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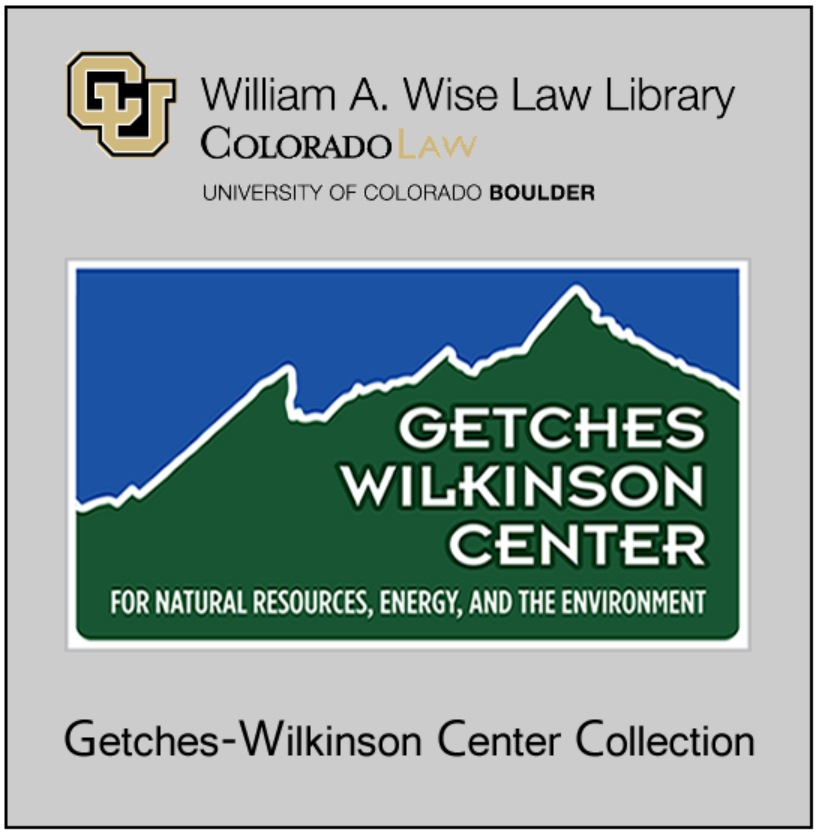
Water Conservation: The New Paradigm

Jeanne McKeever



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Water Conservation: The New Paradigm

Jeanne McKeever
Director
Strategic Planning and Public Involvement

Chair
Conservation Committee, American Water Works Association

Portland Water Bureau
Portland, Oregon

Water Organizations in a Changing West

Natural Resources Law Center
University of Colorado School of Law
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I. INTRODUCTION

A. Summary

Water conservation is gaining a strong foothold throughout North America in the water resource planning arena. With 22% of the nation's largest water systems being short of supplies, there are a variety of conservation programs being implemented by municipal water utilities. At the same time, much work is still being done to document the water savings from a variety of water conservation technologies.

Following in the footsteps of energy planning, conservation is now being treated as a serious resource. Some water utilities are now beginning to use integrated resource planning to address future water needs and to "institutionalize" conservation. The Portland Water Bureau, in conjunction with 26 other water providers in the metropolitan area, are coming together voluntarily to jointly finance and manage Phase II of an integrated resources planning process. Conservation will be a key part of that process, resulting in a balanced approach to meeting the needs of the region to the year 2050.

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II. WHY THE NEED FOR CONSERVATION IN THE MUNICIPAL/INDUSTRIAL SECTOR?

A. Fun Facts

1. The municipal/industrial sector uses 20 percent of the water used in America.

2. As an example of that use, residential customer water use at St. Louis Water Company in 1990 was 290.50 gallons per day per customer. (Buescher, 1992)

3. Today approximately 22% of the nation's largest water systems are short of supplies.

4. A small unnamed water district in the Portland, Oregon metropolitan area has a system leakage rate of over 50%; For older water systems it is nearly impossible to maintain an unaccounted-for water rate of less than 10%. In the Delaware River Basin, unaccounted-for water is about 240 mgd, or about 23 percent of the public water supply send-out. (Featherstone, 1992)

5. Many of us in the water utility business stand on the premise that water conservation is an important component in addressing the water supply issues being faced throughout North America. Today, I'd like to give you a glimpse as to what is being done through conservation, specifically related to conservation's role in water supply planning.

