This presentation premiered at WaterSmart Innovations

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Greater Financial Control through Data, Customer Engagement, and Water Rates

PAUL CLARK
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WATERSMART INNOVATIONS CONFERENCE 2015: USE OF IMAGERY AND REMOTE SENSING FOR WATER CONSERVATION

Eagle Aerial Solutions
Paul Clark
Co-Owner

EAGLE AERIAL
SOLUTIONS

Who We Are: Eagle Aerial Solutions

* Aerial imagery and related geographic data.
* Technological solutions, including remote sensing analysis.
* Web-based hosting/data management.

What We Do: Enhancing Water Conservation Efforts

* World Class Remote Sensing Experience allows for accuracy that was not previously available.

* Detailed and accurate parcel-by-parcel data becomes the foundation for effective and politically acceptable water conservation programs.

Irrigated Area Measurement—overlay of classified data over imagery

Irrigated Area Measurement – SFR

Irrigated Area Measurement – SFR

* Precise irrigated area measurement of Single Family Residential.
* Tabular and visual output per parcel.
* All data GIS Compatible.

High Resolution Aerial Image

Landcover Area and Percentage

APN	CLASS	AREA	%
7126411	grass	503.00	13.80
7126411	impervious	2604.02	71.46
7126411	trees/bushes	537.01	14.74
7126409	impervious	3384.00	78.33
7126409	grass	843.00	19.50
7126409	trees/bushes	93.00	2.17

KEY TO ACCURATE RESULTS

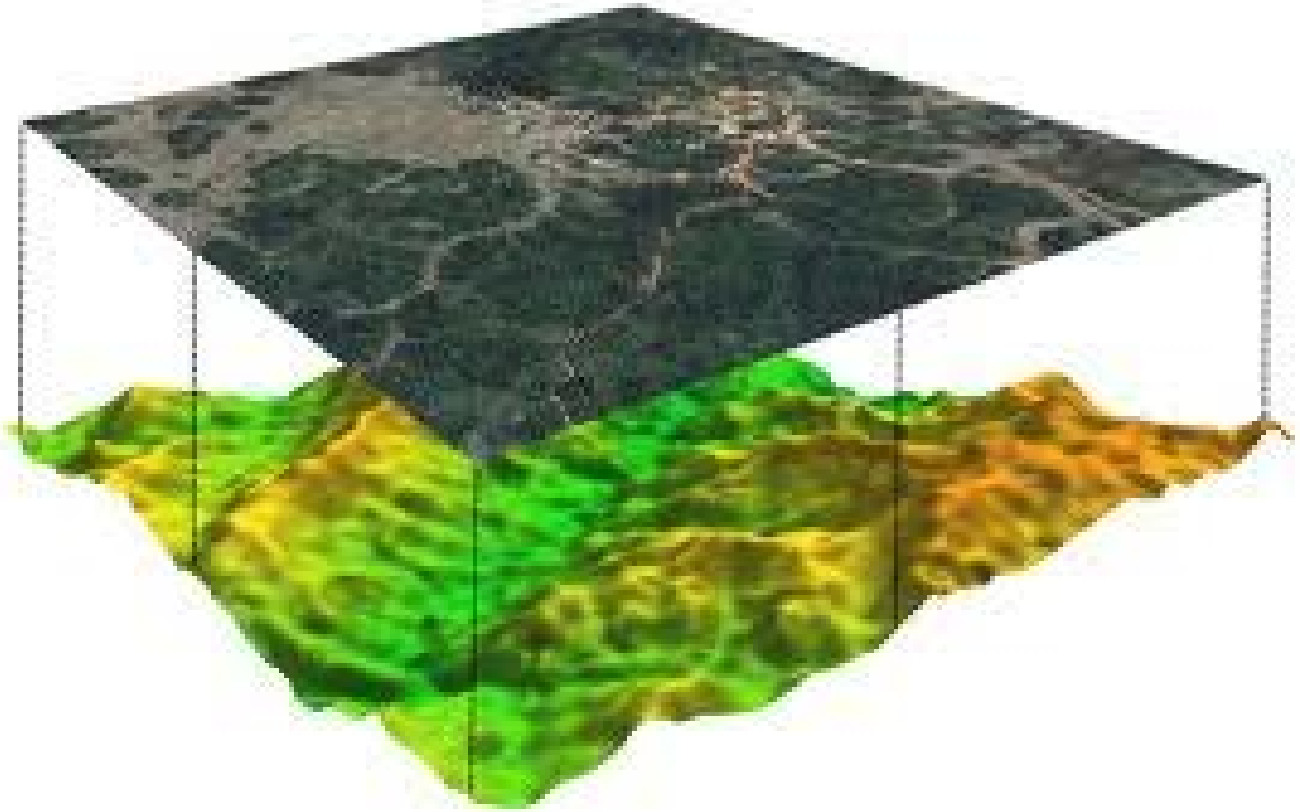
Software Expertise PLUS Consistent Hand Editing by Highly Experienced Team of Remote Sensing Professionals.

How Accurate are We? Lodi Project – DWR Analysis of Accuracy: Hand Measuring vs. Imagery Analysis

DWR

Partition Name	Tom L_P	Shem L_P	Eagle L_P	Tom L_P_%	Shem L_P_%	Eagle L_P_%
SS-0%-25%	7,482,801	8,255,245	7,244,457	36%	39%	35%
SS-25%-50%	7,196,918	7,144,894	7,902,892	36%	36%	40%
SS-50%-75%	7,985,036	7,856,782	8,255,798	41%	41%	43%
SS-75%-100%	9,322,180	9,309,574	8,725,399	50%	50%	47%
TS-0%-25%	1,650,882	1,676,623	1,682,827	34%	35%	35%
TS-25%-50%	1,368,793	1,405,704	1,644,721	32%	33%	39%
TS-50%-75%	1,816,597	1,980,629	1,686,761	46%	50%	43%
TS-75%-100%	1,841,618	1,924,049	1,826,327	49%	51%	49%
Total Stat Partition	38,664,826	39,553,500	38,969,182	40.4%	41.3%	40.7%

Lidar and Elevation Data Unnecessary



Expanding the Analysis: Automated Irrigated Area Measurement – Dedicated Irrigation

* Ability to analyze dedicated irrigation coverage and efficiency
* Polygons created by district on line quickly using Eagle's SaaS

Further Refining the Data: Identifying the Water Wasters

* Data sets:
  * Irrigated landscape area
  * Individual customer use data
  * Daily ET (agency choice of CIMIS, Spatial CIMIS, or private sector ET)
* Variables:
  * Number of residents (Census default or actual household size)
  * Daily indoor per capita allocation
  * Monthly landscape factor
  * Drought factor

Water Efficiency Calculator - SFR

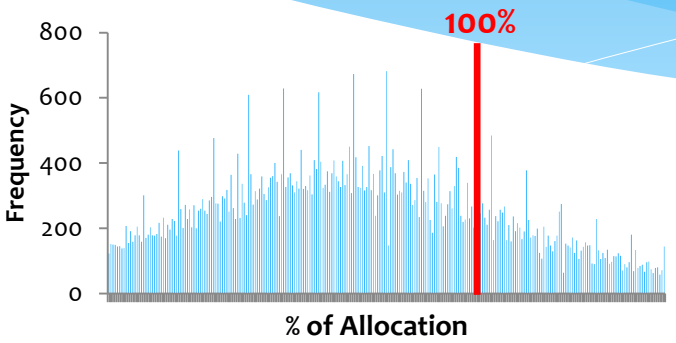
Enter input data in the orange cells.

Customer No.	40597-2	
Zone	1280	
Meter Size	5/8-in	
Indoor Consumption		
Number of Residents	2.8	Persons
Daily Indoor per Person Allocation	55	Gallons
Outdoor Consumption		
Landscape Factor	Turf Coefficients	
January	0.61	
February	0.64	
March	0.75	
April	1.04	
May	0.95	
June	0.88	
July	0.94	
August	0.86	
September	0.74	
October	0.75	
November	0.69	
December	0.6	
Landscape Area (Square Feet)	13098	
Drought Factor	20	%

REFRESH AFTER UPDATING ALL INPUTS

Outputs/Products: Water Efficiency

* Total group use



Example uses State efficiency guidelines

* Breakdown of the user group

Consumption	% of Customers
At or below allocation	74.1%
Greater than 100% up to 125% of allocation	17.6%
Greater than 125% up to 150% of allocation	5.1%
More than 150% of allocation	3.2%

