

Appendix O

Voluntary Reporting of Energy Intensity

This appendix provides guidance for voluntary reporting of the energy intensity associated with sources of water used by the urban water supplier as required by CWC §§10631.2(a). This section of the Urban Water Management Plan is optional, but urban water suppliers are strongly encouraged to provide as much information as possible. If complete data are not available, estimates, informed judgements, and assumptions can be used to fill in missing information.

CWC 10631.2(a)

In addition to the requirements of Section 10631, an urban water management plan may, but is not required to, include any of the following information:

- (1) An estimate of the amount of energy used to extract or divert water supplies.*
- (2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.*
- (3) An estimate of the amount of energy used to treat water supplies.*
- (4) An estimate of the amount of energy used to distribute water supplies through its distribution systems.*
- (5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.*
- (6) An estimate of the amount of energy used to place water into or withdraw from storage.*
- (7) Any other energy-related information the urban water supplier deems appropriate.*

CWC 10631.2 (b)

The department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.

Energy intensity reporting has many benefits for water utilities and their customers including:

- Identify energy saving opportunities as energy consumption is often a large portion of the cost of delivering water.
- Calculate energy savings and Greenhouse Gas Emissions (GHGs) emissions reductions associated with water conservation programs.
- Potential opportunities to receive energy efficiency funding for water conservation programs.
- Informing climate change mitigation strategies
- Benchmarking of energy use at each water acquisition and delivery step and the ability to compare energy use among similar agencies.

Energy Intensity Defined

Energy intensity is a measure of the amount of energy needed to take a unit volume of water from a starting location through all necessary steps to its point of use. Energy intensity is calculated by dividing the quantity of energy consumed (kWh) by the volume of water entering the distribution system (AF). Energy consumption is entered by the urban water supplier in units of kilowatt hours (kWh) in Table O-1.

Overview of Energy Intensity Guidance

This guidance is intended to cover reporting the energy intensity of water supplies within an urban water supplier's operational control for extraction, diversion, conveyance, placement into storage, treatment, and distribution for a one year time period. An option to include the embedded energy from wholesale water supplies is provided in Table O-2. Operational control in this context is defined as authority over normal business operations at the operational level. Thus, an urban water supplier would likely *not* have *operational control* over systems from which the urban water supplier purchases water e.g., the State Water Project, and would therefore not be expected to include energy intensity information for those systems.

Reporting Methods

The availability of water related energy consumption data varies greatly across urban water management wholesalers and suppliers. This guidance is intended to accommodate a wide range of energy consumption detail. Four reporting options are provided; urban water suppliers should decide which level of reporting to provide based on the resolution of available energy consumption data. Using the most detailed reporting approach will provide water managers with the best understanding of the energy intensity of their systems and how energy consumption of water management operations compares throughout the state.

Complete Method (A): Report energy intensity by water supply source for extraction, conveyance, placement into storage, treatment, and distribution. Enter total amount of energy consumed for each water supply source (See Tables O-1A and O-2A on page 10).

Intermediate Method (B): Report energy intensity by water management operation (aggregated across all supply sources). Enter amount of energy consumed for extraction, conveyance, placement into storage, treatment, and distribution (See Tables O-1B and O-2B on page 12).

Simple Method (C): Report single energy intensity for all water management operations. Enter total energy consumed in agencies water operations. The agency's energy intensity is automatically calculated as the ratio of energy consumption over volume of water volume entering the distribution system (See Tables O-1C and O-2C on page 14).

Manual Entry Method (X): This method of reporting is not encouraged but has been provided to accommodate instances in which the Complete, Intermediate, or Simple methods do not accommodate an urban water supplier's data energy format. The urban water supplier can manually enter energy intensities in kWh/AF into a blank version of Table O-2A. No logic or calculations are provided in this template (See Table O-2X on page 16).

Optional Renewable Energy Sources and GHG emissions: Urban water suppliers wishing to report GHG emissions and sources of renewable energy supplies such as solar, wind and hydropower generation can do so in Table O-3 (See Table O-3 on page 17).

