4.3 Step 3 – Integrated Planning and Water Efficiency Benefits and Goals

Step 3 demonstrates how water efficiency planning is essential for water supply planning and meeting future water supply needs. Information is presented on how water efficiency planning can be incorporated into water supply and reliability planning, potential water efficiency benefits, and the corresponding types of goals that should be developed to ensure that the benefits are achieved. It is important to note that Step 3 cannot be fully completed until Step 4 is finalized. Specific details are provided below.

4.3.1 Water Efficiency and Water Supply Planning

Water efficiency may be incorporated into water supply planning at a variety of levels. Providers who have established long-term water efficiency activities with data supporting long-term water savings may have the degree of certainty necessary to directly incorporate projected water savings into their future planning efforts. For instance, these providers may adjust the anticipated timing of when a new water treatment facility is constructed based on forecasted demand data that incorporates projected water efficiency savings. Water savings achieved through water efficiency activities can reduce water demands to such a level that the following benefits may be achieved:

- Eliminate the need for a project (e.g. water or wastewater treatment plant).
- Downsize a project based on reduced capacity needs.
- Postpone a project.
- Eliminate, reduce, or postpone water acquisitions.

Per C.R.S. 37-60-126 (4), State approved plans must express whether projected water efficiency savings are directly incorporated into planning efforts or whether additional monitoring data and level of certainty in the projected water use saving estimates is necessary prior to such incorporation. In other words, having the confidence of the permanency of the water efficiency savings can dictate whether or not more verification is needed to ensure there are sufficient savings available for postponing the timing of a new water treatment facility or using those savings for a drought reserve.

C.R.S. 37-60-126 (4) Requirement: Statement of the provider's best judgment of the role of water efficiency plans in the covered entity's water supply planning.

Regardless of whether water efficiency savings are to be directly incorporated into future supply planning, it is essential that the following exercises are conducted to obtain an idea of potential future demands if the projected water efficiency savings are fully achieved:[1]

- Develop modified water demands that incorporate savings from water efficiency activities.
- Assess potential impacts to future facility and/or water purchases as a result of water efficiency.

Forecasted Modified Water Demands

Forecasted modified water demands reflect the estimated water efficiency savings from the activities selected in Step 4. These modified water demands are developed by reducing the unmodified demands in Step 2 by the estimated water saving achieved through the demand

[1] Following this exercise, some providers may feel water efficiency is not necessary beyond the foundational level of activities (e.g. leak repair). These providers must clearly demonstrate their rationale and provide data supporting their case. For example, water provider "Fiction District" has a customer base that does not support the investment in water efficiency and the District has a reliable water supply that will extend at least 30 years into the future. In this case, "Fiction District" should include in their water efficiency plan future demand and existing supply data to clearly demonstrate their ability to meet future demands and also provide supporting evidence that the majority of their customer base is not interested in investing in certain water efficiency activities at this time.

management activities selected in Step 4. Figure 19 provides an example of the unmodified treated water demands presented in Section 4.2.4 and the corresponding modified forecasted treated water demands.