* Ranking of users

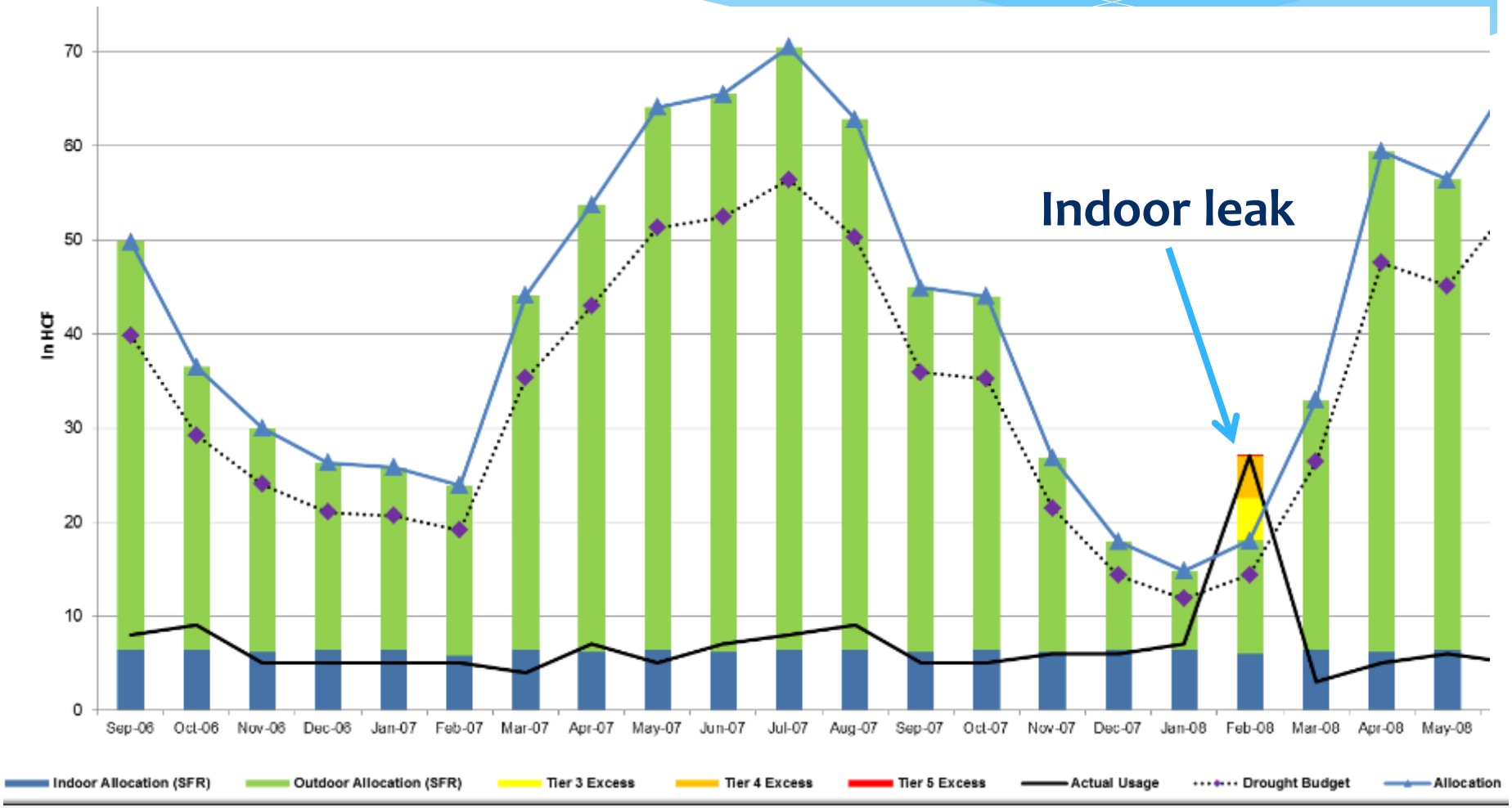
Cust. No	Average Usage as Percentage of Water Budget
42527-1	260.1%
41617-1	259.4%
40726-1	256.0%
42525-1	252.9%

Most inefficient users, top drought response targets

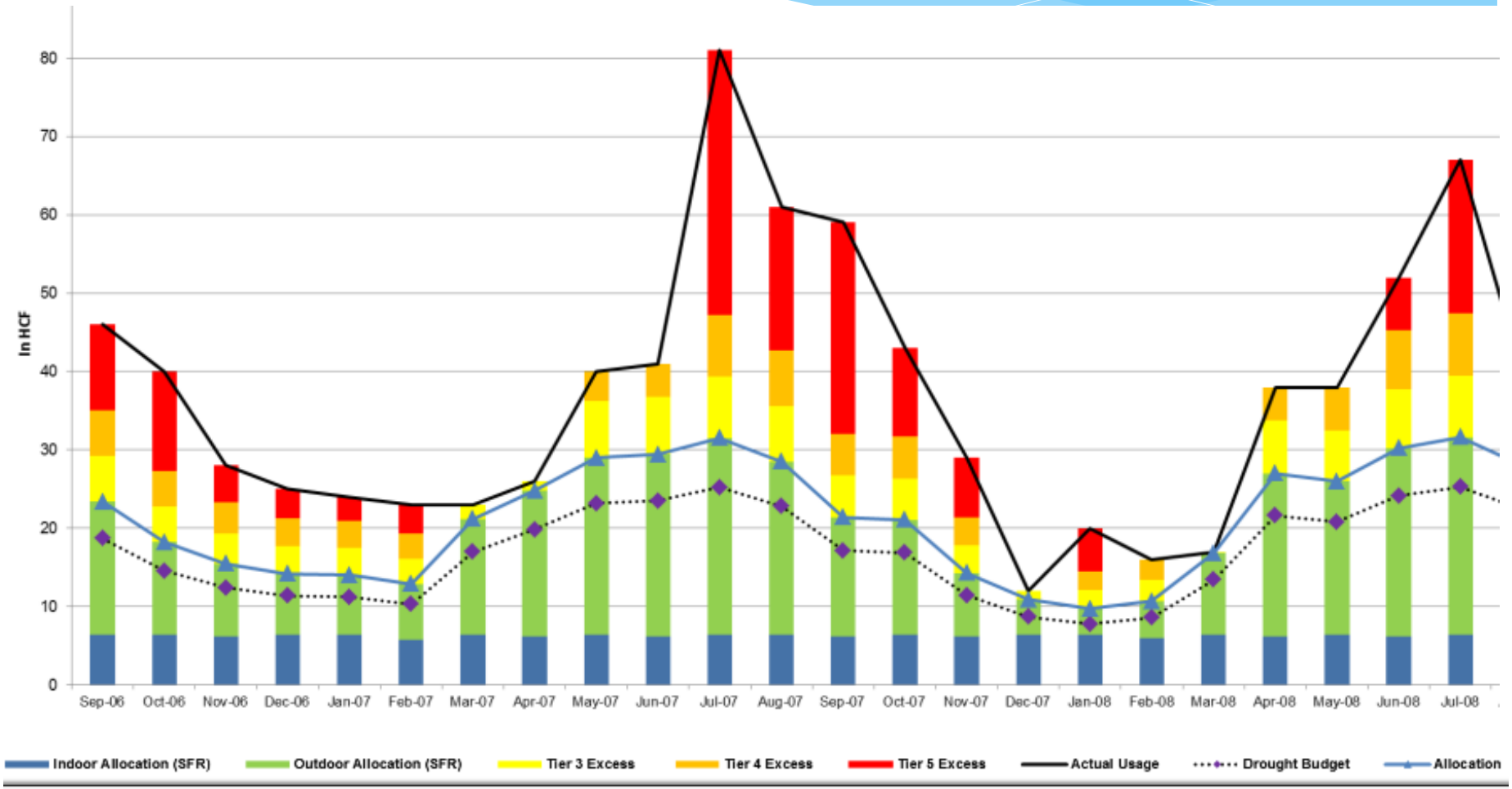
Cust. No	Average Usage as Percentage of Water Budget
40688-1	35.3%
40035-1	34.0%
40107-1	33.0%
40935-1	31.5%

Efficient customers not included in drought outreach

Customer-By-Customer View – Historically **Efficient** Water User



Customer-By-Customer View – Historically **Inefficient** Water User



Short-Term and Long-Term Uses

* **Short term**
  * Know who are efficient and inefficient water users
  * Accurately target biggest water wasters → higher-payoff conservation
  * Use resources (staff time and money) effectively
  * Avoid public relations pitfall of asking already efficiency water users to conserve more
* **Long term**
  * Reduce water use
  * Targeted Turf Abatement
  * Move effectively toward water conservation goals
  * Data can be used to populate a financial model to test impact of water budget rates

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WaterSmart® SOFTWARE

Data-Driven Demand Management

Peter Yolles, Founder
peter@WaterSmart.com

Agenda

- About WaterSmart
- Current challenges
- Demand management
- Data analytics
- Engaging customers
- Financial benefits
- A new framework
- The data-driven utility

About WaterSmart

Helping utilities educate and engage customers to save water and money.

WaterSmart offers a turnkey, cloud-based analytics, engagement and behavioral water efficiency solution.

Headquartered in Silicon Valley and founded in 2009.

