Water Energy Guidance

For Voluntary Reporting in 2015 Urban Water Management Plans

Matt Correa
Department of Water Resources
Climate Change Program

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Water-Energy Intensity Guidance

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 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.

Goals

- Maximize urban water supplier participation
- Minimize level of effort required to report
- Accessible to suppliers of varying capacity
- Uniform methodology
- Useful to urban water suppliers
- Useful for filling in statewide information gaps

Benefits to Urban Water Suppliers

- Identify energy savings opportunities
- Calculate energy savings associated with water conservation programs
- Potential energy efficiency funding for water conservation programs
- Informing climate change mitigation strategies
- Benchmarking of energy use and the ability to compare energy use among similar agencies

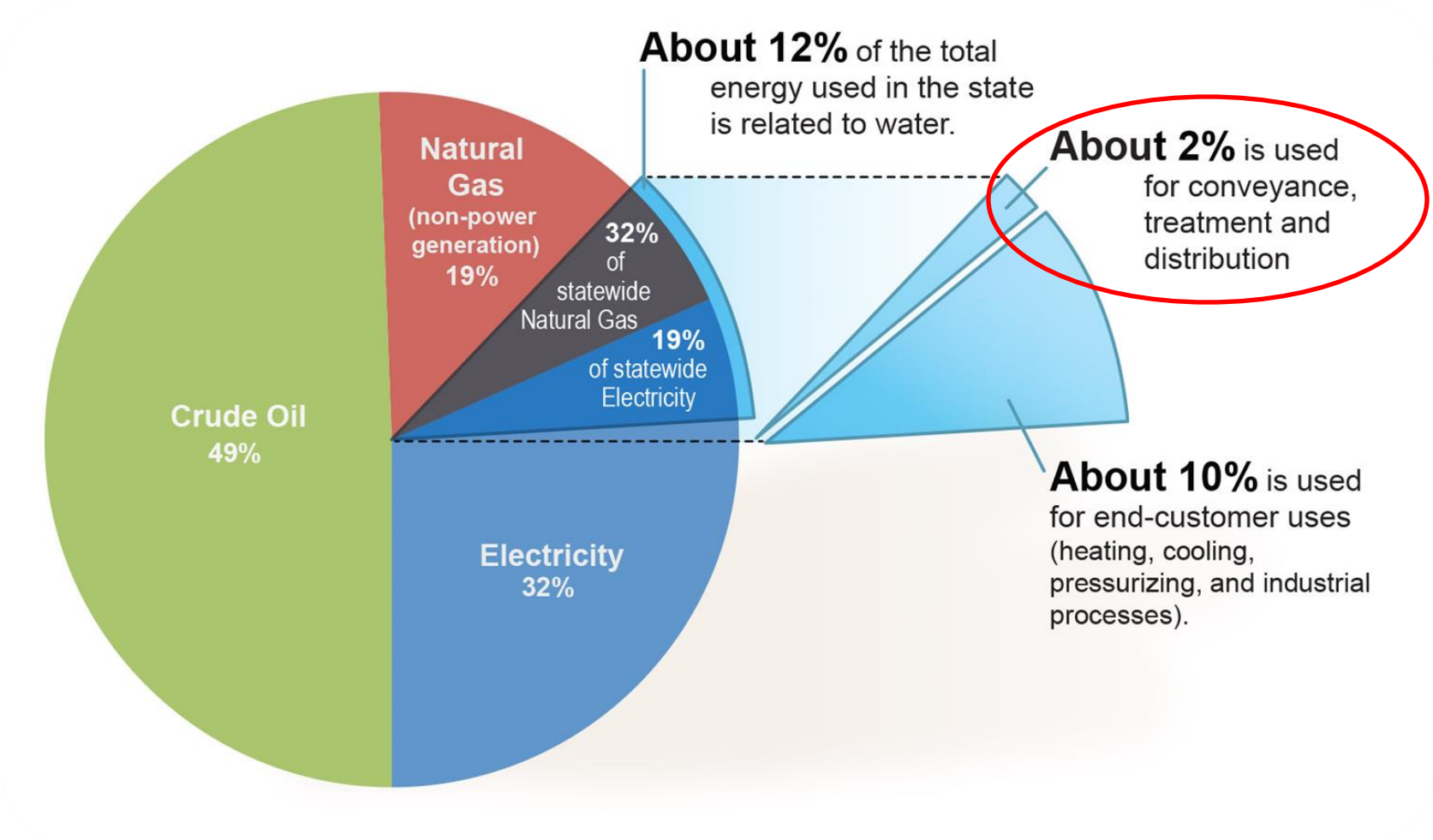
Energy Intensity Definition

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).

