CASCADE WATER ALLIANCE

Water Conservation Analysis

DRAFT

September 6, 2011

HDR

Cascade Transmission and Supply Plan

Water Conservation Analysis

Draft

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626 Columbia Street NW
Suite 2A
Olympia, WA 98501
(360) 570-4400

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Technical Memorandum

Cascade Transmission and Supply Plan

To:	**Ed Cebron, Michael Gagliardo, Mike Brent; Cascade Water Alliance**
From:	**Kelly O'Rourke; HDR**
CC:	**Andrew Graham; HDR**
Date:	**September 6, 2011 - DRAFT**
Subject:	**Water Conservation Analysis; Transmission and Supply Plan HDR Project No. 98140**

HDR performed a water conservation analysis for the Cascade Water Alliance (Cascade). The purpose of the analysis was to provide an updated assessment of potential water conservation measures to assist Cascade to evaluate appropriate conservation spending levels and prioritization of future conservation actions. This assessment addressed demand-side conservation measures only.

This technical memorandum includes the following sections:

1. **Analysis Methodology:** This section describes the methodology used to analyze the conservation measures, describes the conservation measures analyzed, documents key assumptions, and documents demographic and consumption data inputs.

2. **Results and Conclusions:** This section provides results of the analysis for each individual conservation measure, provides results of conservation "packages", and provides conclusions regarding the analysis. ***(Section 2.6 contains the conclusions; for readers interested primarily in the conclusions please refer to that section.)***

1. Analysis Methodology

1.1. Basic Method

The basic methodology for determining water savings and costs for Cascade is to compile demographic information for Cascade's service area, apply assumptions for customer participation rates for each conservation measure, calculate the savings achieved by shifting to more efficient hardware or behavior, and calculate the costs for those shifts.

HDR's proprietary Water Conservation Measure Analysis Model was used for this analysis. The model is an Excel-based tool that estimates the water savings and costs for various demand-side water conservation measures. The spreadsheet is pre-loaded with a set of commonly analyzed conservation measures. The spreadsheet is customized for clients by entering client-specific data (e.g., planning period, demographics, and water consumption) and selecting which of the pre-loaded measures should be analyzed. The spreadsheet analyzes the measures and provides summary tables and graphs. Various program "packages" can also be created based on the analyzed measures to represent potential conservation scenarios. Additionally, three new measures were added to the model for this Cascade project.

The costs for a conservation program can be divided into the three categories shown below. **The HDR model incorporates the direct and indirect costs incurred by the utility, but does not include staff costs.**

- **Direct Costs:** This includes rebates paid to customers (e.g., clotheswasher rebates), purchasing fixtures to give to customers (e.g., efficient showerheads), and paying for professional audits (e.g., outdoor irrigation audits).

- **Indirect Costs:** This includes marketing and distribution costs that are necessary to implement the measures, such as graphic design, printing, postage, and advertising. The exact nature of the marketing and distribution techniques that will eventually be implemented is often unknown during the measure analysis work. Therefore, the model includes assumptions that effectively generate a pool of money designated for marketing and distribution. For most measures, these assumptions are: 1) $0.50 mailing per potential customer for a marketing piece, 2) $0.50 mailing per participating customer for the rebate/device/report, and 3) $200 for miscellaneous costs. This treatment of indirect costs is sufficient for this measure analysis; however it is not intended to reflect how Cascade implements measures either now or in the future.

- **Staff Costs:** This includes the salary and benefits for Cascade staff assigned to plan, manage, and implement the conservation program. Some water utilities include staff costs in their official conservation budget, while others do not. Regardless of whether staff costs appear in the official conservation budget, the "opportunity cost" should be recognized in that staff time allocated to a conservation program is not available for other utility functions.

The initial results from the model are simply the outcomes of the analysis for every conservation measure, considered independently of the other measures. Those results, by themselves, do not indicate which measures should be implemented. The initial results are screened through various criteria in order to determine which measures and/or groups of measures ("packages") are most appropriate. (Section 1.5 discusses the criteria and package development.)

1.2. Measures Analyzed

The measures analyzed for this project are described below.

- **Clotheswashers - Efficient in Residential Dwelling Unit**: Provide partial rebates to replace less efficient residential-capacity clotheswashers (located in single family and multifamily housing units) with more efficient models. The participation rate for this measure was set at 25%. The direct cost is a $75 rebate per clotheswasher. The model assumes one rebate per participating household.
- **Clotheswashers - Efficient in Residential Common Area:** Provide partial rebates to replace less efficient residential-capacity clotheswashers (in multifamily common laundry areas) with more efficient models. The participation rate for this measure was set at 25%. The direct cost is a $75 rebate per clotheswasher. The model assumes one rebate for every five multifamily households for participating multifamily accounts.
- **Clotheswashers - Efficient Laundromats:** Provide partial rebates to replace less efficient commercial-capacity clotheswashers with more efficient models at laundromats.

The participation rate for this measure was set at 25%. The direct cost is a $300 rebate per clotheswasher. The model assumes 12 rebates per participating laundromat.

- **Clotheswashers - Decrease Partial Loads:** Encourage customers to reduce partial loads of laundry, thereby reducing the number of loads by 10%. The participation rate for this measure was set at 10%. There are no direct costs associated with this measure since most behavior measures do not have direct costs. However, this should not be viewed as a "no-cost" measure since the indirect costs for behavior measures can be significant since considerable customer outreach is necessary.

- **Faucets - 0.5 gpm Bathroom Aerators (Residential):** Provide free 0.5 gpm bathroom faucet aerators, which for the residential customer category is more efficient than the maximum of 2.5 gpm allowed under the plumbing code. The participation rate for this measure was set at 25%. The direct cost is $1.50 per aerator. The model assumes 2.5 aerators per participating single family household and 1.5 aerators per participating multifamily household.

  Note that this measure was not analyzed for the non-residential sector. 0.5 gpm is the maximum allowed under the plumbing code for the non-residential sector. Based on the time elapsed since establishment of the plumbing code and the lifespan of aerators, it is assumed that most non-residential customers already have 0.5 gpm aerators.

- **Faucets - 1.0 gpm Bathroom Aerators:** Provide free 1.0 gpm bathroom faucet aerators, which for the residential customer category is more efficient than the maximum of 2.5 gpm allowed under the plumbing code. The participation rate for this measure was set at 25%. The direct cost is $1.5 per aerator. The model assumes 2.5 aerators per participating single family household and 1.5 aerators per participating multifamily household.

- **Faucets - 1.5 gpm Bathroom Aerators:** Provide free 1.5 gpm bathroom faucet aerators, which for the residential customer category is more efficient than the maximum of 2.5 gpm allowed under the plumbing code. The participation rate for this measure was set at 25%. The direct cost is $1.5 per aerator. The model assumes 2.5 aerators per participating single family household and 1.5 aerators per participating multifamily household.

- **Faucets - Decrease Use:** Encourage customers to reduce unnecessary faucet use, such as running the water while brushing teeth, thereby reducing combined bathroom and kitchen faucet use by 10%. The participation rate for this measure was set at 10%. There are no direct costs associated with this measure since most behavior measures do not have direct costs. However, this should not be viewed as a "no-cost" measure since the indirect costs for behavior measures can be significant since considerable customer outreach is necessary.

- **Showerhead 1.5 gpm:** Provide free 1.5 gpm showerheads, which is more efficient than the maximum of 2.5 gpm allowed under the plumbing code. The participation rate for this measure was set at 40% for the residential sector and 20% for the non-residential sector. The direct cost is $4.5 per showerhead. The model assumes 2.0 showerheads per participating single family household, 1.5 showerheads per participating multifamily household, and 10 showerheads per participating non-residential account.

- **Showerhead 2.0 gpm:** Provide free 2.0 gpm showerheads, which is more efficient than the maximum of 2.5 gpm allowed under the plumbing code. The participation rate for this measure was set at 40% for the residential sector and 20% for the non-residential sector. The direct cost is $4.5 per showerhead. The model assumes 2.0 showerheads

per participating single family household, 1.5 showerheads aerators per participating multifamily household, and 10 showerheads per participating non-residential account.

- **Showerheads - Decrease Use:** Encourage customers to reduce showering time by 10%. The participation rate for this measure was set at 10%. There are no direct costs associated with this measure since most behavior measures do not have direct costs. However, this should not be viewed as a "no-cost" measure since the indirect costs for behavior measures can be significant since considerable customer outreach is necessary.
- **Spray Valves – 0.6 gpm Pre-Rinse Spray Valve:** Provide free, direct installation of 0.6 gpm pre-rinse spray valves, which is more efficient than the maximum of 1.6 gpm allowed under the plumbing code. Pre-rinse spray valves are used in commercial kitchens to rinse dishes prior to loading into dishwashers**.** The participation rate for this measure was set at 95%. The cost to Cascade is $65 per spray valve, which is paired with a $65 cost to Puget Sound Energy. Due to the direct install nature of this measure, that cost includes both direct and indirect costs. The model assumes 1.5 spray valves per participating non-residential account.
- **Toilets - 1.28 gpf High Efficiency Toilets (HET):** Provide partial rebates to install High Efficiency Toilets (HETs), which are toilets flushing at a maximum of 1.28 gpf. HETs include both dual flush toilets and pressure-assist tank style toilets and are more efficient than the maximum of 1.6 gpf allowed under the plumbing code. The participation rate for this measure was set at 30% for single family, 20% for multifamily, and 15% for non-residential. The direct cost is a $100 rebate per toilet. The model assumes 2.3 rebates per participating single family household, 1.8 rebates per participating multifamily household, and 12.2 rebates per participating non-residential account.
- **Toilets - 1.6 gpf Ultra Low Flow Toilets (ULFT):** Provide partial rebates to replace less efficient toilets with 1.6 gpf Ultra Low Flow Toilets (ULFT), which is the maximum allowed under the plumbing code. Brings non-code customers up to code. The participation rate for this measure was set at 30% for single family, 20% for multifamily, and 15% for non-residential. The direct cost is a $75 rebate per toilet. The model assumes 2.3 rebates per participating single family household, 1.8 rebates per participating multifamily household, and 12.2 rebates per participating non-residential account.
- **Toilets - Decrease Flushes:** Encourage customers to reduce unnecessary toilet flushing, such as flushing trash, thereby reducing toilet flushes by 10%. The participation rate for this measure was set at 10%. There are no direct costs associated with this measure since most behavior measures do not have direct costs. However, this should not be viewed as a "no-cost" measure since the indirect costs for behavior measures can be significant since considerable customer outreach is necessary.
- **Toilets - Leak Detection:** Provide free toilet leak detection dye strips to determine if toilets leak and provide information on how to fix leaks. The participation rate for this measure was set at 25%. The direct cost is $0.20 per packet of dye strips. The model assumes 2.3 dye strip packets per participating single family household and 1.8 dye strip packets per participating multifamily household. Toilet leak detection dye strips can be considered both a behavioral and a hardware measure. It fits the definition of a behavioral measure in that customers must take action to repair a found leak; it fits the definition of a hardware measure in that the fix to a leaky toilet is a piece of hardware.

- **Urinals - Waterless Models:** Provide partial rebates to install waterless urinals, which is more efficient than the maximum of 1.0 gpf allowed under the plumbing code. The participation rate for this measure was set at 1%. The direct cost is a $100 rebate per urinal. The model assumes 6.1 rebates per participating non-residential account.
- **Urinals - 0.5 gpf Models:** Provide partial rebates to install 0.5 gpf urinals, which is more efficient than the maximum of 1.0 gpf allowed under the plumbing code. The participation rate for this measure was set at 25%. The direct cost is a $100 rebate per urinal. The model assumes 6.1 rebates per participating non-residential account.
- **Urinals - 1.0 gpf Models:** Provide partial rebates to replace less efficient urinals with 1.0 gpf urinals, which is the maximum allowed under the plumbing code. Brings non-code customers up to code. The participation rate for this measure was set at 30%. The direct cost is a $100 rebate per urinal. The model assumes 6.1 rebates per participating non-residential account.
- **Irrigation Controllers - ET Model:** Provide partial rebates for evapotranspiration (ET) based irrigation controllers, which link irrigation to weather conditions. The participation rate for this measure was set at 25%. The direct cost is a $150 rebate per controller for single family customers, a $200 rebate per controller for multifamily customers, and a $300 rebate per controller for non-residential customers. The model assumes one rebate per participating single family household, multifamily account, and non-residential account.
- **Irrigation Controllers - Rain Sensors:** Provide free rain sensors, which turn off automatic irrigation systems when it is raining. This is only applicable to irrigation systems that can use rain sensors. The participation rate for this measure was set at 15%. The direct cost is a $150 rebate per rain sensor. The model assumes one rebate per participating single family household, multifamily account, and non-residential account.
- **Outdoor Audit:** Provide free irrigation audits to improve the efficiency of irrigation systems. Efficiencies can be achieved through hardware improvements or operational changes. The audits are performed by a contracted professional landscape irrigation auditor. The participation rate for this measure was set at 5% for single family, 10% for multifamily, and 15% for non-residential. The direct cost is $400 per audit for residential properties and $700 per audit for non-residential properties. The model assumes one audit per participating single family household, multifamily account, and non-residential account.
- **Outdoor Irrigation Evaluation:** Provide free evaluations of irrigation systems to improve the efficiency of irrigation systems. Efficiencies can be achieved through hardware improvements or operational changes. The participation rate for this measure was set at 10%. The direct cost is $100 per audit. The model assumes one audit per participating multifamily account. This is one of three new measures added to the model for the Cascade analysis. This is a "lighter" version of the Outdoor Audit measure and was designed to represent a measure that Cascade currently offers to the multifamily sector.
- **Outdoor Irrigation Kits:** Provide free outdoor irrigation kits with devices and information to improve the irrigation efficiency of manual irrigation techniques. Kits typically include items such as a watering timer and shut-off device, a spring-loaded hose nozzle, a rain gauge, hose washers, and a conservation brochure. The

participation rate for this measure was set at 25%. The direct cost is $15 per kit. The model assumes one kit per participating single family household.

