

Efficient Pricing as a Part of Short and Long Term WUE Planning

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A Burning Question...

*“How much will my sales
drop and what should I
do with rates?”*

Savings Goals and Achievements

Table 3 Programs Adopted by Retail Water Suppliers during California Drought 1976-77

Supplier	Residential Rationing Program	Achievement, percent
Marin Municipal Water District	Mandatory 57 percent per capita	65
East Bay Municipal Utility District	Mandatory 35 percent per household	40
Contra Costa County Water District	Mandatory 30 percent	25
San Francisco Water Department	Mandatory 25 percent	30
Los Angeles DWP	Mandatory 10 percent	16
Sunnyvale Water Department	Voluntary 25 percent	26
Santa Clara Valley Water District	Voluntary 25 percent	30
City of Pleasanton	No program	19

Source: Reproduced from "2007 Updated Edition, Draft Urban Drought Guidebook" State of California Department of Water Resources, Office of Water Use Efficiency and Transfers, August 2007

Revenue Management and Conservation

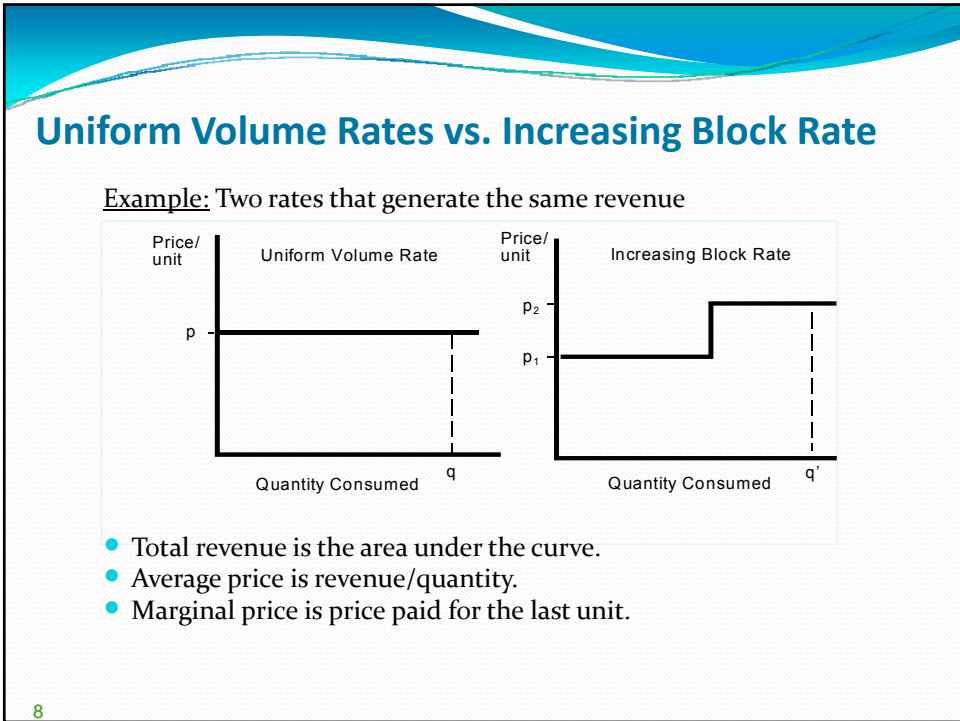
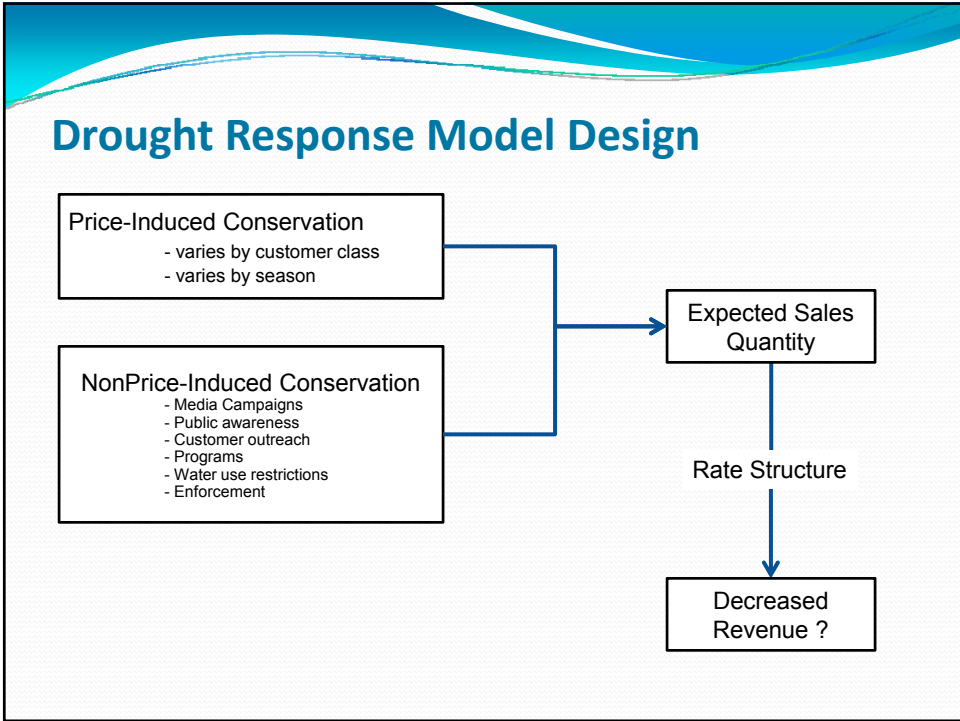
- Net Revenue Management is key
 - Net Revenue = Revenue - Expenditures
 - Account for change in expenditures and reduced revenues
- Drought Pricing includes rates in drought planning (AWWA Rate Manual)
 - Can change block width (shrink block allowance)
 - or height (increase rates)

