colorado waterwise
The Voice of the Colorado Water Conservation Community

Constructing Successful Conservation Rates:
The Art & Science of Revenue and Efficiency

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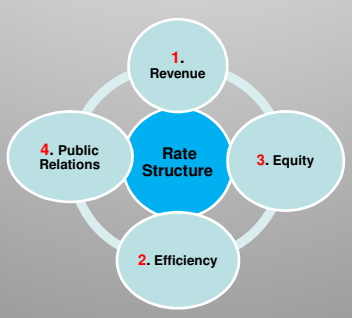
"***Water may be the most vital resource in every aspect of human endeavor, <u>but the economics of water is a mash-up of tradition, wishful thinking, and poor planning</u>.***" Charles Fishman, Author *The Big Thirst, 2010*



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Agenda

Part 1: Setting the Table (9)
- Why are you here?
- What do you expect, or what do you need?
- What are your basic rate designs, and are they successful?
- What would you change?
- "Change"

Part 2: Foundations of Conservation Rate Design (6)
- What is Success?
- What are the ramifications if Rates don't get it "right"?
- Expectations (Agency and Customer)
- What do Agencies Sell?

Break

Part 3: Constructing Successful Rates (15)
- Politics, Process, Demand Analysis
- Allocating Water, Tiers
- Fixed Costs and Revenue Recovery

Break

Part 4: Data (6)
- What, why, how

Part 5: Financial Modeling

Break

Part 6: What to Expect (5)
- What do Agencies/Customers Say about their Rate Evolution

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Part 1: Setting the Table

- Why are you here?
- What do you expect, or what do you need?
- What are your basic rate designs?
- Are they successful?
- What would you change?

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Change

Why Change:

- Does the agency lose money when less water is sold?
- Do customers complain about tiers?
- Do customers complain about "fairness"?
- Do customers complain about service charges?
- Does the agency "need" to sell a certain amount of water to meet budgets?
- Is "conservation" necessary?
- Does the rest of the agency believe conservation is necessary?

Why No! to Change:

- It is too expensive
- It is too hard
- It takes too much data
- This is how we have done it…
- Customers won't understand

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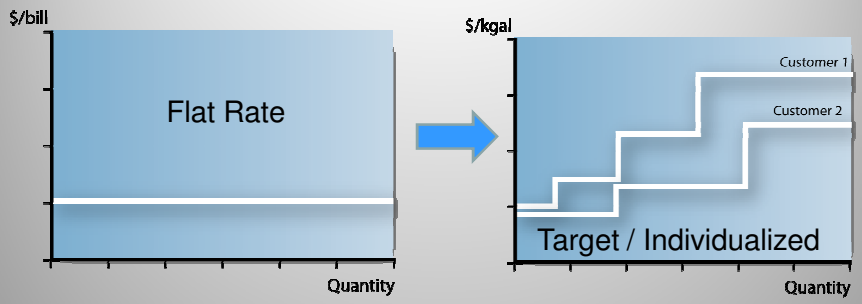
Change Happens…



Less WATER EFFICIENCY & CUSTOMER EQUITY/FAIRNESS More

The Perfect Storm

2008 - 2012:

Lower water sales

Revenue loss

Economic downturn

Drought / Restrictions

~~Rate Design?~~

The "New Normal"

- Water efficiency is here to stay
- Costs will go up
- Drought will happen
- State legislation drives efficiency
- Customers want to see rates that reflect their situation
- Customer Service will become more and more important
- Agencies need more tools
  - Defensible
  - Logical
  - Flexible

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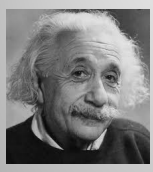
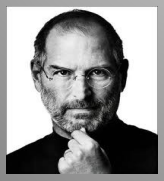
Think Different About Water Rates:



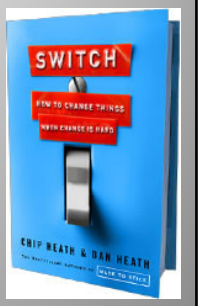
"*Doing the same thing over and over again and expecting a different outcome, is the definition of insanity.* ***Think differently."***
Albert Einstein

"Boys we need to **think different."**
Billy Beane, Oakland Athletics/Moneyball



"A ***Think Different*** attitude enables our company to do things others could not even consider."

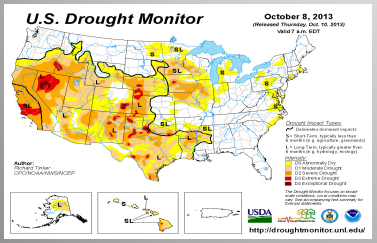
Switch: How to Change Things When Change Is Hard



Expectations:

Thursday, Oct. 10, 2013

It's dry out there — and it could stay that way. Experts predict above-average temperatures and lower-than-normal moisture amounts will be seen in the months ahead — and possibly ***as much as 15 more years****. The cattle and agriculture industry is being hit hard and the prolonged drought is keeping water in limited supply for municipalities.* (Source: Brown&Caldwell; USGS)



Tuesday, Oct. 15, 2013

"Everyone will have to use a little less water each year…" (MWD General Manager)

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Part 1 Summary:

- **Change has happened and more is likely to happen. Are you prepared? Do you have the tools?**
- **Do the same things (do more with less, work harder?)**

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Part 2: Foundation of a Conservation Rate Design

- **ANSI/AWWA G480 Water Conservation Program Operation and Management Standard**
  - "The use of a non-promotional water rate that provides the financial incentive for customers to reduce water use."

"Non-promotional water rate structures include inclining tier rates, marginal cost pricing, seasonal water rates, and water budget-based rates as defined in AWWA M52"

Can a uniform rate structure be "conservation-oriented"?

