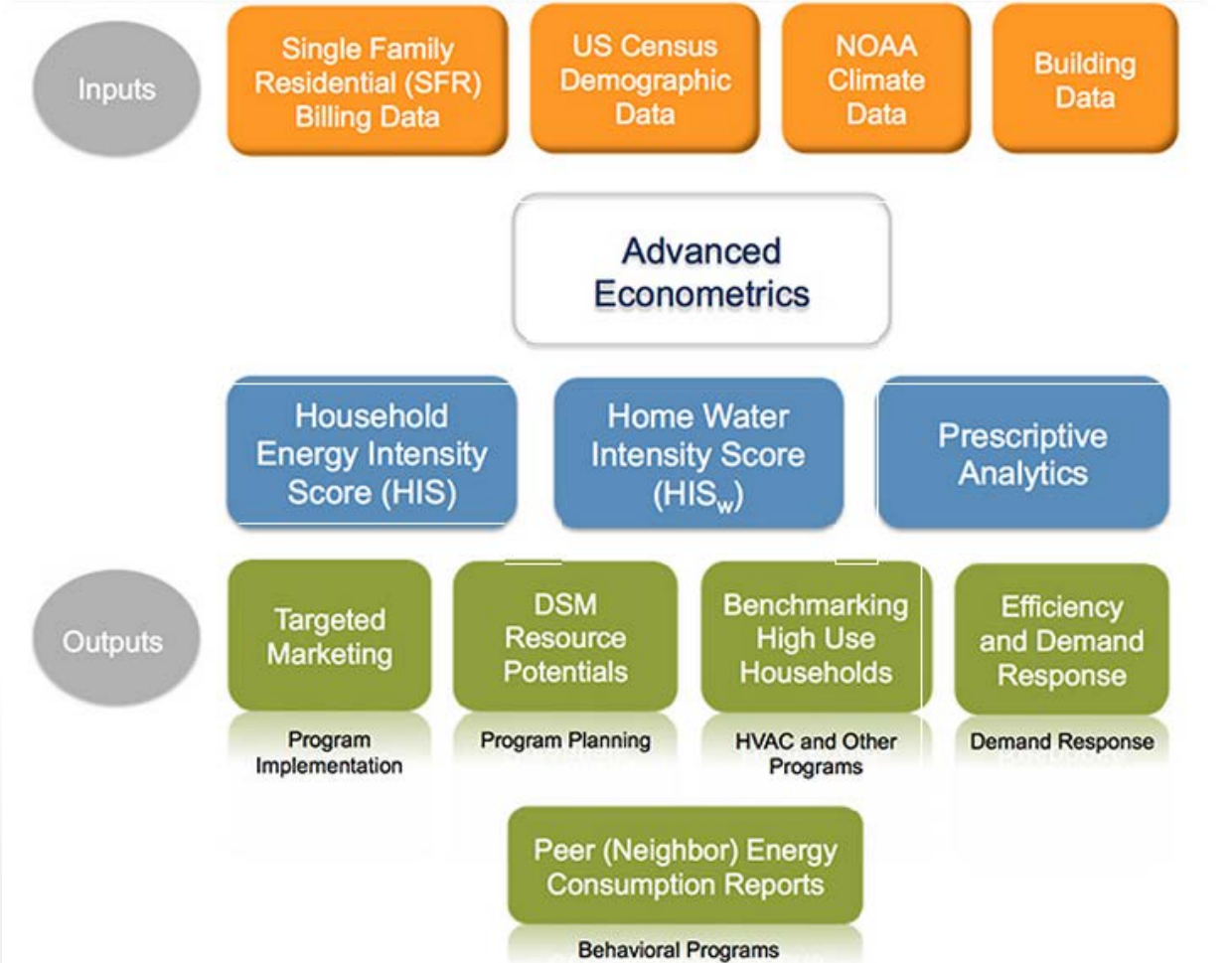
2 Occupants

20,000 ft² lot

.50 CCF / 1,000 ft²

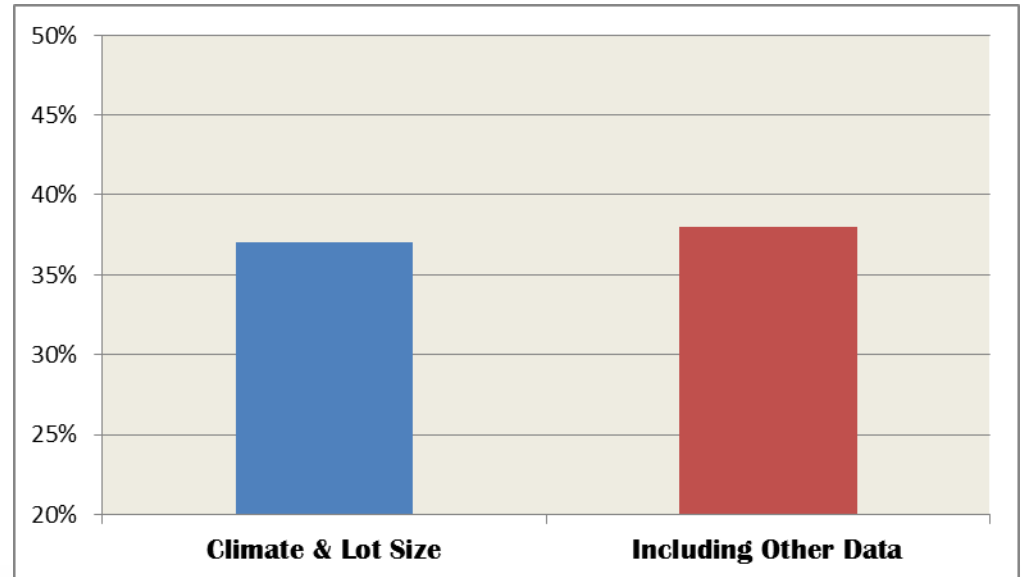


Benchmarking Analytics



Analytics Performance

- Data from a sample of houses in CA
Climate Zone 9
- Climate and Lot Size variables explain about 37% of monthly water consumption
- Detailed customer data only adds another 1%
- The Home Water Intensity Score is a robust need indicator for DSM programs!



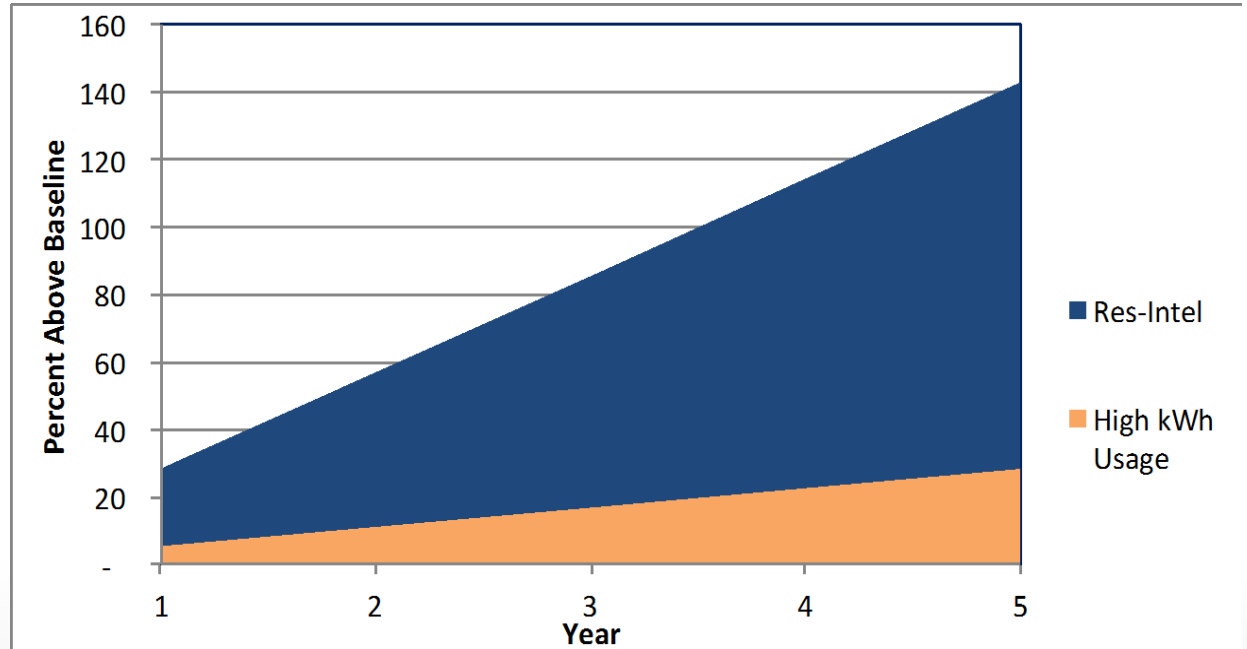
2. Customized Recommendations

Next, given the Benchmarking Results

- Additional econometric techniques make specific program recommendations (indicative only):
 - Interior SFR water conservation measures
 - Retrofit kit
 - Front loading washer rebates
 - Exterior measures
 - Pool covers
 - Low flow sprinklers
 - Weather-based or irrigation clock controller rebates
 - Landscape rebates
 - Interior + exterior conservation programs
 - Advanced metering
 - Water audits