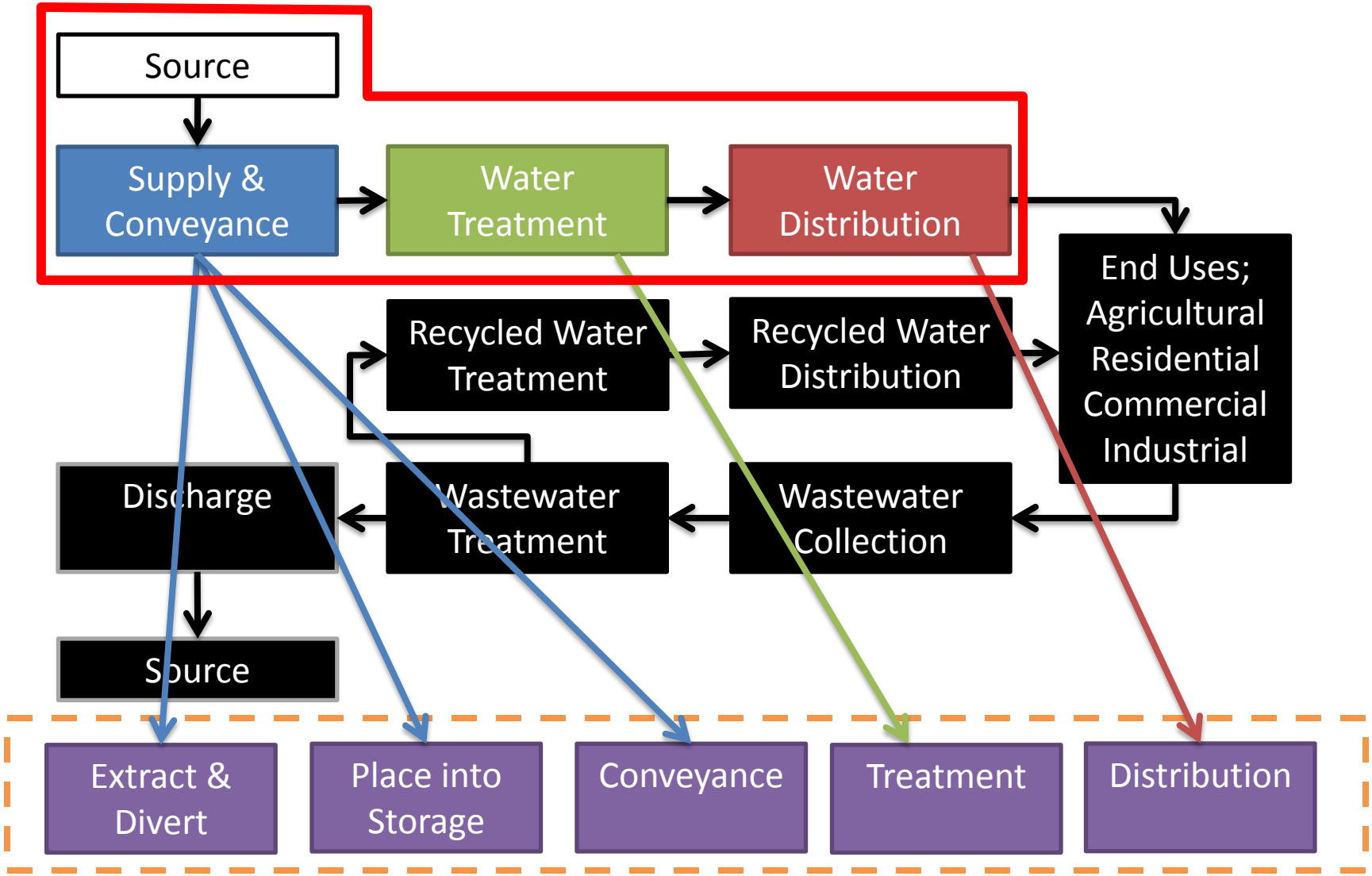
Key Concepts for Guidance

- One year reporting period (ideally 2015)
- Operational Control
- Water Management Processes
  - Extract and Divert
  - Place into Storage
  - Conveyance
  - Treatment
  - Distribution
- Hydropower
  - Consequential
  - Non-Consequential