What is a Successful "Conservation" Rate Structure?

- **Balances the needs of the agency and those of the customer**
  - Allocates costs accurately and proportionally
  - Recovers costs in a stable manner
  - Meets the water needs of the customer
- **Is "flexible" to adapt to changes**
  - Costs
  - Economy
  - Weather
  - Legislation
  - Etc.
- **Can be an equitable "drought response" tool for the agency**
- **Is perceived as "fair" by customers**
- **Is "defensible" for officials**
- **Sustains adequate revenue and maintains water use efficiency**

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What Are the Ramifications of Rate Designs?

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

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

"Agencies create rate structures that are a bad business practice." Former City of Fairfield Water Official

" I have a large family and a large lot. Your rates penalize our family even if we are conservative water users". Riverside County resident

"… we're selling a lot less water than we originally anticipated, that's what we call the *new normal*. We have to embrace, and change some of our foundational assumptions." SDCWA

"We have a rate structure designed to fail." Large Northern California Agency

Remember the last drought? They ask and we conserved. THEN they JACKED up the price. This time they're jacking up the price BEFORE our heavy water usage period. (Source: Colorado Water Blog)

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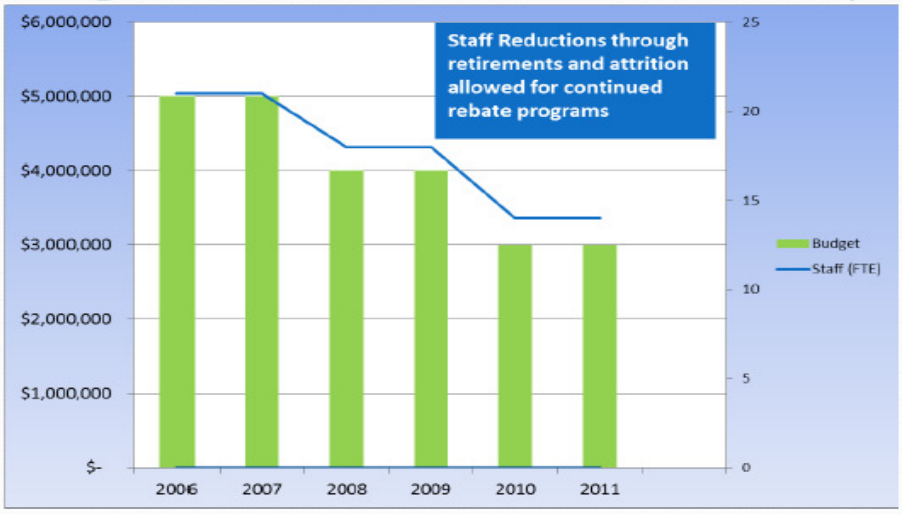
Ramifications of Unsuccessful Rate Designs



Expectations?

Agency:

- Equitable
- Effective
- Clear and understandable
- Delivers required revenue
- Discourages wasteful use (non-promotional)
- Adaptable when necessary
- Other?
  - Highlights Responsibilities

Customer:

- Equitable
- Reasonable
- Clear and understandable
- Consistent
- Information-oriented
  - What is "efficient" use
  - Highlights Responsibilities
- Other?

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What Do Agencies Sell?

Service

$2.00 per day

Water

$.003 Per Gallon

Reality?

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Part 2 Summary:

Rates Should…

- **Balance the needs of the agency & the customer**
- **Motivate Efficiency for both the Agency & Customer**
- **Be flexible for changing situations**
- **Be seen as fair, defensible and highlight responsibilities**
- **Recognizes the reality of what the agency sells**
  - Defensible
  - Transparent
  - Good business practice

How Do We Motivate The Masses?

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Part 3: Constructing Successful Rates

- **Ask the right questions**
- **Get good data/info**
- **Educate officials 1st**

Water Officials?

Staff?

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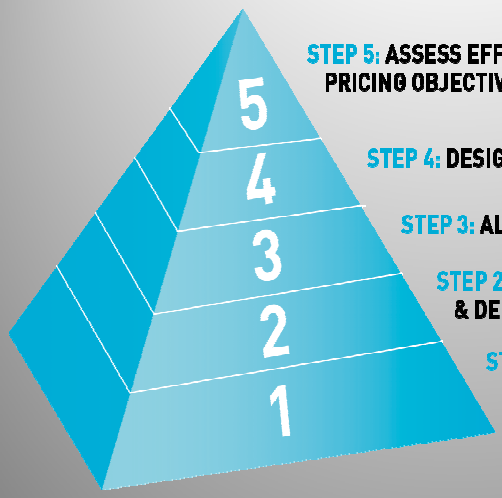
The Rate Setting Process