OUR PARTNERS INCLUDE

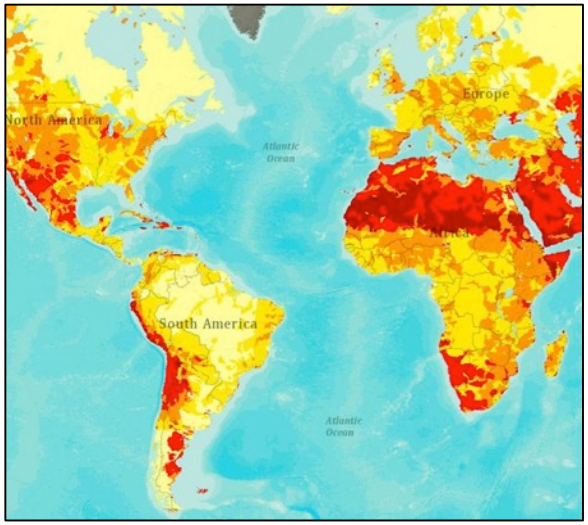
45+ Utilities

2M+ Accounts

Water challenges

Population growth

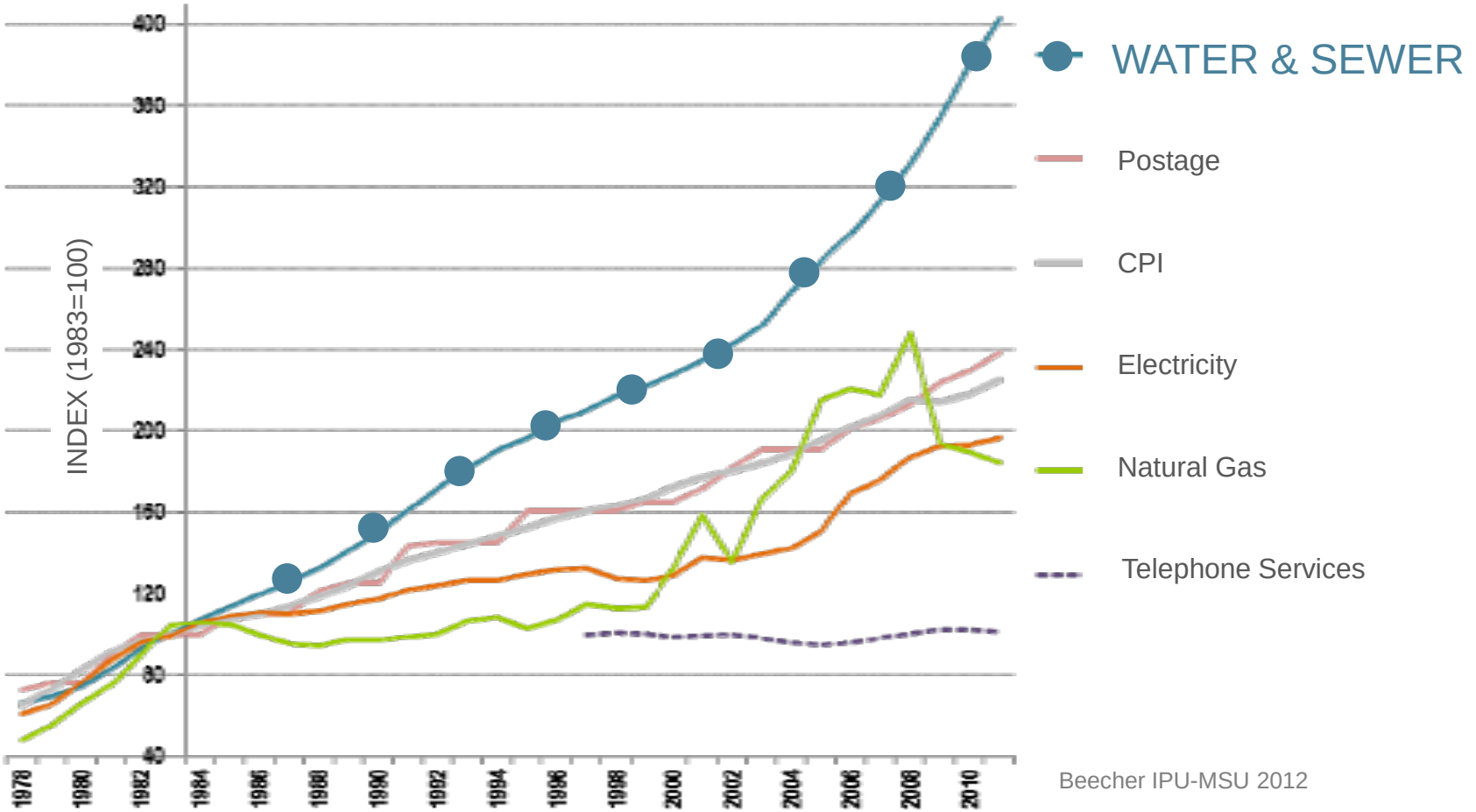
Infrastructure decay



Water stress

Impact: rising costs

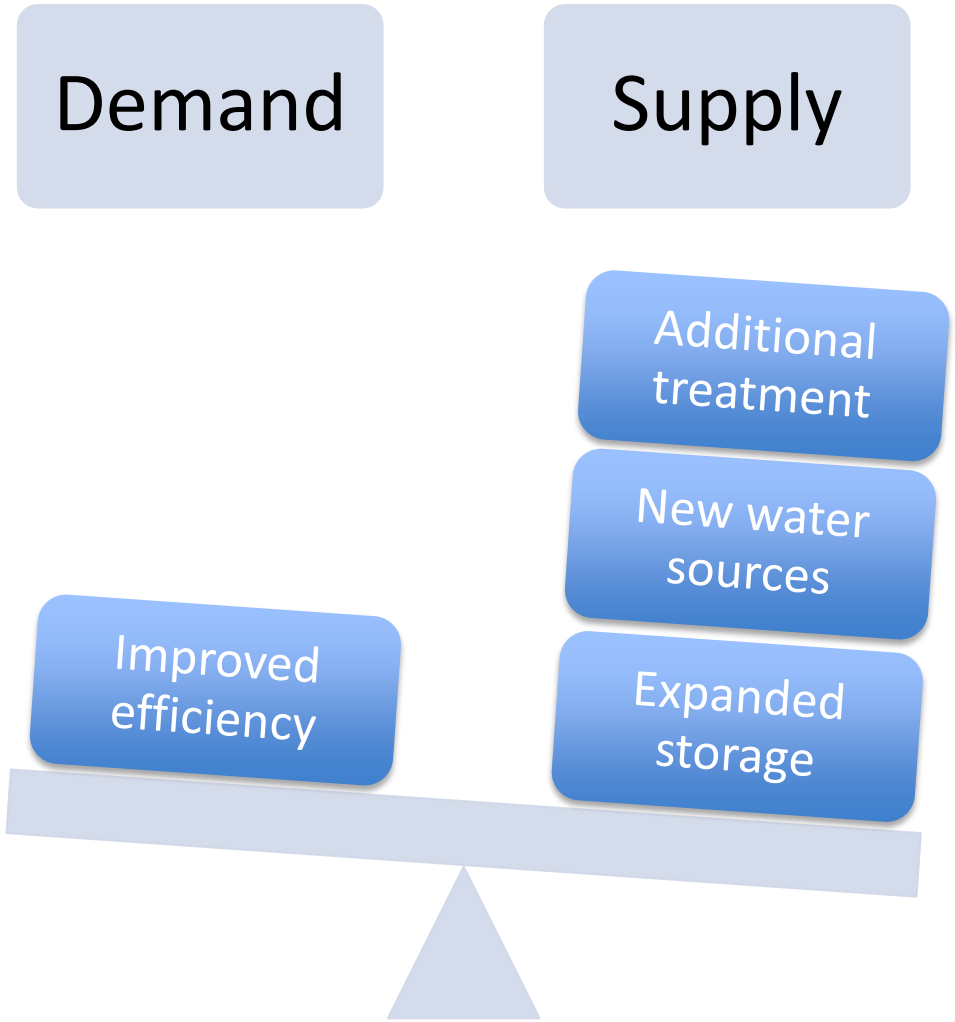
Driven by $4.8T* infrastructure backlog
and increasing cost to source and supply



Beecher IPU-MSU 2012

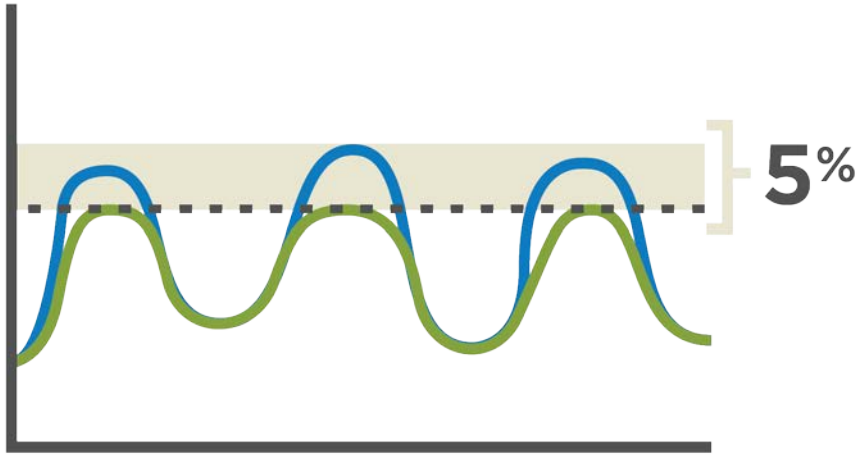
*http://www.usmayors.org/publications/media/2013/04-water-localcosts.pdf