Reporting Period

This guidance uses a one year reporting period. Ideally the reporting period will match the period used for 2015 data provided by the urban water supplier in SBX7-7 Table 4A and UWMP Table 6-8. If energy consumption data is not available for the 2015 time period, urban water suppliers can select an alternate one year reporting period. As with other elements of the UWMP, only one year of data is being requested. Urban water suppliers wishing to report multiple years of energy intensity data can do so by filling out tables O-1 and O-2 for multiple one year periods.

Volume of Water Delivered

Energy intensity calculations in Tables O-1 and O-2 use the volume of water entering the distribution system from SBX7-7 Table 4A in Acre-Feet for 2015 or selected reporting period. In some cases the quantity of water delivered for each water supply is unknown due to co-mingling of multiple water supplies. To estimate volume entering the distribution system for each water supply it is recommended to apply percentage based on Table 6-8 "Actual Volume" for 2015. Possible that SBX 7-7 Table 4A methodology will be updated to include this calculation.

Hydropower and other Electricity Generation within the Water System

Non-Consequential Hydropower Generation: There are many challenges in identifying how to appropriate hydropower generated from such a facility. For the purposes of this reporting, Non-Consequential Hydropower Generation is defined as power generated by water systems where the generation of electricity is not directly connected to water deliveries i.e., energy could be generated even if no water were being delivered to water users. Non-consequential hydropower generation is not to be included in energy calculations for the UWMP. An example of non-consequential hydropower generation is the energy generated from the State Water Project by the Hyatt-Thermalito Powerplant at Oroville Dam. Water flowing out of Oroville Dam generates electricity, the water is then sent down the Feather River channel where it could be lost to evaporation, groundwater recharge, or environmental usage, could flow out to sea, or could be delivered to SWP customers. This methodology is not intended to diminish the role or importance of hydropower production. For the State Water Project the Department of Water Resources accounts for hydropower production when calculating the GHG emissions of the project. Procedures to calculate GHG emissions are not addressed by this guidance; urban water suppliers that want to report hydropower generation or GHG emissions can do so in Table O-3 and in the narrative section of this chapter.

Consequential Hydropower Generation: Consequential hydropower generation occurs where energy generation is a direct consequence of water delivery. Water passing through the energy generation devices must be delivered to users and an interruption in water deliveries would result in an interruption in energy generation. An example of consequential hydropower generation is the State Water Project's Warne, Alamo and Devils Canyon energy recovery power plants. Consequential hydropower generation should be netted out from the total amount of energy consumed. If consequential hydropower generation is greater than the amount of total energy consumed, energy intensity will be a negative value meaning that the water delivery is a net negative energy consumer or a net positive energy generator.

Renewable Energy Sources: Unless renewable energy generation is a direct result of water delivery (Consequential Hydropower Generation), renewable energy generation should not be netted from energy consumed or included in energy intensity calculations. If energy produced from renewable

sources (i.e. solar panels) is directly consumed by a water management process (renewable generation “behind the meter”), add the estimated amount of energy produced by solar panels to the metered energy consumption for the appropriate water management process. While energy production from renewable energy sources is not considered in these energy intensity calculations it should be included when considering GHG emissions associated with water management. Urban water suppliers that want to report energy generated from renewable sources or GHG emissions can do so in Table O-3 and in the narrative section of this chapter.

Water Storage

Inter-annual storage: For urban water suppliers with inter-annual (multiyear) storage, the volume of water passing through each water management process in a given year can vary significantly. For example the volume of water being extracted and diverted could be significantly larger or smaller than the volume of water passing through treatment and distribution in a given year. In these instances the urban water supplier should follow the steps listed below or use the manual data entry format (Table O-2X).

To calculate the quantity of energy consumed for Extract and Divert, Place into Storage, and Conveyance water management process use the following steps to fill in Table O-1:

1. Identify quantity of energy consumed (kWh) by given water management process for reporting period.
2. Identify volume (AF) that passed through given water management process for reporting period.
3. Calculate energy intensity (kWh/AF) by dividing the quantity of energy in Step 1 by the volume of water in Step 2.
4. Multiply energy intensity from Step 3 by the volume of water delivered to customers for reporting period.
5. Enter quantity of energy from Step 4 into Table O-1 for the given water management process.
[Make a note in the narrative section that inter-annual storage adjustments have been made to applicable water management processes.]