STEP 5: ASSESS EFFECTIVENESS IN ADDRESSING PRICING OBJECTIVES

STEP 4: DESIGN RATE STRUCTURE

STEP 3: ALLOCATE COSTS

STEP 2: IDENTIFY REVENUE REQUIREMENTS & DEMAND PROJECTIONS

STEP 1: IDENTIFY FINANCIAL & PRICING OBJECTIVES

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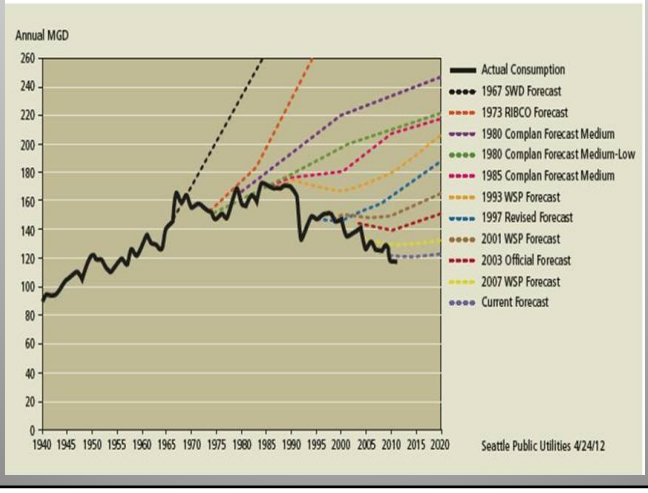
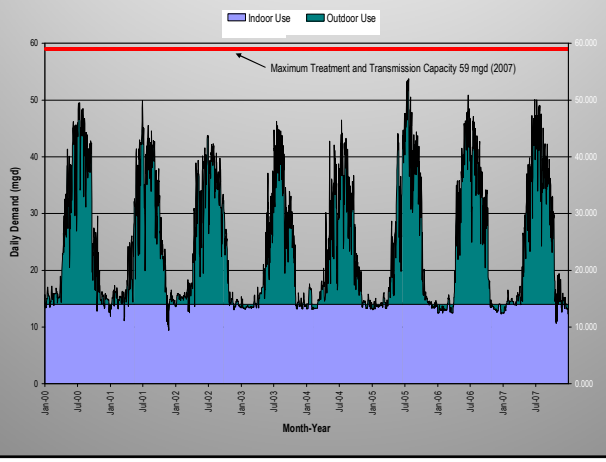
Constructing Successful Rates: Demand Analysis

- Construct a realistic demand forecast

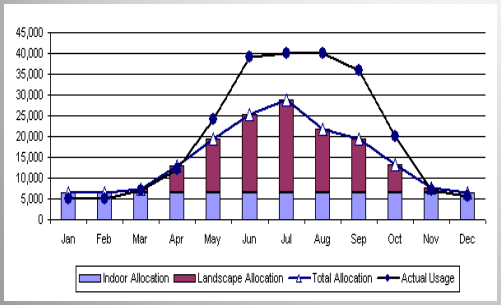


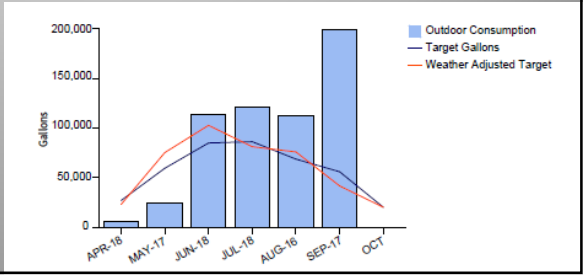
Constructing Successful Rates: Demand Analysis

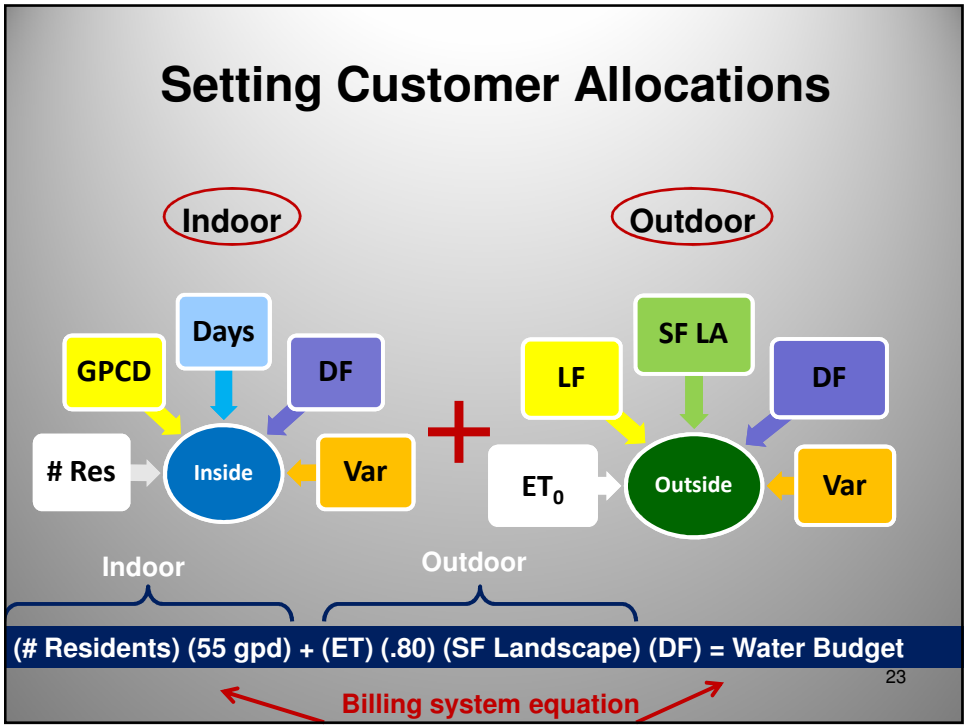
- Understand drivers of peak demand
  - Typically irrigation or other seasonal drivers



Agency Allocations / Customer Allocations?






