

Water Pricing During the Drought

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STANDING ADVISORY COMMITTEE

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Water Demand Management

- Many programs/policies to promote conservation
 - Educational /Informational Campaigns
 - Advertisement, pamphlets, bill inserts, workshops
 - Water Audits – home inspections
 - Rebate Programs
 - “Cash for Grass”, Low-flow fixture replacement, Efficiency goal
 - Pricing Mechanisms
 - Tiered or drought rates
- How effective are rebate programs compared to pricing mechanism?

Rebate Program: Turf Conversion Program

- Irrigation accounts for majority of residential use
- Xeriscape
 - Replacement of lawn with drought tolerant vegetation
 - Many definitions
 - Not “zero-scape”
- Highly profiled in LV
- Other water districts
 - CA, NM, AZ, & TX
- Often subsidized
 - Rebate - \$0.20 - \$1.50/sqft
 - Capped at specific amount



Benefits of Program

- Reduction in annual water consumption
 - ~30% total use overall
 - Per square foot reduction ranges [18-62 gals/yr]
 - Highly variable (xeriscape choice, turf type, ET rate, soil)
- Reduction is immediate and constant over time
- Reduction is most prominent in summer
 - Majority of savings resulted from more efficient irrigation
 - Peak use can be reduced

Benefits of Program

- Savings to resident
 - For a 60% conversion (SNWA)
 - Avg 2.2 hrs/mo & \$206/yr in maintenance costs
 - Avg \$240/yr savings to bill
- Return on Investment (ROI)
 - Resident: 1-3 yrs with \$1/sqft rebate; 3-5 yrs w/out
 - Water Utility: 37% on the dollar (SNWA)
 - Frees water resources up for immediate use
- Neighbor Effect
 - 1/3 of xeriscape was rebate driven (SNWA)
 - No empirical data to back this up

Costs of Program

- Monetary costs to Utility
 - Program costs - rebates can cost millions
 - Administrative costs - multiple inspections, paperwork process, customer service
 - Demand hardening - changes are often permanent
 - Conserved water may or **may not** be reallocated for new customers
 - Reduced revenue for future conservation CIPs
 - Reduced opportunity for further reduction in water use
- Environmental costs of xeriscape
 - Reduces groundwater quality and recharge
 - Increases heat absorption (“heat islands”)
 - Decreases property values
 - Decreases recreation amenities

Caveats to Conversion Program

- Acceptance for conversion programs are relatively low
 - 5% - 30% of overall residential customers prefer xeriscape
 - Most programs are voluntary – self-selection bias
- HOA/municipal codes hurdles
 - Landscape ordinances need to be addressed
- Overall design
 - Irrigation design can impact water savings by $\pm 30\%$
 - Efficiency decreases over time
 - Xeriscape type and coverage can impact water savings by $\pm 60\%$
 - Some residents water **more** with xeriscape (as much as 17%)
- Issues of equity/fairness
 - Program funding from customer rates

Rebates- Conclusion

- Effects are highly variable geographically
 - Consideration of effectiveness & ROI in region
 - Ex) \$1 rebate for 1 mil sqft reduces water by 0.1%
- Changes are not seen across the board
- Landscaping /HOA codes often in conflict
 - Necessary to be done in tandem with program
- Funding source- who pays?
 - High rebate/low cap
 - Customer often does more
 - Higher subsidy for lower income customers

Pricing Mechanism: Tiered/Drought Rates Structure



- Provides strong price signaling
 - Behavior will adjust accordingly
- Flat to metered rate billing conversion
 - Up to a 40% reduction in usage once on metered rate
 - Fairly consistent across months
 - Illustrates how pricing mechanism can change behavior
- Pricing study of Reno residential customers
 - Increasing price by **10%** decreases water use by **2%** overall
 - Effects of pricing vary by household traits
 - Determine target reduction to set price

Pricing Mechanism -Conclusion

- Compared to rebate programs
 - More efficient - allows resident to determine changes in behavior/landscape
 - More effective/equitable – changes are made across the board
 - Reduces potential for demand hardening
- Highly flexible
 - Can target high water use / seasonal use
 - Many options -adjust tiers, additional tiers, drought (short-term) pricing increases
- Considerations
 - Revenue neutrality
 - Pricing is typically cost recovery only
 - Compare costs over time given rate adjustment

Questions?
Comments?

Thank you

References

- Addink, S. (2005). Cash for Grass-A Cost Effective Method to Conserve Landscape Water?. University of California, Riverside, Turfgrass Research Facility, <http://ucrturf.ucr.edu/>, accessed February, 23, 2005.
- Lott, C., Tchigriaeva, E., Rollins, K., & Stoddard, S. (2014). Residential water demand, climate change and exogenous economic trends. In 2014 Annual Meeting, July 27-29, 2014, Minneapolis, Minnesota (No. 170660). Agricultural and Applied Economics Association.
- Musick, D. J. (2013). Cost-Effectiveness Analysis and Comparison of Xeric vs. Turf Lawns in San Angelo, Texas. SS-AAEA Journal of Agricultural Economics.
- Sovocool, K. A., Rosales, J. L., & Authority, S. N. W. (2001). A Five-Year Investigation into the Potential Water and Monetary Savings of Residential Xeriscape Fn the Mojave Desert.
- Sovocool, K. A., Authority, S. N. W., & Morgan, M. (2005) Xeriscape Conversion Study.
- Tchigriaeva, E., Lott, C., Rollins, K., & Stoddard, S. (2014). Modeling Multiple Factors of Residential Water Demand for Assessing Price and Non-Price Instruments under Climate Change: An Application to Las Vegas, Nevada