Water balance



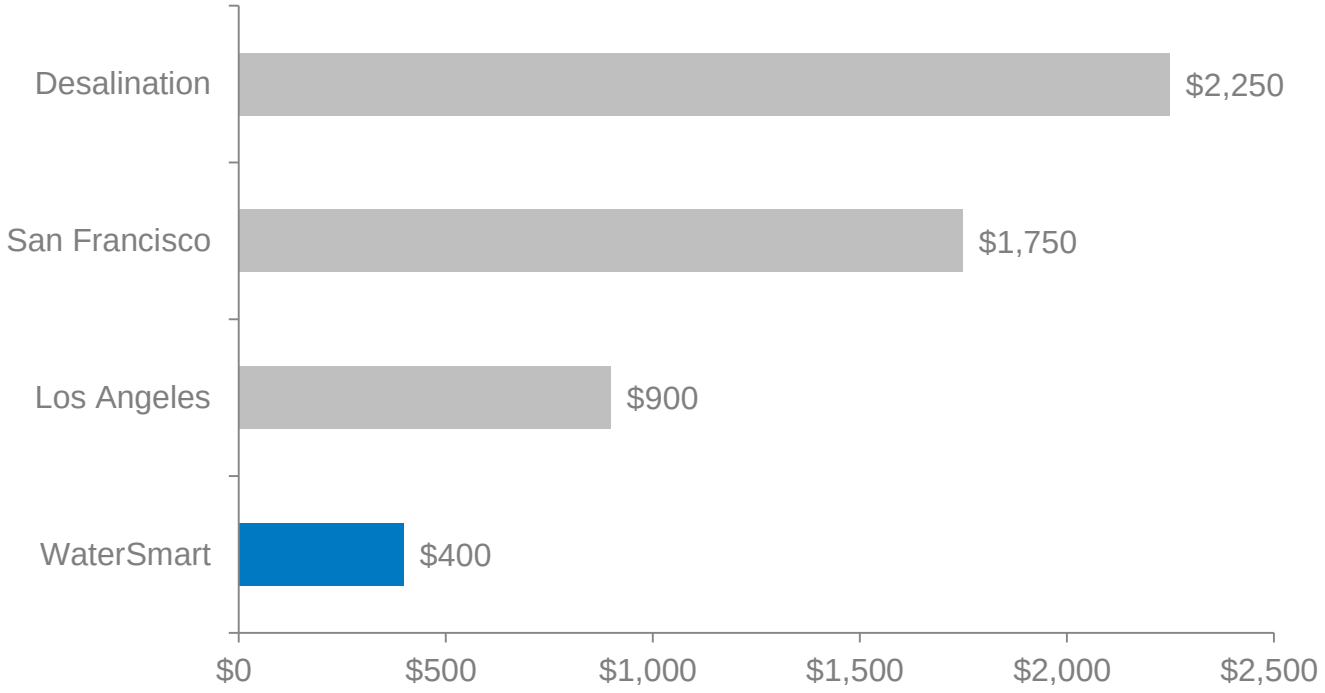
Demand management

- Reduce demand variability
- Improve revenue predictability
- Extend asset lifetimes
- Increase O&M efficiency



Cost comparisons

Efficiency is the least expensive source of water supply



MARGINAL COST OF WATER PER ACRE FOOT

Wholesale cost of treated water per acre-foot. San Francisco water purchased from BAWSCA . Los Angeles water purchased from MWDSC. Desalination cost of Carlsbad plant.