III. DEFINING WATER CONSERVATION

A. Defining Conservation

1. There are probably as many different definitions for water conservation as there are water utilities - and there are approximately 52,000 water utilities in the United States. In Oregon alone, there are 3,000 community water systems providing potable water to 15 or more customers.

2. Denver Water has a good, yet simple definition: "Water conservation is defined as eliminating waste and making beneficial uses more efficient. Conservation does not mean deprivation or preservation. Rather the term encompasses the voluntary choices people make about water to ensure a sustainable future." (Denver Water, 1992)

IV. A PROFILE OF WATER CONSERVATION IN AMERICAN CITIES

A. The Leaders

1. The Western U.S. has made tremendous investments in conservation. Early leaders are Bay area and southern California utilities, and Arizona and Colorado cities.

2. In other parts of the country, the states of Florida, Texas, Connecticut and Washington are also leaders.

3. The Delaware River Basin Commission, regulating water use in four northeastern states, has been an early adopter. Much of the Northeast is served by investor-owned utilities and PUC's in those states are now

requiring water conservation, as they do with energy utilities.

B. Examples Of The Water Savings Potential

1. In New York City, water meters are being installed in 630,000 residential buildings, ranging from single-family dwelling units to large apartment towers. The program, which began in 1989, will take about 10 years to complete, at an estimated cost of $290 million. With the move from flat to metered water rates, the City expects to reduce per capita water usage somewhere between 10 to 30 percent. (Featherstone, 1992) The annual average daily use in New York is 8.2 billion gallons.

2. Water utilities throughout the country are adopting conservation rates such as inclining block rates, seasonal rates and excess-use surcharges. The Delaware River Basin Commission and the South Florida Water Management District are putting regulatory pressure on utilities to adopt conservation as a condition for issuing water allocation permits. They estimate the savings potential to be in the 10 to 20 percent range.

3. The Massachusetts Water Resources Authority (MWRA) in the Boston area has reduced its total water demand from 330 mgd in 1987 to 280 mgd in 1992. A contributor to these savings is MWRA's nonresidential customer program. It includes on-site water audits, seminars and workshops, and guidebooks tailored to specific industrial and commercial sectors. The MWRA is tracking the water use of its 600 largest customers. On the basis of 40 on-site water audits, the Authority has estimated water use savings of between 10 and 25

percent, with payback periods of six months to three years. (Featherstone, 1992)

4. The Phoenix Water Services Department visits its large customers annually, followed-up by detailed reports with conservation recommendations. The Department has estimated the potential water savings to be in excess of 2 billion gallons per year.

5. Savings in the 10-15 percent range for the residential sector are common. Comprehensive studies have concluded that residential retrofit programs, meaning the installation of low-volume showerheads, faucet aerators and toilet retrofit devices, save an average of 16 gallons per capita per day.

6. Because of the manner in which conservation technology has emerged, many utilities, and not the ones I've mentioned here, have simply implemented conservation programs, without incorporating conservation in the planning process.

V. CONSERVATION AS A COMPONENT OF WATER RESOURCE PLANNING

A. Institutionalising Water Conservation

1. U.S. water suppliers are increasingly incorporating conservation into their management strategies as a way to enhance supply capacities and shift consumer demand toward sustainable-use patterns.

2. Incentives to the utility for following this management strategy, aside from conserving water, include reduced investment and operating costs and preservation of environmental assets. Disincentives include revenue shortfalls, more frequent rate adjustments, and difficulty predicting future demand. (Beecher, 1993) Water supply planning horizons are 50-75 years.

3. A key assumption underlying the potential incentive strategies for conservation is that increased water efficiency is an equal substitute for water supply capacity and has equivalent value in the marketplace, in addition to offering environmental benefits.

