Evaluation of Customer Information and Data Processing Needs for Water Demand Planning and Management

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Presentation Overview

Background on Water Research Foundation (WRF) Project 4527
  - Project Objectives
  - Research Approach
Principal findings
Common Opportunities/Barriers
Recommendations
Project Background

WRF Project #4527

Evaluation of Customer Information and Data Processing Needs

Tailored Collaboration project

Focus on “water demand-related” information

Primary driver for study

Lack of consistent, standardized data to support planning and evaluation efforts

Water Utility Working Group

Tampa Bay Water
Southern Nevada Water Authority
San Diego County Water Authority
Regional Municipality of York
Canadian National Water Efficiency Network
Project Objectives

Define needs and establish priorities for improving the amount and quality of information used for water demand analysis

Identify interim “best practices” for moving toward standards
Project Approach

Study used surveys to gather input / perspectives

- Utilities – telephone interviews
  - 60 invites
  - 29 interviews completed (23 retail / 6 wholesale)

- Government agencies – written
  - 8 invites
  - 5 surveys completed

- Consulting firms – written
  - 7 invites
  - 5 surveys completed
Project Approach

Interview guides/questionnaires developed in collaboration w/WUWG and Project Advisory Committee

1. General use of water use, billing, and customer data
2. Accessibility and quality of data
3. Classification of customers
4. Use and linkage of external data sources
5. Challenges and opportunities for improvement
Generalized Model of Utility Information Management Processes

Customer Information Systems (CIS)

Primary Design Considerations

• Revenue collection is main driver
• Information to process and send water bills
  • Billed consumption
  • Rate classes and rate structure ($)
  • Billing address
• Planning and evaluation seldom mentioned as a factor for influencing CIS design
Utility Interviews

• “Demand data” supports array of planning and evaluation functions

• Utilities generally satisfied w/amount and quality of data

• Most interested in classifying beyond categories currently in CIS…but most do not.

• Linkage to external sources
  - Weather
  - Census/MPO
  - Majority indicated meters are geocoded either directly in CIS or in external GIS

• Long-term demand forecasting
• Short-term demand forecasting
• Master water planning
• Conservation planning
• Drought planning
• Capital improvement planning
• Financial planning

• Forecast monitoring
• Estimating non-revenue water
• Evaluating efficiency programs
• Water supply assessments
• Profiling water use
• Regulatory reporting/compliance
Water Management Agencies

- Planning and regulatory functions
- Government agencies collect data through periodic collection/survey’s
- Reliance on existing disaggregation/classification…lack of authority to require more
- Agencies generally expressed satisfaction with quality of data…meet current needs
  - Some issues w/consistency / uniformity and disaggregation by source / sector

- Regional/basin water supply studies
- Reservoir reallocation
- Water needs assessment
- Periodic withdrawal/water use surveys
- Metric development
- Permitting
- Policy development
- Repositories for public use
Consultant Interviews

• Level of data disaggregation varies considerably
• Need for more refined, consistent customer classification (MF/NR)
• Linkage to external data not frequently made available by clients
• Geocoded data seldom made available...contrary to typical utility response
• Time collecting and processing data to support analysis: 10-50%
Customer Classification

- Typical: Residential/Nonresidential
  - Multifamily (master-metered) grouped with commercial accounts
  - No differentiation among nonresidential customers
- 6 sample utilities w/MF classification
- 13 sample utilities w/NR designations beyond general/NR
- 10 retail utilities use external sources to further classify users
Linkage to External Data Sources

- External data available from a variety of sources
  - Tax Assessor / Census / Other

- Potential uses include:
  - Classifying customers
  - Developing water use metrics
  - Characterizing water use patterns over time/geographic areas

- Requires geocoding
  - Mapping address to the geographic coordinates of a parcel
Unique Water Using “Locations”

Associates metered water use records to the physical boundaries where water use occurs.