Putting it in action…

The WaterSmart platform

METERS

SURVEYS

REBATES & INCENTIVES

REAL-ESTATE & DEMOGRAPHICS

CITATIONS

WEATHER & CLIMATE

WaterSmart SOFTWARE

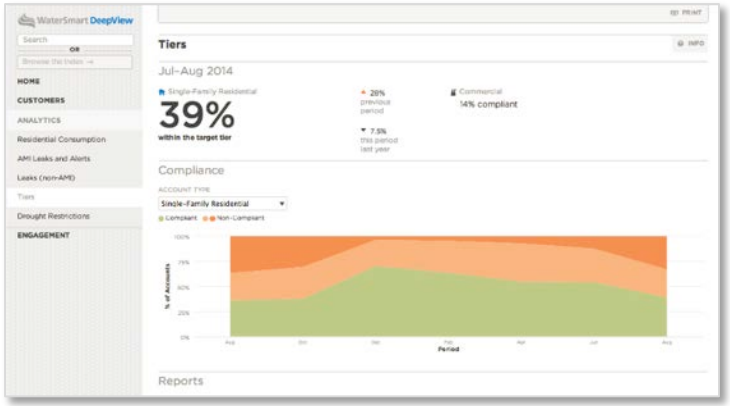
ANALYZE
Utility Dashboard

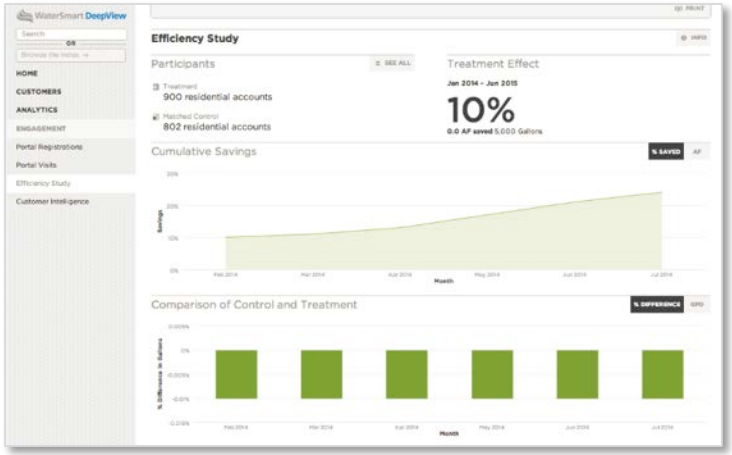
ENGAGE
Consumer Portal

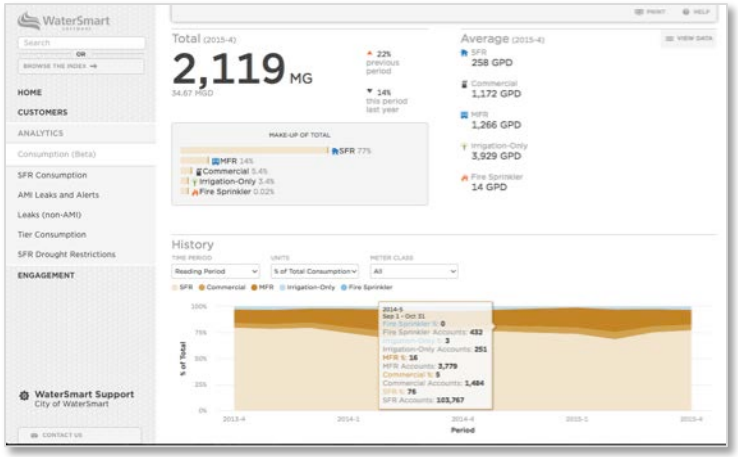
NUDGE
Home Water Reports and Alerts

Data analytics

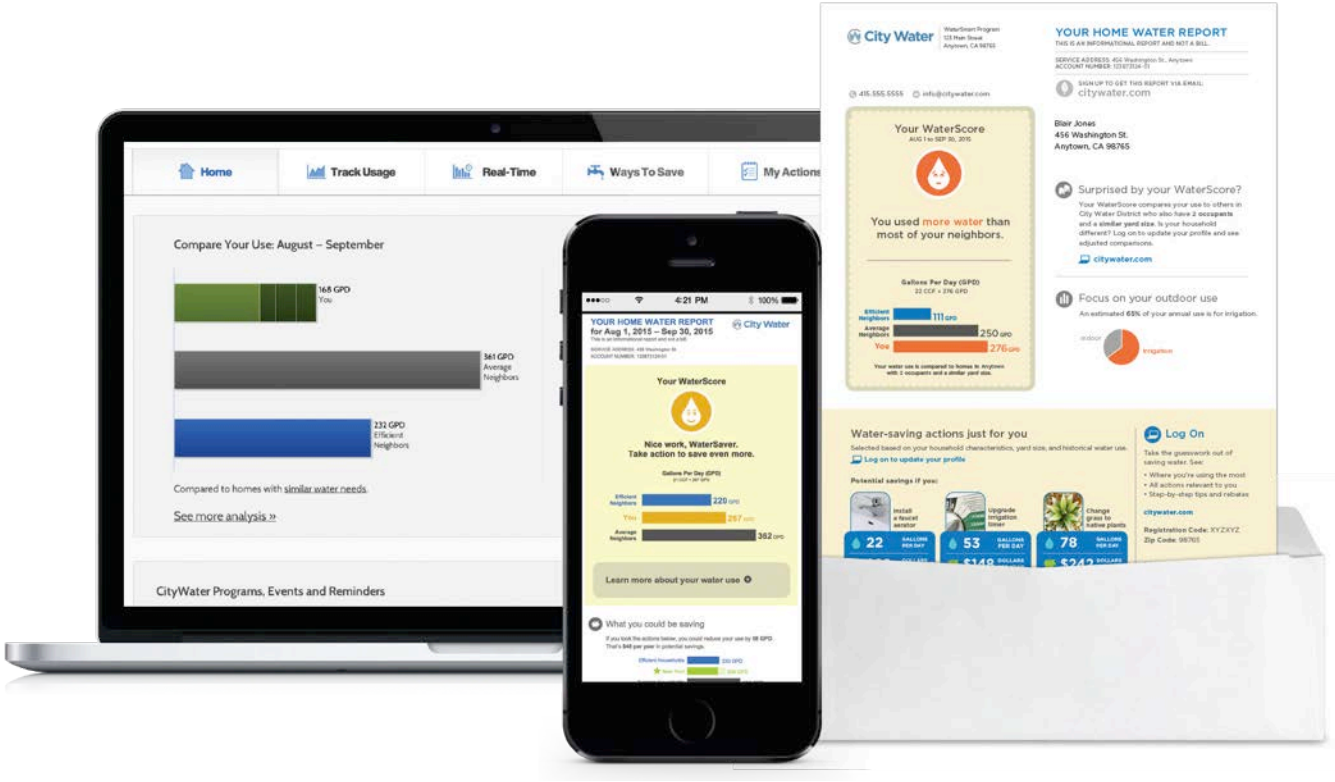
- Segment customer usage
- Identify pressure districts for priority rehabilitation
- Track progress toward efficiency goals
- Compare ROI of various programs
- Improve demand forecasting
- Build consensus through information transparency







Engaging customers



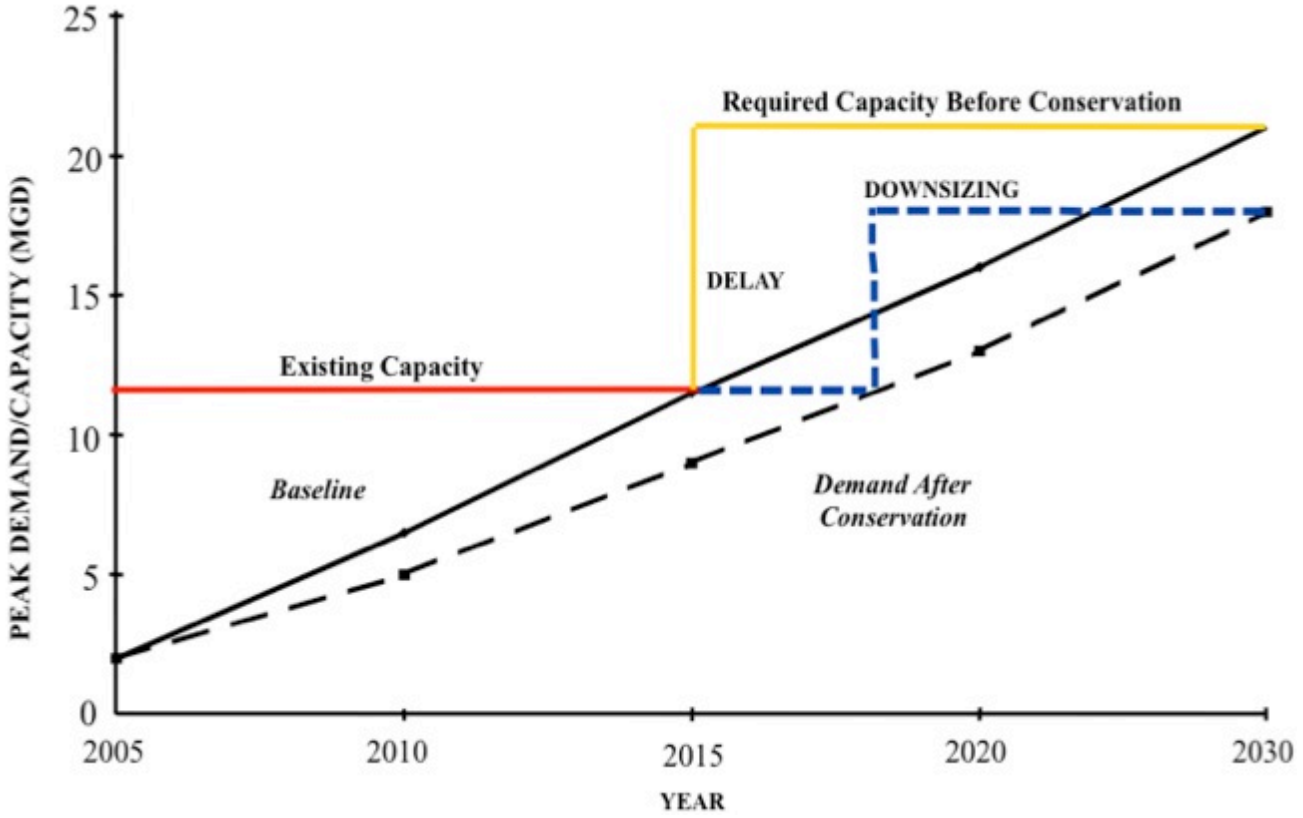
- Proactive communications accelerate demand control
- Consumers become more educated on the value of water
- Customer satisfaction soars

Operational benefits

- Avoided cost of water supply purchases
- Reduced energy charges for conveyance
- Lower cost for treatment chemicals
- Faster customer support call times

Capital benefits

Reduce and Defer Capex



REDUCE OR DELAY CAPACITY BY REDUCING PEAK DEMAND

Wholesale cost of treated water per acre-foot. San Francisco water purchased from BAWSCA . Los Angeles water purchased from MWDSC. Desalination cost of Carlsbad plant.

Chart Source: AWWA Manual M-52

Interest expense benefits

Deferred investment yields substantial savings

System Size	20 Year Capital Need ($M)	Number of Systems	Average Investment ($M)	Annual Interest on a 20 year Bond ($M)
100,000 Connections or More	$145,100	426	$340.61	$12.77
3,301 - 100,000	$161,800	8,787	$18.41	$0.69
Less than 3,300	$64,500	42,322	$1.52	$0.06

Figure 4 Capital Investment Needs Derived From EPA Sources

A new framework

The Old Framework

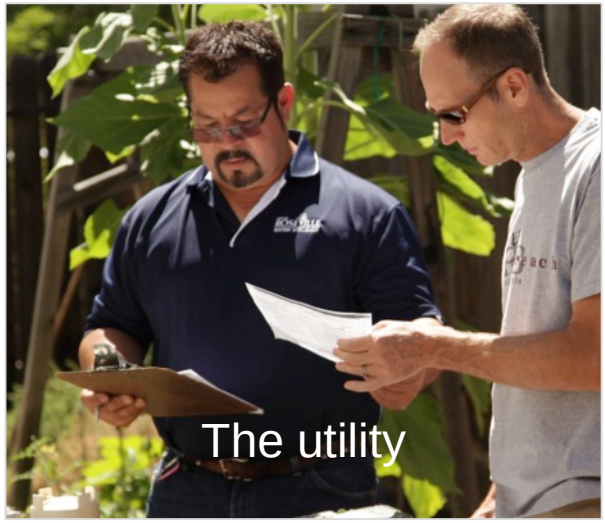
Reducing supply deliveries leads to revenue erosion and subsequent rate increases

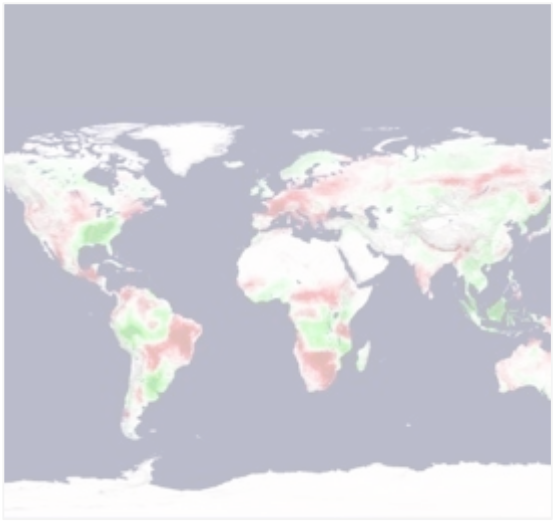
The New Framework

Water demand management improves long-term financial and infrastructure planning and reduces future rate increases

The data-driven utility

Who wins?

