

APPENDIX C

Water Agency Profile: City of Ontario

Recycled Water Summary

		2005	2010	2015	2020	2025	Source
1	Total Water Demand	45,881	61,334	66,583	76,585	84,316	2005 UWMP, Table 2-13
2	Targeted Conservation	840	2,635	3,994	4,900	6,149	2005 UWMP, Table 2-13
3	Net Water Demand	45,041	58,699	62,589	71,685	78,167	Line 1 – Line 2
4	Treatment Plant Capacity	-	-	-	-	-	Provided by IEUA
5	Tertiary Flows	-	-	-	-	-	Provided by IEUA
6	Connected R.W. Demand	-	-	-	-	-	Provided by IEUA
7	Direct Uses of Recycled Water	1,829	7,926	8,816	11,761	12,435	2005 UWMP, Table 2-6
8	GWater Replenishment from Recycled Water	-	-	-	-	-	Provided by IEUA
9	Santa Ana Environmental Water	-	-	-	-	-	Provided by IEUA
10	Excess R.W. Discharged	-	-	-	-	-	Provided by IEUA
Note: All above numbers are in acre-feet per year, unless otherwise noted.							

In the City of Ontario (Ontario), agricultural lands are rapidly undergoing conversion to urban and suburban developments. By 2030, Ontario anticipates serving a population 80% larger than its population today. Most of this growth will occur in the New Model Colony (NMC), which will transform over the next 25 years from agricultural and dairy land uses to a primarily urban residential community with some commercial and industrial developments. As a consequence, Ontario’s demand for both potable and recycled water is expected to significantly increase.

Ontario relies on four main sources of water to meet its current demand: potable groundwater pumped from its groundwater wells in the Central region of the Chino Basin, imported water from the State Water Project (SWP), potable water from the Chino Desalter Authority (CDA), and recycled water from the Inland Empire Utilities Agency (IEUA). Ontario’s main source of water is groundwater from its Chino Basin wells. SWP water is purchased via IEUA but treated by the Water Facilities Authority (WFA) before delivery to Ontario. Ontario emphasizes the importance of local supplies, which typically are cheaper and more dependable than imported supplies. In the future, Ontario anticipates continuing to rely on its groundwater supplies and recycled water from IEUA.

The energy intensity of Ontario’s supplies ranges from 3,240 kWh/acre-foot (for imported water from the SWP) to 333 kWh/acre-foot (the amount of distribution energy needed to deliver recycled water from the IEUA). The average energy intensity of groundwater falls in the middle, at 876 kWh/acre-foot. In Ontario, all wastewater must be treated to tertiary standards; therefore, the only additional energy needed to use recycled water is the energy to distribute it.

Most of the increased future demand for recycled water will be in the NMC. In both the NMC and the Old Model Colony (OMC), additional infrastructure such as distribution pipes, storage facilities, and customer connections will be necessary to meet future potential demand for

recycled water. Some of these structures (including main distribution lines and storage facilities but *excluding* local laterals) will be constructed by IEUA; others will be constructed by Ontario, developers, or individual customers. The cost of this infrastructure varies significantly, depending on a number of factors including distance between the wastewater treatment plants and customers, projected water demand to be served and pipeline capacity, adequacy of existing rights-of-way, and types of systems and facilities that will need to be disrupted during construction.

General Description

Ontario is located in the heart of IEUA's service area. As of 2004, approximately 168,000 people lived in Ontario. Most of Ontario's population resides in the OMC, the northern portion of Ontario. The NMC was annexed to Ontario in 1999. Until recently, the NMC was primarily agricultural. Now, however, it is being converted to residential at an aggressive pace. Ontario anticipates a 3% *annual* growth rate until 2030, when Ontario is expected to reach full build out. At build out, Ontario's total population is expected to exceed 305,000, an 80% increase over its current population.

