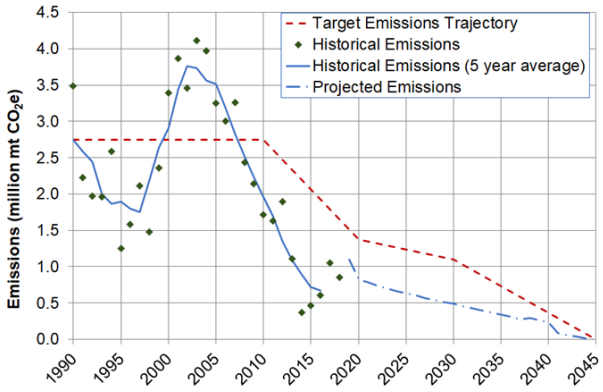
THE WATER ENERGY NEXUS PROTOCOL: DWR

Sacramento, California



DWR's greenhouse gas historical emissions (blue solid), target future trajectory (red dash), and projected emissions (blue dashed). DWR emissions are already well below its target emissions.

PROJECT DESCRIPTION

The California Department of Water Resources (DWR) is a wholesale provider of water to 27 million residents and 750,000 acres of farmland. The DWR also generates approximately 1,700 Megawatts (MW) of power, mostly from its clean hydroelectric generating resources. The DWR, through the California State Water Project, is the single largest user of electric power in California, and its carbon footprint is 90% attributable to Scope 2 emissions from electricity consumed to pump water throughout the state. Scope 2 emissions are indirect greenhouse gas (GHG) emissions associated with the purchase of electricity, steam, heat or cooling. For transparency and educating the public about GHG emissions associated with water operations, DWR partnered with The Climate Registry (TCR) to develop a water specific GHG protocol, called the Water Energy Nexus (WEN) protocol.

Over the course of a year of collaboration with numerous other stakeholders, DWR and TCR developed the first-ever water utility-specific GHG protocol for California water utilities. The collaboration created metrics that California water utilities can use for benchmarking GHG emissions, to assess performance relevant to other agencies, to target areas for reductions and for transparency with the public. For instance, one metric evaluates carbon emissions across the whole water enterprise per volume of water delivered, a metric referred to as 'carbon intensity.' Tracking carbon intensity allows for a water utility to track how energy efficient it is with its water deliveries, regardless of whether the utility is delivering more or less water compared to historical. For example, if a utility with growing customer demand needs to deliver more water compared to the past (and thus uses more total energy compared to the past), the carbon intensity metric allows for an evaluation of the energy efficiency that the larger volume of water is being delivered with.

This carbon intensity analysis shows the efficiency of the delivery system regardless of whether the total energy usage is increasing or decreasing and allows customers to better understand and compare the energy delivery efficiency of water they purchase. Other metrics break down the components of the water cycle to identify which part of the cycle has the highest carbon intensity, and thus enables DWR to understand which part of the cycle to focus to target for carbon intensity reductions.

WUCA
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MAKING THE PROJECT HAPPEN

State regulations prompted proactive action by DWR. With the passage in 2006 of Assembly Bill 32 which requires the state to reduce its greenhouse gas emissions to 1990 levels by 2020, and the fact that DWR was the state's single largest energy user, DWR focused on reductions. Then Senate Bill 1425 passed in 2016 that explicitly required the California Environmental Protection Agency to oversee the development of a registry for greenhouse gas emissions resulting from the water-energy nexus. Further policies, such as the CA Water Code (Urban Water Management Planning Act of 1983, Ch. 1009, Sec. 1) focused attention on the challenge that water utilities are oftentimes large energy users and energy producers are frequently large water users. The CA Water Code requires that all urban water suppliers develop an urban water management plan, and as of January 2019, these urban water management plans are required to include estimates of the amount of energy used for different aspects of the water cycle. The code also encourages a voluntary calculation or estimation of the energy intensity of the urban water system (See Section 10631.2).

Strong organizational leadership ensured DWR action. The vision and path to address the GHG emission reduction challenge was set by a forward-thinking leader at the executive level, and a strong group of advocates at staff and mid-management levels. Also, a key element was having staff with the technical talent to enable the Department to execute the Director's vision.

FINANCES

The partnership to develop the WEN protocol consisted of a year of staff time meeting twice a month. Membership to TCR is also required for reporting GHG emissions, and the membership fee is scaled. The scale is based on whether the entity is commercial or government and the size of the organization's annual budget. Membership for government agencies ranges from $750 to $5,500 for agencies with an annual operating budget under $20 million for the former and over $2 billion dollars for the later.

IMPLEMENTATION

To track the energy used for the different aspects of the water cycle and use it to develop water specific WEN metrics, DWR had to (1) Identify all energy meters across the organization, (2) find all energy bills for each facility (a challenge with hundreds of facilities), (3) create a centralized database to track water and energy efficiency, and (4) add submeters because buildings were not separated from the plant energy meters (a requirement). A benefit of taking these actions was that DWR was able to locate and mitigate instances where it was being over-billed for electricity.

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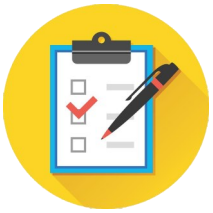
CHALLENGES

A potential challenge for any utility in tracking GHG emissions is having the technical expertise to calculate GHG emissions associated with various equipment and processes. However, there are various resources and external services available to help a utility get started (see links in the "Additional Resources" section). DWR's size and staffing capacity made it possible for them to take the steps necessary to understand where emissions could be reduced.

> ***You can't manage what you don't measure –***
>
> ***Peter F. Drucker***

ADVICE AND LESSONS LEARNED



DWR credits using TCR's GHG reporting guidance and the WEN protocol with enabling it to more accurately quantify its emissions and determine what kinds of projects and upgrades would most effectively reduce emissions. It helped to take advantage of TCR and the WEN protocol because it provides guidance, trainings, and a process for utilities to follow. A new user doesn't have to recreate the wheel.

Additionally, because DWR was already collecting energy data, it was prepared in advance of legislative actions of Senate Bill 1425. Being proactive allowed them to be prepared for regulatory action.

ADDITIONAL RESOURCES

- The Climate Registry Water Energy Nexus for California
  https://www.theclimateregistry.org/programs-services/california-water-energy-nexus-registry/
- The Climate Registry Resources & Training
  https://www.theclimateregistry.org/waterenergynexusregistry/resources-training/
- DWR Unveils New Benchmark Toward Reducing Carbon Emissions
  https://water.ca.gov/News/Blog/2020/May/Carbon-Emissions
- State Water Project Energy Intensity Map
  https://dwr.maps.arcgis.com/apps/Styler/index.html?appid=c112a21431884158b58fc5564e66c439

LEARN MORE

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