

# Local Resource Management in Southern California

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## Abstract

With a population of nearly 18 million, the Southern California region has demands in excess of 3.8 million acre-feet per year (AFY) of water. Between forty to fifty percent of the water used is developed locally. Metropolitan Water District of Southern California is the regional wholesaler with 26 member public agencies. Metropolitan supplements the remaining fifty to sixty percent of regional water demands with supplies imported from the Colorado River via Metropolitan's Colorado River Aqueduct and the Sacramento- San Joaquin River Delta through the State Water Project.

Earlier this year, Metropolitan's board of directors adopted the Integrated Resources Plan Update, which is a regional blueprint for water supply reliability through 2025. This long-term, regional plan ensures a diverse and adaptable water supply, recognizing environmental, political and institutional constraints while emphasizing reliability affordability and quality. The IRP makes one thing very clear: that water conservation and the reduction of per capita water use are critical components in meeting our region's needs for the next two decades.

To help meet future demands and reduce dependency on imported water, Metropolitan has designed several water management programs to support additional local resource development. Metropolitan's programs provide financial incentives to help local agencies develop cost-effective projects and defray the typically higher cost per acre-foot of producing water through recycling or groundwater recovery projects.

Since these incentives are based on project performance (actual water produced and delivered), the programs have proven to be a win-win scenario. Local agencies benefit directly with the new supply, while Metropolitan's region benefits by reducing the demand for imported water. Metropolitan has changed the nature of the process into a competitive approach, which has proven beneficial by encouraging the development of more efficient and less costly projects. This paper briefly describes some of Metropolitan' incentive programs and the philosophy behind regional supply development and coordination.

## 1. Introduction

Metropolitan is a consortium of 26 cities and water districts that provide drinking water to nearly 18 million people in parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura counties. Metropolitan currently delivers an average of 1.7 billion gallons of water per

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day to a 5,200-square-mile service area Metropolitan's mission is to provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

During the late 1980s and early 90s, Southern California experienced a significant drought as well as regulatory cutbacks in deliveries from the State Water Project. This scenario increased competition for existing water supplies needed to meet the region's growing demands. Metropolitan and its member agencies responded to this challenge by launching an Integrated Resource Planning Process (Resource Plan or IRP, see notation used below and in figure 1) that resulted in a comprehensive water resources management strategy that balanced local water supply development with imported supplies.

The Resource Plan was a collaborative effort drawing input from many groups including Metropolitan's board of directors, a workgroup (comprised of Metropolitan staff, member agency and sub-agency managers, as well as groundwater basin managers), and representatives from the environmental, agricultural, business and civic communities. It was important that the Resource Plan be a collaborative process because its viability was contingent on the success of local projects and local plans in achieving their individual target goals for resource management and development.

By diversifying the region's water supply mix, the Resource Plan sought to ensure a reliable and affordable regional water supply for the next 25 years. The Resource Plan addressed the threat of periodic shortages, and outlined the essential building blocks and investments required to guarantee Metropolitan's service area a strong economy and a healthy quality of life. Metropolitan's Board of Directors formally adopted this Resource Plan in January 1996 with the understanding that it would be updated periodically.

When Metropolitan's board initiated the Resource Plan, they stipulated that six policy objectives be met: reliability, affordability, water quality, diversity, flexibility, and sensitivity to environmental and institutional constraints. Feasible resource options were identified, examined, and combined into various strategies or "mixes" which were measured against the Resource Plan objectives. The result of this collaborative evaluation was the selection of the Preferred Resource Mix that represents a sensible balance between local and imported supplies.

