

# Demand Forecasting Outreach & Communication

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EXTENSION

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ILLINOIS-INDIANA

# Background

- Where we've been – Water2050 outreach
- Water supply concerns
- What are we planning for?
- Accurate data and modelling are important to making informed cost-effective management and policy decisions.

# What is Water Demand Forecasting?

- Estimation of future water demands based on data and trends.
- Simplest method is population-based linear extrapolation (Ex. Evanston Water Conservation Plan)

$$\text{Pop.} \times \text{GPCD} = \text{Water Demand}$$

- More complex methods consider sectors (Public, IC, ag, power, self-supply) and other factors climate change, customer behavior change, price elasticity (Ex. Water2050 Plan)
  - Water Demand = f(price, income, climate, water conservation..)

# Why do Water Demand Forecasting?

## Temporal Considerations

Forecast Type	Forecast Horizon	Applications
Long-Term	Decades	Sizing system capacity, raw water supply
Medium-Term	Years to a decade	Sizing, staging treatment and distribution system improvements
Short-Term	Years	Setting water rates, revenue forecasting, program tracking and evaluation
Very Short-Term	Hours, days, weeks (up to two weeks)	Optimizing, managing system operations, pumping

Source: Billings and Jones (2008)

-> More frequent data/model updates improves accuracy of forecasts; naturally lose accuracy with longer term forecasts.

# Why do Water Demand Forecasting? Spatial Considerations

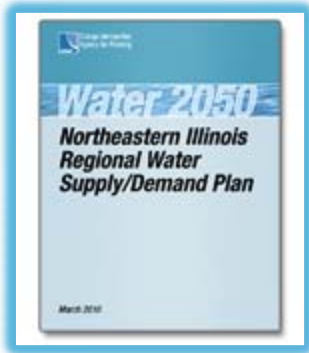
Scale	Water Management
Regional	Regional/State Agency Planning Decisions – CMAP, ISWS, IDNR
County	County Government
Major System	Consolidated Systems
System	Municipal

Source: Author's Construct

-> Need to match forecast scale with scale of management decision. Need the proper scale of data for the decision that you are making.

## Discussion

- Do you forecast water demand?
- Why is it important to forecast water demand?
- How often should you update water demand forecasts?
- What type of data would be helpful regionally? Locally?



# Community Characteristics Impact BMP Effectiveness

## Local factors and associated conservation measures

Local factor	Conservation measure <sup>67</sup>
Median home value (\$500,000 or greater)	<ul style="list-style-type: none"> <li>■ Large landscape</li> </ul>
Housing units built before 1994	<ul style="list-style-type: none"> <li>■ High efficiency toilets</li> <li>■ Residential plumbing retrofits</li> <li>■ High efficiency clothes washers</li> </ul>
Utilities with substantial water loss	<ul style="list-style-type: none"> <li>■ System water audits</li> <li>■ Leak detection and repair</li> </ul>
Peak demand as a percent of peak capacity (80% or greater)	<ul style="list-style-type: none"> <li>■ Water waste (landscape)</li> <li>■ System water audits, leak detection and repair</li> <li>■ Public information</li> <li>■ Large landscape</li> </ul>

Source: CMAP 2010



# Within Utility Metrics for Conservation Benchmarking

## Policy Efficiency

- Possible to **normalize metrics** to account for heterogeneity – but need information on their impact on water use
  - i.e, An increase of one inch in required water irrigation results in an average increase of 3.5 gallons per account per day.
- Responsiveness of water use to determining factors varies both *across* and *within utilities*.
- **Community and utility level data analysis is needed** to quantify the responsiveness of water use to determining factors
  - Accurate forecasting to design effective conservation and pricing policies.
  - Better benchmarking and target identification
- Blanket policies based on assuming homogenous service areas and consumers is not efficient, and results in wasted resources.





# Household Response to Water Conservation Programs

## Showerhead Retrofit Example

Target 8% of customers to meet conservation objective

Cost of targeted policy is 20% of blanketing policy

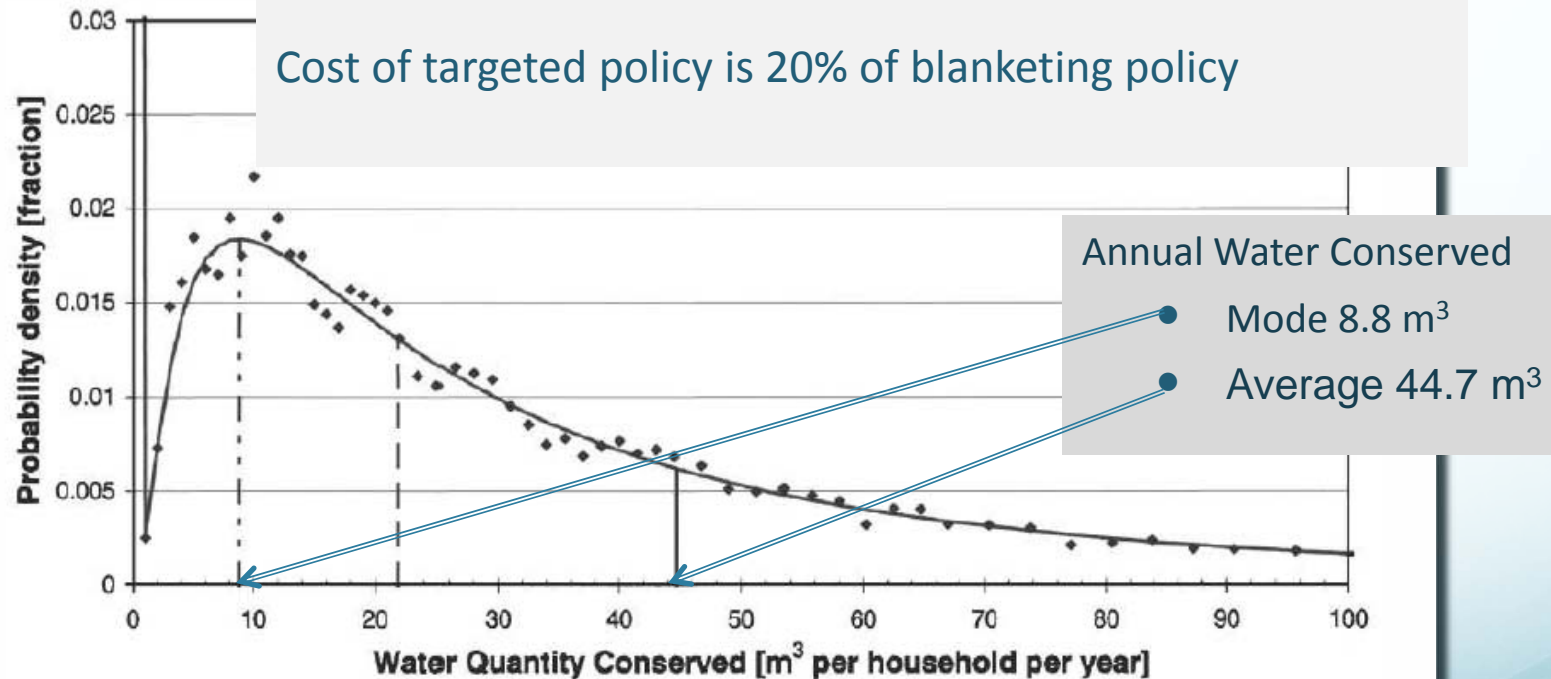


Figure 2.1 Distribution among households of water conserved by retrofitting showerheads (Rosenberg, 2007, p. 46)