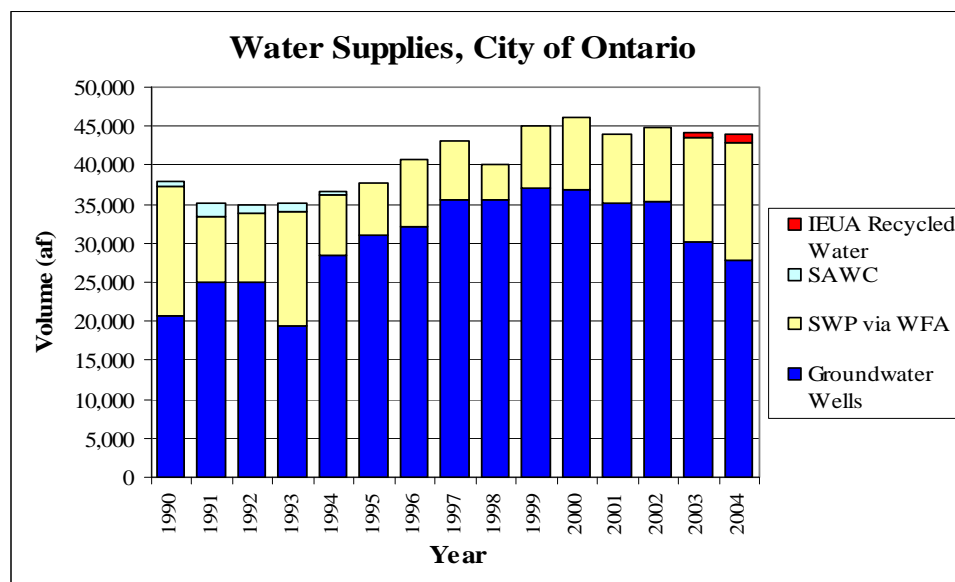
Water Supply

Ontario has four primary sources of water: local groundwater, imported water from the SWP via IEUA, potable water from the CDA, and tertiary-treated recycled water from IEUA. Over the last ten years, local groundwater supplied between 63 and 89 percent of Ontario's total water demand. The Chino Basin Aquifer, the source of Ontario's groundwater, contains approximately 5 million acre-feet of water in storage and has an unused capacity of 1 million acre-feet of additional storage.

Generally, water quality is best in the northern and central portion of the basin, where the groundwater aquifer is recharged. Water in many areas of the southern portion of the basin exceeds drinking water quality standards for total dissolved solids (TDS) and nitrates. Degradation of water quality in the southern portion of the basin is generally attributed to percolation of pollutants generated during the many years of agricultural and dairy activities in this area. At the southern end of the basin, the CDA operates a wellfield and the the CDA I Desalter, which extracts and treats contaminated water to potable standards for delivery to CDA member agencies.

In its 2005 Urban Water Management Plan (UWMP), Ontario anticipated receiving approximately 5,000 acre-feet of potable water from the CDA, starting in 2006. At that time, Ontario also purchased water from the San Antonio Water Company (SAWC). High nitrate concentrations in SAWC wells caused Ontario to discontinue use of the wells. Ontario transferred its water supply entitlement to City wells and is reimbursed for pumping costs by SAWC.

**Figure C-1
Water Supplies for the City Of Ontario, 1990 – 2004**



Note: Chino Desalter Authority deliveries did not begin until 2006.¹

In the future, Ontario anticipates continued reliance on local sources of water, including groundwater, water from the CDA, and recycled water. In addition, Ontario is in the process of constructing an ion exchange facility.²

Recycled Water

All of Ontario’s supplies of recycled water are provided by the IEUA, the regional wastewater treatment provider and purveyor of wholesale recycled water. IEUA provides the treatment facilities, major distribution pipelines, and storage facilities, where needed. Prior to 2005, IEUA also delivered recycled water directly to water users in Ontario. Currently, however, Ontario purchases recycled water from IEUA on a wholesale basis and resells it at retail to Ontario’s water customers. Under this arrangement, Ontario has responsibility for providing local laterals and customer connections to IEUA’s recycled water pipeline.

Water Demand

Since 1998, water demand in Ontario has remained relatively constant at approximately 45,000 acre-feet per year. Almost half of this water is used in single-family residences. Multi-family residences, commercial uses, and irrigation represent smaller, but substantial, water demands.

¹ Data from Ontario’s 2005 UWMP, Section 4, Page 4-3 and personal communication, Ray Hahn, Ontario Utilities Department (November 2006).

http://www.ci.ontario.ca.us/index_textonly.cfm/22/30776

² Ion exchange is a process commonly used to improve the quality of source water.