Groundwater Banking: This guidance does not address how to incorporate the energy intensity from groundwater banking operations. It is possible to include the energy intensity from ground water banking in the Place into Storage or Embedded Energy in Wholesale Water Supplies categories. If ground water banking operations occur within the urban water supplier’s operational control please include a brief discussion of how groundwater banking was addressed in energy intensity calculations or provide a general overview of how ground water banking would impact the overall energy intensity of water supplies.

Recycled Water Supplies

For recycled water supplies the energy intensity is measured as the incremental amount of energy needed to treat wastewater effluent beyond the amount of energy that otherwise would have been required to treat the wastewater effluent to a quality acceptable for discharge.

Report Narrative

Please provide a narrative for each water supply discussing water management processes in which energy is consumed or produced. Please also provide a narrative documenting data sources, assumptions and methods used to complete the energy intensity calculations.

This guidance and associated reporting tables do not capture all of the water-energy complexities or issues that may be of interest to the urban water supplier. Urban water suppliers are encouraged to include additional tables, charts, text and other additional water-energy information that is of interest.

DRAFT

Definitions (words within definitions that are italicized are also defined in this list):

Consequential Hydropower Generation (kWh): Amount of energy generated using turbines or other generation devices to generate electricity from falling water where the energy generation is a direct consequence of water delivery. Water passing through the energy generation devices must be delivered to users.

Conveyance (kWh): Amount of energy consumed within an UWMP's *operational control* to transport water from point of diversion to point of treatment less any *consequential hydropower generation*. This does not include any energy expended by a water wholesaler e.g., DWR for the conveyance of State Water Project supplies. For wholesale water supplies, the conveyance energy to be reported by the urban water supplier is only the energy expended by the urban water supplier itself to transport the water from the point at which it receives the water from the wholesaler to the urban water supplier's treatment plant. Urban water suppliers can report the embedded energy intensity of the wholesale water supplies they receive in the "Optional" section of tables O-1. For State Water Project water supplies, embedded energy and GHG information can be found at:

http://www.water.ca.gov/climatechange/WaterEnergyNexusSWP_test.cfm

Data Quality: The urban water supplier is asked to make a subjective assessment of the quality of the data that is being provided in tables O-1 and O-2. DWR recognizes that energy intensity reporting for water supplies may be new for some urban water suppliers and that some processes may not be sub-metered to allow for precise quantification of energy use. Estimates and informed judgement by the water supplier should be used to fill in as much information as possible.

Distribution (kWh): Amount of energy expended within an urban water supplier's *operational control* to transport water from the treatment plant or wellhead disinfection point to the point of delivery. For treated wholesale water supplies, distribution starts at the point where the urban water supplier takes control of water. Reported distribution energy should include only energy expended by the urban water supplier to transport water from the point it receives the water to the point of delivery less any *consequential hydropower generation*.

Embedded Energy in Wholesale Supplies (kWh/AF): Energy that has been applied to a water supply by all upstream wholesalers. This includes a summation of energy applied for extract and divert, place into storage, *conveyance*, treatment, and distribution.

Energy Intensity (kWh/AF): Quantity of energy consumed divided by volume of water entering the distribution system from SBX7-7 Table 4A. A measure of the required amount of energy needed to take a unit volume of water from its starting location through all necessary steps to its point of use.

Extract and Divert (kWh): Amount of energy consumed within an urban water supplier's *operational control* to remove water from a channel, pipeline, stream, or aquifer less *consequential hydropower generation*.

Kilowatt-hour (kWh): A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kWh is equivalent to 3,412 Btu.

Level of Treatment: See definition in Chapter 6.

