Section 9 | Appendix

9.1 Data for Calculation of End-Use Energy Intensities

These tables provide more detailed data and assumptions for calculation of urban and agricultural end-use energy intensities, as described in Sections 3.1.2.1 and 3.1.2.2 and of the main report (link below).

Table 29. Hot Water Shares and Temperatures of Residential Indoor Water End-Uses

Water End-Use	Avg. Daily Hot Water Use (gphd)	Avg. Daily Cold Water Use (gphd)	Total Indoor Water Use (gphd)	Share of Residential Indoor Water Use (%)	Outlet Temp °F	Outlet Temp °C
	[A]	[B]	[C] = [A] + [B]	[D]		
Faucets	15	12	27	20%	80	27
Toilets	0	33	33	25%	58[a]	15[a]
Showers & Baths	20	11	31	24%	103	40
Dish-washers	2	0	2	2%	139	59
Clothes Washers	4	18	22	17%	78	26
Leaks	2	16	18	13%	91.4[b]	33[b]
Total	**44.5**	**88.4**	**132.9**	**100%**		

[a] *Same as California average inlet temperature*
[b] *Average of all other temperatures*

Table 30. Estimated Average CII Water End-Uses for Each Process[1]

End-Use Category in CII Process	Total Share of End-Use Category in CII Water	End-Uses Within Category	Share of End-Use Category (%)	Estimated Outlet Temperature °C
Restroom	16%	Showers	7%	41
		Faucets	4%	27
		Urinals	17%	15[a]
		Toilets	72%	15[a]
Cooling	15%	Cooling	100%	15[a]
Kitchen	6%	Pre-Rinsing	14%	49
		Pot Cleaning	17%	41
		Dishwashing	24%	82
		Ice Making	19%	15[a]
		Food Preparation	9%	27
		Other	17%	27
Process	17%	Hospitals	2%	27
		High-Tech	13%	49
		Dairy	1%	49
		Meat Processing	2%	49
		Fruits & Vegetables	12%	49
		Beverages	6%	49
		Laundries	0%	26
		Refining	8%	49
		Paper	5%	49
		Textiles	6%	27

[1] Data from Gleick, et.al. *Waste Not, Want Not: The Potential for Urban Conservation in California*. Pacific Institute, 2003.

End-Use Category in CII Process	Total Share of End-Use Category in CII Water	End-Uses Within Category	Share of End-Use Category (%)	Estimated Outlet Temperature °C
		Metals	3%	49
		Unexplained	42%	27[b]
Laundry	2%	Laundry	100%	26
Other	9%	Other	100%	27[b]
Landscaping	35%	Turf	70%	15[a]
		Other Vegetation	30%	15[a]

[a] *Same as California average inlet temperature*
[b] *Assumed same as faucet flow*

Table 31. Energy Intensity and Acreage Share of Irrigation Technologies, by Crop Type

Energy Intensities by Irrigation Technology (kWh/AF)					
	Flood/ Gravity[a]	Standard Sprinklers	Drip/Micro Irrigation (Low Volume)	Other[b]	
Energy Intensity	15	284	206	168	
Acreage Share by Irrigation Technology, by Crop Type					
Crop Type	**Flood/ Gravity (% Acres)**	**Standard Sprinklers (% Acres)**	**Drip/Micro Irrigation (Low Volume) (% Acres)**	**Other (% Acres)**	**Weighted Average Energy Intensity of Irrigation by Crop (kWh/AF)**
Almonds & Pistachios	13%	14%	71%	1%	190.8
Vineyards	20%	2%	75%	2%	168.3
Alfalfa	77%	18%	3%	3%	71.6
Grains	79%	13%	3%	5%	63.8

Other Deciduous	31%	27%	40%	1%	166.7
Corn	78%	1%	7%	14%	52.0
Other Vegetables	24%	41%	35%	0%	191.3
Subtropical Trees	6%	15%	76%	4%	205.3
Pasture	69%	26%	0%	6%	92.9
Other Field Crops	69%	15%	14%	2%	84.5
Cotton	73%	7%	15%	4%	70.6
Beans (Dry)	67%	21%	12%	0%	95.6
Safflower	54%	44%	0%	1%	136.3
Sugar Beets	86%	3%	12%	0%	45.0
Cucurbit	51%	11%	39%	0%	117.7
Onions & Garlic	19%	39%	42%	0%	200.1
Potatoes	2%	81%	17%	0%	265.4
Tomatoes (Fresh)	44%	11%	45%	0%	131.3
Tomatoes (Process)	33%	4%	63%	0%	145.6
Rice[c]	100%	0%	0%	0%	15.0