- **Lawn Dormant:** Encourage customers to let their lawn go dormant in the summer. It should be noted that allowing lawns to go dormant during the summer does not eliminate lawn watering completely. Dormant lawns still require some water to stay alive. The participation rate for this measure was set at 10% for residential customers. This measure is not applied to non-residential customers. There are no direct costs associated with this measure since most behavior measures do not have direct costs. However, this should not be viewed as a "no-cost" measure since the indirect costs for behavior measures can be significant.
- **Food Steamers - Efficient**: Provide partial rebates to replace less efficient (boiler-based) commercial food steamers with more efficient models (boilerless / connectionless). The participation rate for this measure was set at 30%. The direct cost to Cascade is $500 per food steamer. Note that the energy utility (Puget Sound Energy) currently offers a $750 rebate, therefore the customer receives a total rebate of $1,250. The model assumes one rebate per participating non-residential account. This is one of three new measures added to the model for the Cascade analysis.
- **Dishwashers - Efficient**: Provide partial rebates to replace less efficient dishwashers with more efficient models. For the residential sector, this applies to standard residential dishwashers. For the non-residential sector, this applies to commercial dishwashers ranging from small under-the-counter models to large conveyor style models. The participation rate for this measure was set at 20%. The direct cost to Cascade is $25 per dishwasher for residential customers and $1,000 per dishwasher for non-residential customers. Note that the energy utility (Puget Sound Energy) currently also offers a non-residential $1,000 rebate, therefore the non-residential customer receives a total rebate of $2,000. The model assumes one rebate per participating household or non-residential account. This is one of three new measures added to the model for the Cascade analysis.

1.3. Key Assumptions

There are several key assumptions that are fundamental to the analysis. Those assumptions are explained below.

- **Planning Period:** A planning period of 2012 to 2060 was used. The 2060 end date was selected to match the planning period for Cascade's Transmission and Supply Plan. The planning period is the period of interest for analyzing water conservation savings and costs. The planning period is different than the initial implementation period (see below). For example, Cascade may distribute showerheads for ten years (the initial implementation period), but may be interested in seeing how the savings and costs associated with those showerheads play out until year 2060 (the end of the planning period).
- **Initial Implementation Period:** An initial implementation period of 2012 to 2021 (10 years) was used. The initial implementation period is the period when the conservation program will be implemented (aside from any renewals, see below). The initial implementation period is for the entire conservation program (i.e., all measures), rather than for any individual measure (e.g., just high-efficiency showerheads). Therefore, the last year of the initial implementation period is the last year that any one measure is initially implemented. A multi-year implementation period reflects the budgetary and

administrative reality that Cascade would most likely not implement all measures immediately.

- **Implementation Schedule:** An even-paced implementation schedule was assumed for all measures. The implementation schedule is the rate at which the measures are implemented during the initial implementation period. Since the initial implementation period is 10 years, this means that measures were applied to 10% of the potential customers each year until they reach full implementation in the tenth year. This means that the gallons per day savings increase over the first 10 years, then remain constant. An even implementation provides a consistent program budget for each year in the initial implementation period.

- **Renew Measure:** Measures are renewed if necessary to maintain savings over the planning period. Measure renewal is necessary if the measure lifespan is shorter than the planning period and if Cascade wants to maintain the savings during the planning period. For example, the outdoor audit measure has a lifespan of five years, which means that since Cascade's planning period is 49 years, the savings from the outdoor audits will disappear after five years unless Cascade renews the measure and gives customers additional outdoor audits. Measure renewal has the benefit of maintaining savings; however it means that Cascade pays to implement a measure more than once to the same customer.

  For the Cascade analysis, several hardware measures that are typically modeled as requiring renewals were modeled as not requiring renewals. This was done at the request of Cascade staff with the assumption that future plumbing code changes (or other mechanisms) would preclude the need for renewals. The affected measures include the following: clotheswasher rebates, toilet rebates, urinal rebates (except waterless models), dishwasher rebates, ET controllers, and rain sensors.

- **Participation Rates:** Participation rates were selected to represent moderate program implementation levels. In the modeling analysis, participation rates represent the percent of target customers (those with the applicable hardware or behavior that have not already implemented the measure) that participate in the program. For example, for the HET toilet measure, the participation rate is the percent of customers that do not already have a HET toilet that are assumed to participate in Cascade's HET toilet program. Participation rates are dependent on many factors including marketing and distribution techniques. Moderate level marketing and distribution techniques were assumed for the analysis.

  The participation rates are a subjective assessment of the relative attractiveness of the measures to customers. The rates were established using Cascade's experience with their program and professional judgment based on HDR's experience with other communities. The following participation rates were used for the analysis:

  - 1% = unattractive to customers (waterless urinals only)
  - 10%-15% = not very attractive to customers
  - 20%-25% = fairly attractive to customers
  - 30%-40% = very attractive to customers
  - 95% = special case for 0.6 gpm spray valves measure

- **Free Riders:** The concept of free ridership was addressed in the analysis. Free riders are customers that participate in Cascade's conservation program, even though they would have implemented the measure anyway. For example, a free rider is a customer

who takes a rebate for an efficient clotheswasher, but who was going to buy that clotheswasher regardless of whether Cascade offered a rebate program.

When free ridership is addressed in the analysis, the savings associated with free riders are excluded from the cost-effectiveness calculations, which provide a more accurate representation of the true cost-effectiveness of the conservation program. This impacts two values in the model: 1) "Savings for All Customers Over Measure Life (ccf)" and 2) "Cost per ccf Saved Over Measure Life." Those two numbers do not include water savings from free riders. Aside from those two numbers, all other numbers in the model include effects from free riders.

The free ridership percentages are a subjective assessment of the relative level of free ridership for measures. The percentages were established using professional judgment based on HDR's experience with other communities. The following free ridership percentages were used for the analysis:

- 5% = no reason to assume much free ridership (most measures)
- 15% = higher level of free ridership is expected (clothewashers only)
- 25% = measures bringing customers up to current plumbing code

1.4. Demographic and Consumption Data Inputs

Demographic Data

The demographic data used in the model are provided in Table 1 and were developed based on multiple data sources including: 1) CDM's October 2010 demand forecast technical memorandum, 2) Cascade's 2005 Conservation Potential Assessment, 3) Cascade's annual member survey, and 4) Water Facilities Inventories from the Washington State Department of Health.

Table 1. Demographics

Demographic Unit	First Initial Implementation Year ("Existing" Demographics)		Last Initial Implementation Year		Change Between First and Last Year ("Future" Demographics)	
Year	2012	a	2021	a	10	e
Single Family Households (SF HH)	100,187	b	108,055	b	7,868	e
Persons Per SF HH	2.9	c	2.9	c	0.0	e
Multifamily Households (MF HH)	53,027	b	63,315	b	10,288	e
Multifamily Accounts	5,411	d	6,162	d	751	e
Persons Per MF HH	2.0	c	2.0	c	0.0	e
Non-Residential (NR) Accounts	8,749	d	9,608	d	859	e
Employees	356,850	b	391,884	b	35,034	e
Employees Per NR Account	40.8	e	40.8	e	0.0	e

a. Provided by client via Measure Selection worksheet.

b. Based on data from CDM's October 2010 demand forecast technical memorandum.

c. Based on data from Cascade's 2005 Conservation Potential Assessment.

d. Initial implementation year based primarily on data from Cascade's 2009 annual member survey; also used Cascade's 2010 annual member survey for Sammamish Plateau WSD and Skyway WSD's August 2010 Water Facilities Inventory. Last implementation year based on growth rates from CDM's October 2010 demand forecast technical memorandum.

e. Calculation.

Consumption Data

The water consumption data used in the model are provided in Table 2 and were developed from data used by CDM in developing Cascade's October 2010 demand forecast. Water consumption data are used to calculate the Peak Season Increased Use (PSIU), which is the annual amount of water used in the summer months above the base use (i.e., winter water average use). The PSIU is used in the savings formulas for outdoor measures. Three years of water consumption data (2006-2008) for Cascade are provided in Table 2. A graphical representation of that data, including the distinction between base use and the PSIU, is provided in Figure 1, Figure 2, and Figure 3. All three graphs use the same scale on the vertical axis to show the relative amount of PSIU between the single family, multifamily, and non-residential sectors.

Table 2. Cascade Water Consumption (gallons)

Month	Single Family			Multifamily			Non-Residential		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
Jan	477,497,035	472,423,201	470,667,608	224,369,519	209,534,255	200,690,644	215,070,114	229,569,413	231,885,236
Feb	429,644,842	435,384,253	481,829,435	146,783,810	156,696,366	167,763,684	208,792,928	217,704,136	234,663,762
Mar	427,994,851	429,033,524	399,061,785	193,444,132	180,630,533	169,423,496	203,891,343	209,733,822	225,017,848
Apr	428,164,408	389,867,593	391,883,887	152,016,212	144,899,568	148,552,800	215,927,509	221,004,835	211,218,707
May	555,697,114	460,848,245	433,495,209	202,643,141	194,489,724	197,712,108	217,027,555	316,980,708	253,281,552
June	613,932,833	554,766,138	502,978,134	171,698,194	176,291,632	171,942,012	284,714,569	251,910,453	289,831,001
July	677,747,077	716,476,991	612,682,020	206,884,937	229,009,400	213,895,088	282,326,160	423,498,601	382,169,656
Aug	916,224,871	864,435,692	848,767,695	182,732,600	194,841,284	191,761,805	354,289,452	449,570,590	634,992,070
Sep	986,730,004	788,325,585	805,683,015	235,283,602	221,577,572	234,727,636	344,067,404	439,885,276	457,013,938
Oct	851,253,419	671,506,206	722,821,617	177,483,114	174,479,976	185,913,119	328,251,348	383,533,260	478,618,092
Nov	564,139,536	517,633,645	481,989,358	216,278,433	208,745,108	190,352,536	255,365,719	280,607,921	271,961,505
Dec	460,721,557	432,412,128	430,676,970	150,692,828	158,012,756	150,768,735	214,236,154	218,989,716	218,130,892
Total	**7,389,747,547**	**6,733,113,204**	**6,582,536,733**	**2,260,310,521**	**2,249,208,174**	**2,223,503,663**	**3,123,960,253**	**3,642,988,731**	**3,888,784,259**

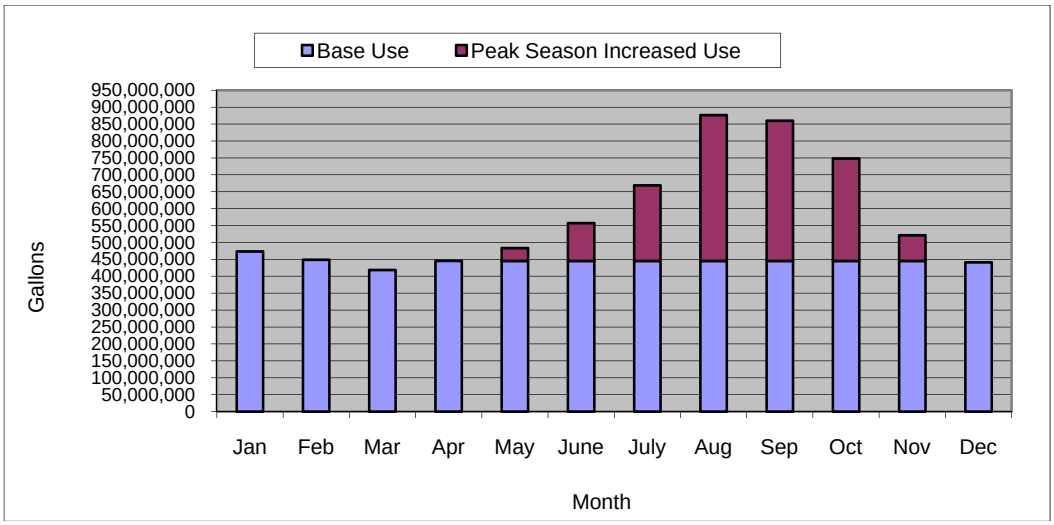

Figure 1. Single Family Consumption (2006-2008)

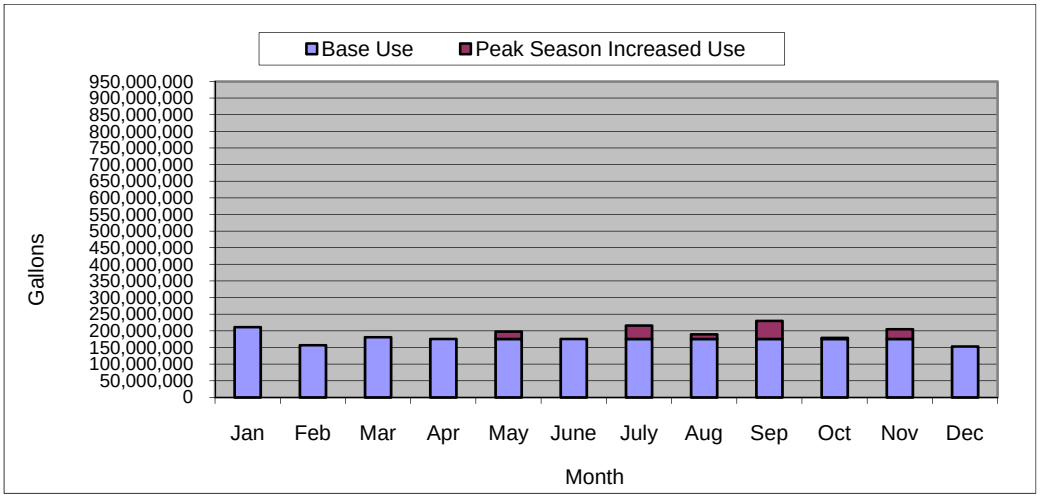

Figure 2. Multifamily Consumption (2006-2008)

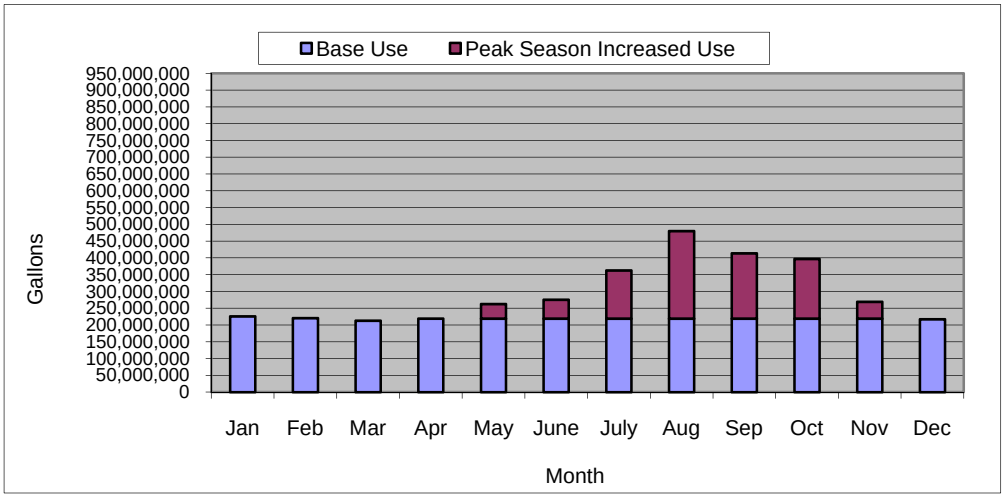

Figure 3. Non-Residential Consumption (2006-2008)

1.5. Developing Packages

The model's "package tool" was used to group subsets of measures that represent potential conservation scenarios for Cascade. The packages developed for Cascade were selected during a meeting on July 18, 2011 and are described below.