3. Targeted Marketing

- Baseline Uptake: Statewide, about 25% of single family households have front loading clothes washers.
- High Usage Uptake: High kWh customers show about a 5.6% higher probability of purchasing a front loader.
- BI Uptake: Target households that have a 29% higher probability



Customized Efficiency Reports

- Prescriptions analytics are sent to high probability customers
- Highlight bill savings and incentives that are available from the utility
- Report content developed by program staff
- Peer comparison reports also available

Water Efficiency Report



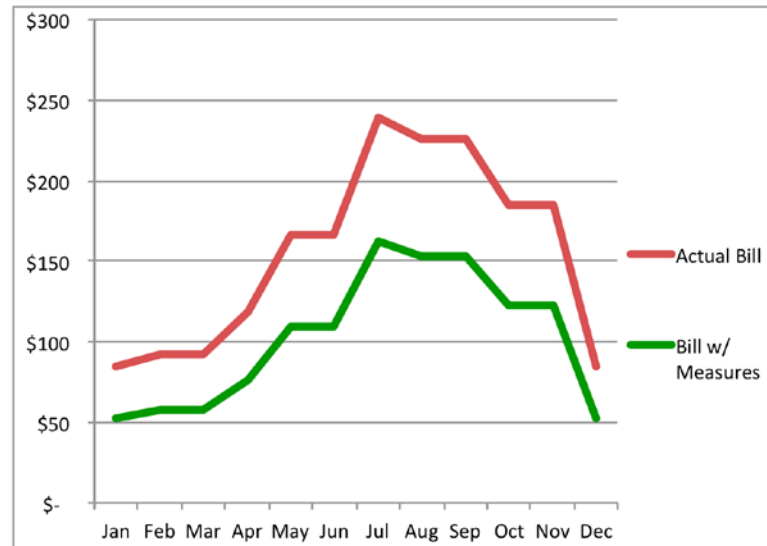
www.YourUtility.com

Customized for:
The Nelson Family
123 Limestone Rd
Claremont, CA 91711
Account# [10001](#)
Report Date Jan-14

These measures are likely to save water at your household:

Toilet Retrofit Kit	✓	Free
Low Flow Faucet and Showerhead	✓	Free
Drip Irrigation Kit	✓	Rebate Available
Smart Sprinkler Controller	✓	Incentive Available

Your water bill could look like this with more efficient equipment:



Annual Savings \$ 594

Next Steps:

To begin saving water and money each month, visit our website at:

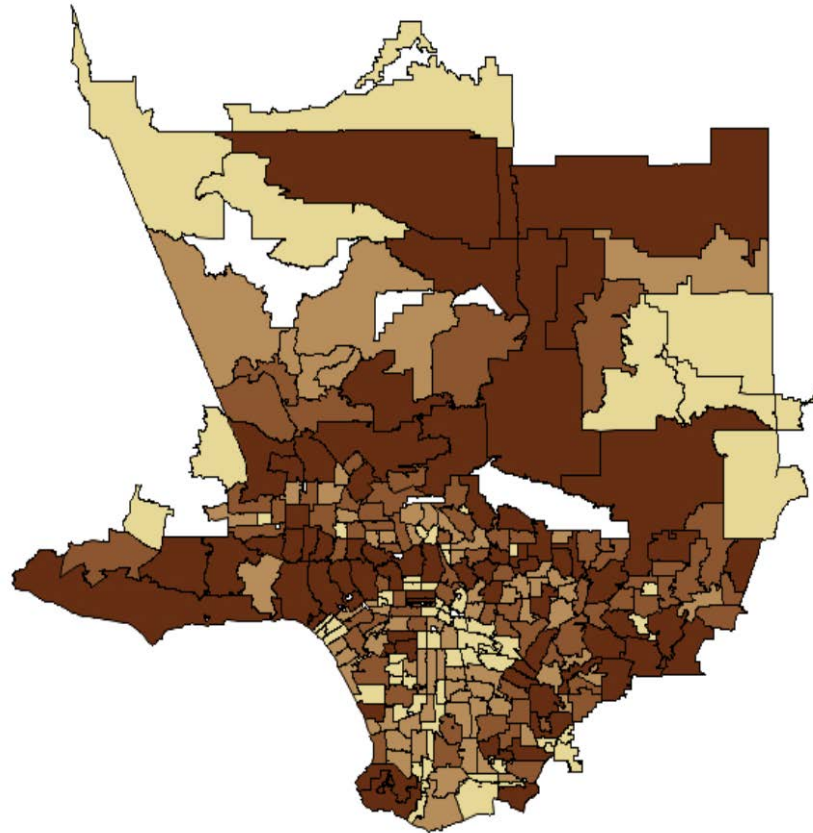
www.yourutility.com

Click on the start savings button!