Planning Tools for Efficient Pricing

- An **empirical** planning tool to assist member agencies to plan for Drought Response (consistent with Model Drought Ordinance):
 - 4 Customer Demand Reduction Targets
 - Revenue Management and Rate Design Issues
- Needs to address **both** price-induced and non price-induced water conservation.

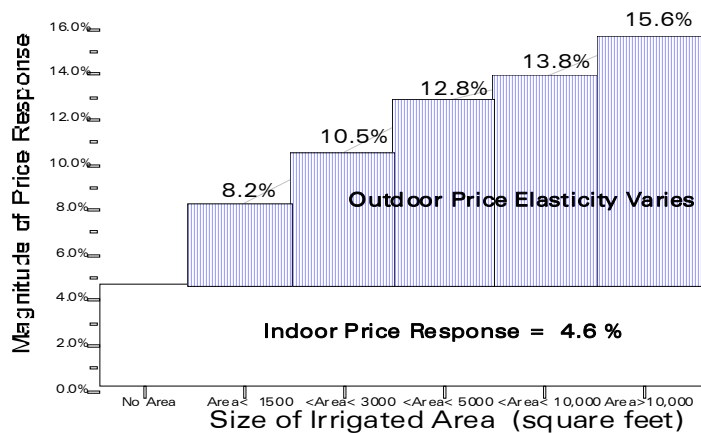
Approach—Generic Model Design

- Need to separate price options from nonprice options
- Need to allow flexibility in rate design
 - Seasonal Rates—
 - winter vs. summer rates
 - Block Rates—
 - change height or width
 - up to 5 blocks possible
 - Up to 5 Generic Customer Classes with a Customizable Class
- Need to adjust revenue requirements for
 - Decrease in purchases of imported water and
 - Increases in conservation program expenditures



Demand -- Willingness to Pay

Urban demand is very inelastic



Source: Chesnutt, et al. (1995), *ULF Toilet Programs*

Price-Induced Water Conservation

- Recommendation for Price Elasticities:
 - Single Family Summer: -.20
 - Thus, a 100 percent increase in rates would result in a 20 percent decrease in summer water demand
 - Single Family Non Summer: -.12
- Basis:
 - *Do Residential Water Demand Side Management Policies Measure Up? An Analysis of Eight California Water Agencies* Renwick and Green, Journal of Environmental Economics and Management, 2000.
 - Study set in California, most recent drought, better empirics
 - Elasticity could be higher **IF** there is a strong media campaign