- **Package #1 – Conservation Potential Assessment (Original):** This package was designed to show the maximum water savings available, given certain assumptions such as participation rates. It is intended to provide an estimate of maximum potential savings. The package was assembled by including all of the analyzed measures, except that mutually exclusive measures have been omitted to avoid double counting of savings.

- **Package #2 - Conservation Potential Assessment (Excludes High Cost Outliers):** This is the same as the CPA Original package, except that three measures with very poor cost-effectiveness have been excluded. Those measures are the outdoor audits and outdoor irrigation evaluation. This package was designed to be a CPA package that excludes outliers with very poor cost-effectiveness.

- **Package #3 - Current Budget:** This package was designed to reflect the most cost-effective use of Cascade's current conservation budget, given the analyzed measures. This package was assembled by starting with Package #2 (CPA Excludes High Cost Outliers) and then eliminating measures based on cost-effectiveness, until the average annual cost during the initial 10-year implementation period was approximately $1.25 million.

- **Package #4 - 50% of Current Budget:** This package was designed to reflect a reduced investment in conservation at approximately half the level of the current conservation budget. This package was created starting with Package #3 (Current Budget) and then eliminating measures based on cost-effectiveness, until the average annual cost during the initial 10-year implementation period was approximately $0.63 million.

2. Results and Conclusions

2.1. Results for Individual Measures

The results of the analysis for each individual measure are provided in Table 4. (The table is located at the end of this Tech Memo since it is 11 x 17 in size.) The results represent the highest level of water savings (and associated costs) that can be expected from each analyzed measure, given certain assumptions such as participation rates. It should be noted that additional savings might be obtainable from measures not included in the model, such as supply-side measures (e.g., leak detection) or more aggressive demand-side measures, however that would require additional spending in order to increase the participation rates.

The savings and costs in Table 4 are not totaled since there is some overlap due to mutually exclusive measures. For example, the analysis includes 0.5 gpm, 1.0 gpm, and 1.5 gpm faucet aerator measures. Those measures were analyzed independently of each other. Cascade would most likely choose to implement only one of those measures; therefore the savings and costs from the non-selected measures need to be disregarded. If Cascade implemented all

three measures, the participation rates (and thus savings and costs) for all three measures would need to be reduced.

Key definitions related to Table 4 (as well as similar tables for the packages) are provided below:

- **Participating Customers:** The number of customers with the applicable fixture or behavior that have not already implemented the measure and that participate in the program. For example, the number of single family households with showers that do not already have an efficient model that participate in the utility's showerhead program. Note that the number of "potential" customers is the number of single family households; multifamily households or accounts; or non-residential accounts (as applicable for each measure), which is provided in Table 1.
- **Savings Generating Customers:** The number of customers that generate savings. For measures that only require one step to achieve savings (e.g., toilet rebates), this is the same as the number of participating customers. For measures that require two steps to achieve savings, this is the number of customers that perform both steps and therefore achieve the savings. For example, the number of single family households that take the utility's showerhead and follow through and install it.
- **Devices / Rebates / Audits:** The number of devices, rebates, or audits that will be distributed or performed. For example, the number of toilet rebates. This number can be higher than the number of participating customers since often there are multiple fixtures per customer and due to renewals.
- **Savings for All Customers at Full Implementation (gpd):** This is the gallons per day savings for all customers once the program has been fully implemented. This value is presented for both the average annual and peak season time periods.
- **Savings for All Customers Over Measure Life (ccf):** This is the total savings, in hundreds of cubic feet (ccf), that are obtained by the measure over the measure lifespan (or multiple lifespans if the measure is renewed). This is the savings number that is used to calculate the cost-effectiveness of the measure.
- **Total Cost Over Planning Period:** This is the total direct and indirect cost for a measure over the planning period including the impacts of renewals if applicable. This number is a key input to the measure cost effectiveness calculation.
- **Cost per CCF Saved Over Measure Life:** This is the cost effectiveness of the measure. It is calculated by dividing the "Savings For All Customers Over Measure Life (ccf)" into the "Total Cost Over Planning Period." This number can be used to compare measures to one another, or to compare conservation to other sources of supply.

2.2. Package #1 – Conservation Potential Assessment (Original)

As described previously, this package was designed to show the maximum water savings available, given certain assumptions such as participation rates. This package is intended to provide an estimate of the maximum potential savings. As described previously, this package omits certain mutually exclusive measures. This allows the results to be summed for all the remaining measures. The decisions for which measures within a mutually exclusive set were included are explained below:

There are five sets of mutually exclusive measures, as described below:

- **Mutually Exclusive Set #1 – Residential Bathroom Faucet Aerators:** Three versions of residential bathroom faucet aerators were analyzed: 0.5 gpm, 1.0 gpm, and 1.5 gpm. All three versions are more efficient than the plumbing code of 2.5 gpm. The 0.5 gpm versions were included in this package since they are more cost effective and save a larger volume of water, compared to the 1.0 gpm and 1.5 gpm versions.

- **Mutually Exclusive Set #2 - Showerheads:** Two versions of showerheads were analyzed: 1.5 gpm and 2.0 gpm. Both versions are more efficient than the plumbing code of 2.5 gpm. The 1.5 gpm versions were included in this package since they are more cost effective and save a larger volume of water, compared to the 2.0 gpm version.

- **Mutually Exclusive Set #3 – Toilets:** Two versions of toilets were analyzed: 1.28 gpf and 1.6 gpf. The 1.6 gpf version brings customers up to the plumbing code and the 1.28 gpf version goes beyond code. The 1.28 gpf versions were included in this package since they are more cost effective and save a larger volume of water, compared to the 1.6 gpf version.

- **Mutually Exclusive Set #4 - Urinals:** Three versions of urinals were analyzed: waterless, 0.5 gpf, and 1.0 gpf. The 1.0 gpf version brings customers up to the plumbing code, while the other two versions go beyond code. The 0.5 gpf versions were included in this package since they are more cost effective and save a larger volume of water, compared to the waterless or 1.0 gpf versions. The waterless versions were also excluded since they are often less acceptable to customers.

- **Mutually Exclusive Set #5 – MF Irrigation Assessment:** Two types of assessments for irrigation in the multifamily sector were analyzed: outdoor audit and outdoor irrigation evaluation. The outdoor irrigation evaluation is simply a “lighter” version of the outdoor audit and was added for this Cascade analysis. The outdoor irrigation evaluation was included in this package since it reflects the direction Cascade is likely heading for MF irrigation assessments.

The results for Package #1 are shown in Table 5. (The table is located at the end of this Tech Memo since it is 11 x 17 in size.) The analysis estimates the package would save approximately 2.52 million gallons per day (mgd) on an annual average basis and 2.94 mgd on a peak season basis. The annual average savings represents 7.2% of Cascade’s 2006-2008 average day consumption, which was 34.8 mgd. The total direct and indirect cost of achieving those savings is estimated at approximately $39.9 million over the course of the 49-year planning period (2012-2060) and an average annual cost of $2.0 million during the initial 10-year implementation period (2012-2021).

The following pie charts provide more information regarding the nature of the savings from this package. Figure 4 shows that approximately two-thirds of the savings are from the single-family customer category, with the remaining savings attributable to the multifamily and non-residential customer categories. Figure 5 shows that approximately 80 percent of the savings are associated with measures with year-round savings and 20 percent of the savings are associated with measures focused only on the peak season. Figure 6 shows that approximately 70 percent of the savings are associated with hardware measures and approximately 30 percent with behavioral measures.

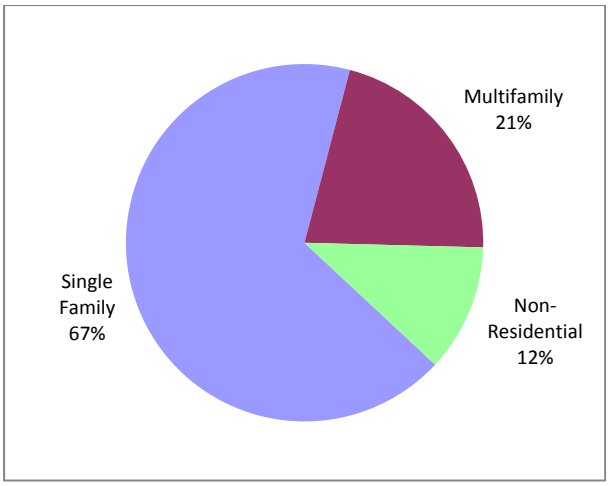

Figure 4. Savings by Customer Category (Package #1)

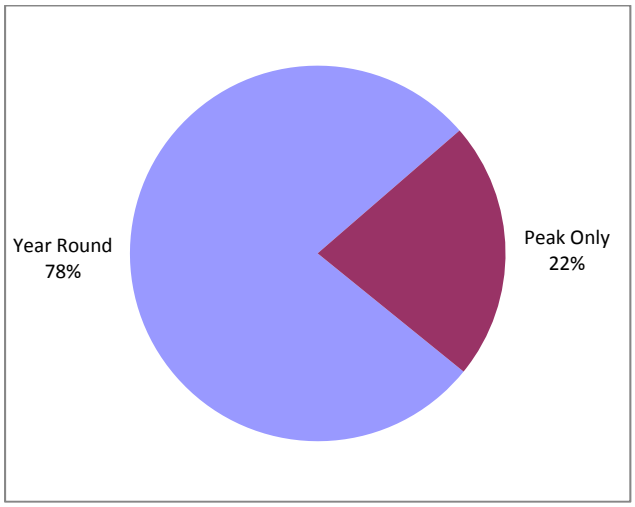

Figure 5. Savings by Seasonality (Package #1)

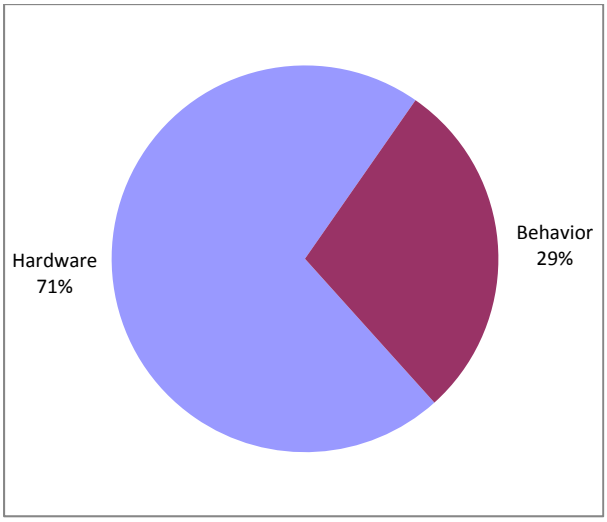

Figure 6. Savings by Hardware vs. Behavior (Package #1)

Figure 7 shows the gallons per day savings for each year for each customer category. The figure shows how the gallons per day savings: 1) increase during the initial implementation period of 2012-2021, 2) reach their highest level by the last year of the initial implementation period, 3) stay at that level throughout the planning period until 2060, and 4) decline after the end of the planning period as the measures' lifespans expire and the measures are no longer renewed. Note that the savings could be preserved beyond the planning period; however that would require continued spending for renewals.

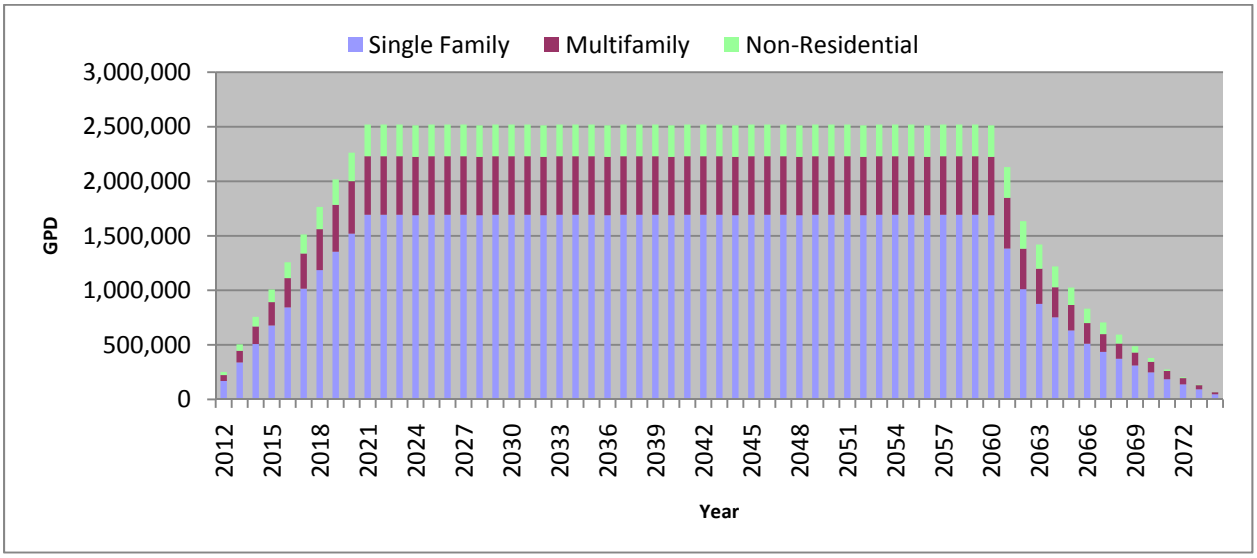

Figure 7. Total Savings Each Year (Package #1)

Figure 8 shows the total direct and indirect costs for each year during the planning period for each customer category. The figure shows how the costs: 1) are highest during the initial implementation period, 2) continue at a reduced level during the rest of the planning period due to measure renewal, and 3) end after the planning period.

