

## **WR1: Limit GHGs from POTWs**

### **Brief Summary:**

This measure will explore regulatory action to reduce GHG emissions from publicly owned treatment works (POTWs), as well as work with POTWs to obtain funding for green infrastructure or demonstration projects. Finally, this measure will explore the potential to streamline the Air District's permitting process relating to POTW permits.

### **Purpose:**

The purpose of this measure is to reduce direct emissions of nitrous oxide and methane, related to water and wastewater treatment. This measure is also intended to promote additional emission reduction opportunities within the water sector, including the potential for methane capture and re-use at POTWs through biogas recovery systems.

### **Source Category:**

Stationary sources – water and wastewater treatment.

### **Regulatory Context and Background:**

California's water system includes a complex infrastructure that has been developed to support the capture, use, conveyance, storage, conservation, recycling and treatment of water and wastewater. Statewide, the majority of developed water resources (80 percent) are used for agriculture. However, a significant amount of water is also used to support residential, commercial, and industrial activities. In the Bay Area, over 400 billion gallons of water is used each year. This water use results in air pollutant emissions, including greenhouse gases (GHG), criteria air pollutants, and toxic air contaminants (TACs).

Greenhouse gas emissions from the water sector are primarily associated with the energy required to pump, convey, recycle, and treat water and wastewater throughout the Bay Area; these are referred to as *indirect* GHG emissions. Greenhouse gases are also *directly* emitted from POTWs which treat water and wastewater. Greenhouse gases are emitted from wastewater collection, treatment, and storage systems through the volatilization of organic compounds (VOCs) at the liquid surface. Methane is emitted from wastewater when it is treated in anaerobic conditions. Nitrous oxide (N<sub>2</sub>O) emissions are also emitted during the wastewater treatment process. In addition, combustion sources at POTWs emit GHGs, as well as criteria air pollutants and TACs.

The water sector also provides opportunities. Greenhouse gas emissions, primarily methane, can be captured and reused in POTWs through biogas recovery systems. Anaerobic digestion captures the methane that might otherwise be released into the atmosphere. This biogas can be used on-site for heat, electricity, or mechanical energy, or can be purified for off-site vehicle use or use as a natural gas substitute. For example, the Las Gallinas Valley Sanitary District's wastewater treatment plant in San Rafael operates a biogas-fueled internal combustion engine which generates renewable heat and power for on-site use.

The Air District regulates criteria pollutants and TACs at POTWs, and could expand these activities to include rules to reduce GHGs at POTWs as well. The Air District intends to work closely with POTWs to explore regulatory action to reduce GHGs. The first step in this process is to better understand total GHG emissions at each POTW. The Air District will also increase its efforts by exploring potential monetary incentives and/or assisting POTWs in securing funding to implement biogas recovery systems and to foster other emerging ideas and technologies.

**Implementation Actions:**

Air District will:

- Initiate a process to better understand and quantify GHG emissions at POTWs.
- Explore rulemaking to reduce GHGs emitted directly within POTWs.
- Work with the POTW operators and existing organizations such as the Bay Area Clean Water Agencies (BACWA) to obtain funding for the development of green infrastructure in POTWs.
- Collaborate with POTWs on potential streamlining of the Air District’s permitting processes to promote biogas recovery, as well as address potential cross-media regulatory issues such as State Water Resources Control Board regulations on nutrient removal (which may increase GHG emissions).

**Emission Reductions:**

Emission reductions will be identified and quantified during the formal rule development phase of this control measure, if rulemaking is pursued.

**Emission Reduction Methodology:**

Emission reductions will be identified and quantified during the formal rule development phase of this control measure, if rulemaking is pursued.

**Emission Reduction Trade-offs:**

Emission reduction trade-offs will be identified and quantified during the formal rule development phase of this control measure, if rulemaking is pursued.

**Cost:**

Implementation of this control measure may include costs to POTWs for new equipment and technologies. These costs could be offset by securing grant funding or financing. Costs could also be offset if projects included production and use of on-site energy. Precise cost estimates (pertaining to POTWs and the Air District) will be identified and quantified during the formal rule development phase of this control measure, if rulemaking is pursued.