Over the next 25 years, water demand is projected to grow proportionate with population growth. The most notable increases in demand are in NMC single-family residences. Ontario anticipates a total potable water demand of over 70,000 acre-feet annually by 2030, with over half of this water used by single-family residences (see Figure C-2). System water losses and demand for recycled and irrigation water are expected to increase total water requirements to 86,000 acre-feet (Table C-1).

Figure C-2
Projected Potable Water Demand for the City of Ontario³

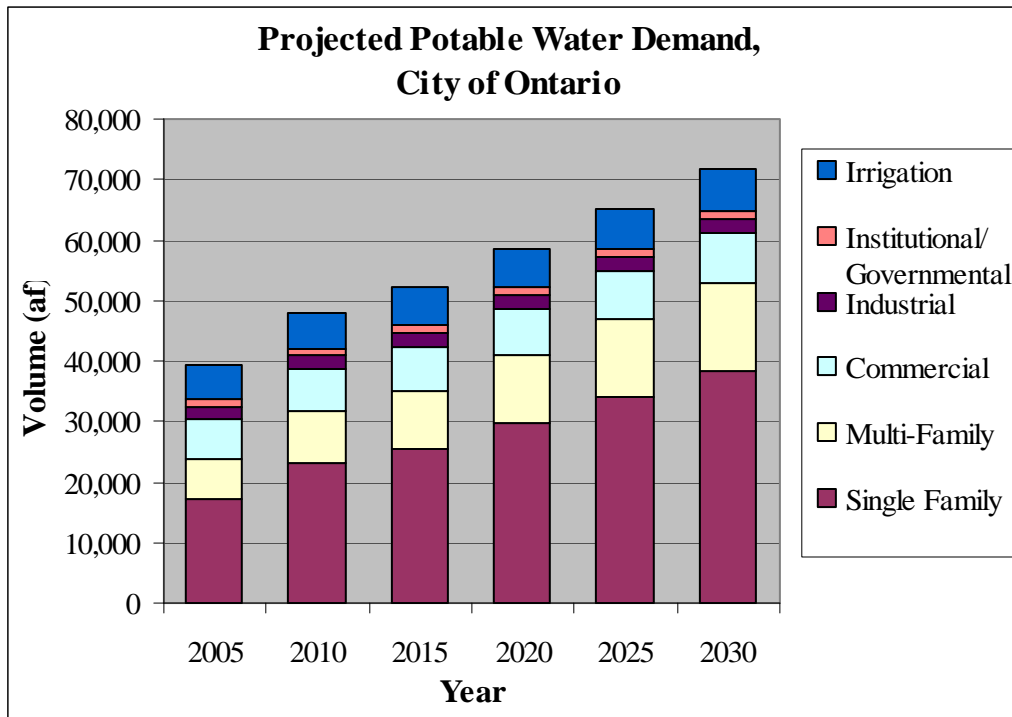


Table C-1
Total Projected Demand for the City of Ontario⁴

Water Use	2010 (AFY)	2015 (AFY)	2020 (AFY)	2025 (AFY)	2030 (AFY)
Potable Water (Consumption)	48,091	52,127	58,661	65,195	71,730
Recycled Water	7,926	8,816	11,761	12,435	14,492
Sunkist (irrigation water)	1,470	1,470	1,470	1,470	1,470
Water Loss	3,847	4,170	4,693	5,216	5,738
Total w/o Conservation	61,334	66,583	76,585	84,316	93,430
Water Conservation	-2,635	-3,994	-4,900	-6,149	-7,747
Total with Conservation	58,699	62,589	71,685	78,167	85,683

³ City of Ontario, 2005 UWMP, Section 2, Table 2-4.

⁴ City of Ontario, UWMP Section 7, Table 7-1.