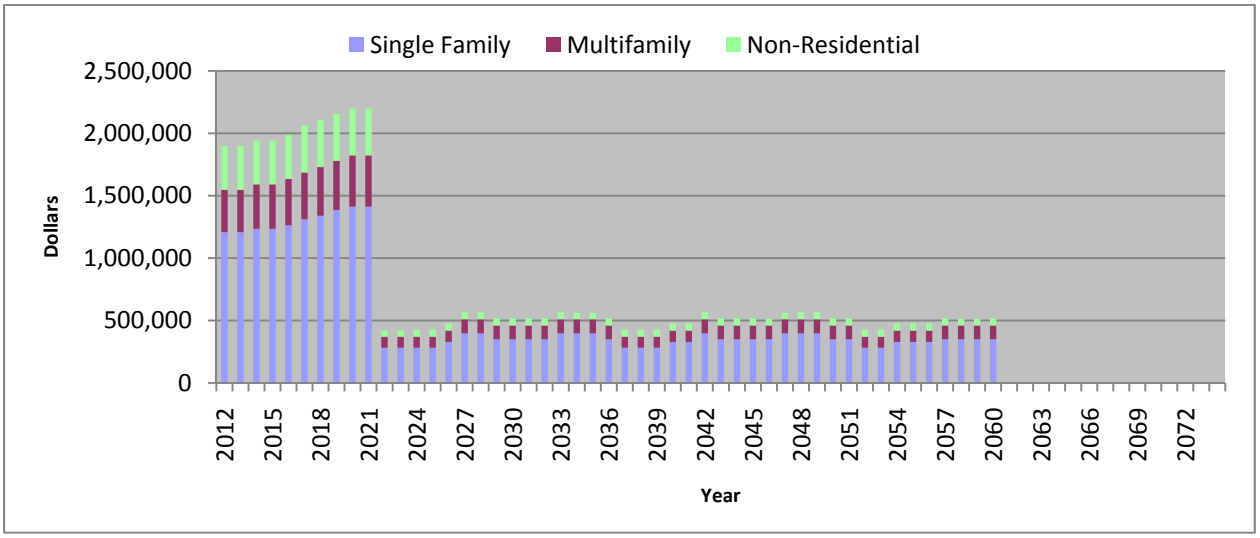

Figure 8. Total Costs Each Year (Package #1)

2.3. Package #2 – Conservation Potential Assessment (Excludes High Cost Outliers)

As described previously, this package was designed to be a CPA package that excludes outliers with very poor cost-effectiveness. This is the same as the CPA Original package, except that three measures with very poor cost-effectiveness have been excluded. Those measures are the outdoor audits and outdoor irrigation evaluation.

The results for Package #2 are shown in Table 6. (The table is located at the end of this Tech Memo since it is 11 x 17 in size.) The analysis estimates the package would save approximately 2.51 million gallons per day (mgd) on an annual average basis and 2.91 mgd on a peak season basis. The annual average savings represents 7.2% of Cascade's 2006-2008 average day consumption, which was 34.8 mgd. The total direct and indirect cost of achieving those savings is estimated at approximately $32.9 million over the course of the 49-year planning period (2012-2060) and an average annual cost of $1.9 million during the initial 10-year implementation period (2012-2021).

The following pie charts provide more information regarding the nature of the savings from this package. Figure 9 shows that approximately two-thirds of the savings are from the single-family customer category, with the remaining savings attributable to the multifamily and non-residential customer categories. Figure 10 shows that approximately 80 percent of the savings are associated with measures with year-round savings and 20 percent of the savings are associated with measures focused only on the peak season. Figure 11 shows that approximately 70 percent of the savings are associated with hardware measures and approximately 30 percent with behavioral measures.

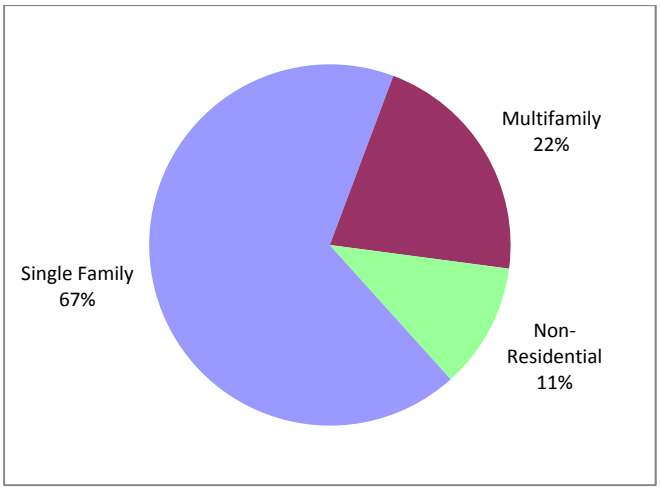

Figure 9. Savings by Customer Category (Package #2)

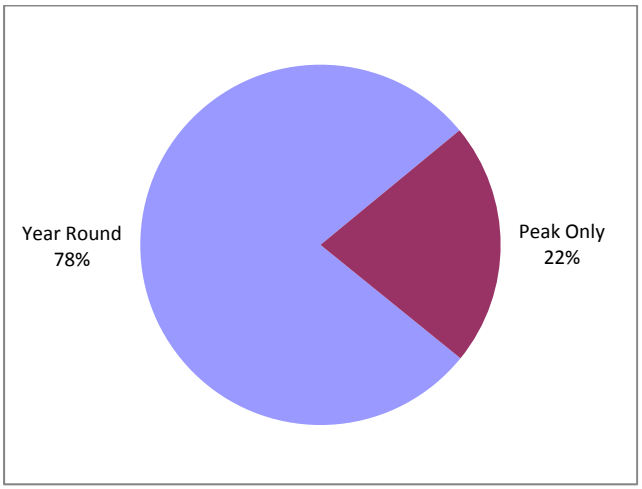

Figure 10. Savings by Seasonality (Package #2)

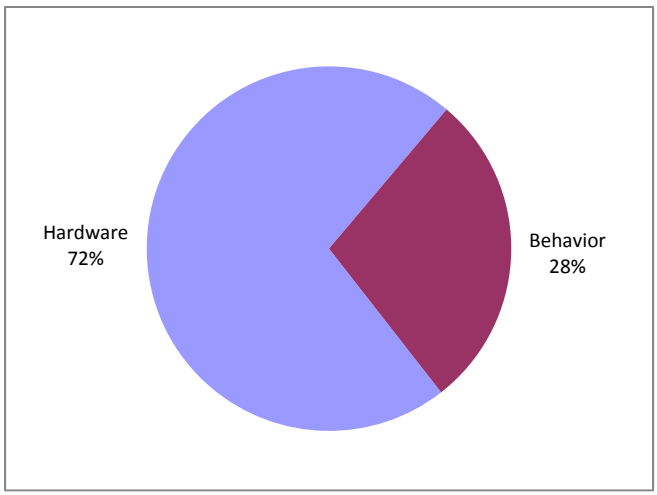

Figure 11. Savings by Hardware vs. Behavior (Package #2)

Figure 12 shows the gallons per day savings for each year for each customer category. The figure shows how the gallons per day savings: 1) increase during the initial implementation period of 2012-2021, 2) reach their highest level by the last year of the initial implementation period, 3) stay at that level throughout the planning period until 2060, and 4) decline after the end of the planning period as the measures' lifespans expire and the measures are no longer renewed. Note that the savings could be preserved beyond the planning period; however that would require continued spending for renewals.

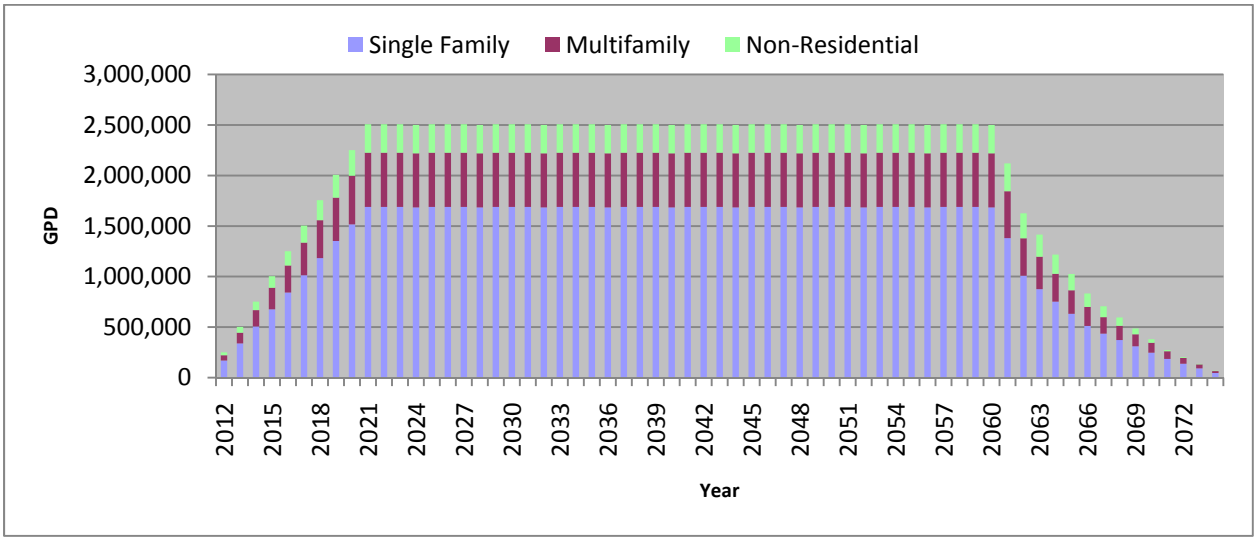

Figure 12. Total Savings Each Year (Package #2)

Figure 13 shows the total direct and indirect costs for each year during the planning period for each customer category. The figure shows how the costs: 1) are highest during the initial implementation period, 2) continue at a reduced level during the rest of the planning period due to measure renewal, and 3) end after the planning period.

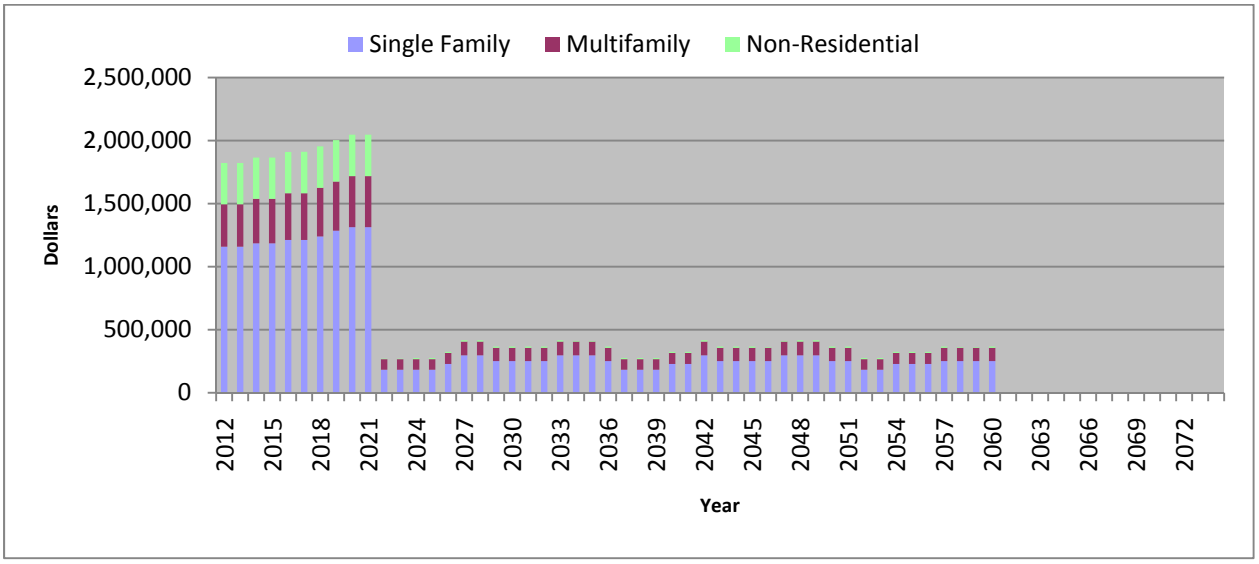

Figure 13. Total Costs Each Year (Package #2)

2.4. Package #3 – Current Budget

As described previously, this package was designed to reflect the most cost-effective use of Cascade's current conservation budget, given the analyzed measures. This package was assembled by starting with Package #2 (CPA Excludes High Cost Outliers) and then eliminating measures based on cost-effectiveness, until the average annual cost during the initial 10-year implementation period was approximately $1.25 million.

The results for Package #3 are shown in Table 7. (The table is located at the end of this Tech Memo since it is 11 x 17 in size.) The analysis estimates the package would save approximately 2.09 million gallons per day (mgd) on an annual average basis and 2.43 mgd on a peak season basis. The annual average savings represents 6.0% of Cascade's 2006-2008 average day consumption, which was 34.8 mgd. The total direct and indirect cost of achieving those savings is estimated at approximately $17.0 million over the course of the 49-year planning period (2012-2060) and an average annual cost of $1.3 million during the initial 10-year implementation period (2012-2021).