Setting Customer Allocations
Indoor
Outdoor
Days
GPCD
DF
Res
Inside
Var
LF
SF LA
DF
ET0
Outside
Var
Indoor
Outdoor
(# Residents) (55 gpd) + (ET) (.80) (SF Landscape) (DF) = Water Budget
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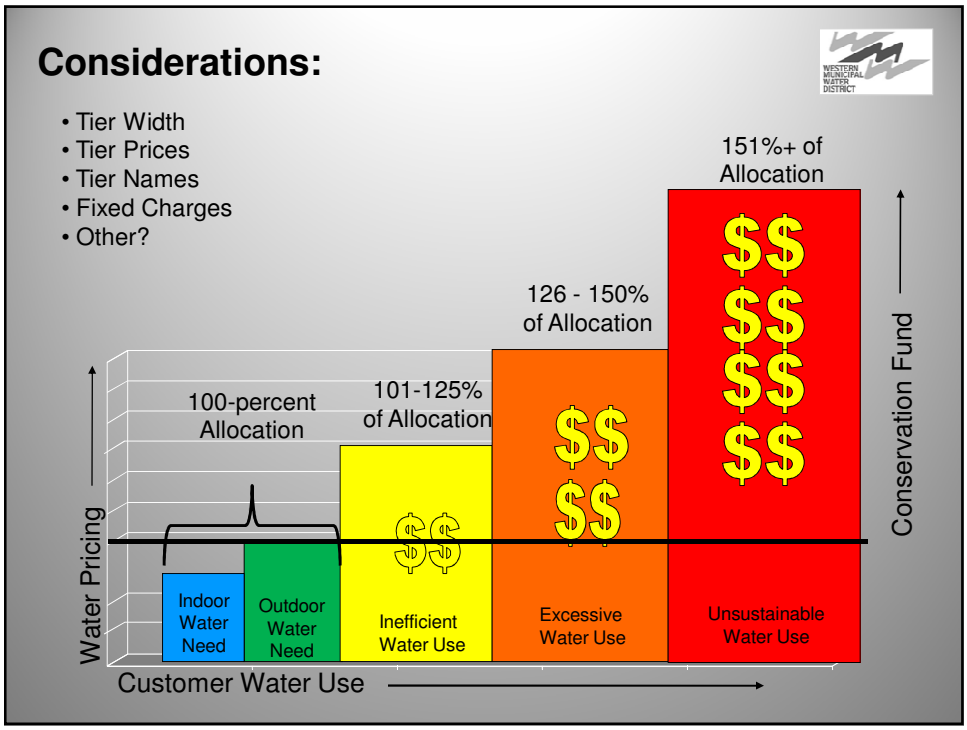
Billing system equation


Considerations:
• Tier Width
• Tier Prices
• Tier Names
• Fixed Charges
• Other?
151%+ of Allocation
126 - 150% of Allocation
101-125% of Allocation
100-percent Allocation
Indoor Water Need
Outdoor Water Need
Inefficient Water Use
Excessive Water Use
Unsustainable Water Use
Water Pricing
Customer Water Use
Conservation Fund

Boulder, CO
Water Budget Allocation

Indoor allocations = 7,000 gal/month (Single-family)

= 5,000 gal/month (Multi-family)

Outdoor allocation based on irrigable area.

Irrigable Area (square feet)	**Gallons per Square Foot** (gpsf)
0 - 5,000	15
5,001 – 9,000	12
>9,000	10

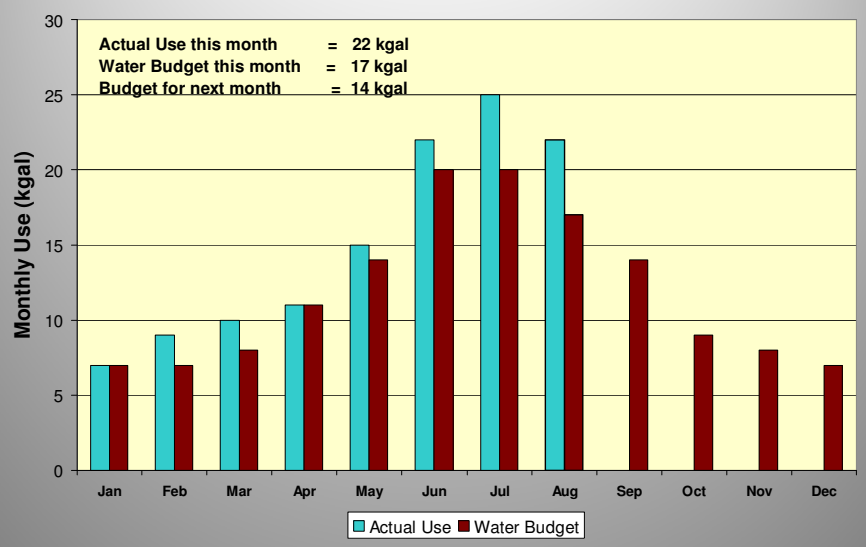
Boulder, CO
Rate Structure

Implemented in January 2007

Tier	**Use** (% of water budget)	**2013 Charges** (per kgal)
1	0 – 60%	$2.32
2	61 – 100%	$3.09
3	101 – 150%	$6.18
4	151 – 200%	$9.27
5	201% +	$15.45

Wastewater = $4.02/kgal (volume based on winter consumption)
Service charge ~ $9/month

Boulder Water Bill Graphic



The Water Waster:

8/10/98 9/09/98 1255 1337 82 Use = CCF

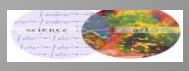
USAGE - LOW VOLUME	16	.480	$7.68
USAGE - CONSERVATION BASE RATE	23	.640	$14.72
USAGE - PENALTY	20	1.280	$25.60
USAGE - EXCESSIVE	19	2.560	$48.64
USAGE - ABUSIVE	4	5.120	$20.48
WATER SERVICE CHARGE			$3.90
SEWER SERVICE CHARGE			$6.90