## Common Opportunities for Improvement

### Areas for Improvement Identified by Predominantly Retail Utilities

<table>
<thead>
<tr>
<th>Theme</th>
<th>Area for Improvement</th>
<th># Retail Utilities Identifying Improvement (n=23)</th>
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</thead>
<tbody>
<tr>
<td>Measures of Occupancy or Scale</td>
<td>Occupancy at residential properties</td>
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<tr>
<td></td>
<td>Number of units served at multifamily properties</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Measures of occupancy or scale for CII facilities (employment, rooms, beds, etc.)</td>
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<tr>
<td></td>
<td>Area measures (e.g., irrigated acres, lot size, square footage of buildings)</td>
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</tr>
<tr>
<td>Customer Classification</td>
<td>Development of multifamily class or sub-classes</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Development of CII classes and sub-classes</td>
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<tr>
<td>Other Classifiable</td>
<td>More frequent time measurement</td>
<td>4</td>
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<td>Socioeconomic and demographic information</td>
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<td></td>
<td>Information on large users/process use</td>
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<tr>
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<td>Geographic capabilities and matching</td>
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</tr>
<tr>
<td></td>
<td>Year of construction</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Better/additional contact information</td>
<td>2</td>
</tr>
</tbody>
</table>

Common Challenges

Barriers for Making Identified Improvements

Agency or departmental priorities and incentives
Availability of resources and skills
Ability to quantify and demonstrate value

✓ Rates and revenue collection do not present a technical barrier but can be a practical barrier
Importance of Water Demand Research

Importance of Water Demand Research

Residential End Uses Study Update (4309)
Methodology for Evaluating Water Use in CII Sectors (4375)
Water Use in the Multifamily Housing Sector (4554)
Changes in Water Use under Climate Change Scenarios (4263)
Water Demand Forecasting in Uncertain Times: Isolating the Effects of the Great Recession (4458)

Research generates knowledge, but research requires information
Segments of the Water Utility Community

With respect to information needs for planning:

1. Those without pressing needs for additional information
2. Those that work within constraints of data available within their organization and data management systems
3. Those who have already invested in or are actively seeking additional data and processing capabilities

Evolution of Planning Needs and Information Management

Recommendation #1

Standardization of water customer classes and adoption of uniform class definitions.

- List of 17 primary categories as an initial basis for future refinements
- Supports more refined evaluation of trends and water use modeling
- Provides better level of detail for deriving water use metrics
- Permit more meaningful comparisons across utilities
Benefits of Sub-classification

Sub-classification permits establishment of more homogeneous groups for analysis/metric development

- Multifamily, vary in similarity w/single-family customers
  - Multiple dwelling units, master-metering, unique water end uses, common property

- Nonresidential, variety of business or facility functions
  - Sub-classification can improve ability to evaluate water use patterns

Differentiating MF customers helps refine estimates of water use for all other sectors
Recommendation #2

**Geographical referencing of water customers and unique locations.**

- Creates bridge between water use and property ownership or management data
- Associates metered water use records to the physical boundaries where water use occurs
- Permits aggregation to various geographic levels, where supplemental data may exist

Benefits of Geographical Referencing

Recommendation #3

Preservation of historical water use and billing information

• Preserve minimum of 10 years metered water consumption history

• At any given time, the last decade of water usage trends can be examined

• Basis for examining past trends, developing alternative water use metrics and benchmarks, and modeling consumer behavior
Benefits of Standardized Data

Utility Benefits

Improved, more robust knowledge base and metrics influencing

- Water demand forecasts
- Efficiency program development
- Rate structures and pricing
- Benchmarking

Water utilities on the “front line” of this effort
External benefits may exceed internal benefits
Benefits of Standardized Data

“External” Benefits

Enhance quality of national, basin, regional assessments

- Identifying and evaluating trends in important sectors
- Estimating climate change impacts
- Estimating economic impacts
- Estimating trends in efficiency

More refined Public and Domestic water withdrawal estimates for USGS surveys

Basis for disaggregation for EPA’s Portfolio Manager

Alternative metrics for Planning and Regulatory agencies
Concluding Remarks

Establish a “Water Demand Data Committee” to encourage standardization efforts

1. Ensure information benefits are adequately captured across perspectives
   - Federal, state, regional water management agencies
   - Water utilities
   - Researchers
   - Consultants
Water Demand Data Committee

2. Finalize the minimum requirements of a standardized water customer classification scheme and the processes necessary to ensure uniformity in class definitions.

3. Establish a desirable set of water use metrics and the information needed to calculate them.
Water Demand Data Committee

4. Propose, design, and conduct additional research to elaborate on and develop solutions for common challenges

5. Serve as proponent for:
   - Articulating the benefits of water use data standardization
   - Establishing a common vernacular on the topics of customer classification, water use metrics, and water data management