The following pie charts provide more information regarding the nature of the savings from this package. Figure 14 shows that approximately 70 percent of the savings are from the single-family customer category, with the remaining savings attributable to the multifamily and non-residential customer categories. Figure 15 shows that approximately 80 percent of the savings are associated with measures with year-round savings and 20 percent of the savings are associated with measures focused only on the peak season. Figure 16 shows that approximately 75 percent of the savings are associated with hardware measures and approximately 25 percent with behavioral measures.

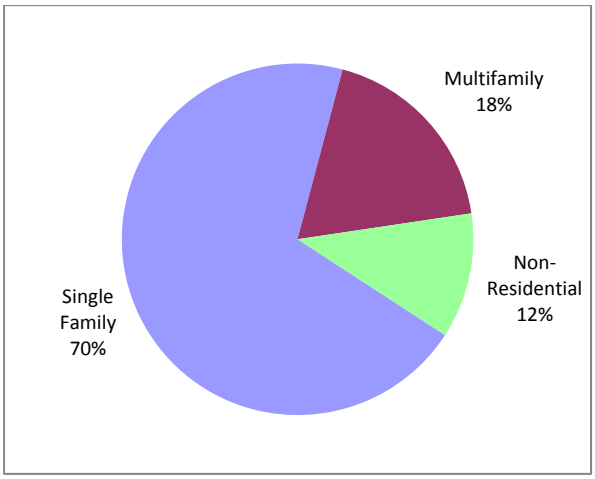

Figure 14. Savings by Customer Category (Package #3)

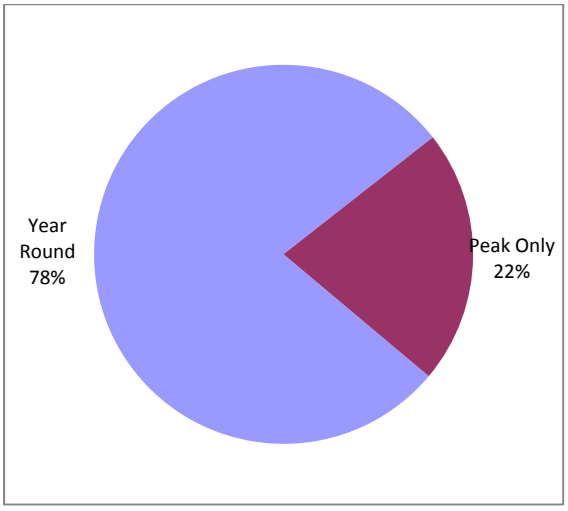

Figure 15. Savings by Seasonality (Package #3)

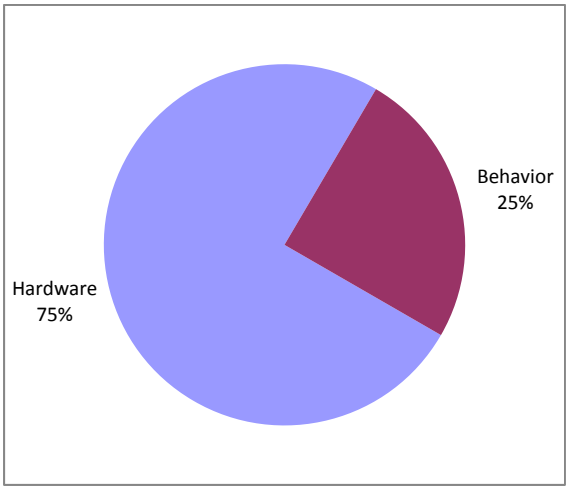

Figure 16. Savings by Hardware vs. Behavior (Package #3)

Figure 17 shows the gallons per day savings for each year for each customer category. The figure shows how the gallons per day savings: 1) increase during the initial implementation period of 2012-2021, 2) reach their highest level by the last year of the initial implementation period, 3) stay at that level throughout the planning period until 2060, and 4) decline after the end of the planning period as the measures' lifespans expire and the measures are no longer renewed. Note that the savings could be preserved beyond the planning period; however that would require continued spending for renewals.

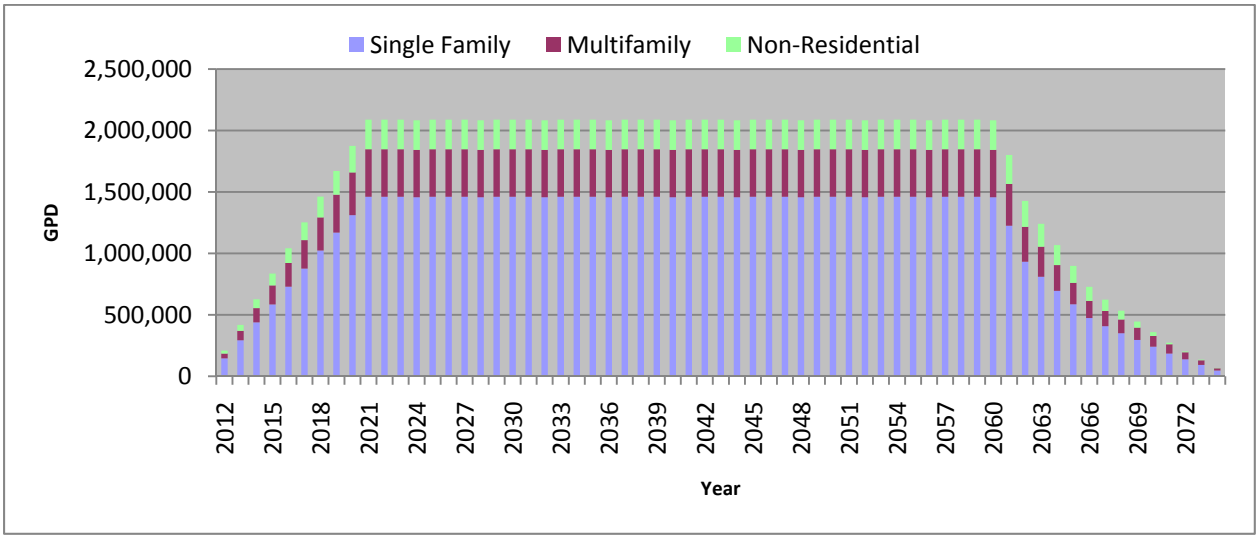

Figure 17. Total Savings Each Year (Package #3)

Figure 18 shows the total direct and indirect costs for each year during the planning period for each customer category. The figure shows how the costs: 1) are highest during the initial implementation period, 2) continue at a reduced level during the rest of the planning period due to measure renewal, and 3) end after the planning period.

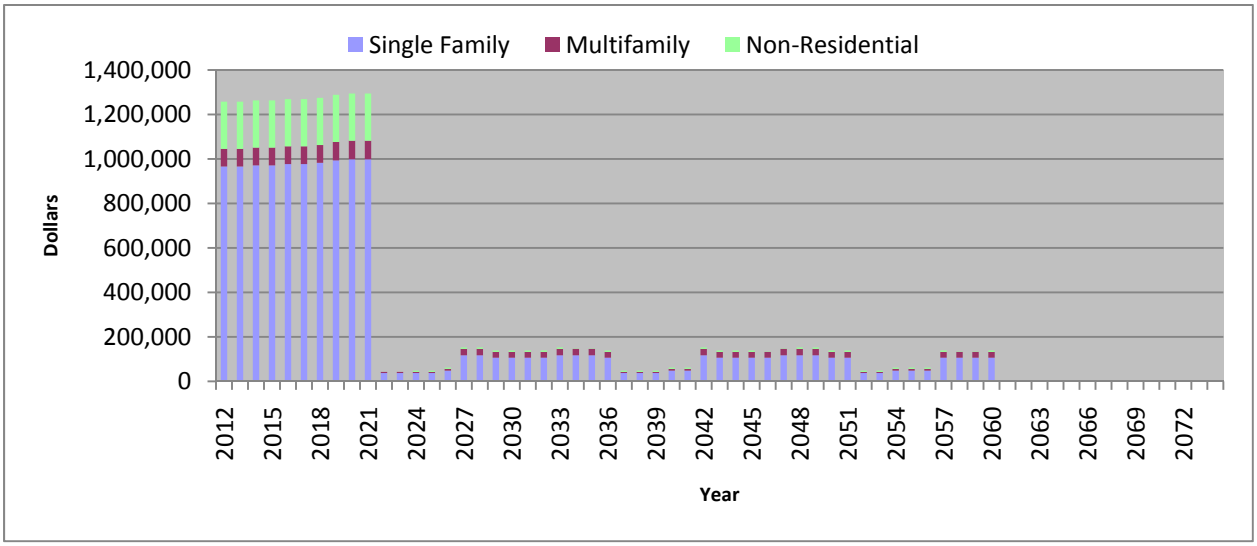

Figure 18. Total Costs Each Year (Package #3)

2.5. Package #4 – 50% of Current Budget

As described previously, this package was designed to reflect a reduced investment in conservation at approximately half the level of the current conservation budget. This package was created starting with Package #3 (Current Budget) and then eliminating measures based on cost-effectiveness, until the average annual cost during the initial 10-year implementation period was approximately $0.63 million.

The results for Package #4 are shown in Table 8. (The table is located at the end of this Tech Memo since it is 11 x 17 in size.) The analysis estimates the package would save approximately 1.84 million gallons per day (mgd) on an annual average basis and 2.22 mgd on a peak season basis. The annual average savings represents 5.3% of Cascade's 2006-2008 average day consumption, which was 34.8 mgd. The total direct and indirect cost of achieving those savings is estimated at approximately $10.7 million over the course of the 49-year planning period (2012-2060) and an average annual cost of $0.6 million during the initial 10-year implementation period (2012-2021).

The following pie charts provide more information regarding the nature of the savings from this package. Figure 19 shows that approximately two-thirds of the savings are from the single-family customer category, with the remaining savings attributable to the multifamily and non-residential customer categories. Figure 20 shows that approximately 70 percent of the savings are associated with measures with year-round savings and 30 percent of the savings are associated with measures focused only on the peak season. Figure 21 shows that approximately 70 percent of the savings are associated with hardware measures and approximately 30 percent with behavioral measures.

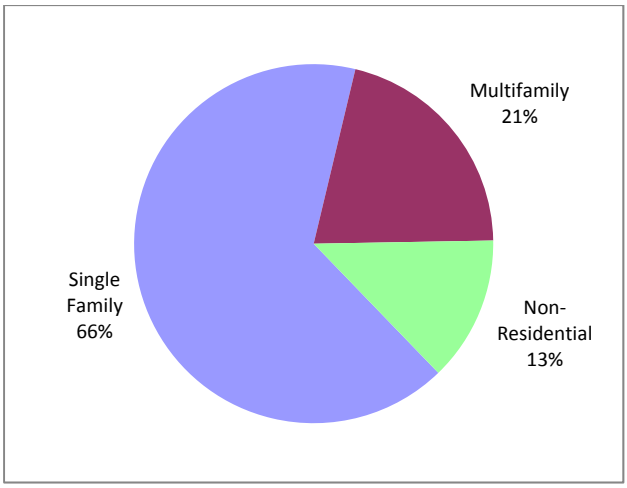

Figure 19. Savings by Customer Category (Package #4)

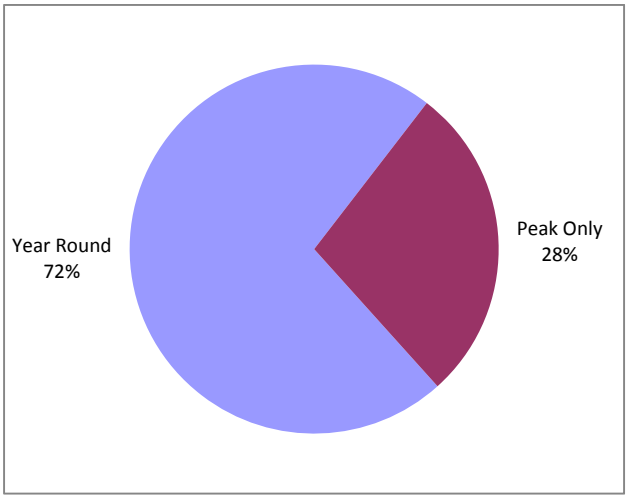

Figure 20. Savings by Seasonality (Package #4)

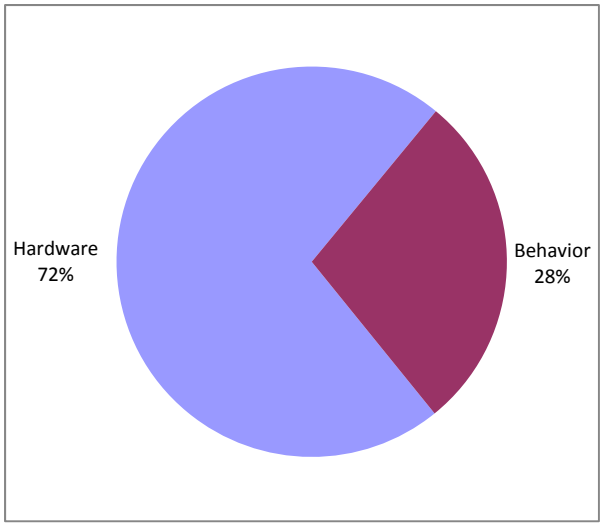

Figure 21. Savings by Hardware vs. Behavior (Package #4)

Figure 22 shows the gallons per day savings for each year for each customer category. The figure shows how the gallons per day savings: 1) increase during the initial implementation period of 2012-2021, 2) reach their highest level by the last year of the initial implementation period, 3) stay at that level throughout the planning period until 2060, and 4) decline after the end of the planning period as the measures' lifespans expire and the measures are no longer renewed. Note that the savings could be preserved beyond the planning period; however that would require continued spending for renewals.