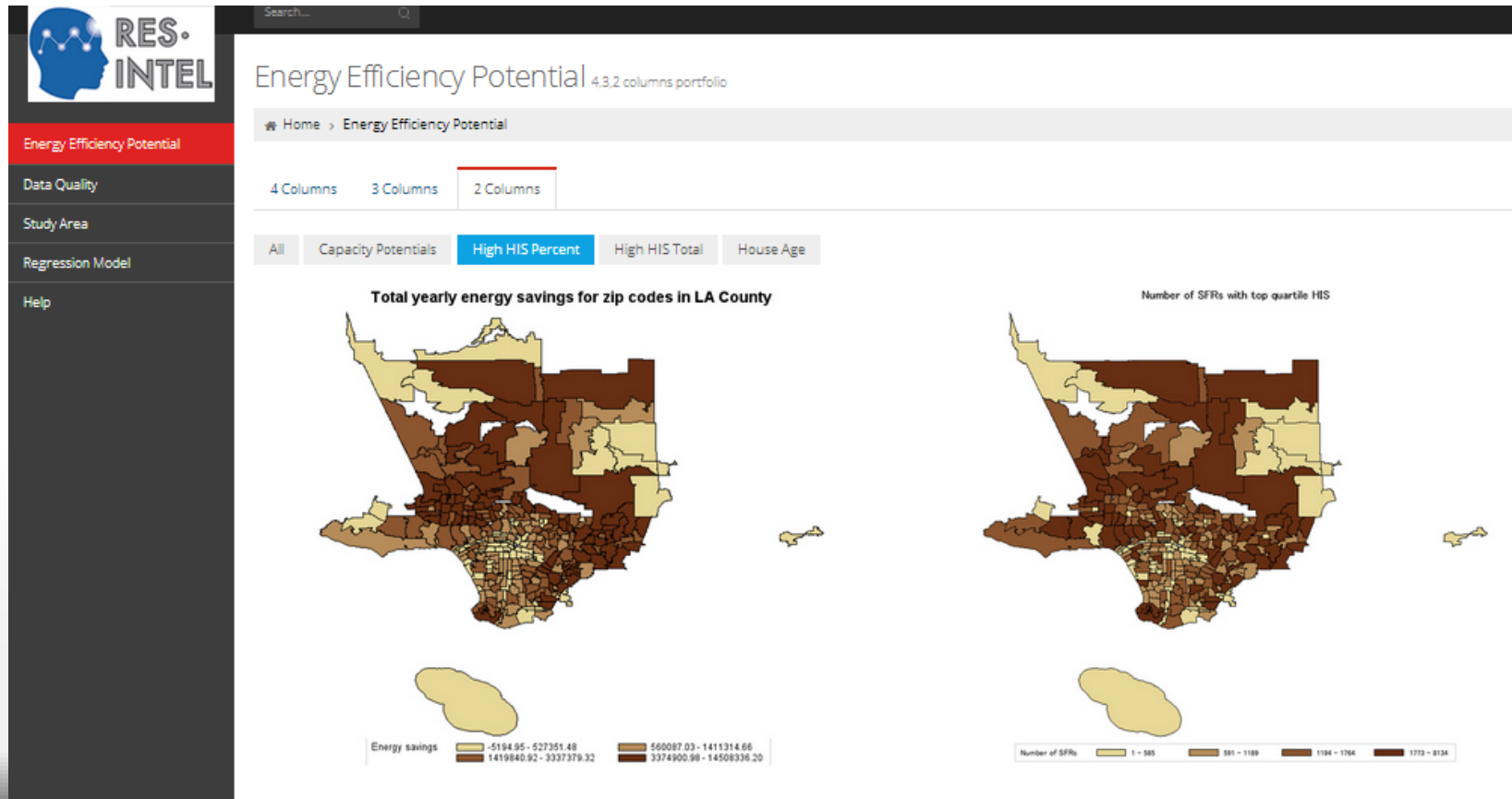
Business Intelligence Visualization

- Spatial capabilities allow dashboard of DSM opportunities
- CCF of Energy Efficiency Supplies by Zip Code (illustration)