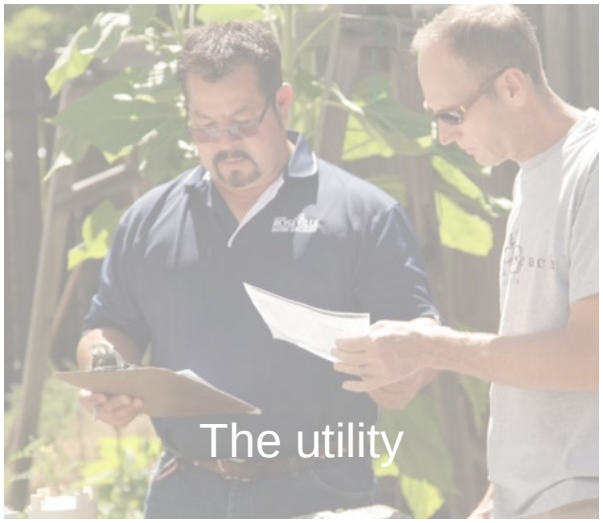


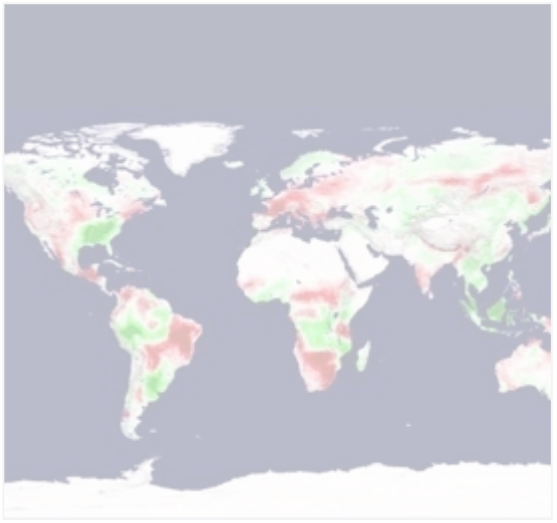


“My day has changed because I can engage customer in conversation about water-use efficiency in a sustainable way.”
City of Newport Beach

The data-driven utility

Who wins?

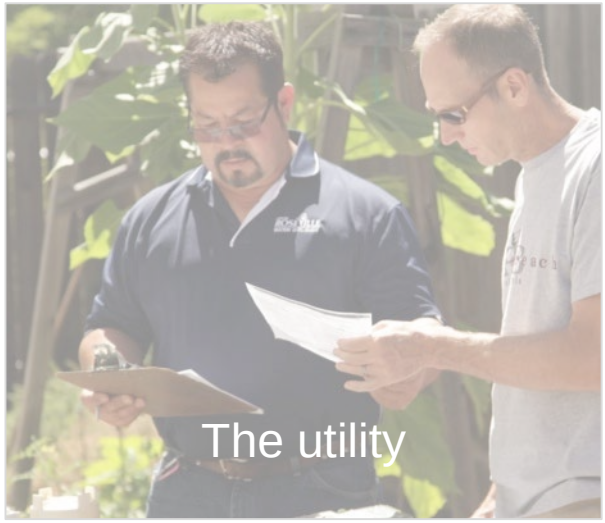


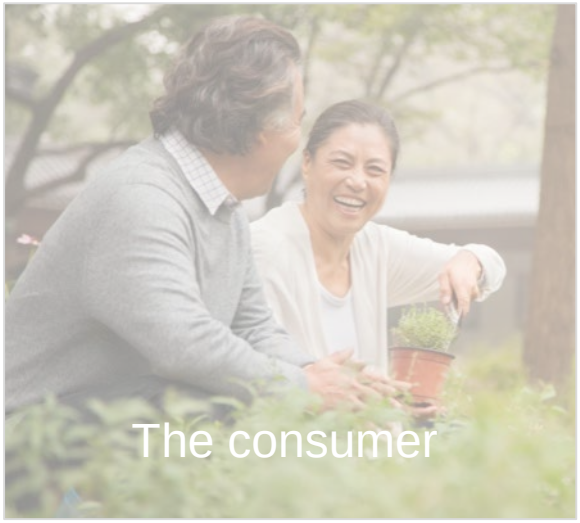


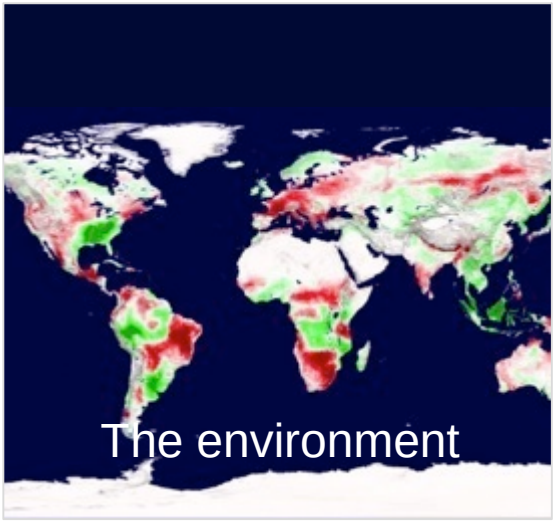
"You notified me of a possible leak the weekend of August 31…you were correct. I found it. THANKS. Your system is TERRIFIC."
Glendale Water and Power customer

The data-driven utility

Who wins?







"$30 million…for direct expenditures and grants to state and local agencies to improve water use efficiency, save energy and reduce greenhouse gas emissions from state and local water transportation and management systems."

California 2014 Drought Relief Bill

The data-driven utility

- Engage customers to make case for smart meters, infrastructure improvements, and rate increases
- Deploy powerful analytics and presentment tools to derive data insights
- Prioritize demand management for cost control
- Reduce pace of rate increases
- Deliver value to customer, utility, and community

Thank You

Peter Yolles
peter@WaterSmart.com

Water Smart Innovations

2015

Greater Financial Control through Data, Customer Engagement & Water Rates

Tom Ash

Inland Empire Utilities Agency

tash@ieua.org

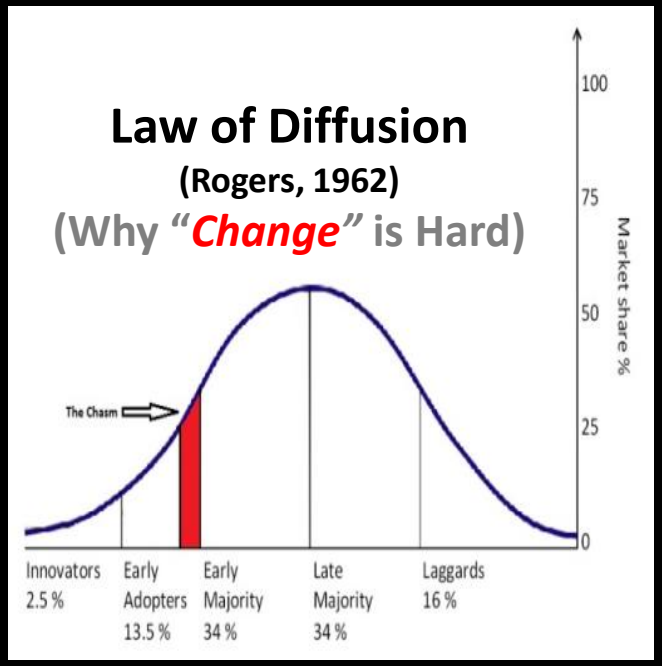
https://www.youtube.com/watch?v=mZdoL_5qdac

- *Drought/Mandated Conservation Targets*
- *Sales Revenues are down*
- *Capital Projects on hold*
- *O & M & staff cuts*
- *Bond Ratings in jeopardy*

What to Do?

Change!