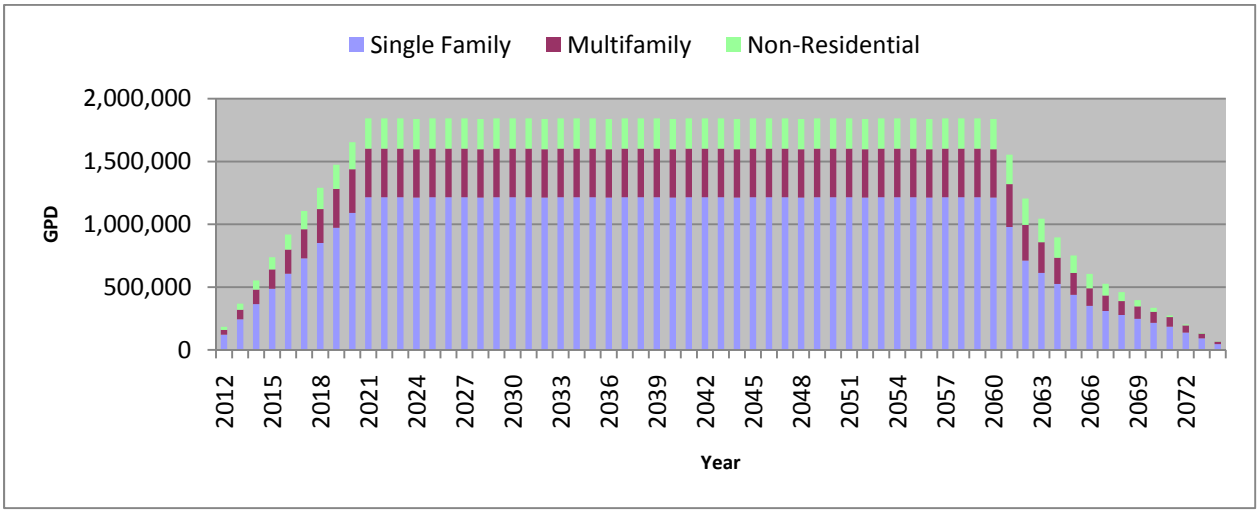

Figure 22. Total Savings Each Year (Package #4)

Figure 23 shows the total direct and indirect costs for each year during the planning period for each customer category. The figure shows how the costs: 1) are highest during the initial implementation period, 2) continue at a reduced level during the rest of the planning period due to measure renewal, and 3) end after the planning period.

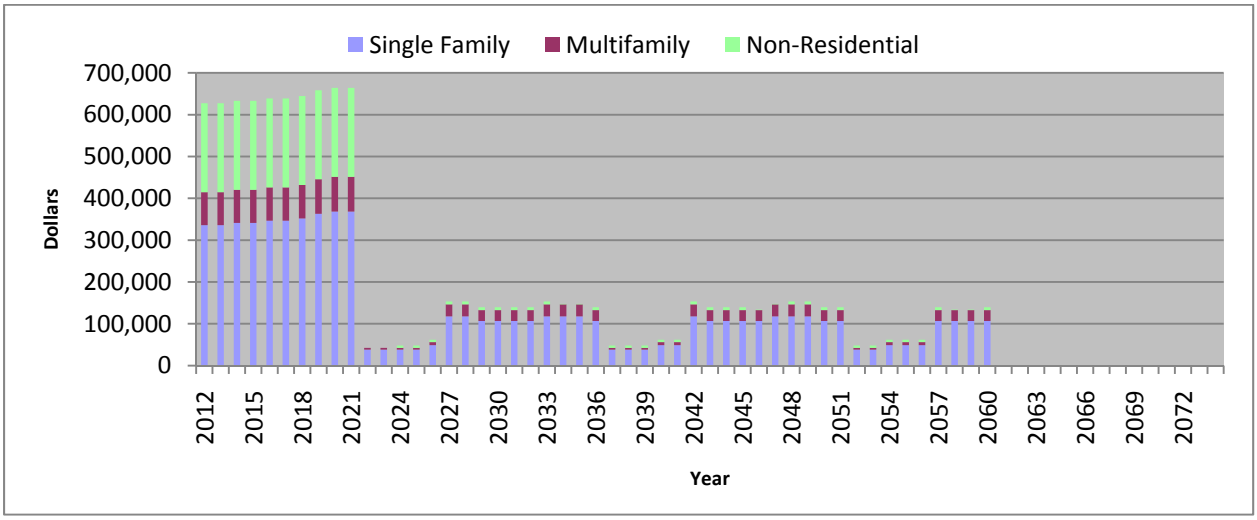

Figure 23. Total Costs Each Year (Package #4)

2.6. Conclusions

A summary of the results from the conservation packages is provided in Table 3. A scatter plot of the average annual savings and the total cost over the 49-year planning period is provided in Figure 24. Each of the packages would be reasonable to implement from a cost effectiveness perspective since their cost effectiveness, which range from $0.26 to $0.71 per ccf of saved water, are all very reasonable. However, the total cost of Packages 1 and 2 are well beyond Cascade's current conservation budget of $1.25 million per year.

Table 3. Summary of Conservation Package Results

Package	Average Annual Savings		Peak Season Savings (mgd)	Total Cost Over 49-Year (2012-2060) Planning Period (million $)	Average Annual Cost During 10-Year (2012-2021) Initial Implementation Period (million $)	Cost per CCF Saved Over Measure Life
	(mgd)	% of 2006-2008 Average Day Consumption[1]				
#1 CPA (Original)	2.52	7.2%	2.94	$39.9	$2.0	$0.71
#2 CPA (Excludes High Cost Outliers)	2.51	7.2%	2.91	$32.9	$1.9	$0.59
#3 Current Budget	2.09	6.0%	2.43	$17.0	$1.3	$0.36
#4 50% of Current Budget	1.84	5.3%	2.22	$10.7	$0.6	$0.26

1. The 2006-2008 average day consumption was 34.8 mgd.

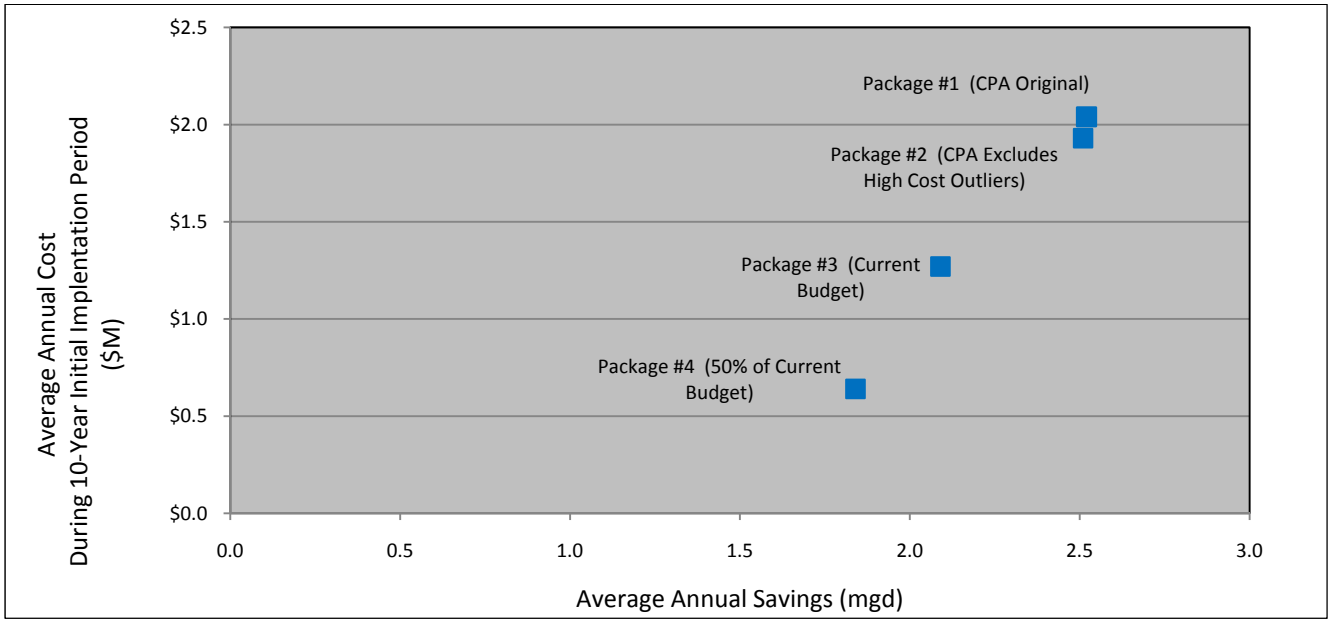

Figure 24. Comparison of Package Savings and Costs

Table 4. Analysis Results – All Measures

Conservation Measure	Sector	Seasonality	Hardware vs Behavior	Customer Definition	PARTICIPATION			SAVINGS			COSTS	
					All Customers			Savings For All Customers At Full Implementation (gpd)		Savings For All Customers Over Measure Life	Total Cost Over 49-Year (2012-2060) Planning Period	Cost per CCF Saved Over Measure Life
					Participating Customers [2]	Savings Generating Customers	Devices / Rebates / Audits	Annual Average	Peak Season	CCF [1]		
Clotheswashers - Efficient - In Res. Dwelling Unit	SF	Year Round	Hardware	SF Households	13,864	13,864	13,864	224,597	224,597	4,657,831	$1,100,960	$0.24
Clotheswashers - Efficient - In Res. Dwelling Unit	MF	Year Round	Hardware	MF Households	4,405	4,405	4,405	49,336	49,336	1,023,161	$364,440	$0.36
Clotheswashers - Efficient - In Res. Common Area	MF	Year Round	Hardware	MF Households	5,333	5,333	1,067	59,730	59,730	1,238,710	$83,540	$0.07
Clotheswashers - Efficient - Laundromats	NR	Year Round	Hardware	NR Accounts	2	2	24	2,688	2,688	55,745	$12,210	$0.22
Faucets - 0.5 gpm Bathroom Aerators	SF	Year Round	Hardware	SF Households	24,509	18,382	208,327	159,949	159,949	3,781,460	$538,526	$0.14
Faucets - 0.5 gpm Bathroom Aerators	MF	Year Round	Hardware	MF Households	14,503	10,877	73,965	65,262	65,262	1,542,963	$124,508	$0.08
Faucets - 1.0 gpm Bathroom Aerators	SF	Year Round	Hardware	SF Households	22,005	16,504	187,043	100,697	100,697	2,380,647	$502,350	$0.21
Faucets - 1.0 gpm Bathroom Aerators	MF	Year Round	Hardware	MF Households	13,178	9,884	67,208	41,513	41,513	981,398	$114,138	$0.12
Faucets - 1.5 gpm Bathroom Aerators	SF	Year Round	Hardware	SF Households	22,005	16,504	187,043	57,787	57,787	1,366,173	$502,350	$0.37
Faucets - 1.5 gpm Bathroom Aerators	MF	Year Round	Hardware	MF Households	13,178	9,884	67,208	23,722	23,722	560,799	$114,138	$0.20
Showerhead 1.5 gpm	SF	Year Round	Hardware	SF Households	43,222	32,417	293,910	301,523	301,523	7,128,499	$1,800,878	$0.25
Showerhead 1.5 gpm	MF	Year Round	Hardware	MF Households	25,326	18,995	129,163	125,367	125,367	2,963,854	$609,144	$0.21
Showerhead 1.5 gpm	NR	Year Round	Hardware	NR Accounts	96	72	3,264	23,760	23,760	561,735	$31,858	$0.06
Showerhead 2.0 gpm	SF	Year Round	Hardware	SF Households	35,207	26,405	239,408	108,297	108,297	2,560,379	$1,501,100	$0.59
Showerhead 2.0 gpm	MF	Year Round	Hardware	MF Households	22,144	16,608	112,934	49,824	49,824	1,177,941	$534,004	$0.45
Showerhead 2.0 gpm	NR	Year Round	Hardware	NR Accounts	83	62	2,822	9,300	9,300	220,758	$29,886	$0.14
Toilets - 1.28 gpf High Efficiency Toilets (HET)	SF	Year Round	Hardware	SF Households	30,914	30,914	71,102	306,091	306,091	7,094,722	$7,179,900	$1.01
Toilets - 1.28 gpf High Efficiency Toilets (HET)	MF	Year Round	Hardware	MF Households	12,133	12,133	21,839	87,358	87,358	2,024,816	$2,192,280	$1.08
Toilets - 1.28 gpf High Efficiency Toilets (HET)	NR	Year Round	Hardware	NR Accounts	1,376	1,376	16,837	89,855	89,855	2,082,695	$1,695,690	$0.81
Toilets - 1.6 gpf Ultra Low Flow Toilets (ULFT)	SF	Year Round	Hardware	SF Households	5,744	5,744	13,211	161,414	161,414	236,295	$1,044,010	$4.42
Toilets - 1.6 gpf Ultra Low Flow Toilets (ULFT)	MF	Year Round	Hardware	MF Households	2,241	2,241	4,034	43,475	43,475	63,644	$305,930	$4.81
Toilets - 1.6 gpf Ultra Low Flow Toilets (ULFT)	NR	Year Round	Hardware	NR Accounts	282	282	3,451	48,307	48,307	70,717	$263,520	$3.73
Urinals - Waterless Models	NR	Year Round	Hardware	NR Accounts	77	77	1,366	3,142	3,142	84,468	$151,235	$1.79
Urinals - 0.5 gpf Models	NR	Year Round	Hardware	NR Accounts	1,834	1,834	11,221	37,414	37,414	867,190	$1,127,980	$1.30
Urinals - 1.0 gpf Models	NR	Year Round	Hardware	NR Accounts	160	160	979	3,264	3,264	1,195	$102,540	$85.84
Spray Valves - 0.6 gpm Pre-Rinse Spray Valve	NR	Year Round	Hardware	NR Accounts	130	130	1,814	3,692	3,692	79,585	$165,075	$2.07
Food Steamers - Efficient	NR	Year Round	Hardware	NR Accounts	104	104	426	35,568	35,568	811,221	$233,946	$0.29
Dishwasher - Efficient	SF	Year Round	Hardware	SF Households	17,646	17,646	17,646	26,493	26,493	614,071	$530,670	$0.86
Dishwasher - Efficient	MF	Year Round	Hardware	MF Households	7,542	7,542	7,542	7,542	7,542	174,812	$193,300	$1.11
Dishwasher - Efficient	NR	Year Round	Hardware	NR Accounts	133	133	133	22,544	22,544	522,528	$138,070	$0.26
Clotheswashers - Decrease Partial Loads	SF	Year Round	Behavior	SF Households	10,305	10,305	0	42,265	42,265	881,666	$1,220,175	$1.38
Clotheswashers - Decrease Partial Loads	MF	Year Round	Behavior	MF Households	4,638	4,638	0	13,914	13,914	290,255	$1,447,200	$4.99
Faucets - Decrease Use	SF	Year Round	Behavior	SF Households	10,806	10,806	0	37,836	37,836	789,279	$1,220,175	$1.55
Faucets - Decrease Use	MF	Year Round	Behavior	MF Households	6,332	6,332	0	15,197	15,197	317,015	$716,850	$2.26
Showerheads - Decrease Use	SF	Year Round	Behavior	SF Households	10,806	10,806	0	24,869	24,869	518,775	$1,220,175	$2.35
Showerheads - Decrease Use	MF	Year Round	Behavior	MF Households	6,332	6,332	0	11,398	11,398	237,761	$716,850	$3.02
Toilets - Decrease Flushes	SF	Year Round	Behavior	SF Households	10,806	10,806	0	31,352	31,352	654,027	$1,220,175	$1.87
Toilets - Decrease Flushes	MF	Year Round	Behavior	MF Households	6,332	6,332	0	12,664	12,664	264,179	$716,850	$2.71
Toilets - Leak Detection	SF	Year Round	Behavior	SF Households	9,371	4,686	1,665,128	103,092	103,092	2,241,126	$725,342	$0.32
Toilets - Leak Detection	MF	Year Round	Behavior	MF Households	5,236	2,618	113,967	39,794	39,794	865,169	$191,687	$0.22
Irrigation Controllers - ET Model	SF	Peak Only	Hardware	SF Households	5,459	5,459	5,459	60,573	103,839	1,403,985	$875,810	$0.62
Irrigation Controllers - ET Model	MF	Peak Only	Hardware	MF Accounts	447	447	447	9,949	19,897	230,592	$92,900	$0.40
Irrigation Controllers - ET Model	NR	Peak Only	Hardware	NR Accounts	544	544	544	56,866	97,484	1,318,057	$168,480	$0.13
Irrigation Controllers - Rain Sensors	SF	Peak Only	Hardware	SF Households	2,771	2,771	2,771	10,249	17,570	237,555	$471,260	$1.98
Irrigation Controllers - Rain Sensors	MF	Peak Only	Hardware	MF Accounts	227	227	227	1,684	3,368	39,034	$37,440	$0.96
Irrigation Controllers - Rain Sensors	NR	Peak Only	Hardware	NR Accounts	275	275	275	9,582	16,427	222,099	$46,390	$0.21
Outdoor Irrigation Kits	SF	Peak Only	Hardware	SF Households	15,123	11,342	101,324	20,975	35,958	456,044	$2,389,823	$5.24
Outdoor Audit	SF	Peak Only	Behavior	SF Households	1,109	277	10,314	3,074	5,269	66,314	$4,634,934	$69.89
Outdoor Audit	MF	Peak Only	Behavior	MF Accounts	182	46	1,693	1,024	2,048	21,829	$708,381	$32.45
Outdoor Audit	NR	Peak Only	Behavior	NR Accounts	330	83	3,069	8,676	14,873	185,897	$2,194,800	$11.81
Outdoor Irrigation Evaluation	MF	Peak Only	Behavior	MF Accounts	182	91	1,693	1,350	2,700	29,105	$200,601	$6.89
Lawn Dormant	SF	Peak Only	Behavior	SF Households	9,185	9,185	0	339,725	582,386	7,086,878	$1,220,175	$0.17
Lawn Dormant	MF	Peak Only	Behavior	MF Accounts	431	431	0	37,078	74,155	773,464	$73,800	$0.10