Recycled Water

In 2006-2007,⁵ approximately 2,442 acre-feet of recycled water was used in Ontario. This volume excludes recycled water delivered to the Ely spreading basins, a groundwater recharge area located within City boundaries that is served directly by IEUA.⁶ Recycled water was delivered to 40 locations in 2006-2007, including street medians, a golf course, farms, and numerous businesses. The number of recycled water customers and volume delivered is projected to increase in 2007-2008 to serve 65 new customers and deliver an additional 4,194 acre-feet per year.⁷

Recycled water demand is expected to increase at a significantly faster rate than total demand, growing 700% by 2030. This projected increase is attributable to several primary factors:

- A City ordinance requiring use of recycled water for outdoor irrigation and other non-potable purposes.
- An IEUA policy and agreement with its contracting agencies to maximize beneficial use of recycled water (see discussion under the Policies section of this chapter).
- The aggressive pace of residential development in the NMC.⁸
- IEUA's 2007 Business Plan, which accelerates development of recycled water (see Appendix B).

In 2005, Ontario completed a recycled water feasibility study. This study assessed the potential demand for recycled water and other factors to determine *projected* demand. Note that projected demand is lower than the potential demand, because the cost of connecting some potential landscape customers in the OMC was deemed prohibitive.⁹

⁵ Data is for November 2006 to October 2007. Personal communication, Ray Hahn, Ontario Utilities Department.

⁶ In 2005, Ely Basins received approximately 500 acre-feet of recycled water.

⁷ IEUA's Draft 3 year business plan. IEUA projects this volume to grow to 8,682 acre-feet per year by fiscal year 2008-2009.

⁸ Recycled water delivered to new developments in the NMC has been stalled, due to the recent slump in the residential housing market. Existing projections of near-term recycled water use may be overly optimistic, given the housing market slump. Source: Ray Hahn, Draft comments, March 31, 2008.

⁹ City of Ontario, UWMP, Section 2.

Figure C-3
Projected Recycled Water Demand in the City of Ontario

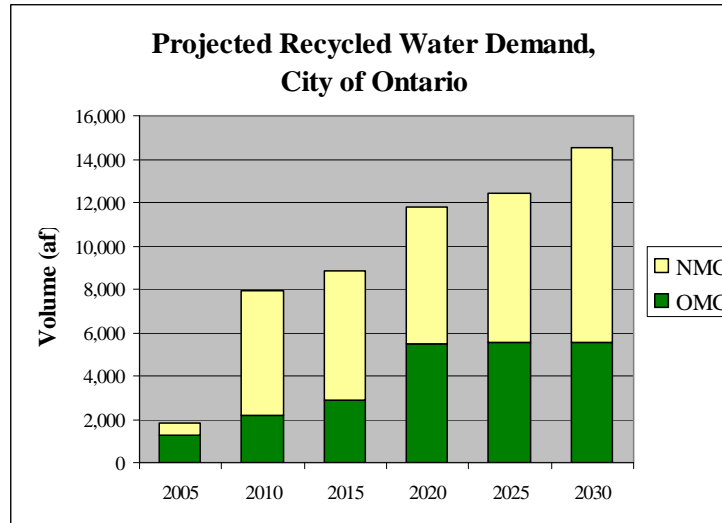


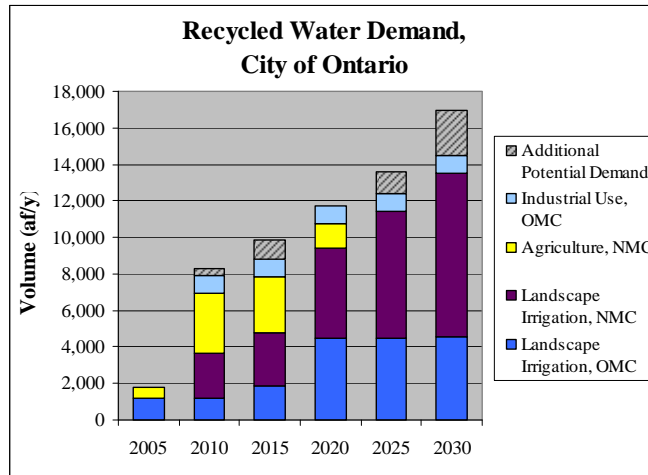
Table C-2
Projected Recycled Water Demand in the City of Ontario¹⁰

	2005	2010	2015	2020	2025	2030
Old Model Colony	1,229	2,198	2,903	5,471	5,512	5,554
New Model Colony	600	5,728	5,913	6,290	6,923	8,938
Total	1,829	7,926	8,816	11,761	12,435	14,492

Note: All above numbers are in acre-feet per year, unless otherwise noted.

