WATER ENERGY NEXUS See REGISTRY

The Water-Energy Nexus:

Measuring Energy and Greenhouse Gas Emissions in the Water Sector

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Welcome & Introductions



Alissa Benchimol Program Coordinator, Water-Energy



Ryan Cassutt Manager, Voluntary Reporting Programs



Agenda

- Introduction to TCR
- Introduction to the Water-Energy Nexus
- How to calculate a carbon footprint
- The Water-Energy Nexus Registry
 - Overview
 - How it works
 - Benefits of participation
- Conclusion and wrap-up



The Climate Registry

- Designs, builds, and operates greenhouse gas reporting programs and registries
- Provide resources & services to assist organizations to measure, report, and verify the GHGs in their operations



The Climate Registry

• Empower our generation to reduce its carbon footprint



Community of Members























What is a Carbon Footprint?



What is a Carbon Footprint?



The total amount of greenhouse gases that are emitted into the atmosphere each year by an organization or company, either directly or indirectly.

Greenhouse gases include:

- Carbon dioxide (CO2)
- Methane (CH4)
- Nitrous oxide (N2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF6)
- Nitrogen trifluoride (NF3)



GHG Sources





Scopes Examples







Scope 1 - Direct

Scope 2 - Indirect

Scope 3 – Other Indirect



Benefits of GHG Reporting to Companies

Be more competitive



Be prepared for future climate policy



Reporting your GHGs will help you save money and become more efficient

Gain advantage for future carbon market or regulation

Be a leader in the low-carbon economy



customers,

and other key

stakeholders

Be seen as a Se leader to and vendors,

Track your success



Set a baseline and track annual progress



Steps to Reporting a Carbon Footprint



Steps of the Reporting Process





Steps of the Reporting Process





Organizational Boundary

Drawing a box around the facilities and emissions sources within an inventory.





Steps of the Reporting Process





Example: Facilities and Sources

Entity Southern California Water Agency

Facility Headquarters Building– LA County

Source Electricity for lighting, computers, etc. purchased from SCE

Source Boilers – natural gas purchased from SoCal Gas

Source Refrigerators – refrigerant leakage

Source Forklifts – propane



Steps of the Reporting Process





Data Sources

- Scope 1
 - Fuel purchase records
 - Mileage logs
 - Continuous Emissions Monitoring System

- Scope 2
 - Utility bills
 - Building management
 - Renewable
 Energy Contracts

- Scope 3
 - Employee reimbursements
 - Expense reports
 - Annual surveys





Steps of the Reporting Process





Calculating your GHG Emissions

3 key data types necessary for calculating GHG emissions

Activity Data Quantity of fuel or material that, when used, emits GHGs



Emission Factor (EF) Converts activity data into amount of GHGs



Global Warming Potential (GWP) Converts GHG emissions into CO₂e values





Steps of the Reporting Process





Verification

Why verify my inventory?

There are many benefits to third-party verification, including:

Ensures conformance with the General Reporting Protocol

Improves credibility of data with key stakeholders

Identify reduction opportunities from an accurate baseline

Required for recognition opportunities Improve internal data management and processes



Water-Energy Nexus



What is the Water-Energy Nexus?





Energy Embedded in Water





Energy Intensity of Water











Water-Energy Nexus Registry



The WEN Registry - A voluntary GHG reporting program

Born out of California's SB 1425

- Clear and standardized GHG accounting guidance for the water sector
- Providing resources & services to assist organizations in California to measure, report, and verify the GHGs in their operations
- **Pathway** to publish verified emissions and performance metrics
- **Opportunities** to demonstrate and achieve recognition for emissions measurement and reductions





WEN Registry Program

Participating organizations have access to:









Stakeholder Outreach and Engagement





Water-Energy Nexus Registry Protocol

Key Components

- Boundary Considerations for Water Sector Reporting
- Water Sector-Specific Emissions Quantification
- Reporting Water-Related Data
- Water Sector Performance Metrics





Water-Energy Nexus Registry Protocol

- Water Sector Emissions Quantification
- Wastewater
- Biogas derived biofuels
- Reservoirs and other wetlands
- Upstream water supply chain



WATER SECTOR GHG EMISSIONS QUANTIFICATION

Reporting Requirements: General Reporting Protocol (GRP) GHG Emissions Quantification Methods Module

The majority of emissions associated with water management are the result of fossil fuel combustion or energy consumption. Standards for calculating these emissions are provided in the GRP's <u>GH-GE missions Quantification</u> <u>Methods Modula</u> and <u>Accounting for Renevable Energy Guidance</u>.¹ This section provides emissions quantification methods for sources unique to water managers, including wastewater and its co-products, reservoirs, and indirect emissions from the water support chain!

Local governments and electric power providers should refer to TCR's Local Government Operations Protocol and <u>Electric Power Sector Protocol</u>, respectively, for additional guidance on quantifying emissions from unique operations.⁹ Participants interested in reporting emissions management strategies or reductions (e.g., avoided emissions, offsets projects) may disclose these emissions estimates separately from the emissions inventory, and should refer to TCR's Tracking Emissions Over Time Guidance.