SF – Single Family, MF – Multifamily, NR – Non-Residential

1. Savings from free riders have been omitted from this column, since this number is used in the cost-effectiveness calculation.
2. For the number of potential customers, look at the number of SF households, MF households, MF accounts, or NR accounts (as applicable) in Table 1.

Table 5. Analysis Results – Package #1 Conservation Potential Assessment (Original)

Conservation Measure	Sector	Seasonality	Hardware vs Behavior	Customer Definition	PARTICIPATION			SAVINGS			COSTS	
					All Customers			Savings For All Customers At Full Implementation (gpd)		Savings For All Customers Over Measure Life	Total Cost Over 49-Year (2012-2060) Planning Period	Cost per CCF Saved Over Measure Life
					Participating Customers [2]	Savings Generating Customers	Devices / Rebates / Audits	Annual Average	Peak Season	CCF [1]		
Clotheswashers - Efficient - In Res. Dwelling Unit	SF	Year Round	Hardware	SF Households	13,864	13,864	13,864	224,597	224,597	4,657,831	$1,100,960	$0.24
Clotheswashers - Efficient - In Res. Dwelling Unit	MF	Year Round	Hardware	MF Households	4,405	4,405	4,405	49,336	49,336	1,023,161	$364,440	$0.36
Clotheswashers - Efficient - In Res. Common Area	MF	Year Round	Hardware	MF Households	5,333	5,333	1,067	59,730	59,730	1,238,710	$83,540	$0.07
Clotheswashers - Efficient - Laundromats	NR	Year Round	Hardware	NR Accounts	2	2	24	2,688	2,688	55,745	$12,210	$0.22
Faucets - 0.5 gpm Bathroom Aerators	SF	Year Round	Hardware	SF Households	24,509	18,382	208,327	159,949	159,949	3,781,460	$538,526	$0.14
Faucets - 0.5 gpm Bathroom Aerators	MF	Year Round	Hardware	MF Households	14,503	10,877	73,965	65,262	65,262	1,542,963	$124,508	$0.08
Showerhead 1.5 gpm	SF	Year Round	Hardware	SF Households	43,222	32,417	293,910	301,523	301,523	7,128,499	$1,800,878	$0.25
Showerhead 1.5 gpm	MF	Year Round	Hardware	MF Households	25,326	18,995	129,163	125,367	125,367	2,963,854	$609,144	$0.21
Showerhead 1.5 gpm	NR	Year Round	Hardware	NR Accounts	96	72	3,264	23,760	23,760	561,735	$31,858	$0.06
Toilets - 1.28 gpf High Efficiency Toilets (HET)	SF	Year Round	Hardware	SF Households	30,914	30,914	71,102	306,091	306,091	7,094,722	$7,179,900	$1.01
Toilets - 1.28 gpf High Efficiency Toilets (HET)	MF	Year Round	Hardware	MF Households	12,133	12,133	21,839	87,358	87,358	2,024,816	$2,192,280	$1.08
Toilets - 1.28 gpf High Efficiency Toilets (HET)	NR	Year Round	Hardware	NR Accounts	1,376	1,376	16,837	89,855	89,855	2,082,695	$1,695,690	$0.81
Urinals - 0.5 gpf Models	NR	Year Round	Hardware	NR Accounts	1,834	1,834	11,221	37,414	37,414	867,190	$1,127,980	$1.30
Spray Valves - 0.6 gpm Pre-Rinse Spray Valve	NR	Year Round	Hardware	NR Accounts	130	130	1,814	3,692	3,692	79,585	$165,075	$2.07
Food Steamers - Efficient	NR	Year Round	Hardware	NR Accounts	104	104	426	35,568	35,568	811,221	$233,946	$0.29
Dishwasher - Efficient	SF	Year Round	Hardware	SF Households	17,646	17,646	17,646	26,493	26,493	614,071	$530,670	$0.86
Dishwasher - Efficient	MF	Year Round	Hardware	MF Households	7,542	7,542	7,542	7,542	7,542	174,812	$193,300	$1.11
Dishwasher - Efficient	NR	Year Round	Hardware	NR Accounts	133	133	133	22,544	22,544	522,528	$138,070	$0.26
Clotheswashers - Decrease Partial Loads	SF	Year Round	Behavior	SF Households	10,305	10,305	0	42,265	42,265	881,666	$1,220,175	$1.38
Clotheswashers - Decrease Partial Loads	MF	Year Round	Behavior	MF Households	4,638	4,638	0	13,914	13,914	290,255	$1,447,200	$4.99
Faucets - Decrease Use	SF	Year Round	Behavior	SF Households	10,806	10,806	0	37,836	37,836	789,279	$1,220,175	$1.55
Faucets - Decrease Use	MF	Year Round	Behavior	MF Households	6,332	6,332	0	15,197	15,197	317,015	$716,850	$2.26
Showerheads - Decrease Use	SF	Year Round	Behavior	SF Households	10,806	10,806	0	24,869	24,869	518,775	$1,220,175	$2.35
Showerheads - Decrease Use	MF	Year Round	Behavior	MF Households	6,332	6,332	0	11,398	11,398	237,761	$716,850	$3.02
Toilets - Decrease Flushes	SF	Year Round	Behavior	SF Households	10,806	10,806	0	31,352	31,352	654,027	$1,220,175	$1.87
Toilets - Decrease Flushes	MF	Year Round	Behavior	MF Households	6,332	6,332	0	12,664	12,664	264,179	$716,850	$2.71
Toilets - Leak Detection	SF	Year Round	Behavior	SF Households	9,371	4,686	1,665,128	103,092	103,092	2,241,126	$725,342	$0.32
Toilets - Leak Detection	MF	Year Round	Behavior	MF Households	5,236	2,618	113,967	39,794	39,794	865,169	$191,687	$0.22
Irrigation Controllers - ET Model	SF	Peak Only	Hardware	SF Households	5,459	5,459	5,459	60,573	103,839	1,403,985	$875,810	$0.62
Irrigation Controllers - ET Model	MF	Peak Only	Hardware	MF Accounts	447	447	447	9,949	19,897	230,592	$92,900	$0.40
Irrigation Controllers - ET Model	NR	Peak Only	Hardware	NR Accounts	544	544	544	56,866	97,484	1,318,057	$168,480	$0.13
Irrigation Controllers - Rain Sensors	SF	Peak Only	Hardware	SF Households	2,771	2,771	2,771	10,249	17,570	237,555	$471,260	$1.98
Irrigation Controllers - Rain Sensors	MF	Peak Only	Hardware	MF Accounts	227	227	227	1,684	3,368	39,034	$37,440	$0.96
Irrigation Controllers - Rain Sensors	NR	Peak Only	Hardware	NR Accounts	275	275	275	9,582	16,427	222,099	$46,390	$0.21
Outdoor Irrigation Kits	SF	Peak Only	Hardware	SF Households	15,123	11,342	101,324	20,975	35,958	456,044	$2,389,823	$5.24
Outdoor Audit	SF	Peak Only	Behavior	SF Households	1,109	277	10,314	3,074	5,269	66,314	$4,634,934	$69.89
Outdoor Audit	NR	Peak Only	Behavior	NR Accounts	330	83	3,069	8,676	14,873	185,897	$2,194,800	$11.81
Outdoor Irrigation Evaluation	MF	Peak Only	Behavior	MF Accounts	182	91	1,693	1,350	2,700	29,105	$200,601	$6.89
Lawn Dormant	SF	Peak Only	Behavior	SF Households	9,185	9,185	0	339,725	582,386	7,086,878	$1,220,175	$0.17
Lawn Dormant	MF	Peak Only	Behavior	MF Accounts	431	431	0	37,078	74,155	773,464	$73,800	$0.10
Total					N/A	N/A	N/A	2,520,926	2,935,072	56,333,876	$39,924,867	$0.71

SF – Single Family, MF – Multifamily, NR – Non-Residential

1. Savings from free riders have been omitted from this column, since this number is used in the cost-effectiveness calculation.
2. For the number of potential customers, look at the number of SF households, MF households, MF accounts, or NR accounts (as applicable) in Table 1.

Table 6. Analysis Results – Package #2 Conservation Potential Assessment (Excludes High Cost Outliers)