Non Price Conservation Tool: Estimated Savings by Restriction

Model Ordinance Conservation targets:


- Level 1 Up to 10%
- Level 2 Up to 20%
- Level 3 Up to 40%
- Level 4 Above 40%

Water use restrictions (vary by Level):

- Washing paved surfaces
- Irrigation
- Fountains, Lakes, and Ponds
- Vehicle Washing
- Leak Repair
- New Connections
- Water Allocations

Look and Feel of Generic Model

**Drought Response Model
Key Policy Choices**



(A.) SUMMARY OF MODEL ORDINANCE DROUGHT RESPONSE LEVELS AND WATER-USE RESTRICTIONS

Drought Response Levels	Voluntary or Mandatory Restrictions	Customer Conservation Targets	Water Authority DWP Stage
Level 1	Drought Watch	Voluntary Up to 10%	Stage 1 or Stage 2
Level 2	Drought Alert	Mandatory Up to 20%	Stage 2 or Stage 3
Level 3	Drought Critical	Mandatory Up to 40%	Stage 3
Level 4	Drought Emergency	Mandatory Above 40%	Stage 3

(B.) SET NON-PRICE CONSERVATION TARGETS AND EXPECTED COMPLIANCE RATE

Drought Response Levels	Non-Price Conservation (planned)	Compliance Rate (expected)	Net Non-Price Conservation
Level 1	Drought Watch	10.0%	8.8%
Level 2	Drought Alert	20.0%	17.2%
Level 3	Drought Critical	35.0%	30.5%
Level 4	Drought Emergency	40.1%	34.5%

(C.) ENTER COSTS OF DROUGHT RESPONSE PROGRAM

Drought Response Level	Program Units: Marketing				Program Units: Compliance	
	Stuffers	Radio Ads	Newspaper Ads	Public Events	Dev&Admin	Site Visits
Level 1	10,000	200	20	4	250	50
Level 2	10,000	200	50	12	500	100
Level 3	20,000	300	104	12	750	150
Level 4	20,000	400	156	12	1,000	200
Costs/Unit	\$ 0.05	\$ 1,000.00	\$ 1,000.00	\$ 5,000.00	\$ 75.00	\$ 100.00

Level	Stuffers	Radio Ads	Newspaper Ads	Public Events	Dev&Admin	Site Visits	Total
Level 1	\$ 500	\$ 100,000	\$ 20,000	\$ 20,000	\$ 18,750	\$ 5,000	\$ 170,250
Level 2	\$ 500	\$ 200,000	\$ 52,000	\$ 60,000	\$ 37,500	\$ 10,000	\$ 360,000
Level 3	\$ 1,000	\$ 300,000	\$ 104,000	\$ 60,000	\$ 56,250	\$ 15,000	\$ 536,250
Level 4	\$ 1,000	\$ 400,000	\$ 156,000	\$ 60,000	\$ 75,000	\$ 20,000	\$ 712,000

Generic Model Outputs

Drought Response Model Summary

Test Year = 2008

Test Year: 2008

UNDER PRESENT RATES

Rate Class	Seasonal Rate T	Sales	Sales Units	Commodity Revenues	Fixed Revenue	Total Revenue
Res_1	No	2,340,100	HCF	\$ 6,344,396		\$ 6,344,396
Res_2	No	1,402,065	HCF	\$ 3,779,909		\$ 3,779,909
NonRes	No	404,607	HCF	\$ 1,079,339		\$ 1,079,339
Total		4,146,772	HCF	\$ 11,203,644		\$ 11,203,644