Participants that control one or more facilities subject to mandatory GHG emissions reporting by a regional, state, or federal program should ensure that inventories for these facilities are prepared in accordance with regulatory requirements, which may include mandated quantification methods, prescribed emission factors, or distinct inventory boundaries.¹⁰

- 9 Participants should rely on guidance provided in newer protocols where there is overlap with guidance provided in older protocols.
- 10 Where mandatory requirements exclude certain emission sources, participants may quantify emissions from those sources in accordance with TCR reporting requirements, or may exclude them from the reporting boundary, provided the exclusion is documented and justified.

WATER-ENERGY NEXUS REGISTRY PROTOCOL WATER SECTOR GHG EMISSIONS QUANTIFICATION



⁸ This includes guidance for measuring emissions associated with the heating and cooling of water (processes generally powered by fuel combustion, electricity, or refrigerants) during its use phase.

Water and Wastewater Operations Footprint





The Water Use Cycle Processes



Source: Water-Energy Nexus Registry Protocol (2019), California's Water Use Cycle



Water Sector Performance Metrics

- Understanding the GHG intensity of water operations and deliveries.
- Guidance for measuring annual GHG Intensity Metrics (GHG/AF) associated with water deliveries:

Emissions from Water Management (metric tons GHG) Volume of Water Delivered (AF)



Water Sector Performance Metrics

Communicating the annual average emissions intensity of water-related activities and products

Metrics

System Average

Water Product

Groundwater Basin Average

Biosolids Product

Biogas Product

Efficiency Metrics: Emissions intensity of an agency's operations. Doesn't consider upstream emissions.

Delivery Metrics: Total emissions embedded in water delivered to customers or treated. Includes emissions associated with upstream activities.



Applying Performance Metrics in the Water Sector

Combined, emissions intensity metrics can provide information about the overall efficiency of California's water system, and:

- Provide further context on the emissions impacts of different regions and water year types
- An understanding of how water management technology and techniques can help reduce the emissions intensity the water supply chain





Tracking Emissions Over Time

Monitor emissions associated with water management operations by smoothing out annual variability





Additional Water-Related Information

Contextualizing organization's GHG emissions data

Water or Wastewater Managers

System Narrative

Population Served or Number of Employees

Service Territory and System Boundary Maps

Water Conservation Targets and Savings

Water Loss Data

Consumers/End Users

Water use

Water consumption

On-site treatment or recycling

Discharges

Quantify Scope 3 emissions from acquired water



Communicating with Stakeholders

Allowing customers to understand emissions associated with purchased water products or coproducts.

 Provide emission factors to customers for calculating the indirect Scope 3 emissions associated with the water products they purchase.





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DWR's State Water Project Intensity of Water Supplies

Example: Energy Intensity of Water Supplies



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Achieving Reductions - Good Data Matters



A robust and ambitious GHG reduction target requires an accurate emissions baseline solidly underpinned by good data. This will enable organizations to make meaningful and measurable GHG reductions.



Without a basic understanding of GHG inventory, organizations are flying blind. You can't manage what you don't measure.



Common GHG reduction opportunities in the water sector

 Mobile emissions Modify fleet (hybrids, alternative fuel trucks, e.g., natural gas) Invest and promote vehicle fuel economy Reduce vehicle miles travelled 	 Energy efficiency and conservation Use LED lights and energy- efficient equipment On-peak/off-peak optimization 	OtherPumped hydro storageLeak detection
 Electricity Purchase renewable energy/green power Use of biogas and biosolids 	 Employee commuting Transit subsidy, carpooling/employee ride share programs and resources, bike to work/walk to work stipend 	



Case Study: CA Department of Water Resources

- In 2016, its total emissions were just over 1 million mtCO2e, marking a 69% reduction from 3.25 million mtCO2e in 2007.
- DWR has achieved average savings of 1.14E6 kWh per year – equivalent to \$87,000 in annual energy savings





Case Study: Irvine Ranch Water District



- From 2015-2017, IRWD's average emissions were ~58.9 mtCO2e – 5% percent below its average of ~62 mtCO2e from 2012-2014.
- Reductions resulting from energy efficiency projects that reduced total electricity usage in kWh by ~6 percent.
- IRWD encourages water conservation and offers incentive programs on use of effective water-saving devices and the adoption of drought-tolerant landscaping.



Water-Energy-Climate



Climate & Water Challenges

- Energy-intensive systems contributes to carbon emissions
- Increased variability in the water cycle
- Mismatches between water availability and needs
- Infrastructure design



Mitigation & Adaptation Strategies





Joining the WEN Registry

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WATER ENERGY NEXUS SEE REGISTRY

HOME ABOUT JOIN RESOURCES & TRAINING WATER-ENERGY LEADER

www.theclimateregistry.org/wenregistry

- It is open to organizations with operations in California at no cost to participate.
- Program and participation sponsored by CalEPA and administered by The Climate Registry.





Management



Guidance & Support

The Water-Energy Nexus Registry helps Participar

Participants use standardized guidance

For Organizations in California

Sponsored by the California Environmental



THANK YOU