[a] Flood" energy intensity averaged across energy intensity values for irrigation 'with 10ft lift' and 'without on-farm lift' from Burt et al. 2003 (Burt, C., Howes, D., Wilson, G., 2003. California Agricultural Water Electrical Energy Requirements (No. ITRC Report No. R 03-006). Prepared by Irrigation Training and Research Center for the California Energy Commission.)

[b] "Other" averaged from flood, sprinklers, and micro irrigation

[c] Rice assumed to be grown with flood irrigation

9.2 Additional Results

9.2.1 Detailed Urban Water Results for Other Scenarios

Table 32. Annual Urban Water Demand by Sector (AF) — Water Supplier Projections Scenario (High-Case)

Demand Sector	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Residential, Indoor	1,842,682	2,346,592	2,486,350	2,608,215	2,723,160	48%	880,479
Residential, Outdoor	1,448,045	1,890,643	2,015,650	2,127,849	2,237,118	54%	789,073
Commercial	682,261	843,602	883,116	914,963	948,601	39%	266,340
Industrial	216,065	262,013	268,868	271,775	284,293	32%	68,228
Institutional/ Governmental	162,886	160,091	170,735	180,749	183,696	13%	20,810
Landscape	315,900	345,831	357,317	371,382	388,154	23%	72,253
Losses	342,822	386,752	409,464	426,604	445,402	30%	102,580
Other	421,546	534,337	567,108	584,157	604,959	44%	183,413
Total	**5,432,207**	**6,778,861**	**7,158,608**	**7,485,695**	**7,815,382**	**44%**	**2,383,175**

Table 33. Annual Urban Water Demand by Sector (AF) — Declining Per-Capita Demand Scenario (Low-Case)

Demand Sector	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Residential, Indoor	1,842,682	1,811,809	1,735,211	1,656,292	1,574,775	-15%	(267,906)
Residential, Outdoor	1,448,045	1,449,017	1,396,802	1,341,293	1,283,806	-11%	(164,238)

Demand Sector	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Commercial	682,261	651,187	615,724	580,487	548,133	-20%	(134,126)
Industrial	216,065	196,822	182,805	168,302	160,483	-26%	(55,583)
Institutional/ Governmental	162,886	120,675	116,732	112,772	104,495	-36%	(58,391)
Landscape	315,900	268,425	250,684	237,274	226,075	-28%	(89,825)
Losses	342,822	295,484	283,084	268,382	255,239	-26%	(87,583)
Other	421,546	405,523	383,309	359,188	338,650	-20%	(82,896)
Total	**5,432,207**	**5,198,943**	**4,964,351**	**4,723,990**	**4,491,656**	**-17%**	**(940,550)**

9.2.2 Detailed Urban Water Supply Results for Other Scenarios

Table 34. Annual Urban Water Supply by Source (AF) — Water Supplier Projections Scenario (High-Case)

Supply Source	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Central Valley Project Deliveries	259,046	350,136	375,196	394,433	410,515	58%	151,469
Colorado River Deliveries	871,975	897,972	939,342	968,188	922,388	14%	120,413
Desalinated Water (Brackish)	205	4,952	8,981	12,829	16,653	8,016%	16,447
Desalinated Water (Seawater)	27,888	33,442	36,344	36,707	36,957	33%	9,096