¹⁰ City of Ontario, 2005 UWMP, page 2-9

Figure C-4
Recycled Water Demand in the City of Ontario by End User



Note: As discussed previously, potential demand was reduced by the amount of recycled water demand that would likely be deemed uneconomic because of high costs of dual-plumbing existing customer sites. The amount of the adjustment is shown as “Additional Potential Demand.”

Table C-3
Projected Recycled Water Demand by User Type¹¹

	2005	2010	2015	2020	2025	2030
Landscape in the OMC (existing users)	1,229	1,229	1,229	1,229	1,229	1,229
Agriculture use in NMC (temporary)	600	3,295	3,019	1,381	0	0
Landscape in the OMC (future users)	0	0	669	3,237	3,278	3,320
Industrial in the OMC (future user)	0	969	1,005	1,005	1,005	1,005
Landscape in NMC	0	2,433	2,894	4,909	6,923	8,938
Wildlife Habitat	n/a	n/a	n/a	n/a	n/a	n/a
Wetlands	n/a	n/a	n/a	n/a	n/a	n/a
Groundwater Recharge	n/a	n/a	n/a	n/a	n/a	n/a
Total	1,829	7,926	8,816	11,761	12,435	14,492

Note: All above numbers are in acre-feet per year, unless otherwise noted.

Additional Information

Costs

To encourage recycled water use, Ontario offers reduced recycled water rates. These rates are significantly lower than potable water rates (see Table C-4). The rates were established by Ordinance No. 2816, which also provides guidance for customers’ capital costs for connections. Specifically, the ordinance states that customers shall pay the cost of connections to distribution pipelines, but Ontario may reimburse the customer for a portion of the costs, as described in

¹¹ City of Ontario, 2005 UWMP, Table 2-8, Page 2-10.

subsection (c) of Section 6-8.715. Pursuant to this section, Ontario may reimburse an applicant for costs incurred to install oversized facilities in the public right-of-way, construct pipelines, pumping stations, or other facilities; or pay the upfront costs of constructing recycled water facilities (to be repaid by customers through increased recycled water delivery rates, which are not to exceed potable water rates).

In addition to these financial incentives, customers may be eligible for funding from the IEUA and the Metropolitan Water District of Southern California (MWD). IEUA has identified 26 customers in Ontario that are eligible for MWD’s public sector retrofit rebates in 2007-2008. This program, which only applies to public sector agencies, offers customers \$250 per acre-foot of recycled water for the first two years of use through a new service connection. IEUA also offers low interest loans to customers to cover retrofit and connection costs.

**Table C-4
Monthly Volume Commodity Charge¹²**

Block	Commodity Rate per Acre-Foot		
	12/01/2004	01/01/2006	01/01/2007
Potable			
0-15	\$496.59	\$518.37	\$561.93
15+	\$548.86	\$605.49	\$649.05
Recycled			
0-1000	\$283.14	\$283.14	\$304.92
1000+	\$239.58	\$239.58	\$257.01
Note: Water rate increases exceed typical escalation adjustments. The need for rate increases were attributed to the following factors: increased costs of water supply, cost of energy to meet average and back-up power needs, cost of treatment to meet more stringent water quality regulations, and cost of labor, materials, and land to repair or construct system facilities. (City of Ontario, Ordinance No. 2816.)			

Policies

In addition to financial incentives, Ontario adopted several policies to encourage (and in some cases, mandate) recycled water use. Ontario requires new developments install recycled water mains in all common irrigation areas, parks, and schools. In addition, Ordinance Number 2689 allows Ontario to mandate recycled water use in new developments if it is available in the area. Another key policy of particular note is IEUA’s Ordinance 75, adopted by its Board of Directors in May 2002, which allows IEUA to levy financial penalties on customers who fail, neglect, or refuse to use recycled water if it is available.

¹² City of Ontario Ordinance No. 2816.