- The Agency cost-recovery approach
- Establish water use efficiency standards
- Be objective and equitable for customers
- Take changes to the public



Infrastructure for Water Use Efficiency

Rates:
Reliable Cost Recovery & Conservation

Customer Outreach:
Technology-based Conservation

Customer Level Data:
Irrigated Area/Parcel, Local ET

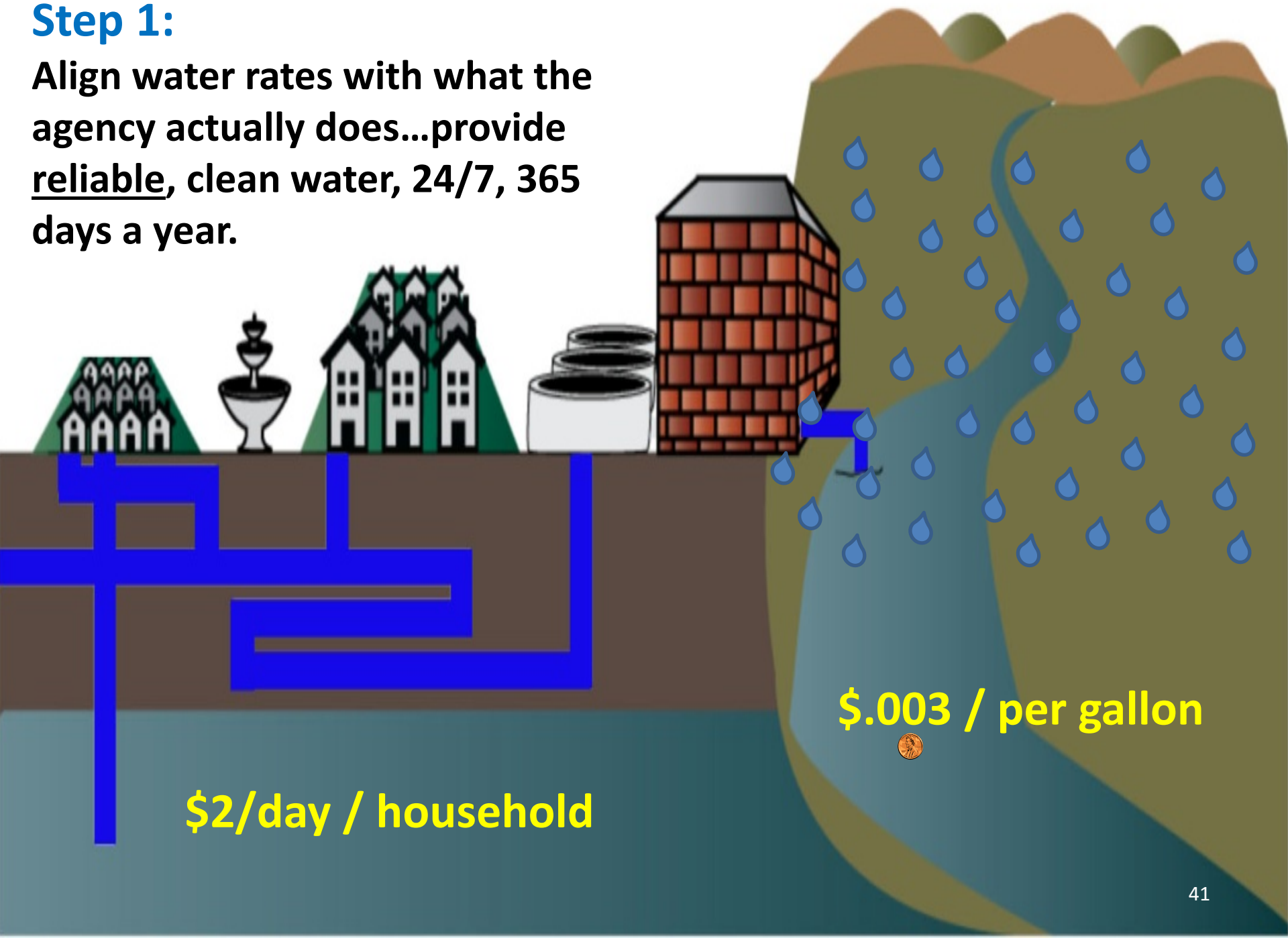
Santa Ana Watershed (SAWPA):

- 70 agencies, 3 counties
- 6 w/ Allocation-based rates
- 15 w/ letters of intent for rate changes
- 14 w/ letters of intent for tech-based conservation
- Supported by a State grant of $12.5 million
- 25% of SAWPA agencies will have a full “infrastructure” in 3 years.

SAWPA

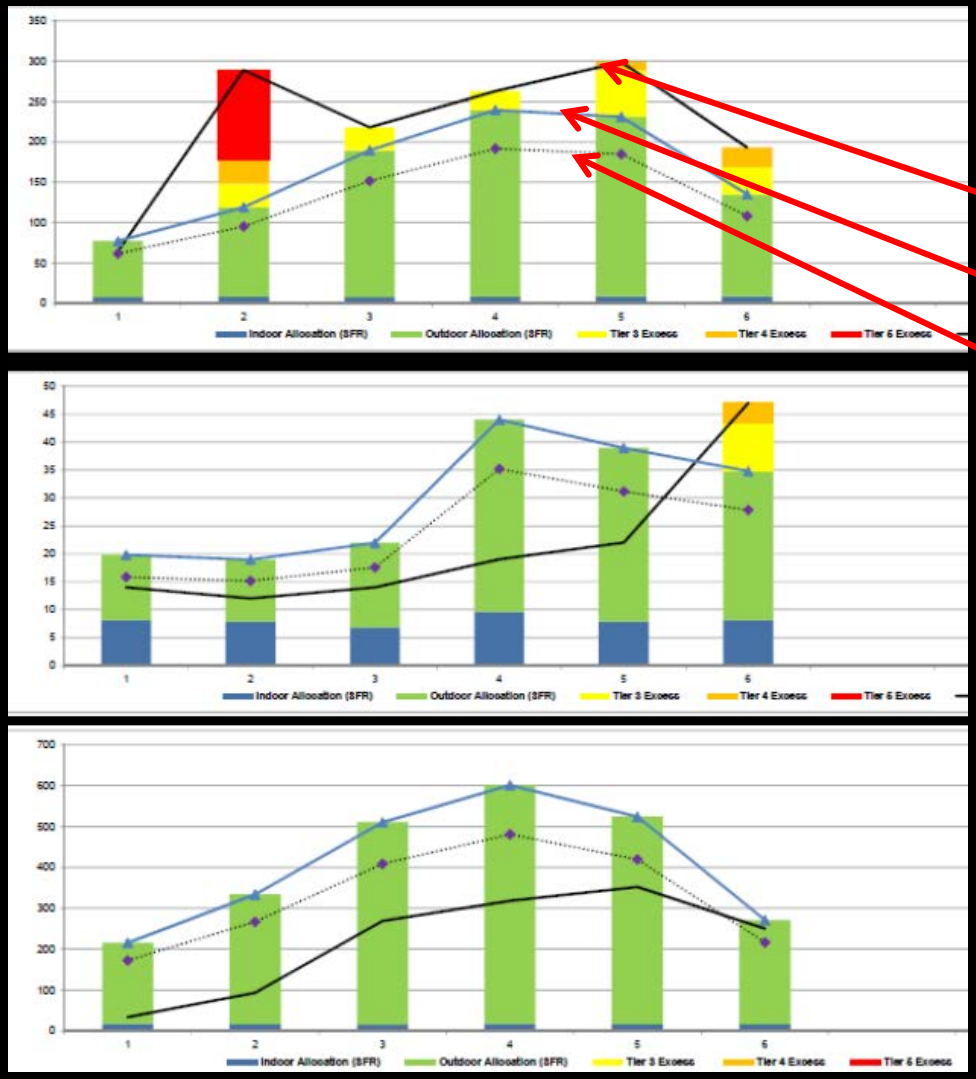
Step 1:

Align water rates with what the agency actually does…provide <u>reliable</u>, clean water, 24/7, 365 days a year.



Step 2: Set water use efficiency standards (a mix of reality, science and legislation)

(# Residents) (55 gpcd) + (ET) (SF) (.70) = Allocation



3 Agency Board Members

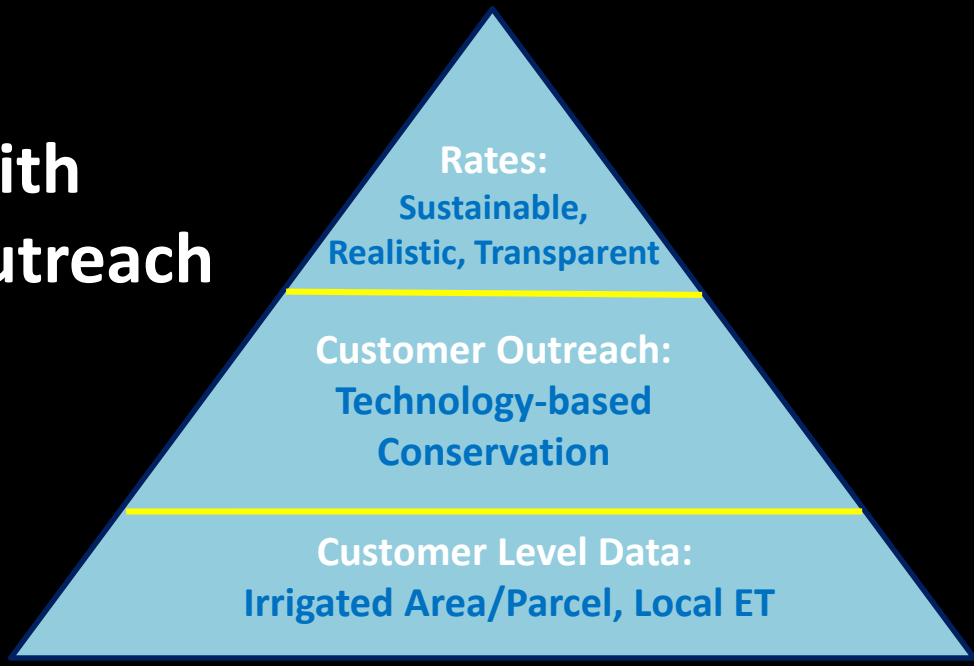
Use Allocation 20% Reduction

Result of this "education"?