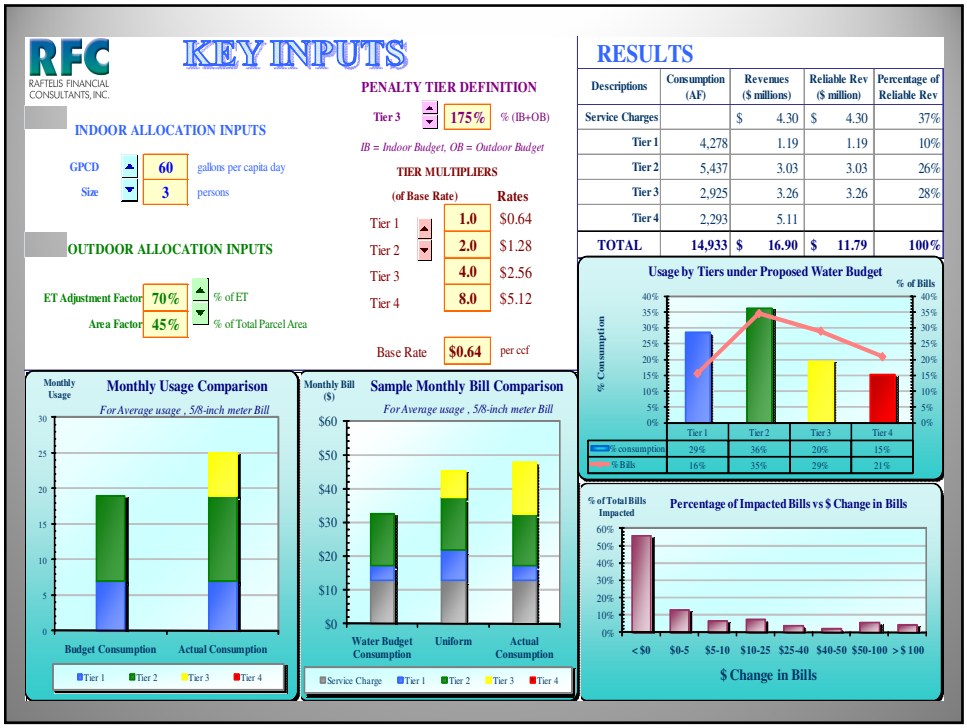
BILL CALCULATION BASED ON 4 People + .12 ACRES

YOUR ALLOCATION FOR THIS BILL 39 CCF

YOUR USE in the BILLING Period 82 CCF $127.92

Science & Art displayed on a water bill



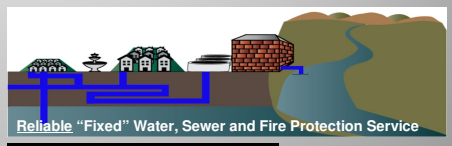


Descriptions	Consumption (AF)	Revenues ($ millions)	Reliable Rev ($ million)	Percentage of Reliable Rev
Service Charges		$ 4.30	$ 4.30	37%
Tier 1	4,278	1.19	1.19	10%
Tier 2	5,437	3.03	3.03	26%
Tier 3	2,925	3.26	3.26	28%
Tier 4	2,293	5.11		
TOTAL	14,933	$ 16.90	$ 11.79	100%

Recovering "Necessary" (Fixed) Costs?

The most controversial philosophical and practical policy dilemma for agencies is "**how**" to recover costs…

- **Recover "fixed" costs independent of water sales**
- **Recover "fixed" costs in a "service" charge and efficiency tiers**
  - It's okay to lose "variable" revenue
  - Be sure of "demand" analysis



Water

$.003 Per Gallon

Reality?

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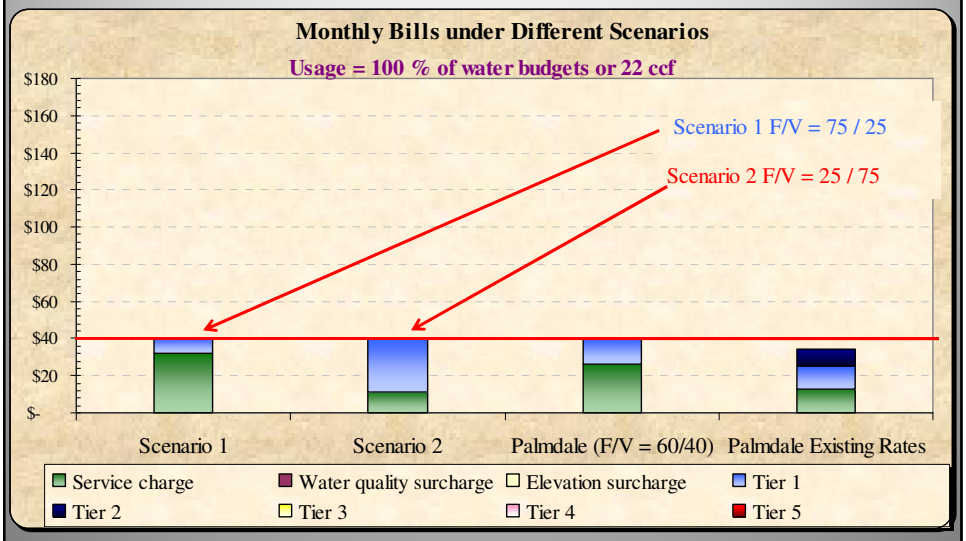
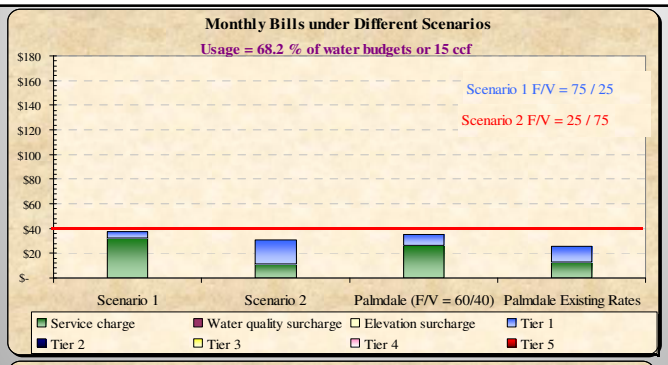
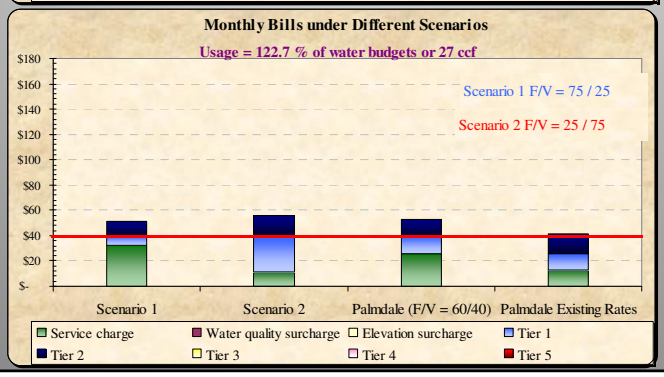
Modeling Cost of Service and Allocations

