Customer Characterization: Analysis to Prioritize BMP Selection

Applicability

The effectiveness of urban water conservation planning relies on the completion of a customer characterization analysis prior to the implementation of any water conservation BMPs. The practice of completing a customer characterization enables water utility staff to learn how water is used within the service area, to recognize “normal” usage trends within each customer category, and to establish positive relationships to familiarize high consumptive users with more efficient practices for water use.

Failure to complete this analysis could result in spending resources on conservation practices with little impact for a utility. For example, if a utility has mostly new housing stock, it would be a poor use of resources to manage a large high efficiency toilet retrofit program for single family customers. If a utility has a strong summer peaking challenge, they may be best served by looking at BMP options that help address outdoor landscape issues.

The goal of this process is to stimulate discussions and creative thinking that will benefit the water utility and its customers by targeting water conservation BMPs, which will allow the water utility the opportunity to leverage available resources to implement the most cost-effective water savingactivities . Therefore, it is most important that a customer characterization is performed, although the way it is carried out will vary by utility and customer base.

# Description

Customer characterization is a very important practice to ensure that utility conservation goals are met in an effective and efficient manner. To keep the customer characterization process simple to understand and perform, recommended steps are outlined below. It is important to remember that any step-by-step processes suggest a single method, not the only method, to complete a customer characterization, and will vary among utilities based on available information, time and manpower, and expertise.

### Gather Data

Data used for the process in this example include, billed consumption by account (available within the utility) and individual property information (available from local Appraisal Districts). It is also possible to utilize census demographics and any spatial data available from the City or Appraisal District.

### Prepare Data

Preparing existing data for analysis includes removing nonessential accounts, separating accounts by customer category, and integrating property data into the consumption data set. Thorough preparation of the data will support easier identification of account characteristics across a wide range of consumption levels in the next phase.

To accurately compare and sort data, the complete data set must be separated into similar customer use categories. A residential customer should not be compared to a non-residential customer on any scale, as the characteristics of these customer categories and the nature of their consumption are inherently different.

### Analyze Data

The initial analysis of residential customer data consists of yearly and aggregate consumption distributions by ranges of property build-dates and assessed home values, compared to annual consumption. These distributions serve to identify the characteristics of high consumption accounts. It is appropriate to compare water use on a per capita (per person) basis when comparing single-family residential accounts, because the nature of consumption is the same for most single-family residential customers.

However, non-residential customers use water in a different way, even when compared to each other, so methods of normalization are necessary. Normalization is as simple as comparing water consumption per output. Car washes evaluate their efficiency in terms of gallons per car. Institutional, Commercial, and Industrial (ICI) or non-residential customers can be analyzed based on water consumption per dollar of revenue. The idea is to use terms that are comparable to each other without having to further sub-categorize customers.

## Non-residential customers

Multi-family properties like apartments and duplexes sometimes contain one billed water meter (and account) for multiple residences, and so they should be considered as non-residential in category since the nature of their use is more difficult to estimate. Therefore, non-residential customers are made up of multi-family residential customers, as well as industrial, commercial, and institutional (ICI) customers. This customer group is more difficult to categorize since it consists of many different uses of water, but doing so will allow for an accurate comparison between users of the same type. For example, a large-scale manufacturing customer or car wash facility will most likely have higher consumption levels than an office park.

The most complete list of categories can be found in the North American Industry Classification System (NAICS) which consists of two to six-digit coded categories that describe the type of use for each customer account. As utilities update their billing systems or update to Customer Relation Management (CRM) platforms, they should consider starting a practice of adding an NAICS code to each non-residential account. The benefits of the practice are significant as they allow the utility to analyze use patterns by specific industrial or commercial categories. This identifies outliers in high usage to work with and may help with future rate setting practices.

It can be helpful to sort users from highest to lowest annual consumption, and isolate a specified number of non-residential users with the highest annual consumption so that the process of categorization can be applied to only those customer accounts that may allow the utility to realize the largest amount of savings, instead of the entire data set.

# Implementation

Strategic decisions about which BMP strategies to adopt and which customers to target should be derived from analysis of water use patterns. If the strategic need of a utility is to delay a sewage treatment plant upgrade, then targeting older homes with higher indoor (winter) water usage rates would be logical. If in contrast the strategic need is to better manage peak demands during hot, dry summers then targeting customers with the highest summer consumption is important.

It has been common for utilities to adopt toilet replacement programs early in the planning process because high efficiency toilets save a considerable amount of water if they replace older high-flow toilets. However, the Energy Policy Act of 1992 passed national efficiency standards stating that toilets were not allowed to be installed in new development if they did not meet a 1.6 gallon per flush or less requirement. As a result, manufacturers no longer produce toilets with flow rates higher than 1.6 gallons per flush, and all development is currently required to meet this standard. In addition, manufacturers are moving to the updated EPA WaterSense Standard and much of new fixture installation is meeting this target. Having data suggesting the market penetration of high efficiency fixtures vs. older high flow ones is important before deciding that a retrofit program would be cost-effective. If a retrofit program is desired in a community of mixed age development, then the program requirements could be designed to expend funds only on older housing stock retrofits.

# Scope & Schedule

## Scope

The process of customer characterization is considered complete when groups of similar water users are identified, and their use has been evaluated for trends. There is no individual indicator that the process is complete across all utilities or water providers. Data may be analyzed in a very fine or coarse capacity, as deemed necessary by that utility or water provider, until enough information is presented to make informed choices for water conservation BMPs that best suit their service area. Utilities concerned with peak usage should complete analyses showing which customers contribute most to peak. Utilities concerned with overall growth in total annual demand may instead focus on which customers generate the largest annual usage increase.

## Schedule

It is important for the process of utility customer characterization to occur prior to any water conservation BMP planning, as well as on a regular basis. Annual customer characterizations within the water utility will produce more accurate and informative trends of water consumption within different customer categories. Managers will become familiar with normal usage trends and be able to better recognize anomalous and consistent high consumption levels. An annual process will also help managers target BMPs accordingly, and to be able to recognize the point at which specific BMPs are no longer needed among different groups, when accompanied with program evaluations.

# Why This is A Strategic BMP

Customer characterization is intended to act as a tool for urban water conservation planning. It is the best way to ensure that chosen conservation BMPs are successful in reducing consumption and continue to target the correct audience is to conduct BMP evaluations before and after implementation, in addition to an annual customer characterization. Consistent program evaluations will indicate when a BMP is no longer producing a significant amount of water savings and will give the utility an opportunity to make adjustments.

# Cost-Effectiveness Considerations

There are no capital costs involved in performing a customer characterization, but it is a process requiring significant staff time or the services of a qualified contractor. It is important to note that the investment of time to complete this analysis will help ensure proper utilization of utility resources in the future.

It is expected that any time and manpower costs will be reduced over time as the process of customer characterization becomes more familiar and streamlined to fit the needs of the utility or water provider.

# References for Additional Information

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# Determination of the Impact on Other Resources

Conservation programs are funded through municipal government utilities and water providers. Therefore, efficient time utilization through efficient water conservation planning saves tax-payer money as well.

# Acknowledgments

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