UNDER PROPOSED RATES

Rate Class	Seasonal Rate T	Projected Sales	Sales Units	Commodity Revenues	Fixed Revenue	Total Revenue
Res_1	No	1,806,093	HCF	\$ 4,602,023		\$ 4,602,023
Res_2	No	1,127,793	HCF	\$ 3,565,526		\$ 3,565,526
NonRes	No	324,683	HCF	\$ 856,100		\$ 856,100
Total		3,258,569	HCF	\$ 8,923,649		\$ 8,923,649

DIFFERENCE FROM PRESENT RATES

Rate Class	Change in Sales	Sales Units	% Change in Sales	Change in Revenue	% Change in Revenue
Res_1	(534,007)	HCF	-22.8%	\$ (1,742,373)	-27.5%
Res_2	(274,272)	HCF	-19.5%	\$ (213,383)	-5.7%
NonRes	(79,924)	HCF	-19.8%	\$ (223,239)	-20.7%
Total	(888,203)	HCF	-21.2%	\$ (1,168,995)	-10.4%

DIFFERENCE IN NET REVENUE

Rate Class	Change in Purchase Cost	Change in Gross Revenue	Change in Net Revenue	Program Cost	Total Net Impact
Res_1	\$ (527,898)	\$ (341,475)	\$ 246,173		
Res_2	\$ (145,015)	\$ (164,303)	\$ 156,422		
NonRes	\$ (103,641)	\$ (123,239)	\$ (21,598)		
Total	\$ (776,554)	\$ (629,017)	\$ 360,000	\$ 360,000	\$ 0

Illustrative Model Runs

- Status Quo
- Run 1-Non-price measures only: 10% target.
- Run 2-Price-only measures: Increase rates enough to get 10% savings.
- Run 3-Combination: Combine price and non-price measures to achieve 10% savings and net revenue neutrality.
- Run 4-Combination: Combine price and non-price measures to achieve 20% savings and net revenue neutrality.

Run 1 - Non-Price only

Assumptions:

- Level 1 - 10 percent reduction request
- Assumes 10 percent customer cutback (100 Compliance)

Results:

- 10 percent reduction in sales quantity
- 10 percent reduction in revenue (oops)

Back to the Drawing Board

Run 2 - Price only

Assumptions:

- Increase rates to achieve Level 1 - 10 percent reduction

Results:

- 10 percent reduction in sales quantity
- 50.5 percent increase in rates
- 35.5 percent increase in revenue (oops)

Back to the Drawing Board

Run 3 - Combined Price and Non-price, 10%

Assumptions:

- Imperfect Compliance to Restrictions
- Adjust rates to achieve the same **net** revenue
 - Net Revenue = Revenue – Change in Expenses
- Reduce block width (a 10% reduction) and
- Increase rates in blocks 2 and 3 to solve.

Run 3 – Step by Step

Padre Dam Drought Policy Scenarios (Run 3 – A 10 % Target)

Eastern and Western Combined

Scenario	Target	Compliance	Price Adj. Block 1	Price Adj. Block 2	Price Adj. Block 3	Sales (HCF)	Delta Sales	Net Revenue Impact
Base Forecast	0.0%	0.0%	0%	0%	0%	4,480,609	0.0%	\$ -
Non-Price Only	10.0%	86.5%	0%	0%	0%	4,093,036	-8.6%	\$ (735,528)
Non-Price and Change Block Width	10.0%	86.5%	0%	0%	0%	4,083,361	-8.9%	\$ (622,243)
Non-Price, Change Block Width and Height	10.0%	86.5%	0%	4%	10%	4,056,168	-9.5%	\$ (285,501)
Net Revenue Neutral	10.0%	86.5%	0%	8%	14%	4,032,454	-10.0%	\$ 0

Results:

Change block width by 10%
 Block 1 rate = 0%, Block 2 rate ≈ 8% , Block 3 rate ≈ 14%
 10 percent reduction in sales quantity achieved
 No reduction in Net Revenue

Final Comments

- The Drought Response Tool is a one-year ahead forecast tool
- Conclusions:
 - Price Signal should be at the front end of the drought rather than at the end
 - Water rates have a long term effect on water demand
 - The effects of price can be planned for
 - Revenue can be managed

Questions?