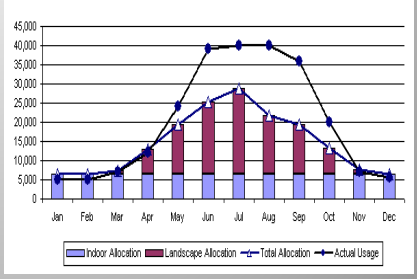






Part 3 Summary:

- Ask the right questions
- Use a deliberate process
- Make accurate demand forecasting
- Use the science we have to give customers a "target"
- Take the "risk" out of revenue recovery
- Model scenarios for internal discussion
- Make "efficient" water cheap water; Make "wasted" water expensive
- Recover Revenue and Reduce Water Waste



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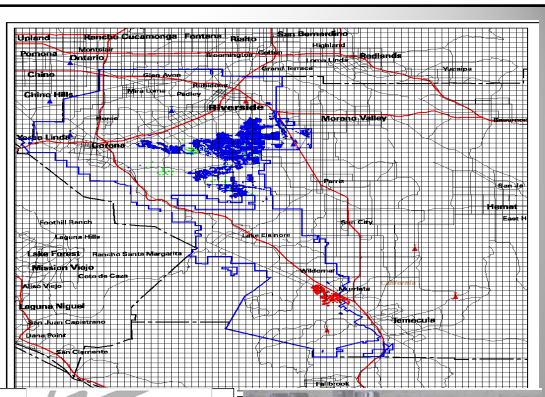
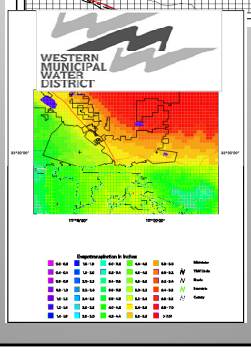
Part 4: Data

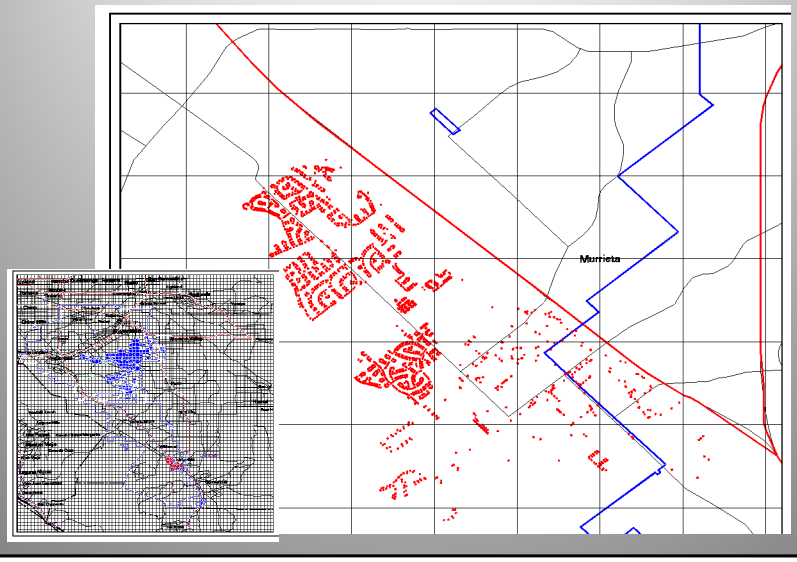
- Indoor demand
  - # Residents
  - Efficiency Standard

- Outdoor Demand
  - ET
  - Landscape area
    - Residential
    - Commercial





Meters to Microclimates



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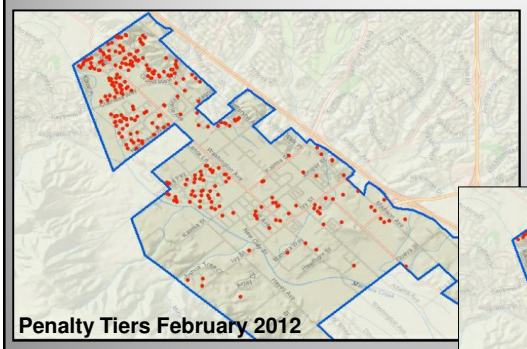
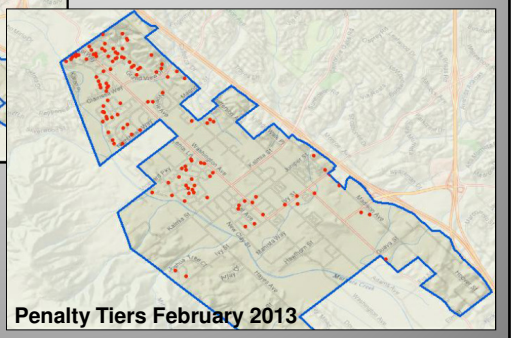
Water Allocations and Targeting