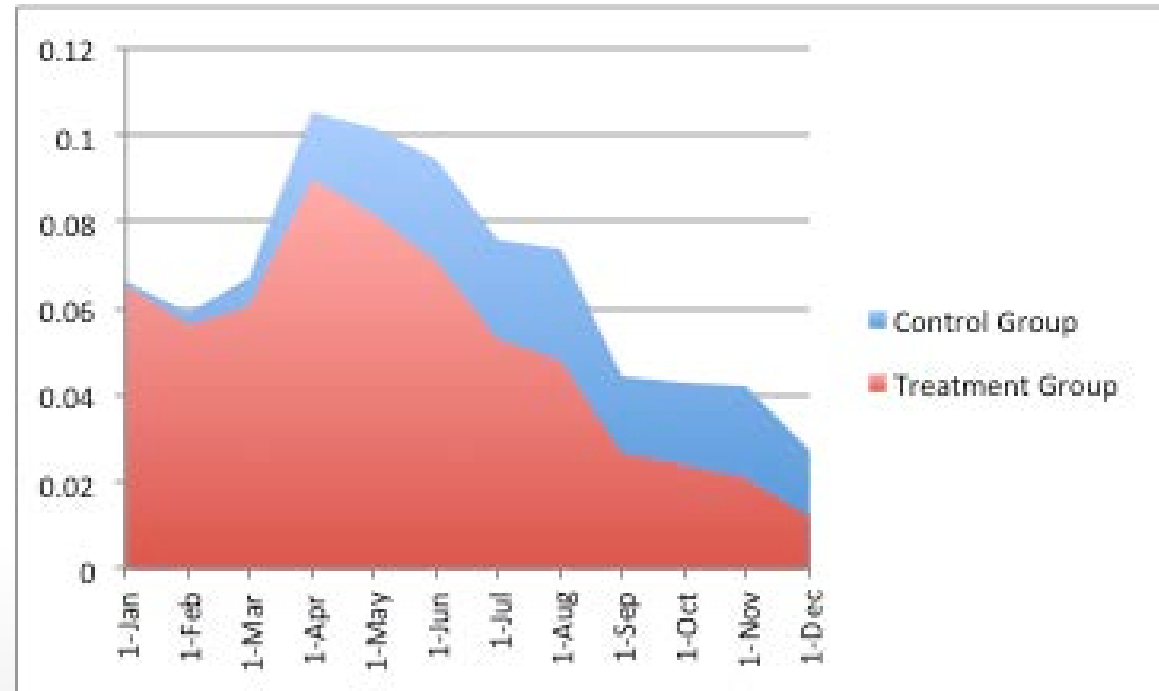
Software Dashboard

- HTML interface with dynamic menus that allow users to ask questions of the data and visualize the results



Real Time Program Feedback

- Monitor CCF/day consumption by program or system-wide
- Program group versus a propensity-matched control group
- No need to wait 3 years to assess program effectiveness!



Business Intelligence Software

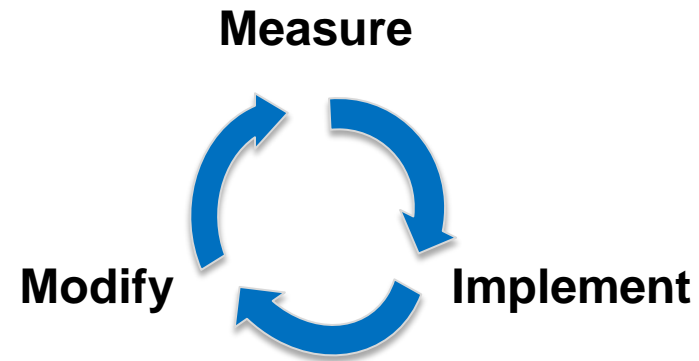
- Utility-facing **software tool**: analytical package with no customer interface
 - Targeting water utilities in the US
 - Transforms utility data into business intelligence
 - Improve customer satisfaction
 - Reduce costs of water conservation
- Targets **Single Family** homeowner and renter segments
- BI components:
 1. Database integration and publishing
 2. Packaged analytics
 3. Customizable outputs (SQL, SAS, MS Office)

Program Benefits from BI

- BI can revolutionize residential SFR water planning and outreach
 - DSM demand indicator developed from rigorous econometric modeling
 - Lower costs of saved water:
 - CCF efficiency potentials by account, municipality, zip code, service territory
 - Defer investment in distribution system
 - Geo-target conservation in areas with older / constrained distribution infrastructure

BI in the DSM Program Lifecycle

- **Measure:** Need indicator offers “bottom up” DSM potentials at the service territory level
- **Implement:** Targeted marketing of customers with the highest need for DSM
- **Modify:** BI evaluation module can offer “real-time” insights into program savings





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Questions and Comments?

- Thanks for your interest in our exciting project!
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For more information visit: www.Res-Intel.com