## Recycled Water and Recovered Groundwater Production in Metropolitan's Service Area

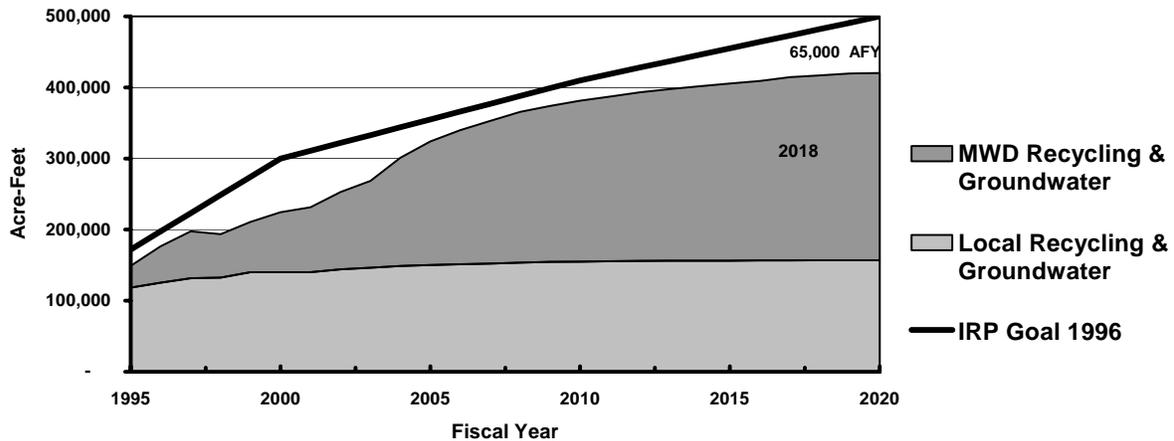


Figure 1

Regional targets were established by the Preferred Resource Mix for the development of Conservation, Local Supplies, State Water Project (SWP), Colorado River, Regional Storage and Central Valley Transfers. The Preferred Resource Mix reflected a comprehensive strategy on

how the region should achieve affordable water supply reliability, which included ensuring that full-service retail demands would be satisfied under all foreseeable hydrologic conditions through 2020.

The Resource Plan set initial resource development targets for the region to achieve reliability through 2020 as shown in Figure 1. The production objective for water recycling and groundwater recovery for 2020 is 500,000 AFY of which approximately 270,000 AFY is presently being produced. Originally, the Resource Plan did not include targets for seawater desalination. However, in August 2001, Metropolitan approved the Seawater Desalination Program (SDP) with an initial target of 50,000 AFY to expand its future portfolio of resources and address current efforts by its member agencies. In response to changing conditions, Metropolitan regularly assesses the need to modifying the resource targets. In 2003, Metropolitan identified a shortfall of 65,000 AFY by 2018. As a result, a request for proposals was issued in 2003 for that amount of locally developed water under the competitive Local Resources Program (LRP). In March 2004, 13 projects were selected that must have complete required environmental documentation and an agreement executed with Metropolitan by December 2005.

Resource Plan studies show reduced long-term costs to the region when local resources are developed due to reducing or down-sizing Metropolitan's capital improvements and a reduction in operating costs for imported supplies.

An update of the Resource Plan (Resources Plan Update) was approved by Metropolitan's board in July 2004. The Update reconfirmed the 1996 resource targets and identified two new areas of concern: (1) increasingly stringent water quality regulations, and (2) resource implementation risk surrounding the development of planned projects.

The Resources Plan Update recommends a supply buffer of up to 10 percent of regional demands to manage the two concerns and other uncertainties. The planning buffer calls for Metropolitan to develop 500,000 AFY of supplies in addition to the resource targets by 2025. The supply buffer is consistent with Metropolitan's practice of developing supplies that are available at least 10 years in advance of need. As such, the buffer serves as a contingency measure to help ensure regional reliability and to mitigate against implementation risk. Partial or full implementation of the buffer supply is dependent on the progress in developing planned projects and ongoing decisions by Metropolitan's board.

Future actions by the board will determine which existing or new programs will be expanded or created to meet new targets. The new buffer recommended by the Resource Plan Update would allow the expansion of the original seawater desalination target to 150,000 AFY, which would address the growing interest and planning objectives of Metropolitan's member agencies. Metropolitan's history in regional planning and the experience gained through sponsoring development of local projects through financial incentive programs based on performance led the way to the adoption and development of the SDP mentioned earlier.

The use of performance-based incentives to help develop local resources was part of Metropolitan's original concept because it is a clear way to demonstrate a reduction in dependency from imported supplies. Originally, one of the objectives was to provide the agency with the avoided cost of imported water as an incentive. However, with the experience gained with the original programs, Metropolitan has changed the nature of the process into a competitive approach. This competitive approach has proven beneficial to the region because local agencies now emphasize the development of more efficient projects.