Penalty Tiers February 2012



Penalty Tiers February 2013

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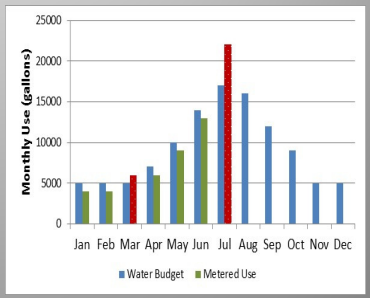
Data & The Billing System

- **Capable billing system is essential**
- **Required capabilities are NOT extreme**
  - Basic mathematics (+, -, x, ÷)
  - Careful planning
  - Involve IT department up-front
  - Customer data storage – for retrieval and comparison

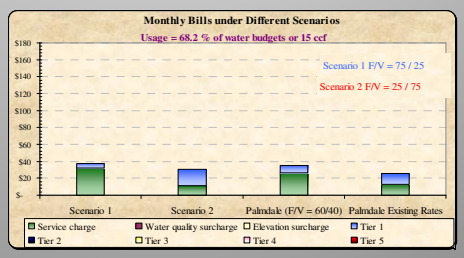
Detail of Current Charges & Adjustments

Water Consumption:		Total CCF		Total Gallons	Gal per Day
	Current	34.00		25,432	847.73
Efficient Water Use - Tier 1		9.63 ccf	X	$ 1.90	18.32
Efficient Water Use - Tier 2		21.25 ccf	X	$ 2.04	43.24
Inefficient Water Use - Tier 3		3.12 ccf	X	$ 2.62	8.18
Total Water Charge					69.74
Riverside Utility Tax					6.22
System Charge		30 Days	X	$ 0.74600	22.38
Pumping Charge		34 ccf	X	$ 0.10500	3.57
Water Reliability Charge		34 ccf	X	$ 0.21000	7.14
Late Interest					3.31CR
Late Interest					4.06CR
Total Current Charges					**$101.68**
Total Balance Due					**$109.05**



Part 4 Summary:

- **Acquire accurate customer data**
  - Compare costs, accuracy and defensibility
- **Model and test different scenarios using actual customer water use in the context of individualized targets for efficiency**
  - Test tier widths, efficiency standards, fixed and variable cost scenarios



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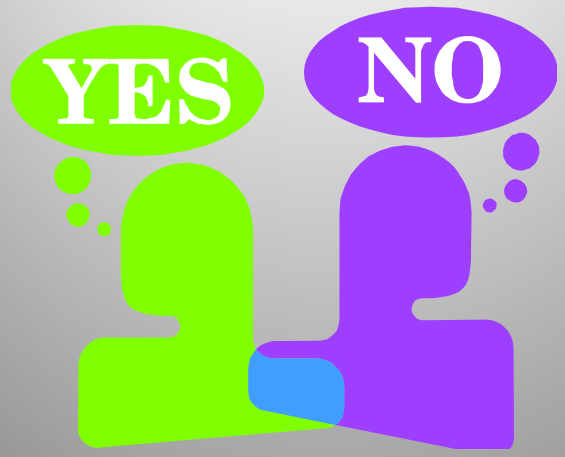
Opinions?



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Part 5: Financial/Rate Design Modeling

Yorba Linda Water District
Rate Dashboard

Water Rate Model

Select Meter Ratios	AWWA
Effective Year	FY 2013
Effective Month	Jul 1st, 2012

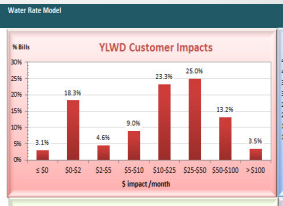
Water Rate Structure		Current	FY 2013	% Cum Rev Adj
Monthly Service Charges				
5/8		$11.73 / mo	$7.56 / mo	-35.5%
3/4		$11.73 / mo	$7.56 / mo	-35.5%
1		$11.73 / mo	$12.60 / mo	7.4%
1 1/2		$11.73 / mo	$25.20 / mo	114.8%
2		$11.73 / mo	$40.32 / mo	243.7%
3		$11.73 / mo	$88.20 / mo	651.9%
4		$11.73 / mo	$158.76 / mo	1,253.5%
6		$11.73 / mo	$352.80 / mo	2,907.7%
Commodity Rates				
Tier 1	0 10	$2.52 / hcf	$2.42 / hcf	-4.0%
Tier 2	11 25	$2.52 / hcf	$2.61 / hcf	3.6%
Tier 3	26 and above	$2.52 / hcf	$3.48 / hcf	38.2%

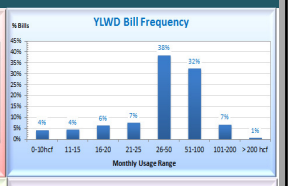
Req Revenues from Rates	Current	FY 2013	% Cum Rev Adj	Units of Service per year	Unit Cost of Service
Service Charge	$3,391,471	$3,756,492	100.0%	497,152 EMU	$7.56
Commodity Rates	$20,943,247	$21,349,180	0.0%	8,310,812 hcf	$2.57
Total Rev from Rates	**$24,334,719**	**$25,105,673**			
Cummulative Rev Adj without Passthrough		$365,021	1.5%		
Passthrough Increases to Commodity Rates		$405,933	1.7%		
Overall Increases		**$770,954**	**3.2%**		