Non-Consequential Hydropower Generation: Amount of energy generated using turbines or other generation devices to generate electricity from falling water where the energy generation is not a direct consequence of water delivery. If water that has generated electricity is released to natural channels and may or may not end up being delivered to an end user the generation should be considered *non-consequential hydropower generation*.

Operational Control: Authority over normal business operations at the operational level. This would not include other systems from which the urban water supplier purchases water.

Place into Storage (kWh): Amount of energy consumed within an urban water supplier's *operational control* to place water into a long term storage reservoir or groundwater bank less any *consequential hydropower generation*.

Reporting Period: One year period for reporting *volume of water delivered* and quantity of energy consumed. When possible, use time period used to report 2015 data in SBX7-7 Table 4A and UWMP Table 6-8.

Start Date: First day of one year *Reporting Period*.

Total EI for Water Supply (kWh/AF): Total urban water supplier *energy intensity* plus the *Embedded Energy in Wholesale Supplies*.

Total Urban Water Supplier Operational Control (kWh or kWh/AF): Total energy or *energy intensity* within an urban water supplier's *operational control*.

Treatment (kWh): Amount of energy consumed within an urban water supplier's *operational control* to treat water to potable quality. For recycled water supply this is the amount of energy that is in excess of the amount of energy that would have been expended to treat and discharge the water if it were not being recycled.

Volume Entering the Distribution System (AF): Volume of water entering the distribution system from SBX7-7 Table 4A in Acre-Feet for 2015 or selected reporting period. In some cases the quantity of water delivered for each water supply is unknown due to co-mingling of multiple water supplies. To estimate volume entering the distribution system for each water supply it is recommend to calculate percentage based on Table 6-8 "Actual Volume" for 2015. Possible that SBX 7-7 Table 4A methodology will be updated to cover methodology for this calculation.

Water Management Processes: For the purpose of Appendix O defined as *Extract and Divert, Place into Storage, Conveyance, Treatment, and Distribution*.

Select Reporting Format

could become an initial web screen where users would select the proper data entry format####

Spreadsheets

Reporting uses online data entry. For urban water suppliers wishing to download an excel copy of the tables to fill in prior to online reporting a copy can be downloaded at _____.

Reporting Period

Identify a one year reporting period. Ideally reporting period will match reporting period used for 2015 in Chapter 6 of this UWMP. However, if energy consumption data is not available for this time period it may be necessary to use an alternate reporting period. As with other elements of the UWMP, only one year of data is being requested. Urban water suppliers wishing to report multiple years of energy intensity data can do so by filling out tables O-1 and O-2 for multiple one year periods.

Report Type

Select the appropriate reporting table. A short description of the data requirements for each table is provided. Tables showing the input and output formats are provided on pages x, y and z.

- Complete Report (Table O-1A & O-2A)
 - Amount of water delivered for each water supply source listed in Table 6-8
 - Amount of energy consumed for each water supply by the following water management process (some processes may apply to all urban water suppliers):
 - Extract and Divert (kWh)
 - Place into Storage (kWh)
 - Convey (kWh)
 - Treatment (kWh)
 - Total amount of energy consumed for Distribution (kWh)
 - Optional: Energy Intensity for each wholesale water supply (kWh/AF)
- Intermediate Report (Table O-1B & O-2B)
 - Total volume of water delivered by urban water supplier (AF) and
 - Total amount of energy consumed for each of the following water management process (some process may apply to all urban water suppliers):
 - Extract and Divert (kWh)
 - Place into Storage (kWh)
 - Convey (kWh)
 - Treatment (kWh)
 - Distribution (kWh)
 - Optional: Energy Intensity for each wholesale water supply (kWh/AF)
- Simplified Report (Table O-1C and Table O-1C)
 - Total volume of water delivered by urban water supplier (AF)
 - Total amount of energy consumed (kWh)
 - Optional: Energy Intensity for each wholesale water supply (kWh/AF)
- Manual (Table O-2X, to be used only if other table formats do not fit the urban water supplier's energy data structure)
 - Manually enter values into table
 - No logic or calculations are included in table

Instructions Table O-1A and O-2A:

Step 1: In cell C-8 enter start date for one year energy intensity reporting period.