A summary of Metropolitan's incentive programs is presented below.

## **2. Water Management Programs**

Metropolitan's water management programs currently include 53 water recycling projects and 22 groundwater recovery projects with an ultimate yield of about 315,000 AFY per year. There are 56 projects in operation with the remainder in various stages of planning, design or construction. Through December 2003, Metropolitan has contributed nearly \$151 million in financial assistance to projects that collectively produce 110,000 AFY of local water supply.

### **Local Projects Program**

In the late 70s and early 80s, Metropolitan participated in the Orange and Los Angeles County Reuse Study. The study investigated water reuse feasibility with respect to health effects, marketing and financing and found that the major constraint to implementing water recycling

projects was cost and that a significant number of projects were technically and economically feasible when compared to developing new sources of supply.

Metropolitan determined that providing financial assistance toward the implementation of water recycling projects would be a regional benefit to its service area as recycled water could augment local water supplies and increase reliability. In that light, Metropolitan's board initiated the Local Projects Program (LPP) in 1981. Under the program, Metropolitan paid the project capital cost in return for a major portion of the project yield, with water from the project sold back to the project sponsor at rates established by Metropolitan's board. The project sponsor was responsible for design, operations and maintenance. Shortly thereafter, the program was revised to provide a set rate of \$154 per acre-foot for up to 25 years to qualifying projects based on the amount of recycled water delivered by the project in a given year.

### **Groundwater Recovery Program**

Metropolitan's Groundwater Recovery Program (GRP) was established in 1991 to improve regional long-term water supply reliability through the recovery of otherwise unusable groundwater that was degraded by minerals and other contaminants.

The GRP provides a variable rate contribution up to \$250 per acre-foot for 20 years, which is based on actual incurred construction, operation and replacement costs and water production values reported after the end of the fiscal year.

### **Competitive Approach**

In 1995, the LPP and GRP were restructured and administratively combined to provide uniform project implementation, guidelines and funding under the Local Resources Program (LRP). The LRP encourages local development of recycled water and groundwater recovery projects through a process that emphasizes cost-efficiency to Metropolitan, timing new production according to regional need, and minimizing administrative cost and complexity.

The competitive LRP provides a contribution of up to \$250 per acre-foot for 25 years, which is based on request by the proponent agency and the proposals selected. Proposals are selected by a review panel of two water resource consultants and three Metropolitan staff. Selection is based on evaluation of the proposals, which considers the eight selection criteria previously adopted by Metropolitan's board. The selection criteria include:

<u>Criteria</u>	<u>Weight (%)</u>
1. Readiness to Proceed	15
2. Diversity of Supply	10
3. Regional Water Supply Benefits	20
4. Water Quality Benefits	5
5. MWD Facility Benefits*	10
6. Operational Reliability and Probability of Success	5
7. Increased Beneficial Uses	5
8. Cost to Metropolitan	<u>30</u>
Maximum Score:	100

### **Competitive Approach Benefits**

Under the 1998 LRP request for proposals (RFP) targeting 50,000 AFY per year of local water, a total of 28 proposals with an ultimate yield of about 140,000 AFY per year were received, of which 14 projects were selected for participation based on the selection criteria establish for this competitive approach. Under the LRP second RFP targeting 65,000 AFY in 2003, 27 proposals with an ultimate yield of 113,000 AFY were received, of which 13 projects were selected. LRP funding through the competitive process will average less than \$115 per acre-foot for both RFPs, which compares favorably to the maximum price of \$250 per acre-foot paid under the old incentive programs.

Based on the success of the LRP, the competitive approach has also been used for several other Metropolitan programs including Dry-Year Transfer, Innovative Supply, Innovative Conservation, Conjunctive Use and Storage, City Makeover, Community Partnering, and Seawater Desalination.