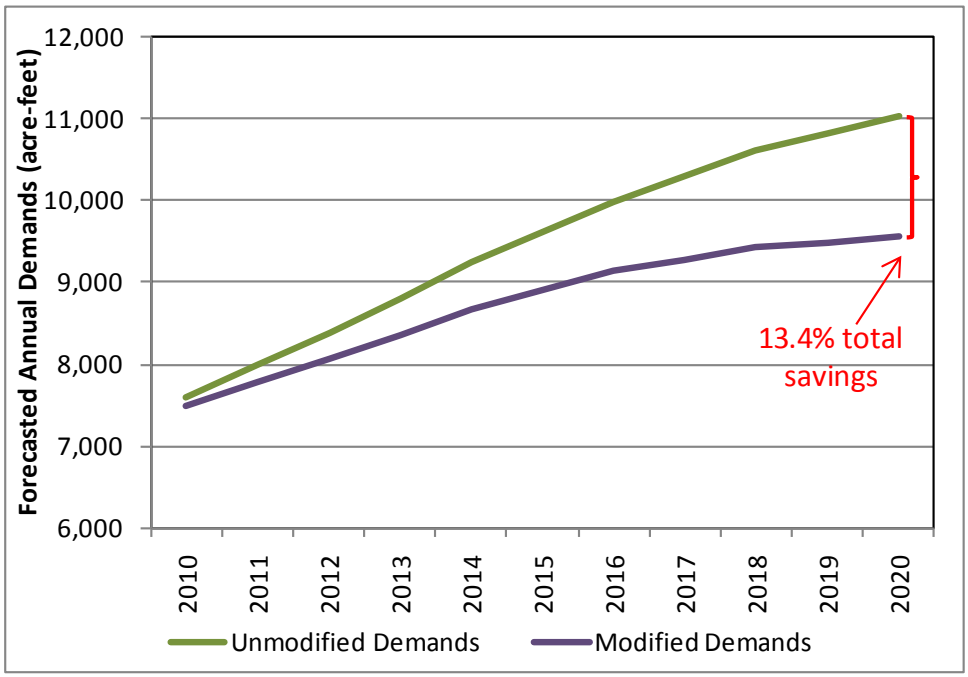

Figure 19 Unmodified and Modified Treated Water Demands

Forecasted modified demands may also be developed for dual water supply systems. This can be useful for future planning efforts where demands for certain types of supplies (e.g. raw ditch and/or re-use supplies) can be distinguished, and facilities necessary for each type of water can be planned for sufficiently.[20]

Forecasted Modified Demands with Passive and Active Water Savings

Forecasted modified water demands may also distinguish between projected passive and active savings. Figure 20 provides an example of projected passive and active water savings. In this example passive savings are assumed to be 9.9% and active savings are estimated at 3.5% by the end of the planning horizon in 2030. This information enables the provider to identify savings that will eventually occur regardless of active demand management activities. These passive savings could affect the range and scope of active saving programs.

[20] Many raw water systems in Colorado are currently not metered. Prior to implementing water efficiency activities on raw water usage, it is recommended that the raw water system is sufficiently metered. This will enable the effectiveness of future water efficiency activities to be monitored. See Section 4.1 for additional information.

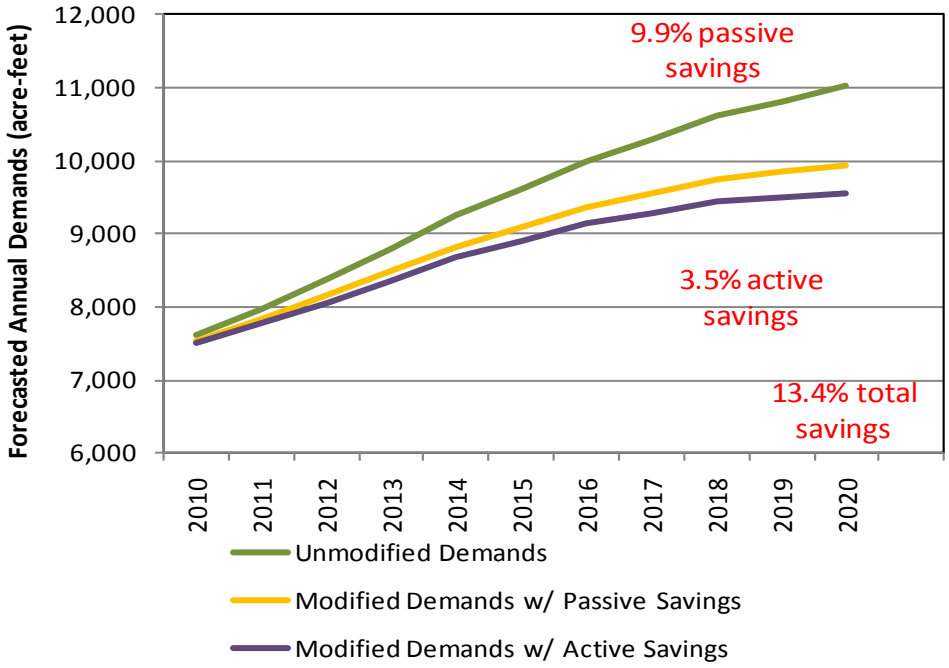

Figure 20 Forecasted Unmodified Demands Showing Active and Passive Savings

As with the estimates of historical passive savings addressed in Section 4.2.2, there are many techniques ranging in levels of sophistication that could be used to project future passive savings. One approach is to take an inventory on the age of existing homes and categorize the homes into groups depending on the age, size, and type of home (e.g. single-family vs. multi-family). Estimates on the rate of fixture replacement for each group could be estimated and then applied to the number of homes per group. The sum of these group estimates would be future residential passive water savings.