Step 2: Copy information from UWMP Table 6-8 columns "A", "B" and "E" into "blue" cells in Table O-1A and O-2A.

Step3: For Table O-1A, Column F:Total, enter total volume of water entering the distribution system for identified reporting period based on SBX7-7 Table 4-A for 2015 or selected reporting period.

Step 4: For Table O-1A, Column E, Enter percentage of total volume entering the distribution system for each of the water supplies listed in UWMP Table 6-8. Recommend calculating percentage based on Table 6-8 "Actual Volume" for 2015.

Step 5: For each water supply enter the total amount of energy consumed less any consequential energy generation in columns G-J (Extract and Divert, Place into Storage, Conveyance, and Treatment). If a cell does not apply enter NA.

Step 6: In column K (Distribution) enter total amount of energy consumed less any consequential hydropower generation.

Step 7: Gray cells in Table O-1A and O-2A are automatically calculated.

Step 8: (optional): Enter Embedded Energy in Wholesale Supplies for all applicable water supplies in TableO-2A column M. Value will likely be obtained from wholesale water supplier. Enter NA if embedded energy does not apply to water supply.

Step 9: Select quality of the data entered in Table O-1A from dropdown menu. (Estimate, Metered, Estimates and Metered)

Step 10: Enter narrative describing general data sources, methodology, assumptions and process where energy is removed from the system for consequential hydropower generation. (xyz character limit)

Step 1: Enter start date for reporting period.

Step 4: Enter % of Total Volume Entering the Distribution System

Step 5: Enter amount of energy consumed for each water supply to extract and divert, place into storage, convey and treat water supply.

Step 7: Cells highlighted in "Gray" are automatically calculated.

Step 2: Copy information from Table 6-8 for 2015 and paste into "blue" cells.

Step 3: Enter Total Volume Entering the Distribution System.

Step 6: Enter total amount of energy consumed for water supply distribution.

Enter Start Date for Reporting Period		1/1/2015		Fraction of Water Supply (%)	Volume Entering the Distribution System (AF)	Urban Water Supplier Operational Control					Total (kWh)
End Date		12/31/2015				Extract and Divert (kWh)	Place into Storage (kWh)	Convey (kWh)	Treatment (kWh)	Distribution (kWh)	
Water Supply Category	Supplying Agency / Basin	Level of Treatment									
Purchased Water	Name of Supplying Agency	tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Groundwater	Name of Basin or Area	tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Surface water		tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Recycled Water	Name of Supplying Agency	tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Desalinated Water		tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Stormwater Use		tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Transfers	Name of Supplying Agency	tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Exchanges	Name of Supplying Agency	tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Other		tbl 6-8		manual input	Calculated	manual input	manual input	manual input	manual input	Calculated	
Total		Calculated = 100% (Sum Column)			2015: SBX7-7 Table 4-A (CellK58)	Calculated	Calculated	Calculated	Calculated	manual input	Calculated

Start Date		1/1/2015		Volume Entering the Distribution System (AF)	Urban Water Supplier Operational Control						Optional	
End Date		12/31/2015			Extract and Divert (kWh/AF)	Place into Storage (kWh/AF)	Convey (kWh/AF)	Treatment (kWh/AF)	Distribution (kWh/AF)	Total (kWh/AF)	Embedded Energy in Wholesale Supplies (kWh/AF)	Total EI for Water Supply (kWh/AF)
Water Supply Category	Supplying Agency / Basin	Level of Treatment										
Purchased Water	Name of Supplying Agency	tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Groundwater	Name of Basin or Area	tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Surface water		tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Recycled Water	Name of Supplying Agency	tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Desalinated Water		tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Stormwater Use		tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Transfers	Name of Supplying Agency	tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Exchanges	Name of Supplying Agency	tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Other		tbl 6-8		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	optional manual input	Calculated
Average					Calculated	Calculated	Calculated	Calculated	Calculated	Calculated		Calculated

Data Quality (Estimate, Metered Data, Combination of Estimates and Metered Data)
dropdown menu

Step 9: Select quality of the data entered in Table O-1A from dropdown menu.