## **3. Water Conservation**

### **Innovative Conservation Program**

The Innovative Conservation Program (ICP) started as a pilot program in 2001 and is a competitive grant program. It was adopted as a pilot program in 2001 and adopted as a biennial program in 2002. The program aims to foster fresh and innovative approaches to water conservation by offering financial support to organizations around Southern California for pilot water-saving programs. Recipients such as cities, public agencies, non-profits, entrepreneurs and universities, can use the funds to explore the water savings potential and practicality of new water conserving technologies, or to enhance existing data and/or create new data on innovative conservation technologies.

Size and scope of projects are not limited; public, private and non-profit organizations are welcome to apply. Total program funding of \$250,000 is the only limiting factor. A review

panel evaluates proposals. In 2001, the first ICP had 35 proposals requesting more than \$3 million in funding. The 2003 ICP received more than 60 applicants totaling \$8.5 million in funding requests.

## **Innovative Supply Program**

The Innovative Supply Program (ISP) will provide up to \$250,000 in grants on a competitive basis to stimulate and advance innovative ideas that have potential to produce new sources of water supply for Southern California. In April 2003, Metropolitan issued the first competitive Request for Proposals (RFP) eliciting seventeen candidate projects requesting \$1.2 million in funding. Proposals were received from individuals, private entities, project partnerships/joint ventures, institutions, member agencies and subagencies. Ten projects were selected for grant funding. The ISP excludes projects that are currently participating, under consideration for participation, or eligible for participation in Metropolitan's traditional water supply programs (e.g. Local Resources, Seawater Desalination, and Innovative Conservation Programs).

## **Outreach**

To help meet the conservation goals set forth in the Resources Plan, Metropolitan's board approved a multi-faceted, long-term awareness campaign to reduce outdoor water use and promote the use of native and California Friendly landscapes. The campaign includes many different elements and has been folded into both new and existing outreach and partnership programs. Integrated components include:

- Multi-million advertising campaign
- Grassroots community involvement and new partnerships with retailers, public agencies
- Public relations/publicity
- Educational materials

All of these programs encourage water conservation at multiple levels.

## **Outdoor Conservation Program**

In the past decade, great strides have been made in water conservation among residential and commercial users with the installation of more than two million ultra-low-flush toilets and other water saving devices that save billions of gallons each year. The next frontier for significant water savings has been identified as the outdoors. Research shows that up to 70 percent of the average family's household water use is applied outside the home, and that up to half of that may be wasted due to inefficient irrigation systems, use of thirsty, exotic plants and lack of knowledge of how much water plants need.

The Outdoor Conservation Program has three key messages:

1. Conservation must be a way of life for Southern Californians, but this does not have to mean sacrifice
2. Cutting back on outdoor watering is one sure way to ensure a reliable water supply for years to come
3. Native and California Friendly plants are beautiful, colorful and use 2/3 less water

There are nearly a dozen different components of the outdoor conservation program. At its centerpiece is the creation of the Bewaterwise.com Web site which includes educational tools and resources such as a sprinkler calculator/index, heritage gardening guide with a database of 1,000 native and California Friendly plants, searchable by a variety of fields including color, size sun/shade preferences, general water conservation tips, fire-resistant native plants list and a retailer list, among other items.

One of the most exciting components of the program is development of partnership opportunities with new home developers. Metropolitan's board approved financial incentive programs that offer rewards to homebuilders who develop "California Friendly" model and new homes, which incorporate a variety of water-efficient elements such as landscape and new technology.

## **Community Partnering Program**

Created in 1999, the Community Partnering Program is a multi-faceted program that encompasses sponsorships, memberships and selected activities for community-based, nonprofit organizations, professional associations and public agencies. With a yearly budget of about \$500,000 for this program, Metropolitan, in cooperation with its 26 member agencies, accepts applications from nonprofit organizations that promote discussion and interaction in regional water quality, conservation and reliability issues. Projects vary from water education projects to fairs, or community activities that promote water conservation and grants range \$500 to \$10,000.

Metropolitan provides support for:

- after-school water education programs
- water resources business forums
- community water festivals
- environmental museum exhibits
- native and drought-tolerant plant garden education programs
- watershed outreach programs
- public policy water conferences
- projects that directly support water conservation or water quality programs

## **City Makeover Program**

The City Makeover Program was established in 2003 by Metropolitan to provide funding for new native and California Friendly themed landscapes in prominent public locations. The first-year awards were granted in 2003 and applications are being accepted for year two beginning November 2004.