Impacts to Future Water Facilities and Supply Acquisitions

As previously mentioned, reducing water demands through water efficiency can result in the avoidance, downsizing, or postponement of water supply and wastewater facility improvements as well as eliminating, reducing, or postponing water purchases. The forecasted modified water demands should be compared with the timing and sizing of planned facility improvements to determine if such changes are possible and appropriate. Worksheet C provides a means to record estimated costs of the facility needs and water right acquisitions, dates of when construction/acquisition is anticipated, and potential changes, assuming success of the water efficiency plan, including potential cost savings.

This information is generally available from existing facility plans, water supply master plans, or other planning documents. Some providers may have sufficient data and planning certainty to benefit from a cost comparison between the costs of supply-side capital/water acquisition modifications to the cost of water efficiency activities. The potential cost savings should be compared to the cost of the water efficiency program to determine overall costs/benefits.

Providers who have a high degree of confidence in their water efficiency water savings/modified water demands should directly incorporate their findings into other water planning efforts, such as a capital improvement plan and water right purchases. Providers with lesser degrees of confidence should include their findings as potential future changes and closely monitor their water efficiency program. An example of this approach is as follows:

> *"If the targeted water savings are achieved within the next seven years, the anticipated 10 mgd water treatment plant expansion planned for 2018 could be reduced by 5 mgd which would provide a cost savings of $20 million in 2011 dollars. This potential reduction will be reassessed in 2016, following five years of monitoring the success of the water efficiency plan."*

4.3.2 Water Efficiency Benefits

Water efficiency benefits address the anticipated results of a successfully implemented plan. Information provided in this section can be important to convey to the public ratepayers on why the provider/municipality is expending resources to plan and implement a water efficiency program.

As discussed in Section 4.3.1, lowering water demands as a result of water efficiency can assist providers in avoiding, downsizing, or postponing the construction and operation of water supply facilities and wastewater facilities as well as eliminate, reduce, or postpone water purchases. In addition to these water supply benefits, there are other societal, political, and environmental benefits. Examples of such benefits include:

- Lowering customer water bills.[21]
- Reduction of wastewater discharges through indoor water savings which can improve water quality and aquatic habitat.
- Reduction of outdoor irrigation runoff which can improve water quality.
- Demonstrating commitment to sustainability.
- Meeting political and regulatory requirements necessary to obtain permitting for local and regional water supply projects.
- Demonstrating leadership to the community that being more efficient is the right thing to do in an arid environment.
- Lowering operational costs such as pumping and water treatment.
- Lowering amount of chemicals needed to treat water.

[21] While this may be a societal benefit where the end-use customer uses less water and consequently has a lower water bill, it is important to note that this can reduce the provider's revenue which if not properly planned for, can inadvertently require the provider to increase water rates in subsequent years to mitigate for revenue shortfalls.

- Providing "insurance" for the uncertainties involving climate change.

- Meeting community expectations for sustainable water use.

Benefits may also be reflected in how the "saved water" is used. Depending on a provider's water supply portfolio and situation, saved water can be used in the following ways:

- *Conserve water for future generations* – Saved water can be a less expensive option than acquiring new supplies for future growth and result in less environmental consequences.

- *Leases to agriculture* – This supports the agriculture sector and can generate additional revenue for the municipality.

- *Drought protection* – Saved water can be stored for later use during a drought. This in turn improves water supply reliability without having to purchase additional water.

- *Instream flows* – Saved water may remain in the stream. This can increase flows in particular reaches of the stream.

Many of these example benefits can be instrumental in developing general campaign messages for educating the public on the importance of water efficiency. Messages can be conveyed in such a manner to "personalize" why a customer should make the effort to conserve water by explaining how the customer, society, and environment at large can be positively impacted.

4.3.3 Water Efficiency Goals

While the water efficiency benefits address "What the needs of the water system are," the water efficiency goals address "How the needs will be taken care of." The water efficiency goals are intended to lay out a set of targeted objectives that if accomplished, will result in the identified benefits.