Step 8 (optional): Enter embedded energy in water supplies.

Narrative:
Step 10: Enter narrative describing general data sources, methodology, assumptions and process where energy is removed from the system by consequential hydropower generation. (xyz character limit)

Instructions Table O-1B and O-2B:

Step 1: In cell C-8 enter start date for one year energy intensity reporting period.

Step 2 (optional): Copy information from UWMP Table 6-8 columns “A”, “B” and “E” into “blue” cells in Table O-1B and O-2B (required for embedded energy calculations in Table O-2B).

Step3: For Table O-1B, Column F:Total, enter total volume of water entering the distribution system for identified reporting period based on SBX7-7 Table 4-A for 2015 or selected reporting period.

Step 4 (Optional): For Table O-1B, Column E, Enter percentage of total volume entering the distribution system for each of the water supplies listed in UWMP Table 6-8. Recommend calculating percentage based on Table 6-8 “Actual Volume” for 2015 (required for embedded energy calculations in Table O-2B).

Step 5: For columns G-K (Extract and Divert, Place into Storage, Conveyance, Treatment and Distribution) enter total amount of energy consumed less any consequential hydropower generation. If a category does not apply enter NA.

Step 6: Gray cells in Table O-1B and O-2B are automatically calculated.

Step 7 (optional): Enter Embedded Energy in Wholesale Supplies for all applicable water supplies in Table O-2B column M. Value will likely be obtained from wholesale water supplier. Enter NA if embedded energy does not apply to water supply.

Step 8: Select quality of the data entered in Table O-1B from dropdown menu. (Estimate, Metered, Estimates and Metered)

Step 9: Enter narrative describing general data sources, methodology, assumptions and process where energy is removed from the system for consequential hydropower generation. (xyz character limit)

Step 1: Enter start date for reporting period.

Step 4 (Optional): Enter % of Total Volume Entering the Distribution System (required for embedded energy calculations in Table O-2B).

Enter Start Date for Reporting Period		1/1/2015	Fraction of Water Supply (%)	Volume Entering the Distribution System (AF)	Urban Water Supplier Operational Control					
End Date		12/31/2015			Extract and Divert (kWh)	Place into Storage (kWh)	Convey (kWh)	Treatment (kWh)	Distribution (kWh)	Total (kWh)
Water Supply Category	Supplying Agency / Basin	Level of Treatment								
Purchased Water	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Groundwater	Name of Basin or Area	tbl 6-8	manual input	Calculated						
Surface water		tbl 6-8	manual input	Calculated						
Recycled Water	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Desalinated Water		tbl 6-8	manual input	Calculated						
Stormwater Use		tbl 6-8	manual input	Calculated						
Transfers	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Exchanges	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Other		tbl 6-8	manual input	Calculated						
Total			Calculated = 100% (Sum Column)	2015: SBX7-7 Table 4-A (CellK:58)	manual input	manual input	manual input	manual input	manual input	Calculated

Step 6: Cells highlighted in "Gray" are automatically calculated.

Step 2 (optional): Copy information from Table 6-8 for 2015 and paste into "blue" cells.

Step 3: Enter Total Volume Entering the Distribution System.

Step 5: Enter total amount of energy consumed

Start Date		1/1/2015	Volume Entering the Distribution System (AF)	Urban Water Supplier Operational Control						Optional	
End Date		12/31/2015		Extract and Divert (kWh/AF)	Place into Storage (kWh/AF)	Convey (kWh/AF)	Treatment (kWh/AF)	Distribution (kWh/AF)	Total (kWh/AF)	Embedded Energy in Wholesale Supplies (kWh/AF)	Total EI for Water Supply (kWh/AF)
Water Supply Category	Supplying Agency / Basin	Level of Treatment									
Purchased Water	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Groundwater	Name of Basin or Area	tbl 6-8	Calculated						optional manual input		
Surface water		tbl 6-8	Calculated						optional manual input		
Recycled Water	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Desalinated Water		tbl 6-8	Calculated						optional manual input		
Stormwater Use		tbl 6-8	Calculated						optional manual input		
Transfers	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Exchanges	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Other		tbl 6-8	Calculated						optional manual input		
Average				Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	

Data Quality (Estimate, Metered Data, Combination of Estimates and Metered Data)
dropdown menu

Step 8: Select quality of the data entered in Table O-1B from dropdown menu.