4. Utilities need to quantify the economic and environmental assets of a conservation program so those elements may be justly incorporated into the financial considerations of alternative supply and demand-side planning options.

5. "The emergence of a conservation paradigm in the water sector is partially responsible for our reexamination of traditional water utility planning. This paradigm recognizes water as a finite and often constrained resource." (Beecher, 1993).

VI. INTEGRATING CONSERVATION INTO PLANNING

A. Challenges

1. A critical challenge is how best to integrate conservation into the planning process so that permanent changes in water-use patterns replace temporary response to droughts and other emergencies.

2. There are some very exciting new avenues being used to bring water conservation "to the table" as an equitable partner in water supply planning to meet future long term needs. In Portland this is being done through Integrated Resources Planning (IRP).

B. Defining Integrated Water Resource Planning

1. If any of you are unfamiliar with the term, Dr. Jan Beecher at the National Regulatory Research Institute has done a lot of work in this area and she defines it as "a comprehensive form of planning that encompasses least-cost analysis of demand-side and supply-side management options as well as an open and participatory decision making process, the construction of alternative planning scenarios, and recognition of the multiple institutions concerned with water resources and the competing policy goals among them." (Beecher, 1993)

2. We view this as different from least-cost planning which Dr. Beecher defines as "emphasizing a balanced consideration of supply-side management and demand-side management options in identifying effective and feasible least-cost alternatives for meeting future water needs." (Beecher, 1993)

C. The Rationale for IRP In Water Supply Planning

1. We may learn that applying IRP to water planning may be easier than when applied to energy planning. The technology related to water delivery systems is much simpler and there are no competitive markets.

2. Comprehensive and strict federal water quality regulations through the Safe Drinking Water Act and the Clean Water Act, and the very high cost of their implementation are upon us. The AWWA estimates the cost to ratepayers to implement the first three of the 85 federal water quality standards soon to be regulated will be $2.7 million annually.

3. Many communities are facing tremendous population growth and must plan to meet that growth in a long-term, cost-effective manner.

4. Our public values continue to support environmental protection and our customers, on whose behalf we are managing the resource, want it used in a conservative manner.

C. Constraints

1. Water conservation as a technology is fairly new. Research necessary to document water savings for several technologies is not yet complete. Consequently conservation is not yet treated as an equitable player in the water resource planning field.

2. The externalities, particularly those related to adverse environmental impacts, have yet to be adequately documented.

3. It is extremely difficult to engage a broad spectrum of the public in the 1990's when they are on "overload" with public policy issues. We must be very creative.

4. Interest groups have competing goals - some are anti-growth, some are anti-logging, while others are concerned about river quality and species habitats. Yet others are pro-housing development, and pro-economic development and would prefer a dam be built rather than install low volume plumbing fixtures. Balancing these conflicting interests in a meaningful way is very difficult.

5. The multiple institutions which are key stakekholders can be mind-boggling. For example, in the Portland metropolitan area, with a population of 1.5 million, there are 65 water providers alone. Then we must involve the metropolitan and state land-use agencies, the boundary commission, state and federal water resource and water quality regulatory agencies, etc.

6. Even though there are many challenges and constraints to IRP in the water planning arena, there are several water utilities who want to start IRP. My utility is in this process.

VII. INTEGRATED RESOURCE PLANNING IN PORTLAND

A. The Context

1. The Portland Water Bureau initiated the planning process by funding Phase I, which included a Demand Analysis for the Metropolitan area, a Supply Study which looked at 29 potential sources of new supply, and

a menu-based conservation study for the City of Portland.

2. The mid-range forecast estimates a need for 47 percent more water in the mid range and 89 percent in the high range by the year 2050. (Portland Water Bureau, 1992) The 29 sources of new supply were reduced to six recommended for further study. The initial conservation study recommended several options for reducing the demand.

3. Now joined by 26 other local water and wastewater providers in the region, we are all voluntarily funding and jointly managing Phase II of our IRP process.

4. Phase II is a $2.2 million effort which officially started last month, with the work being done by a team of five consulting firms, led by Barakat & Chamberlin.