**Co-Benefits:**

Aside from reducing GHGs, this measure has the potential to provide economic benefits to POTWs. This measure will promote biogas recovery systems in wastewater treatment facilities. Benefits of biogas recovery, aside from reduced emissions of GHGs, include production of on-site renewable power (potentially at a cost below retail electricity), and enhanced power reliability.

**Issues/Impediments:**

The BACWA Air Issues and Regulations Committee has expressed concern regarding potential Air District regulatory action targeting POTWs. According to BACWA, Air District regulations inadvertently discourage biogas recovery and use as a fuel substitute. For example, Air District Best Performance Standards for limiting air emissions from engines and boilers are difficult for bio-gas fired engines and boilers to meet cost-effectively. The Air District is therefore investigating these potential conflicts through implementation of this control measure.

**Sources:**

1. US EPA, “Opportunities for and Benefits of Combined Heat and Power at Wastewater Treatment Facilities” April 2007:  
[http://water.epa.gov/infrastructure/sustain/upload/2009\\_5\\_13\\_wwtf\\_opportunities.pdf](http://water.epa.gov/infrastructure/sustain/upload/2009_5_13_wwtf_opportunities.pdf)
2. California Air Resource’s Board Scoping Plan:  
[http://www.arb.ca.gov/cc/scopingplan/2013\\_update/first\\_update\\_climate\\_change\\_scoping\\_plan.pdf](http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf)
3. “Bay Area Integrated Regional Water Management Plan”, September 2013:  
[http://bairwmp.org/docs/2013-bairwm-plan-update/2013-final-plan/San%20Francisco%20Bay%20Area%20IRWMP%20Final\\_September%202013.pdf/view](http://bairwmp.org/docs/2013-bairwm-plan-update/2013-final-plan/San%20Francisco%20Bay%20Area%20IRWMP%20Final_September%202013.pdf/view)
4. Letter dated June 6, 2014, from Bay Area Clean Water Agencies to Air District.
5. CAPCOA, Organic Waste Digestion Project Protocol Version 2.0:  
[https://www.valleyair.org/notices/Docs/2013/12-17-13\\_CAR/provisionally-approved-organic-waste-digestion-protocol.pdf](https://www.valleyair.org/notices/Docs/2013/12-17-13_CAR/provisionally-approved-organic-waste-digestion-protocol.pdf)
6. California Air Resource’s Board Scoping Plan:  
[http://www.arb.ca.gov/cc/scopingplan/2013\\_update/first\\_update\\_climate\\_change\\_scoping\\_plan.pdf](http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf)
7. SPUR, “The Future of Water”, March 2013:  
<http://www.spur.org/publications/article/2013-03-07/future-water>

## **WR2: Support Water Conservation**

### **Brief Summary:**

This measure will promote water conservation, including reduced water consumption and increased on-site water recycling, in residential, commercial and industrial buildings for the purpose of reducing greenhouse gas (GHG) emissions.

### **Purpose:**

The purpose of this measure is to reduce indirect emissions of GHGs associated with the electricity use required to capture, use, convey, store, conserve, recycle and treat water and wastewater in the Bay Area.

### **Source Category:**

Water conveyance and wastewater treatment.

### **Regulatory Context and Background:**

California's water system includes a complex infrastructure that has been developed to support the capture, use, conveyance, storage, conservation, recycling and treatment of water and wastewater. Statewide, the majority of developed water resources (80 percent) are used for agriculture. However, a significant amount of water is also used to support residential, commercial, and industrial activities. The State Water Resources Control Board (State Water Board) ensures high water quality by setting statewide policy for waste and storm water discharge. Regional water quality control boards make water quality decisions for their regions, issuing permits and setting standards for water discharge.