Step 7 (optional): Enter embedded energy in water supplies.

Narrative:
Step 9: Enter narrative describing general data sources, methodology, assumptions and process where energy is removed from the system by consequential hydropower generation. (xyz character limit)

Instructions Table O-1C and O-2C:

Step 1: In cell C-8 enter start date for one year energy intensity reporting period.

Step 2 (Optional) : Copy information from Table 6-8 columns “A”, “B” and “E” into “blue” cells in Table O-1C and O-2C (required for embedded energy calculations in Table O-2C).

Step3: For Table O-1C, Column F:Total, enter total volume of water entering the distribution system for identified reporting period based on SBX7-7 Table 4-A for 2015 or selected reporting period.

Step 4 (Optional): For Table O-1C, Column D, Enter percentage of total volume entering the distribution system for each of the water supplies listed in UWMP Table 6-8. Recommend calculating percentage based on Table 6-8 “Actual Volume” for 2015 (required for embedded energy calculations in Table O-2C).

Step 5: In cell L:20 enter total amount of energy consumed less any consequential hydropower generation for reporting period.

Step 6: Values in Table O-2C are automatically calculated.

Step 7: (optional): Enter Embedded Energy in Wholesale Supplies for all applicable water supplies in Table O-2C column M. Value will likely be obtained from wholesale water supplier. Enter NA if embedded energy does not apply to water supply.

Step 8: Select quality of the data entered in Table O-1C from dropdown menu. (Estimate, Metered, Estimates and Metered)

Step 9: Enter narrative describing general data sources, methodology, assumptions and process where energy is removed from the system for consequential hydropower generation. (xyz character limit)

Step 1: Enter start date for reporting period.

Step 4 (Optional): Enter % of Total Volume Entering the Distribution System (required for embedded energy calculations in Table O-2B).

Enter Start Date for Reporting Period		1/1/2015	Fraction of Water Supply (%)	Volume Entering the Distribution System (AF)	Urban Water Supplier Operational Control					
End Date		12/31/2015			Extract and Divert (kWh)	Place into Storage (kWh)	Convey (kWh)	Treatment (kWh)	Distribution (kWh)	Total UWMP (kWh)
Water Supply Category	Supplying Agency / Basin	Level of Treatment								
Purchased Water	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Groundwater	Name of Basin or Area	tbl 6-8	manual input	Calculated						
Surface water		tbl 6-8	manual input	Calculated						
Recycled Water	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Desalinated Water		tbl 6-8	manual input	Calculated						
Stormwater Use		tbl 6-8	manual input	Calculated						
Transfers	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Exchanges	Name of Supplying Agency	tbl 6-8	manual input	Calculated						
Other		tbl 6-8	manual input	Calculated						
Total			Calculated = 100% (Sum Column)	2015: SBX7-7 Table 4-A (Cell K58)					manual input	

Step 5: Enter total amount of energy consumed.

Step 2 (optional): Copy information from Table 6-8 for 2015 and paste into "blue" cells.

Step 3: Enter Total Volume Entering the Distribution System.