Energy Use in Producing Water

To provide water to its customers, Ontario and other entities use energy to pump, convey, treat, and distribute water. Each of Ontario's main sources is described in greater detail below. Figure C-5 illustrates the production path for each source of water, and Tables C-5 and C-6 present the energy intensity of each of the sources. Where possible, the energy intensity of each step of production – conveyance, treatment, and distribution – is identified.

Groundwater

Groundwater, Ontario's primary source of water, is pumped from City wells located in the Northern and Central parts of the Chino Basin. Once withdrawn from the aquifer, the water is treated with chlorine and pumped into the water delivery system or storage reservoirs. Most of Ontario's well water supply is pumped directly into the delivery system or storage reservoirs, and subsequently flows to end users by gravity. Several booster stations, located around Ontario, are available to transfer potable water between pressure zones. (Generally, the booster stations are used only to transfer water from a lower pressure zone to a higher pressure zone.) These booster stations pump a blend of all potable water sources.

Chino Desalter Authority Supplies

The CDA pumps and treats groundwater withdrawn from its wells in the southern portion of the Chino Basin. This water is treated to meet drinking water quality standards and is distributed to member agencies throughout IEUA's service area, including Ontario. Ontario receives this water under pressure, and does not have additional pumping stations (other than the booster stations described above). Currently, booster stations are used to pump CDA supplies into a reservoir (in the 1212' pressure zone). As demand increases in the NMC, however, storage in the reservoir will not be needed, and delivering CDA water will not have any additional energy requirements.¹³

Recycled Water

Ontario receives recycled water from IEUA, which treats wastewater to meet Title 22 Standards and then distributes it to its member agencies for use. The recycled water is delivered under pressure, and does not need additional pumping by Ontario.

Imported Water

Imported water is conveyed from the Sacramento-San Joaquin Delta to Southern California by way of the California Aqueduct. Imported SWP water is delivered by the MWD to the IEUA, which sells it at a wholesale rate to Ontario. Before delivery, the WFA treats this water to potable standards at its Agua de Lejos facility. This system is described in greater detail in Appendix B, Water Agency Profile: IEUA. From the Agua de Lejos facility, water flows by gravity to Ontario, where it is mixed with other potable supplies and distributed to end users.

¹³ Ray Hahn, Personal communication, April 7, 2008.

**Table C-5
Energy Intensity of the City of Ontario's Water Supplies (By Production Step)¹⁴**

Stage	Facility	Water Type	Annual Production (af/yr)	Energy Intensity (kWh/af)	Annual Energy Usage (MWh)	Principal Energy Supplier
Conveyance	SWP – East Branch to Devil's Canyon	Raw	19,750 ^[1]	3,200	63,200	DWR
	Local Groundwater	Potable	27,824 ^[2]	860	23,929	SCE
	Groundwater via CDA	Potable	5,000 ^[3]	0 ^[4]	0	SCE
Treatment	Agua de Lejos Plant (WFA)	Potable	19,750	24	474	DWR/SCE
	Local Groundwater	Potable	27,824	0	0	SCE
	Groundwater via CDA (withdrawal and treatment)	Potable	5,000	1,816	9,080	SCE
	Recycled Water (IEUA)	Tertiary	1,829 ^[5]	0 ^[6]	368	SCE/IEUA
Distribution	Agua de Lejos Plant (WFA)	Potable	19,750	0 ^[7]	0	DWR/SCE
	Local Groundwater	Potable	27,824	0	0	SCE
	Groundwater via CDA	Potable	5,000	333 ^[8]	1,665	SCE
	Blend of potable water supplies	Potable	2,800 ^[9]	300	840	SCE
	Recycled Water (IEUA)	Tertiary	1,829	333	609	SCE/IEUA

Notes:

[1] The City did not actually use this much in 2005 because they were able to purchase groundwater from the City of Upland. The City stated it will likely continue to purchase groundwater rights from other cities, rather than use their entire MWD entitlement, for as long as possible.

[2] Volume pumped in 2004. Prior years had larger volumes (over 30,000 acre-feet).

[3] Expected volume of supply from the CDA I and CDA II, starting in 2006.

[4] Energy used for pumping is included in the treatment figure.