Water – Energy Nexus



Water – Energy Nexus



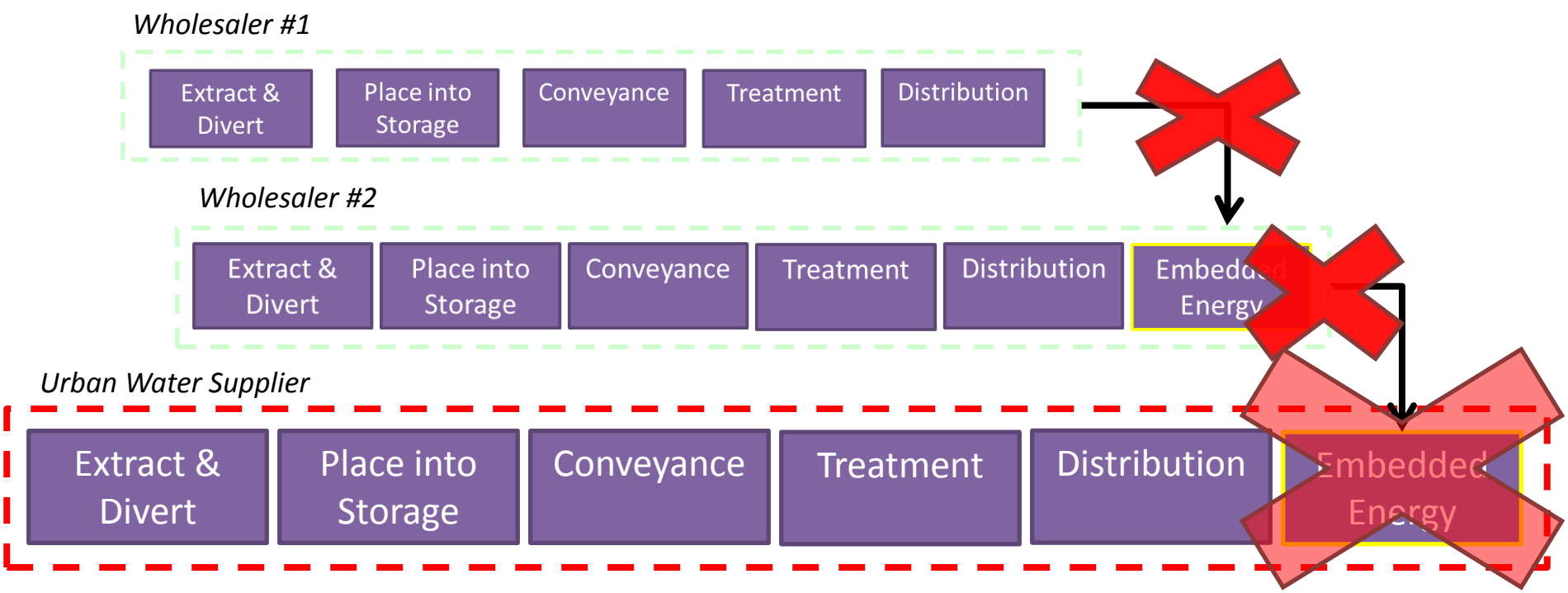
Revisions

- Eliminated:
  - Embedded energy calculations
  - Energy intensity by water supply source
- Added:
  - Non-consequential hydropower generation (optional)
  - Water management process specific volumes
  - Calculate EI by water delivery product (optional)
- Revised:
  - Total EI calculated using volume of water entering distribution system
  - Renewable energy reporting

Embedded Energy

(no longer included as reporting option)

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 by Water Supply Source

(no longer included as reporting option)

Table O-1A: Voluntary Energy Intensity (kWh)

Enter Start Date for Reporting Period	1/1/2015		Fraction of Water Supply	Volume Entering the Distribution System
End Date	12/31/2015			
Water Supply Category	*Supplying Agency / Basin*	Level of Treatment	*(%)*	*(AF)*
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)*

Hydropower

Consequential Hydropower Generation (kWh): 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.