Supply Source	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Exchanges	2,216	4,642	1,391	1,277	1,359	-39%	-857
Groundwater	2,063,977	2,329,289	2,413,785	2,518,323	2,635,035	28%	571,058
Local Imports	365,972	435,704	452,953	466,949	483,001	32%	117,029
Other	98,094	229,528	236,425	248,140	255,471	160%	157,376
Other Federal Deliveries	28,565	34,123	37,124	39,364	40,801	43%	12,235
Recycled Water Non-Potable	287,519	398,667	465,113	520,297	563,031	96%	275,512
Recycled Water Potable	17,010	33,454	69,555	72,039	77,177	354%	60,168
State Water Project Deliveries	716,384	778,044	824,510	857,330	887,842	24%	171,458
Stormwater Use	72	2,466	5,713	9,406	15,163	20,496%	15,091
Supply from Storage	14,329	30,372	30,701	31,022	31,464	120%	17,135
Surface Water	648,056	1,198,034	1,242,554	1,286,390	1,344,440	107%	696,384
Transfers	30,898	18,037	18,921	22,999	24,086	-22%	-6,812
Total	**5,432,207**	**6,778,861**	**7,158,608**	**7,485,695**	**7,815,382**	**44%**	**2,383,175**

Table 35. Annual Urban Water Supply by Source (AF) — Declining Per-Capita Demand Scenario (Low-Case)

Supply Source	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Central Valley Project Deliveries	259,046	244,166	238,641	229,233	217,352	-16%	-41,695
Colorado River Deliveries	871,975	738,400	693,517	648,263	605,025	-31%	-266,950
Desalinated Water (Brackish)	205	3,159	5,887	8,021	9,744	4,649%	9,539
Desalinated Water (Seawater)	27,888	27,011	26,417	24,213	22,190	-20%	-5,698
Exchanges	2,216	3,487	950	800	780	-65%	-1,436
Groundwater	2,063,977	1,813,410	1,695,524	1,606,838	1,529,814	-26%	-534,162
Local Imports	365,972	316,784	300,253	283,314	267,376	-27%	-98,595
Other	98,094	177,203	163,1586	165,619	146,850	50%	48,756
Other Federal Deliveries	28,565	24,038	23,783	23,001	21,469	-24%	-6,916
Recycled Water Non-Potable	287,519	312,988	329,668	335,391	330,625	15%	43,106
Recycled Water Potable	17,010	26,715	50,090	46,972	45,833	169%	28,824
State Water Project Deliveries	716,384	621,357	591,260	556,892	524,000	-27%	-192,384

Supply Source	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Stormwater Use	72	2,026	4,088	6,170	9,107	12,541%	9,035
Supply from Storage	14,329	21,934	20,265	18,801	17,462	22%	3,133
Surface Water	648,056	853,082	807,892	765,651	730,664	13%	82,609
Transfers	30,898	13,182	12,528	13,811	13,184	-57%	-17,714
Total	5,432,207	5,198,943	4,964,351	4,723,990	4,491,656	-17%	-940,550

9.2.3 Detailed Urban Water Energy Results for Other Scenarios

Table 36. State Annual Electricity Use Related to Urban Water, by Water Cycle Category (GWh) — Water Supplier Projections Scenario (High-Case)

Water Cycle Category	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Supply Extraction or Generation	1,277	1,501	1,628	1,711	1,801	41%	524
Supply Conveyance	4,321	4,674	4,927	5,103	5,259	22%	938
Supply Treatment	977	1,253	1,330	1,383	1,437	47%	460
Demand Distribution	2,483	3,059	3,194	3,299	3,409	37%	927
Demand End-Use	12,614	15,812	16,699	17,459	18,196	44%	5,582

Water Cycle Category	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Demand Wastewater Collection	323	406	428	446	465	44%	141
Demand Wastewater Treatment	2,053	2,584	2,723	2,840	2,957	44%	904

Table 37. State Annual Electricity Use Related to Urban Water, by Water Cycle Category (GWh) — Declining Per-Capita Demand Scenario (Low-Case)

Water Cycle Category	2015	2020	2025	2030	2035	% Change from 2015–2035	Change 2015–2035
Supply Extraction or Generation	1,277	1,183	1,157	1,104	1,058	-17%	-219
Supply Conveyance	4,321	3,756	3,556	3,337	3,127	-28%	-1,194
Supply Treatment	977	959	921	872	825	-16%	-151
Demand Distribution	2,483	2,346	2,217	2,087	1,964	-21%	-518
Demand End-Use	12,614	12,183	11,631	11,067	10,504	-17%	-2,109
Demand Wastewater Collection	323	312	297	282	267	-17%	-56
Demand Wastewater Treatment	2,053	1,979	1,886	1,791	1,698	-17%	-355