[5] The energy intensity of recycled water is measured as the incremental amount of energy needed to use wastewater effluent treated to standards required by regulation for safe discharge. This information is provided only for reference. Most of this volume (from all recycled water sources) is currently discharged into the Santa Ana River. The quantity of treated water that is discharged into the river exceeds the amount needed for environmental purposes. Volumes are based on estimated daily flows at the WWTPs (data from IEUA Case study report).

[7] Treatment to tertiary levels is required; therefore, no incremental energy is needed to treat recycled water.

[8] Flow from the WFA treatment plant to water agencies/utilities is gravity driven. The individual water agencies would provide the subsequent energy needed to pump/distribute the water to end users.

[9] This figure is a weighted average of the energy used by IEUA to pump water around its service area. The weighted average is determined based on the total energy used annually to distribute water and the total volume of water distributed. The City is in the middle to lower pressure zones for the IEUA, and pumping needs may actually be slightly lower. Once water supplies are in the City service area, pumping for distribution is not needed, according to Tom O'Neill, Water Production Manager for the City.

[10] Source: Tom O'Neill. Booster stations around the City pump a portion of the City's potable water supplies – approximately 2,800 acre-feet per year.

¹⁴Volumes are from Ontario's 2005 Urban Water Management Plan and are estimates of withdrawals in 2005 unless otherwise noted.

Table C-6
Total Energy Intensity of the City of Ontario's Water Supplies

Source	Energy Intensity (kWh/acre-foot)			
	Conveyance	Treatment	Distribution	Total
State Water Project (East Branch)	3,200	24	16 ^[1]	3,240
Local Groundwater	860	(Included in pumping/ conveyance energy use)	16	876
Groundwater from the CDA	(Included in treatment energy use)	1,816	349 ^[2]	2,165
Recycled Water	0	0 ^[3]	333	333

Notes:
 [1] Energy is used to pump a blend of potable supplies throughout the City; the total energy used to distribute supplies (840 MW per year) is divided among the total volume of potable supplies (52,500 acre-feet) to find an average energy use for distribution of 16 kWh per acre-feet.
 [2] Estimate of energy used to distribute CDA supplies equals 333 kWh per acre-feet (energy used by IEUA) and 16 kWh per acre-feet (energy used by booster stations in the City).
 [3] Treatment to tertiary levels is required; therefore, no incremental energy is needed to treat recycled water.

Ontario has outlined numerous projects in its Recycled Water Management Plan that will increase deliveries of recycled water in both the OMC and the NMC. These projects are not described individually, but their costs are summarized in four phases (2005 – 2030). The volume associated with each of these phases is taken from the Recycled Water Management Plan (Chapter 3). The energy and costs associated with each of these phases are summarized in Table C-7.

Table C-7
Recycled Water System – Planned Expansion Projects and Associated Costs

System Element	Planned Facility	Expected Year Online	Annual Production (af/yr) ^[1]	Energy Intensity (kWh/af) ^[2]	Annual Energy Usage (MWh)	Cost (Capital) \$M ^[3]	Cost (Annual O&M) \$M ^[4]
Distribution	Local Laterals	2006 – 2010	6,990	333	2,328	\$55.0	\$0.3
	Local Laterals	2011 – 2015	942	333	314	\$11.0	\$0.04
	Local Laterals	2016 – 2020	4,445	333	1,480	\$27.5	\$0.2
	Local Laterals	2021 – 2030	2,379	333	792	\$5.2	\$0.1
Total		2005 - 2030	14,756	333	4,914	\$98.7	\$0.64

Notes:
 [1] Volumes are from the Recycled Water Management Plan, Chapter 3, Table 3-24, and are projected *feasible* recycled water demands. Assumed volumes correspond to the capital costs projected in Chapter 11 of the Plan.
 [2] Estimate includes only the energy used to distribute recycled water in Ontario (333 kWh per acre-feet).
 [3] Data from the Ontario RWMP, Chapter 11 (Capital Investments), Table 11-6.
 [4] Analysis uses the cost IEUA incurs to provide recycled water, *not* the cost paid by customers in Ontario. Estimate is based only on IEUA's distribution energy costs, \$42 per acre-foot, derived from an average energy use of 333 kWh per acre-foot and energy cost of 12.5 cents per kWh. Estimate does not include additional costs of distribution or maintenance. No escalation factor is included in the above numbers.