***Agency will implement Allocation-based rates January, 2016**

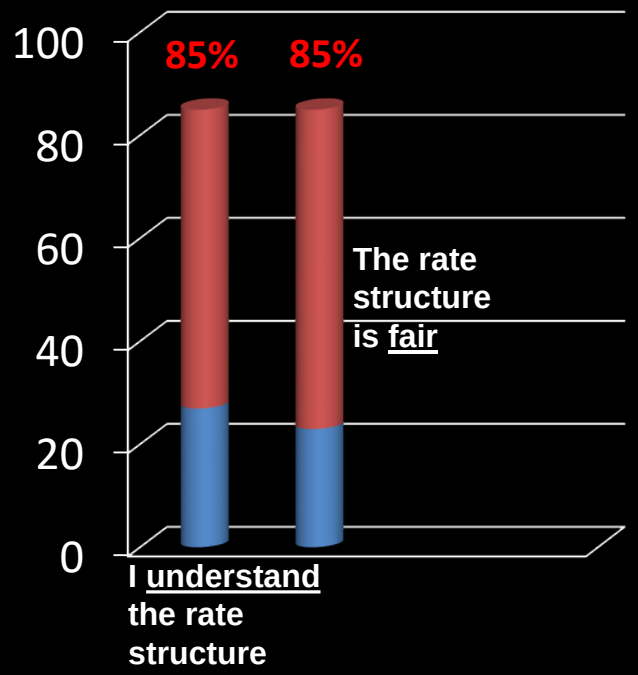
Step 3: Build "it" with Data

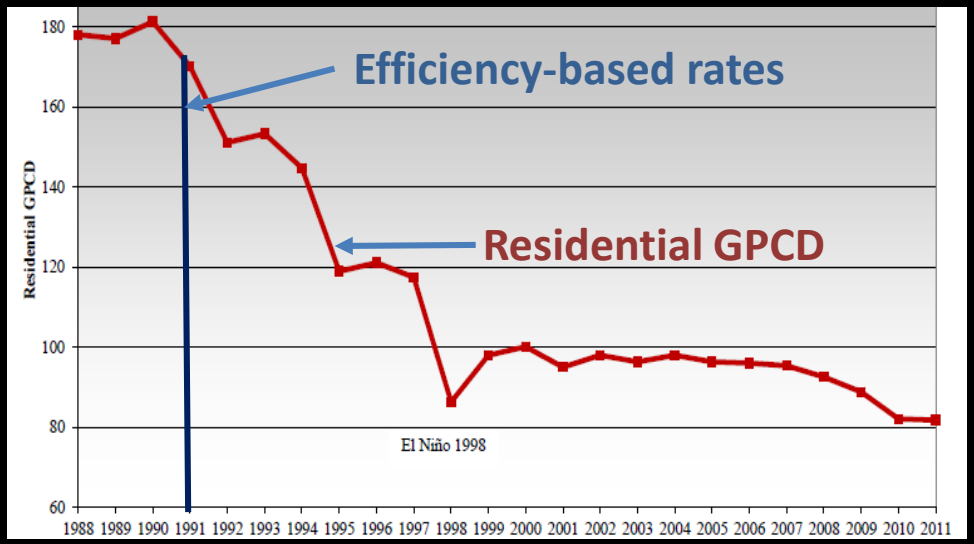
- Use accurate customer level data to:
  - ✓ Design "sustainable, efficiency-based" rates
  - ✓ Understand how customers are using water
  - ✓ Communicate accurately with customers, targeting the right customers with the right information
  - ✓ Better understand future water demands
  - ✓ And…
- Take it to customers with "technology-based" outreach

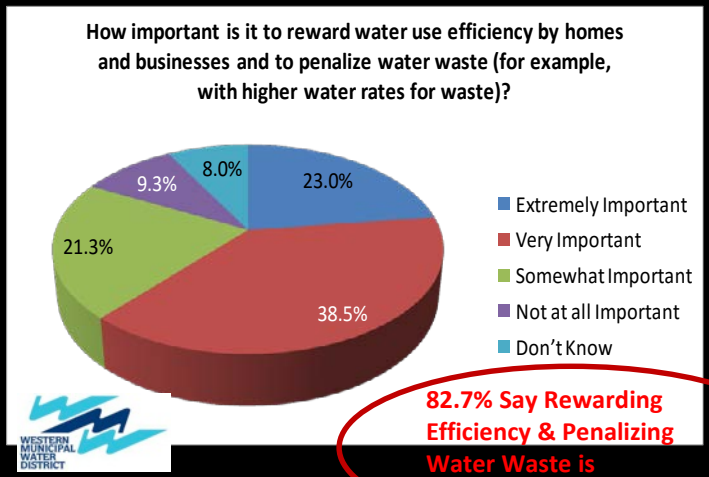


What is the Impact of a "*Data Infrastructure*" & Rates?

- **Less risk of "Fixed" revenue loss**
  (regardless of weather, water use, drought, economy)
- **Significant use reduction**
- **New funding mechanism for efficiency programs**
- **High Customer response (85%+)**
- **Board re-election (every year)**

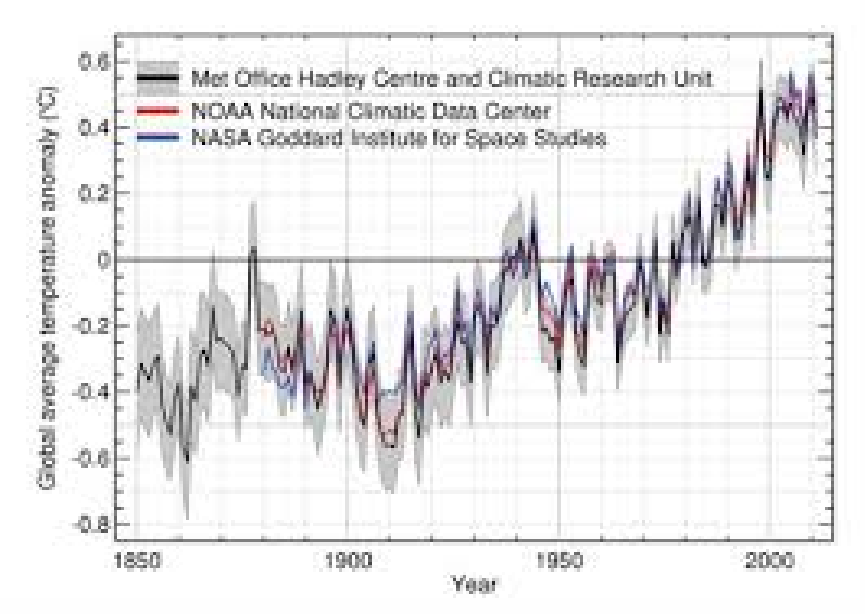






There is a Cost of NOT Changing?

- Raise rates when less water is sold
- Disappoint customers with the same never-ending *message…save water and see rates increase because we did not sell enough water*…
- Never have the money or support to conduct far-reaching conservation programs to deal with "change"



With "Traditional" Rate Designs:

- Desert Water Agency: $10 million loss if they meet their State target
- City of Redlands: $ 6 million loss
- Cucamonga Valley WD: $12 - 15 million loss

With "Sustainable" Rate Designs:

- Moulton Niguel WD: $4 million in "conservation funds"
- Western Municipal WD: $2 million in "efficiency and system" funds
- Eastern MWD reduced use 20% with just a change of rate style, with NO NEGATIVE ECONOMIC IMPACT to the agency, and little impact on low-income households (otherwise needed to raise rates 30%)

Revenues, Conservation & Acceptance

"We saved water when you asked, now you raise our rates because you did not sell enough water. We need to vote you out." The typical customer

"Agencies create rate structures that are a bad business practice." City of Fairfield Public Works Director

"If customers save more than 2% per year due to conservation, we have to raise rates." Coachella Valley WD Finance Director

"We have a rate structure designed to fail." EBMUD

AWWA State of the Industry 2015 Report:

With nearly three of four utilities using the same or less water – largely because of conservation - an interesting question emerges: How will utilities finance impending infrastructure needs as well as increasing day-to-day operating costs with the same or less amount of water flowing through the meters?

Utility employees reported they would attempt to cover costs through a variety of means, including increasing fixed fees within their consumption-based rate structures, changing growth-related fees, shifting rate designs……

"Build it and they will come…"

*SAWPA rates highlight video : https://www.youtube.com/watch?v=mZdoL_5qdac

Thank You

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