Conservation Measure	Sector	Seasonality	Hardware vs Behavior	Customer Definition	PARTICIPATION			SAVINGS			COSTS	
					All Customers			Savings For All Customers At Full Implementation (gpd)		Savings For All Customers Over Measure Life	Total Cost Over 49-Year (2012-2060) Planning Period	Cost per CCF Saved Over Measure Life
					Participating Customers [2]	Savings Generating Customers	Devices / Rebates / Audits	Annual Average	Peak Season	CCF [1]		
Clotheswashers - Efficient - In Res. Dwelling Unit	SF	Year Round	Hardware	SF Households	13,864	13,864	13,864	224,597	224,597	4,657,831	$1,100,960	$0.24
Clotheswashers - Efficient - In Res. Dwelling Unit	MF	Year Round	Hardware	MF Households	4,405	4,405	4,405	49,336	49,336	1,023,161	$364,440	$0.36
Clotheswashers - Efficient - In Res. Common Area	MF	Year Round	Hardware	MF Households	5,333	5,333	1,067	59,730	59,730	1,238,710	$83,540	$0.07
Clotheswashers - Efficient - Laundromats	NR	Year Round	Hardware	NR Accounts	2	2	24	2,688	2,688	55,745	$12,210	$0.22
Faucets - 0.5 gpm Bathroom Aerators	SF	Year Round	Hardware	SF Households	24,509	18,382	208,327	159,949	159,949	3,781,460	$538,526	$0.14
Faucets - 0.5 gpm Bathroom Aerators	MF	Year Round	Hardware	MF Households	14,503	10,877	73,965	65,262	65,262	1,542,963	$124,508	$0.08
Showerhead 1.5 gpm	SF	Year Round	Hardware	SF Households	43,222	32,417	293,910	301,523	301,523	7,128,499	$1,800,878	$0.25
Showerhead 1.5 gpm	MF	Year Round	Hardware	MF Households	25,326	18,995	129,163	125,367	125,367	2,963,854	$609,144	$0.21
Showerhead 1.5 gpm	NR	Year Round	Hardware	NR Accounts	96	72	3,264	23,760	23,760	561,735	$31,858	$0.06
Toilets - 1.28 gpf High Efficiency Toilets (HET)	SF	Year Round	Hardware	SF Households	30,914	30,914	71,102	306,091	306,091	7,094,722	$7,179,900	$1.01
Toilets - 1.28 gpf High Efficiency Toilets (HET)	MF	Year Round	Hardware	MF Households	12,133	12,133	21,839	87,358	87,358	2,024,816	$2,192,280	$1.08
Toilets - 1.28 gpf High Efficiency Toilets (HET)	NR	Year Round	Hardware	NR Accounts	1,376	1,376	16,837	89,855	89,855	2,082,695	$1,695,690	$0.81
Urinals - 0.5 gpf Models	NR	Year Round	Hardware	NR Accounts	1,834	1,834	11,221	37,414	37,414	867,190	$1,127,980	$1.30
Spray Valves - 0.6 gpm Pre-Rinse Spray Valve	NR	Year Round	Hardware	NR Accounts	130	130	1,814	3,692	3,692	79,585	$165,075	$2.07
Food Steamers - Efficient	NR	Year Round	Hardware	NR Accounts	104	104	426	35,568	35,568	811,221	$233,946	$0.29
Dishwasher - Efficient	SF	Year Round	Hardware	SF Households	17,646	17,646	17,646	26,493	26,493	614,071	$530,670	$0.86
Dishwasher - Efficient	MF	Year Round	Hardware	MF Households	7,542	7,542	7,542	7,542	7,542	174,812	$193,300	$1.11
Dishwasher - Efficient	NR	Year Round	Hardware	NR Accounts	133	133	133	22,544	22,544	522,528	$138,070	$0.26
Clotheswashers - Decrease Partial Loads	SF	Year Round	Behavior	SF Households	10,305	10,305	0	42,265	42,265	881,666	$1,220,175	$1.38
Clotheswashers - Decrease Partial Loads	MF	Year Round	Behavior	MF Households	4,638	4,638	0	13,914	13,914	290,255	$1,447,200	$4.99
Faucets - Decrease Use	SF	Year Round	Behavior	SF Households	10,806	10,806	0	37,836	37,836	789,279	$1,220,175	$1.55
Faucets - Decrease Use	MF	Year Round	Behavior	MF Households	6,332	6,332	0	15,197	15,197	317,015	$716,850	$2.26
Showerheads - Decrease Use	SF	Year Round	Behavior	SF Households	10,806	10,806	0	24,869	24,869	518,775	$1,220,175	$2.35
Showerheads - Decrease Use	MF	Year Round	Behavior	MF Households	6,332	6,332	0	11,398	11,398	237,761	$716,850	$3.02
Toilets - Decrease Flushes	SF	Year Round	Behavior	SF Households	10,806	10,806	0	31,352	31,352	654,027	$1,220,175	$1.87
Toilets - Decrease Flushes	MF	Year Round	Behavior	MF Households	6,332	6,332	0	12,664	12,664	264,179	$716,850	$2.71
Toilets - Leak Detection	SF	Year Round	Behavior	SF Households	9,371	4,686	1,665,128	103,092	103,092	2,241,126	$725,342	$0.32
Toilets - Leak Detection	MF	Year Round	Behavior	MF Households	5,236	2,618	113,967	39,794	39,794	865,169	$191,687	$0.22
Irrigation Controllers - ET Model	SF	Peak Only	Hardware	SF Households	5,459	5,459	5,459	60,573	103,839	1,403,985	$875,810	$0.62
Irrigation Controllers - ET Model	MF	Peak Only	Hardware	MF Accounts	447	447	447	9,949	19,897	230,592	$92,900	$0.40
Irrigation Controllers - ET Model	NR	Peak Only	Hardware	NR Accounts	544	544	544	56,866	97,484	1,318,057	$168,480	$0.13
Irrigation Controllers - Rain Sensors	SF	Peak Only	Hardware	SF Households	2,771	2,771	2,771	10,249	17,570	237,555	$471,260	$1.98
Irrigation Controllers - Rain Sensors	MF	Peak Only	Hardware	MF Accounts	227	227	227	1,684	3,368	39,034	$37,440	$0.96
Irrigation Controllers - Rain Sensors	NR	Peak Only	Hardware	NR Accounts	275	275	275	9,582	16,427	222,099	$46,390	$0.21
Outdoor Irrigation Kits	SF	Peak Only	Hardware	SF Households	15,123	11,342	101,324	20,975	35,958	456,044	$2,389,823	$5.24
Lawn Dormant	SF	Peak Only	Behavior	SF Households	9,185	9,185	0	339,725	582,386	7,086,878	$1,220,175	$0.17
Lawn Dormant	MF	Peak Only	Behavior	MF Accounts	431	431	0	37,078	74,155	773,464	$73,800	$0.10
Total					N/A	N/A	N/A	2,507,826	2,912,229	56,052,560	$32,894,532	$0.59

SF – Single Family, MF – Multifamily, NR – Non-Residential

1. Savings from free riders have been omitted from this column, since this number is used in the cost-effectiveness calculation.
2. For the number of potential customers, look at the number of SF households, MF households, MF accounts, or NR accounts (as applicable) in Table 1.

Table 7. Analysis Results – Package #3 Current Budget

Conservation Measure	Sector	Seasonality	Hardware vs Behavior	Customer Definition	PARTICIPATION			SAVINGS			COSTS	
					All Customers			Savings For All Customers At Full Implementation (gpd)		Savings For All Customers Over Measure Life	Total Cost Over 49-Year (2012-2060) Planning Period	Cost per CCF Saved Over Measure Life
					Participating Customers [2]	Savings Generating Customers	Devices / Rebates / Audits	Annual Average	Peak Season	CCF [1]		
Clotheswashers - Efficient - In Res. Dwelling Unit	SF	Year Round	Hardware	SF Households	13,864	13,864	13,864	224,597	224,597	4,657,831	$1,100,960	$0.24
Clotheswashers - Efficient - In Res. Dwelling Unit	MF	Year Round	Hardware	MF Households	4,405	4,405	4,405	49,336	49,336	1,023,161	$364,440	$0.36
Clotheswashers - Efficient - In Res. Common Area	MF	Year Round	Hardware	MF Households	5,333	5,333	1,067	59,730	59,730	1,238,710	$83,540	$0.07
Clotheswashers - Efficient - Laundromats	NR	Year Round	Hardware	NR Accounts	2	2	24	2,688	2,688	55,745	$12,210	$0.22
Faucets - 0.5 gpm Bathroom Aerators	SF	Year Round	Hardware	SF Households	24,509	18,382	208,327	159,949	159,949	3,781,460	$538,526	$0.14
Faucets - 0.5 gpm Bathroom Aerators	MF	Year Round	Hardware	MF Households	14,503	10,877	73,965	65,262	65,262	1,542,963	$124,508	$0.08
Toilets - 1.28 gpf High Efficiency Toilets (HET)	SF	Year Round	Hardware	SF Households	30,914	30,914	71,102	306,091	306,091	7,094,722	$7,179,900	$1.01
Toilets - 1.28 gpf High Efficiency Toilets (HET)	NR	Year Round	Hardware	NR Accounts	1,376	1,376	16,837	89,855	89,855	2,082,695	$1,695,690	$0.81
Irrigation Controllers - ET Model	MF	Peak Only	Hardware	MF Accounts	447	447	447	9,949	19,897	230,592	$92,900	$0.40
Irrigation Controllers - ET Model	NR	Peak Only	Hardware	NR Accounts	544	544	544	56,866	97,484	1,318,057	$168,480	$0.13
Irrigation Controllers - Rain Sensors	NR	Peak Only	Hardware	NR Accounts	275	275	275	9,582	16,427	222,099	$46,390	$0.21
Lawn Dormant	SF	Peak Only	Behavior	SF Households	9,185	9,185	0	339,725	582,386	7,086,878	$1,220,175	$0.17
Lawn Dormant	MF	Peak Only	Behavior	MF Accounts	431	431	0	37,078	74,155	773,464	$73,800	$0.10
Toilets - Leak Detection	SF	Year Round	Behavior	SF Households	9,371	4,686	1,665,128	103,092	103,092	2,241,126	$725,342	$0.32
Toilets - Leak Detection	MF	Year Round	Behavior	MF Households	5,236	2,618	113,967	39,794	39,794	865,169	$191,687	$0.22
Showerhead 1.5 gpm	SF	Year Round	Hardware	SF Households	43,222	32,417	293,910	301,523	301,523	7,128,499	$1,800,878	$0.25
Showerhead 1.5 gpm	MF	Year Round	Hardware	MF Households	25,326	18,995	129,163	125,367	125,367	2,963,854	$609,144	$0.21
Showerhead 1.5 gpm	NR	Year Round	Hardware	NR Accounts	96	72	3,264	23,760	23,760	561,735	$31,858	$0.06
Food Steamers - Efficient	NR	Year Round	Hardware	NR Accounts	104	104	426	35,568	35,568	811,221	$233,946	$0.29
Dishwasher - Efficient	SF	Year Round	Hardware	SF Households	17,646	17,646	17,646	26,493	26,493	614,071	$530,670	$0.86
Dishwasher - Efficient	NR	Year Round	Hardware	NR Accounts	133	133	133	22,544	22,544	522,528	$138,070	$0.26
Total					N/A	N/A	N/A	2,088,846	2,425,995	46,816,583	$16,963,114	$0.36

SF – Single Family, MF – Multifamily, NR – Non-Residential

1. Savings from free riders have been omitted from this column, since this number is used in the cost-effectiveness calculation.
2. For the number of potential customers, look at the number of SF households, MF households, MF accounts, or NR accounts (as applicable) in Table 1.

Table 8. Analysis Results – Package #4 50% of Current Budget

Conservation Measure	Sector	Seasonality	Hardware vs Behavior	Customer Definition	PARTICIPATION			SAVINGS			COSTS	
					All Customers			Savings For All Customers At Full Implementation (gpd)		Savings For All Customers Over Measure Life	Total Cost Over 49-Year (2012-2060) Planning Period	Cost per CCF Saved Over Measure Life
					Participating Customers [2]	Savings Generating Customers	Devices / Rebates / Audits	Annual Average	Peak Season	CCF [1]		
Clotheswashers - Efficient - In Res. Dwelling Unit	SF	Year Round	Hardware	SF Households	13,864	13,864	13,864	224,597	224,597	4,657,831	$1,100,960	$0.24
Clotheswashers - Efficient - In Res. Dwelling Unit	MF	Year Round	Hardware	MF Households	4,405	4,405	4,405	49,336	49,336	1,023,161	$364,440	$0.36
Clotheswashers - Efficient - In Res. Common Area	MF	Year Round	Hardware	MF Households	5,333	5,333	1,067	59,730	59,730	1,238,710	$83,540	$0.07
Clotheswashers - Efficient - Laundromats	NR	Year Round	Hardware	NR Accounts	2	2	24	2,688	2,688	55,745	$12,210	$0.22
Faucets - 0.5 gpm Bathroom Aerators	SF	Year Round	Hardware	SF Households	24,509	18,382	208,327	159,949	159,949	3,781,460	$538,526	$0.14
Faucets - 0.5 gpm Bathroom Aerators	MF	Year Round	Hardware	MF Households	14,503	10,877	73,965	65,262	65,262	1,542,963	$124,508	$0.08
Showerhead 1.5 gpm	SF	Year Round	Hardware	SF Households	43,222	32,417	293,910	301,523	301,523	7,128,499	$1,800,878	$0.25
Showerhead 1.5 gpm	MF	Year Round	Hardware	MF Households	25,326	18,995	129,163	125,367	125,367	2,963,854	$609,144	$0.21
Showerhead 1.5 gpm	NR	Year Round	Hardware	NR Accounts	96	72	3,264	23,760	23,760	561,735	$31,858	$0.06
Toilets - 1.28 gpf High Efficiency Toilets (HET)	NR	Year Round	Hardware	NR Accounts	1,376	1,376	16,837	89,855	89,855	2,082,695	$1,695,690	$0.81
Food Steamers - Efficient	NR	Year Round	Hardware	NR Accounts	104	104	426	35,568	35,568	811,221	$233,946	$0.29
Dishwasher - Efficient	SF	Year Round	Hardware	SF Households	17,646	17,646	17,646	26,493	26,493	614,071	$530,670	$0.86
Dishwasher - Efficient	NR	Year Round	Hardware	NR Accounts	133	133	133	22,544	22,544	522,528	$138,070	$0.26
Toilets - Leak Detection	SF	Year Round	Behavior	SF Households	9,371	4,686	1,665,128	103,092	103,092	2,241,126	$725,342	$0.32
Toilets - Leak Detection	MF	Year Round	Behavior	MF Households	5,236	2,618	113,967	39,794	39,794	865,169	$191,687	$0.22
Irrigation Controllers - ET Model	SF	Peak Only	Hardware	SF Households	5,459	5,459	5,459	60,573	103,839	1,403,985	$875,810	$0.62
Irrigation Controllers - ET Model	MF	Peak Only	Hardware	MF Accounts	447	447	447	9,949	19,897	230,592	$92,900	$0.40
Irrigation Controllers - ET Model	NR	Peak Only	Hardware	NR Accounts	544	544	544	56,866	97,484	1,318,057	$168,480	$0.13
Irrigation Controllers - Rain Sensors	NR	Peak Only	Hardware	NR Accounts	275	275	275	9,582	16,427	222,099	$46,390	$0.21
Lawn Dormant	SF	Peak Only	Behavior	SF Households	9,185	9,185	0	339,725	582,386	7,086,878	$1,220,175	$0.17
Lawn Dormant	MF	Peak Only	Behavior	MF Accounts	431	431	0	37,078	74,155	773,464	$73,800	$0.10
Total					N/A	N/A	N/A	1,843,327	2,223,743	41,125,846	$10,659,024	$0.26

SF – Single Family, MF – Multifamily, NR – Non-Residential

1. Savings from free riders have been omitted from this column, since this number is used in the cost-effectiveness calculation.
2. For the number of potential customers, look at the number of SF households, MF households, MF accounts, or NR accounts (as applicable) in Table 1.