5. Key elements of the Phase II Plan, besides the conservation component are:
   a. Public information and involvement, analysis of public values
   b. Regional system efficiency and transmission analysis and development
   c. Source option analysis
   d. Institutional arrangements
   e. Resource plan integration, including scenario development

B. The Conservation Element of Portland's IRP

1. The Conservation Element of the integrated regional water supply plan will identify demand-side resources capable of satisfying increments of future demand at

the lowest financial cost that is consistent with planning criteria.

2. Demand-side management (DSM) technologies and management practices will include a range of:
   a. Conservation technologies (for the residential, commercial, industrial and irrigation sectors)
   b. Process water recycling and reclamation (industrial)
   c. Efficiency audits and management practice modifications (indoor and outdoor)
   d. Conservation rates and billing procedures, e.g. Water-efficient landscaping
   f. Large area irrigation system improvements
   g. Financial incentives for installation of technologies
   h. Education and information activities

3. Supply-side conservation technologies and management practices will include:
   a. audits of unaccounted-for-water
   b. Leak detection and repair
   c. Operations improvements
   d. Wastewater recycling and reuse
   e. Stormwater runoff reuse

4. "Each technology/management practice is paired with a delivery mechanism for implementation within a particular target customer base. DSM measures generally reduce average, peak season, and peak day water consumption or losses without reducing the level of service to the end-user." (Barakat & Chamberlin, Feb. 1993)

5. "Education and informational activities promote a

conservation ethic by increasing public awareness of the importance of water and water quality, the relationship of water resources to the environment, and the need for efficiency in water use. Education activities are an integral component of demand management and complement other DSM measures." (Barakat & Chamberlin, Feb. 1993)

6. We distinguish those educational and informational activities that are directly associated with other DSM measures (i.e. would not occur without that measure) as marketing. Marketing costs are included in the cost-effectiveness analysis of each measure or the resource option in which it is packaged.

7. The demand-side resources planning effort identifies appropriate DSM technologies and management practices through systematic evaluation of all available candidates against qualitative, economic, and market acceptance criteria.

8. The process takes DSM practices that survive this screening process and pairs them with appropriate delivery mechanisms. These DSM measures are packaged into appropriate resource options for comparison with supply-side resource options in the integration element of the IRP process.

9. The demand-side resources planning effort continues throughout the integration step to provide for necessary rescreening, resizing, and rebundling of DSM components as an optimum mix of supply-and demand-side resources takes shape.

VIII. CONCLUSION

The question then becomes "So what does this all mean?" Is this all just a bunch of words by pointy headed planners speaking gobbly-gook? Will water actually ever be saved?

I think the water savings comes in increments. We see water conservation as a big puzzle that takes a long time to put together. In my experience there are generally two ways to put a puzzle together. First there's a start - the four corner pieces, and you build from there, generally by grouping the like colors. Another way is simply to find two pieces that fit together and then try to find other like colors and pieces that fit together and build from the inside out. Along the way you'll find the corner pieces.

It is this last scenario that I see being played out nationally in water conservation. The four corners - which I would characterize as a framework federal policy - haven't been found yet. We'll see if the Clinton Administration can find them; in my view Senator Hatfield, through his call for a western water policy is the warmest.

What we do see is individual pieces coming together. This is experienced by municipal water utilities implementing programs through joint efforts with other water or energy utilities, and then sharing the research or evaluation results.

Now the municipal and industrial (M&I) sector is coming together - the analogy being the like colors grouping. As an example, the water providers for the M&I sector joined together nationally to work with environmental groups to push for the passage of the federal water efficient plumbing standards. Portland is working with other utilities on a regional and national basis to advocate for integrated resource planning as a

way to institutionalize conservation.

To carry this analogy a bit further, the bottom line is this:

> People can see the big picture; we know that conservation must be an integral part of planning and water supply management.
>
> The task before us is to put the pieces together, and there is more than one approach. We can learn from each other and we can duplicate strategies and programs -- but essentially we need to put the pieces together into the comprehensive whole that fits our understanding and vision of stewardship, accountability and responsibility for the future of our water sources.