As discussed earlier in this section, a preliminary set of goals should be developed prior to the Step 4 selection of the water efficiency activities. These preliminary goals provide a means to screen and evaluate the selected activities. The goals may then need to be modified following Step 4 to ensure that they are realistic from an implementation perspective.

The goal development process should be a collaborative effort between water provider staff and possibly incorporate stakeholder input. If applicable, goals in the previous water efficiency plan should be assessed and incorporated into the new goal development process. Goals should be both qualitative and quantitative and be achievable and reasonable within a specified time frame. The success of the goals should be measurable, through either a qualitative or quantitative method, to determine whether the goals are sufficiently being met.

It is recommended that the goals incorporate the following:

- Targeted water savings. This can be expressed as a percentage, absolute amount (AF), or as a gallons per capita per day amount (gpcd).

- Water savings for targeted customer categories.
- Targeted water savings from system water loss control management.
- How the successes of the goals are intended to be measured. (Successes are to be tracked through monitoring which is discussed in Section 4.5.2.

Table 8 includes ideas, examples, and means to measure the success of goals.

Table 8 Water Efficiency Goals

Ideas for Goals	Examples	Measurement of Success
Water saving targets for certain customer category(ies)	▪ Reduce residential per capita water usage by 10 gpcd. ▪ Gain a better understanding of how commercial customers use water in order to reduce water use.	▪ Monitor billing data (water demands).
Water saving targets for largest users	▪ Identify largest residential water users and reduce water usage by 10%. ▪ Coordinate efforts with college campus (largest water user) to improve water efficiency. Achieve 15% water savings.	▪ Monitor billing data (water demands).
Provider's role in water conservation	▪ Be recognized as a local leader in water efficiency by achieving relatively high water savings for the local area. ▪ Develop innovative water efficiency strategies	▪ Achieve CWCB grant funding for several innovative water efficiency activities that have not been done before.
Improve monitoring	▪ Establish a monitoring system that collects a sufficient amount of data to effectively measure the success of water efficiency activities on an annual basis.	▪ Effectively implement monitoring plan
Cost effectiveness	▪ Develop a water efficiency program that meets budget constraints, yet achieves water saving targets.	▪ Demand and accounting data
Public acceptance	▪ Implement water efficiency activities that are compatible with the community.	▪ Public survey on conservation activities
Lower peak day use	▪ Reduce summer daily peak demand water usage by 10%.	▪ Daily water treatment plant production data.
Water use of new development	▪ Lower per capita use for all newly constructed development post 2010.	▪ Billing/demand data for all new construction post 2010
Passive savings	▪ Accelerate passive savings through retrofits of fixtures and appliances	▪ Estimates of passive savings over the next 10 years
Estimates of residential indoor water savings	▪ Reduce residential indoor water use by 20%.	▪ Estimates of indoor water savings
Estimates of residential outdoor water savings	▪ Reduce residential outdoor water use by 20%.	▪ Estimates of outdoor water savings
Relationships	▪ Develop and maintain collaborative relationships that promote efficient water use throughout the region.	▪ List of new and existing relationships that are actively being maintained.

Ideas for Goals	Examples	Measurement of Success
Sustainability	▪ Implement water efficiency activities that are sustainable from an economic, social and environmental perspective.	▪ Accounting data ▪ Public survey ▪ Means in which conserved water is being used to sustain/improve environment
Water rate structure	▪ Maintain a fair and equitable water rate structure that promotes efficient use while maintaining sufficient revenue.	▪ Revenue remains sufficient and per capita demands are reduced. Demand data.
Drought management	▪ Implement water efficiency activities that also provide drought mitigation	▪ Select and implement water efficiency activities that also provide drought mitigation. Monitor effectiveness of these activities.
Non-Revenue water	▪ Reduce non-revenue water by improving metering and leaks.	▪ Water audit of distribution system to measure leakage and actions taken to improve metering.
Water efficiency and future water resources planning	▪ Incorporate water efficiency into water resources planning.	▪ Include projected water savings through water efficiency activities in the upcoming revision to the Raw Water Master Plan.
Public involvement	▪ Educate the public on the value of water. Foster a water efficiency ethic.	▪ Survey conducted before the education campaign and after five years of the campaign to assess differences.