In 2009, Governor Schwarzenegger signed into law the Water Conservation Act, which requires that urban water demand be reduced by 20 percent by the year 2020. The Act also requires urban water suppliers to calculate their baseline water use and set water use targets for 2015 and 2020 based on guidance from the Department of Water Resources (DWR). A report to the Legislature on progress meeting these targets is scheduled for 2016. On April 1, 2015, Governor Brown issued an Executive Order directing the State Water Board to implement mandatory water reductions in urban areas to reduce urban water use by 25 percent statewide. In response, the State Water Board adopted an emergency conservation regulation setting this target, taking effect on May 18, 2015. The Governor's Executive Order also directed DWR to update the State's Model Water Efficient Landscape Ordinance, which promotes the benefits of landscaping practices that go beyond traditional water conservation practices. Local agencies had until early 2016 to adopt the Ordinance or a local ordinance that is at least as effective in conserving water.

In the Bay Area, over 400 billion gallons of water is used each year. Energy associated with this water consumption results in air pollutant emissions, including GHGs, criteria air pollutants, and toxic air contaminants. Greenhouse gas emissions from the water sector are primarily associated with the energy required to pump, convey, recycle, and treat water and wastewater throughout the Bay Area. These are referred to as *indirect* GHG emissions, as they are

generated at electric power plants, rather than at the point of water use. Greenhouse gases are also *directly* emitted from publicly owned treatment works (POTW) that treat water and wastewater (see WR1: Limit GHGs from POTWs).

The Air District does not have regulatory authority over water consumption and the resulting indirect GHG emissions. Therefore, the Air District is taking a supportive and collaborative role to encourage reductions in water use throughout the Bay Area.

**Implementation Actions:**

Air District will:

- Support efforts of local governments in achieving and exceeding state water use reduction goals by:
  - Disseminating best practices that reduce water consumption and increase on-site water recycling in new and existing buildings;
  - Encouraging the adoption of water conservation ordinances; and
  - Incorporating public outreach and education on water conservation into the Air District's outreach programs.
- Incorporate best practices for water use into local plan guidance, CEQA guidance, and other resources for cities and counties.

**Emission Reductions:**

Due to the voluntary nature of this measure, estimating potential emission reductions would rely on many assumptions and speculations, and is therefore not possible at this point in time.

**Emission Reduction Trade-offs:**

None identified.

**Cost:**

Costs would vary. Available resources would be determined through the Air District's budget process.

**Co-Benefits:**

Aside from reducing indirect GHGs, this measure has the potential to reduce water consumption throughout the Bay Area which is increasingly important during periods of drought. Water conservation and recycling will continue to be crucial as population and demand increase. In addition, a Stanford University study has argued that the on-going drought in California is linked to climate change, which could mean that future periods of drought could be more frequent or prolonged. Thus, water conservation helps reduce GHGs *and* is a critical adaptation strategy.

**Issues/Impediments:**

It is not anticipated that there would be significant impediments due to the voluntary nature of this control measure.

**Sources:**

1. California Air Resource's Board Scoping Plan:  
[http://www.arb.ca.gov/cc/scopingplan/2013\\_update/first\\_update\\_climate\\_change\\_scoping\\_plan.pdf](http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf)
2. SPUR, "The Future of Water", March 2013:  
<http://www.spur.org/publications/article/2013-03-07/future-water>
3. Bay Area Integrated Water Management Plan, September 2013:  
[http://bairwmp.org/docs/2013-bairwm-plan-update/2013-final-plan/San%20Francisco%20Bay%20Area%20IRWMP%20Final\\_September%202013.pdf/view](http://bairwmp.org/docs/2013-bairwm-plan-update/2013-final-plan/San%20Francisco%20Bay%20Area%20IRWMP%20Final_September%202013.pdf/view)
4. Bulletin of the American Meteorological Society, "The Extraordinary California Drought of 2013/2014: Character, Context, and the Role of Climate Change" Tsiang, M., Haugen, M., Singh, D., Charland, A., Rajaratnam, B., Diffenbaugh, N. S. 2014; 95 (9): S3-S7

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