

## **Customer Characterization Best Management Practice**

### **Applicability**

The effectiveness of urban water conservation planning relies on the completion of a customer characterization 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.

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 show the most water savings for the least cost. 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. If NAICS is not readily available in the consumption data set or the other data gathered, then non-residential users must be categorized manually, and this can be a tedious step.

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.

Once the characteristics of high consumptive users have been identified, BMPs may be chosen. When considering conservation programs for residential customers, indoor and outdoor programs are usually separated, with indoor programming focused on more heavily, since making changes to fixtures and appliances inside the home makes it easier for customers to participate, rather than making changes in water use behavior, which is more difficult to maintain over time.

For example, it has been common for utilities to adopt toilet replacement programs early in the planning process because low-flow toilets save a considerable amount of water when replacing 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. Thus, the customer characterization is important in identifying whether or not a toilet replacement program would result in water savings at a reasonable cost to the utility, based on distributions of single-family residential build-dates.

### **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.

#### **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.

### **Measuring Implementation and Determining Water Savings**

It is difficult to track the progress of implementing the process of customer categorization since the process was created to act as a tool for urban water conservation planning. However, 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. Rather, through proper utilization of the customer characterization, a reduction in costs can be achieved due to a reduction in time and manpower involved in ineffective water conservation BMP administration and any associated capital costs.

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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