Successful City Makeover projects combine excellent site conditions, appropriate plant palette, a sustainable landscape design and irrigation to create inspirational landscapes that not only increase public awareness but provide educational opportunities. Proposals are evaluated using a point system based on the degree that the design and program plan achieve these goals.

## **4. Seawater Desalination**

### **Seawater Desalination Technology**

Several technologies are currently used for seawater desalination including multistage flash distillation, which produces the largest percentage of desalted water volume worldwide, reverse osmosis (RO) and electro-dialysis (ED). RO is the leading process in number of plants in operation with 63 percent; ED follows with 12 percent, and MSF with 10.

Today's membranes are a great improvement over their predecessors in terms of increased productivity and efficiency, and lower overall capital and operations and maintenance costs. Other technological changes have significantly reduced desalination energy needs. These improvements are reflected in reduced unit costs for seawater desalination. RO membrane technology is being proposed for most of the planned seawater desalination projects in California.

For many years, Metropolitan has encouraged development of alternative water supplies, including groundwater recovery, conjunctive use, and wastewater reclamation. Metropolitan's broad water management program includes incentives for these innovative sources of delivered water. One of the first incentive programs assisted member agencies in implementing water recycling and reuse projects to help stretch local water supplies and reduce dependence on imported supplies. This model was done to encourage member agencies in developing seawater desalination projects to provide an alternate drinking water supply. In both programs, the financial incentive for delivered water is up to \$250 per acre-foot.

Metropolitan developed a two-step process to solicit participation under the seawater desalination program. Project sponsors were required to submit statements of interest as a prerequisite of participation. Specific respondents that were deemed responsive to the RFP were invited to submit detailed proposals targeting 50,000 AFY per year of sustained seawater desalination production.

A five-member review committee objectively evaluated detailed proposals based on evaluation criteria outlined in the request for proposal. The review committee was asked to select a project or mix of projects that best meets the region's needs and provides Metropolitan with the best return on investment. The review committee had the discretion to recommend a project mix that more or less met the targeted production, and used scoring criteria outlined below to guide its ranking of detailed project proposals. In addition, based on its knowledge of regional water supply practices, the review committee identified and weighed each proposal's significant strengths, weaknesses and miscellaneous issues. Recommendations reflected the collective findings of the committee.

<u>Criteria</u>	<u>Weight (%)</u>
Regional Water Supply Benefits	15
Regional MWD Facility Benefits	15
Water Quality Impacts	10
Operational Reliability	10
Proponent Capability, Project Feasibility and Schedule	10
Risk Mitigation	10
Cost to Metropolitan	<u>30</u>
Maximum Score:	100

Each project selected must complete California Environmental Quality Act requirements and agree on draft contract terms for participation in Metropolitan’s incentive program before seeking approval by Metropolitan’s board. Contracts will include performance provisions similar to the other local project programs. These provisions would that agencies are committed to successfully complete and implement projects.

### **Summary of Desalination Progress**

Seawater desalination has emerged as a viable option to be included as part of the State’s future water resources portfolio. Projects must be evaluated on a case-by-case basis, depending on cost benefits compared to other alternatives.

Development of seawater desalination in California can be accomplished through proper planning and development that emphasize diversity of resources to reduce risk, and add value in the form of water supply reliability in return for smart investments.

The competitive approach has worked well for seawater desalination and other local programs. The competitive approach is an innovative way of funding local projects that help reduce dependency on imported water supplies and helps achieve regional water supply reliability.

The advantage of incentives programs based on performance is that it places the responsibility of producing the resource on the local agency. It is in the best interest of the local agency to develop its own resources, which would produce additional benefits in case of emergencies due to earthquake or drought. The programs include a performance criteria that agencies need to comply with to receive the financial incentives. Continuous monitoring of production, demand and performance is required from Metropolitan to ensure targets are being met. Metropolitan can correct projected production by issuing new request for proposal for local resources if there is a lag in the project’s performance.