Alamo Powerplant

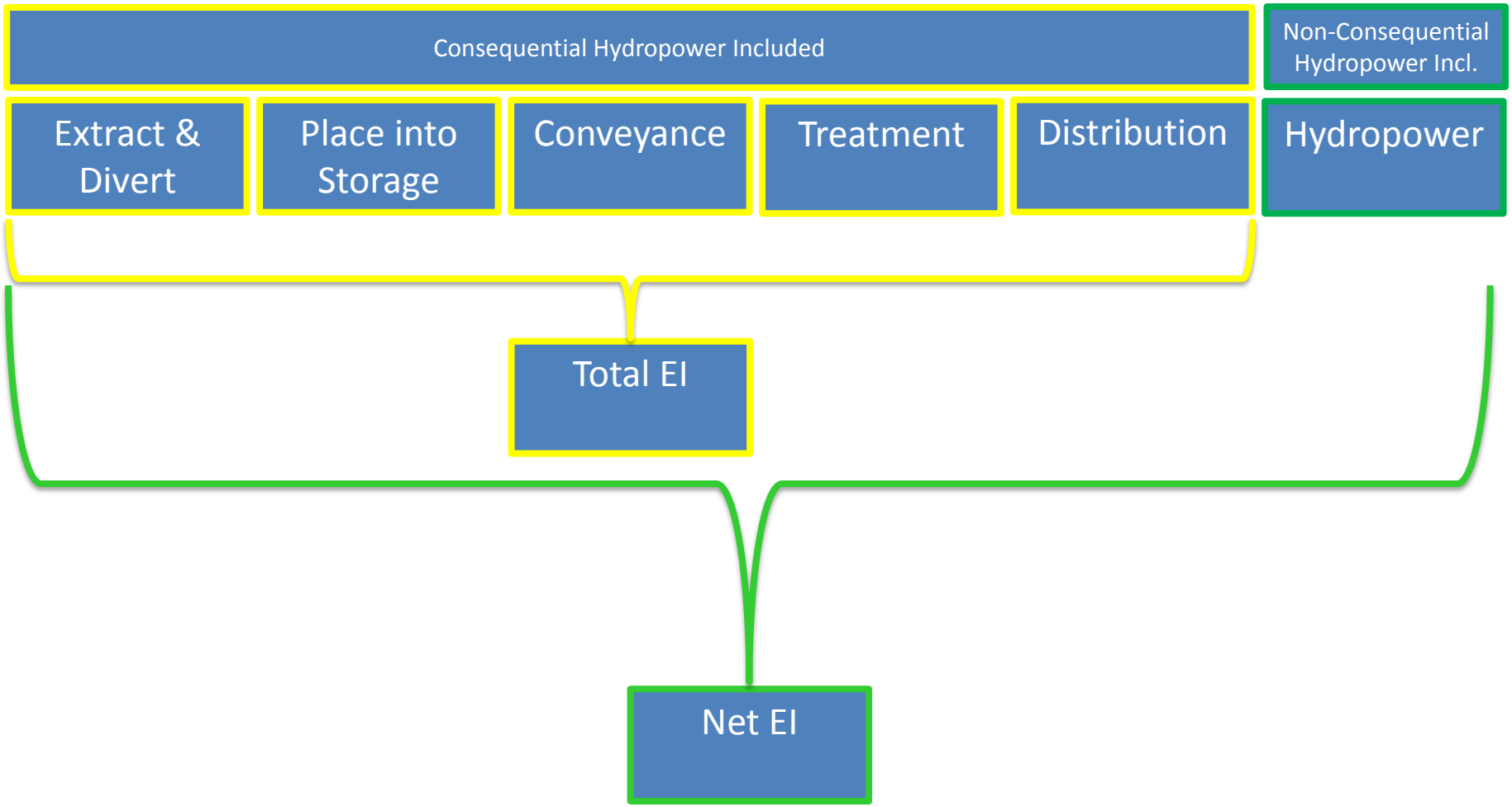
Hydropower

Non-Consequential Hydropower Generation:

Energy generated from falling water where the energy generation is not a direct consequence of water delivery. 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.