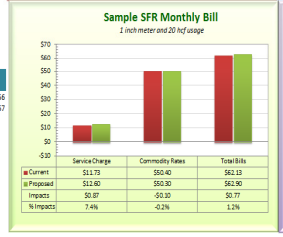
	Allocation Factors to Tiers		Base	Peaking	Conservation
24%	2,031,675 hcf	Tier 1	100.0%	100.0%	
29%	2,386,721 hcf	Tier 2	100.0%	200.0%	100.0%
47%	3,892,416 hcf	Tier 3	50.0%	400.0%	200.0%
	8,310,812 hcf	**Equiv usage**	**6,364,605 hcf**	**22,374,781 hcf**	**10,171,553 hcf**

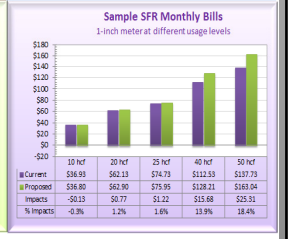
2013 Commodity Rates	Base	Peaking	Conservation	Supply & Power	Total
Cost of Service	$3,900,455	$3,686,963	$213,491.80	$13,548,270	**$21,349,180**

Tiers	Base	Peaking	Conservation	Supply & Power	Suppl. Supply
Tier 1	$0.62 / hcf	$0.17 / hcf	$0.00 / hcf	$1.63 / hcf	$0.00 / hcf
Tier 2	$0.62 / hcf	$0.33 / hcf	$0.03 / hcf	$1.63 / hcf	$0.00 / hcf
Tier 3	$0.31 / hcf	$0.66 / hcf	$0.05 / hcf	$1.63 / hcf	$0.83 / hcf









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Part 5 Summary:

Modeling any rate design scenario can give the agency a picture of what to expect before implementing any rate change.

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Part 6: What to Expect?

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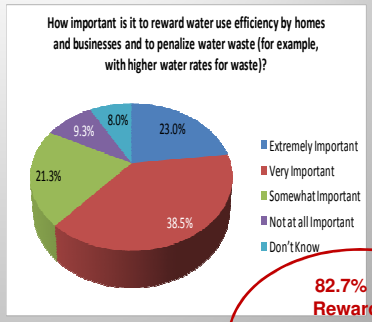
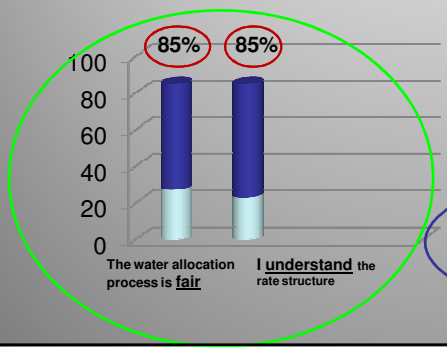
What Would Customers Choose

- Accuracy
- Recognizes "their" personal situation
- Rewards past conservation efforts (penalizes waste)
- Transparent / Logical



82.7% Say Rewarding Efficiency & Penalizing Water Waste is Important!



100% of Agencies (4) with new WBR have Positive/Accepting Customer Response

Source: MWDOC, July 2013 Survey

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What Agencies Say about their Individualized/Sustainable Rate Design

The water budget rates have stabilized revenue, and people now pay attention to leaks and water waste. The rate structure has worked just as it was intended." - Palmdale WD Asst. GM

"Customers have reduced use 13%, revenue recovery is up 6% and we have funding for conservation programs paid for by water wasters."
- EMWD CFO

"We recover 80% of our fixed costs on the fixed service charge. Our revenues are right where we estimated even with significant water savings."
- RCWD Customer Service Mgr

"We have more tools to help customers keep their bills down." – WMWD Customer Service Representative

"I was the biggest skeptic. Now I am the biggest supporter of water budget rates." WMWD Finance & Customer Service Mgr.

Moulton Niguel WD (after 2.6 yrs)
- 87% of customers meet allocations
- Revenue stable
- New source for "conservation" funds

"There's no negatives to this from a cost and PR standpoint IF you put in the proper effort." Charles Roy, MNWD Customer Service and PR Mgr.

Western MWD (after 2 years)
- 85% of customers meet allocations
- Increased customer services
- Revenue up 7% and meets costs of service
- More Conservation funds are available to assist customers (paid only by water wasters)

"We had a payback for the new rate structure implementation within 6 months." Tim Barr, WMWD project mgr.

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CHANGES IN "OVER-BUDGET" WATER USE

PERIOD	TOTAL DEMAND	TIER 3	TIER 4	TIER 5	TOTAL PENALTY
1/12 – 6/12	10,585af	529af	298af	705af	1,532af
1/13 – 6/13	9,569af	402af	199af	413af	1,014af
	- 10%	- 24%	- 33%	- 41%	- 34%

Art Meets Science = Results

Art:

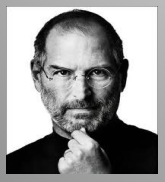
- Why Change…
- Board Education
- Staff Education
- Public Outreach Plan
- Customer Service Plan
- Conservation Programs

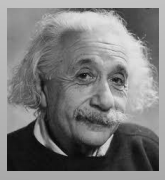
Science:

- Demand Analysis
- Customer Data
- Customer Allocations
- Financial Modeling
- Billing System Upgrade

Results:

- Stable revenue
- Defensible politics
- Educated customers
- Targeting tool
- Increased agency knowledge
- Future flexibility
- Long-term efficiency





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Discussion???

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colorado waterwise
The Voice of the Colorado Water Conservation Community

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