Start Date		1/1/2015	Volume Entering the Distribution System (AF)	Urban Water Supplier Operational Control Operational Control						Optional	
End Date		12/31/2015		Extract and Divert (kWh/AF)	Place into Storage (kWh/AF)	Convey (kWh/AF)	Treatment (kWh/AF)	Distribution (kWh/AF)	Total UWMP (kWh/AF)	Embedded Energy in Wholesale Supplies (kWh/AF)	Total EI for Water Supply (kWh/AF)
Water Supply Category	Supplying Agency / Basin	Level of Treatment									
Purchased Water	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Groundwater	Name of Basin or Area	tbl 6-8	Calculated						optional manual input		
Surface water		tbl 6-8	Calculated						optional manual input		
Recycled Water	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Desalinated Water		tbl 6-8	Calculated						optional manual input		
Stormwater Use		tbl 6-8	Calculated						optional manual input		
Transfers	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Exchanges	Name of Supplying Agency	tbl 6-8	Calculated						optional manual input		
Other		tbl 6-8	Calculated						optional manual input		
Average								Calculated		Calculated	

Data Quality (Estimate, Metered Data, Combination of Estimates and Metered Data)
dropdown menu

Step 8 Select quality of the data entered in Table O-1C from dropdown menu.

Step 6: Energy intensity is automatically calculated.

Step 7 (optional): Enter embedded energy in water supplies.

Narrative:
Step 9: Enter narrative describing general data sources, methodology, assumptions and process where energy is removed from the system by consequential hydropower generation. (xyz character limit)

Instructions Table O-2X: Manual Entry Method

Urban water suppliers are discouraged from using this reporting method. Table O-2X has been provided to accommodate instances in which the Complete (O-1A), Intermediate (O-1B), or Simple (O-1C) methods do not accommodate an urban water supplier's energy data format. The urban water supplier can manually enter energy intensities in kWh/AF into Table O-2A. No logic or calculations are provided in this template.

Enter start date and end data for 1 year reporting period.

Table O-2X: Energy Intensity (kWh/AF)												
Enter Start Date for Reporting Period		1/1/2015			Urban Water Supplier Operational Control						Optional	
End Date		12/31/2015	Fraction of Water Supply (%)	Volume Entering the Distribution System (AF)	Extract and Divert (kWh/AF)	Place into Storage (kWh/AF)	Convey (kWh/AF)	Treatment (kWh/AF)	Distribution (kWh/AF)	Total (kWh/AF)	Embedded Energy in Wholesale Supplies (kWh/AF)	Total EI for Water Supply (kWh/AF)
Water Supply Category	Supplying Agency / Basin		Level of Treatment									
Purchased Water	Name of Supplying Agency		tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Groundwater	Name of Basin or Area		tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Surface water			tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Recycled Water			tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Desalinated Water			tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Stormwater Use			tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Transfers			tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Exchanges	Name of Supplying Agency		tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Other			tbl 6-8	manual input	Calculated	manual input	manual input	manual input	manual input	manual input	manual input	manual input
Total				Calculated = 100% (Sum Column)	2015: SBX7-7 Table 4-A (CellK:58)	manual input	manual input	manual input	manual input	manual input		manual input

Copy information from Table 6-8 for 2015 and paste into "blue" cells.

Data Quality (Estimate, Metered Data, Combination of Estimates and Metered Data)
dropdown menu

Enter Total Volume Entering the Distribution System.

Average calculations should be weighted by volume of water supply.

Narrative:
Enter narrative describing general data sources, methodology, assumptions and process where energy is removed from the system by consequential hydropower generation. (xyz character limit)

Select quality of the data entered in Table O-2X from dropdown menu.

Table O-3

This is an entirely optional table provided for urban water suppliers that wish to report additional information regarding renewable energy supplies and greenhouse gas emissions.

Hydropower Generation

Facility Name	Operational Control (Yes/No)	Consequential? (Consequential / Non-Consequential)	MWh of Generation per Year	Type of Generation Reservoir/Inconduit	Is 100% of water passing through generation turbine used for water supply? yes/no	Please describe where in your system this generation occurs
	<i>drop down menu</i>	<i>drop down menu</i>		<i>drop down menu</i>	<i>drop down menu</i>	

Renewable Power Usage

Facility Name	Type (Solar, Wind, Geothermal, Tidal, Biomass, Other)	MWh of Generation per Year
	<i>drop down menu</i>	

GHGs

Urban Water Suppliers Total GHG Emissions		MtCO ₂ e
Water Operations Only		MtCO ₂ e / AF

End of Appendix O