Hydropower

(Non-Consequential hydropower additional reporting option)



Reporting Options

Table O-1A: Water Supply Process Approach

Water Delivery Product (If delivering more than one type of product use Table O-1C)

dropdown menu

Table O-1A: Voluntary Energy Intensity - Water Supply Process Approach								
Enter Start Date for Reporting Period 10/1/2014 End Date 9/30/2015	Urban Water Supplier Operational Control							
	Water Management Process						Non-Consequential Hydropower (if applicable)	
	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total	Hydropower	Net
Volume of Water Entering Process (AF)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*	*calculated*	*manual input*	*calculated*
Energy Consumed (kWh)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*	*calculated*	*manual input*	*calculated*
Energy Intensity (kWh/AF)	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*

Table O-1B: Total Utility Approach

Water Delivery Product (If delivering more than one type of product use Table O-1C)

dropdown menu

Table O-1B: Voluntary Energy Intensity - Total Utility Approach			
Enter Start Date for Reporting Period 10/1/2014 End Date 9/30/2015	Urban Water Supplier Operational Control		
	Sum of All Water Management Processes	Non-Consequential Hydropower	
	Total	Hydropower	Net
Volume of Water Entering Process (AF)	*manual input*	*manual input*	*calculated*
Energy Consumed (kWh)	*manual input*	*manual input*	*calculated*
Energy Intensity (kWh/AF)	*calculated*	*calculated*	*calculated*

Reporting Options

Table O-1C: Multiple Water Delivery Products Approach

Table O-1C: Voluntary Energy Intensity - Multiple Water Delivery Products

Enter Start Date for Reporting Period 10/1/2014
End Date 9/30/2015

	Urban Water Supplier Operational Control							
	Water Management Process						Non-Consequential Hydropower (if applicable)	
	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total	Hydropower	Net
Total Volume of Water Entering Process (AF)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*	*calculated*	*manual input*	*calculated*
Retail Potable Deliveries (%)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*		*manual input*	
Retail Non-Potable Deliveries (%)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*		*manual input*	
Wholesale Potable Deliveries(%)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*		*manual input*	
Wholesale Non-Potable Deliveries (%)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*		*manual input*	
Agricultural Deliveries (%)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*		*manual input*	
Environmental Deliveries (%)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*		*manual input*	
Other (%)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*		*manual input*	
Energy Consumed (kWh)	*manual input*	*manual input*	*manual input*	*manual input*	*manual input*	*calculated*	*manual input*	*calculated*
Energy Intensity (kWh/AF)	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*	*calculated*

Water Delivery Product	*Production Volume (AF)*	*Total (kWh/AF)*	*Net (kWh/AF)*
Retail Potable Deliveries	*manual input*	*calculated*	*calculated*
Retail Non-Potable Deliveries	*manual input*	*calculated*	*calculated*
Wholesale Potable Deliveries	*manual input*	*calculated*	*calculated*
Wholesale Non-Potable Deliveries	*manual input*	*calculated*	*calculated*
Agricultural Deliveries	*manual input*	*calculated*	*calculated*
Environmental Deliveries	*manual input*	*calculated*	*calculated*
Other	*manual input*	*calculated*	*calculated*
All Water Delivery Types	*calculated*	*calculated*	*calculated*

Renewable Energy Reporting

Table O-3

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
	drop down menu	*drop down menu*		*drop down menu*	*drop down menu*	

Non-Hydropower Renewable Power Usage

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

GHGs

Urban Water Suppliers Total GHG Emissions		MtCO2e
Water Operations Only		MtCO2e / AF

Renewable Energy Reporting

Quantity of Self-Generated Renewable Energy

kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

dropdown menu

Data Quality Narrative:

Narrative:

Suggestions for Water Delivery Product Types

Table O-1C: Water Delivery Product Type

Water Delivery Product
Retail Potable Deliveries
Retail Non-Potable Deliveries
Wholesale Potable Deliveries
Wholesale Non-Potable Deliveries
Agricultural Deliveries
Environmental Deliveries
Other

Do you have suggested types to include/exclude in this list?

Questions