

Appendix C Environmental Issues

C.1 Overview

LADWP's mission includes a role as an environmentally responsible public agency. LADWP continues to develop and implement programs to improve the environment, including:

- Increasing the use of renewable energy to meet the needs of LADWP's customers (20 percent by December 31, 2010 and 35 percent by December 2020 through the development of wind, solar, geothermal, and biomass energy sources and acquiring the associated transmission required to transmit such energy to Los Angeles.
- Prioritizing the use of Energy Efficiency (EE), Demand Side Management (DSM), renewable Distributed Generation (DG), and other renewable resources.
- Continuing the modernization of LADWP's in-basin generating stations, including the repowering of four older, less-efficient utility steam boiler units with advanced gas turbine generating units.

This Appendix provides information on a number of environmental issues and policies including oxides of nitrogen (NO_x) emissions, GHGs and climate change, power plant once-through cooling, (OTC), and mercury emissions.

C.2 Emissions of Oxides of Nitrogen (NO_x)

Oxides of nitrogen, or NO_x, is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Many of the oxides of nitrogen are colorless and odorless. However, one common pollutant, nitrogen dioxide (NO₂), is a major precursor for "smog," which can be seen as a reddish-brown layer over many urban areas. NO_x is also a precursor to the formation of ozone, and the Los Angeles basin has the one of the highest ozone levels in the United States.

Oxides of nitrogen form when fuel is burned at high temperatures, as in a combustion process. Figure C-1 shows the primary man-made sources of NO_x as reported by the United States Environmental Protection Agency (U.S. EPA) in 2008.

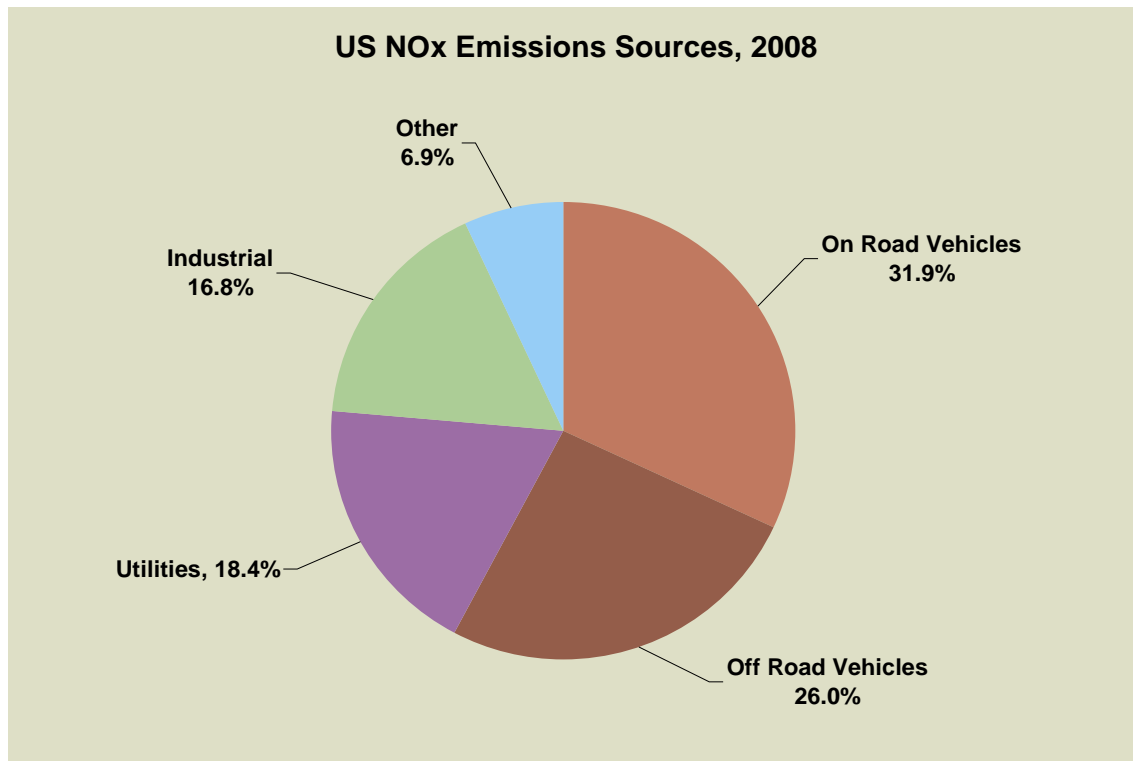


Figure C-1: Source: U.S. Environmental Protection Agency

The Los Angeles area (including Orange, San Bernardino, and Riverside counties) has some of the worst air quality in the United States due in part to the level of NOx emissions. The majority of NOx emissions result from mobile sources such as on-road and off-road vehicles, and not stationary sources such as power plants. The California Air Resources Board (CARB) projects in its 2009 Almanac of Emissions and Air Quality that emissions in the South Coast Air Quality Management District (SCAQMD) in 2010 will be 742 tons of NOx per day. This is down substantially (35 percent) from 10 years ago due to greater regulation of stationary sources and more efficient vehicles. Roughly 90 percent of these emissions are from vehicles, as shown in Figure C-2.

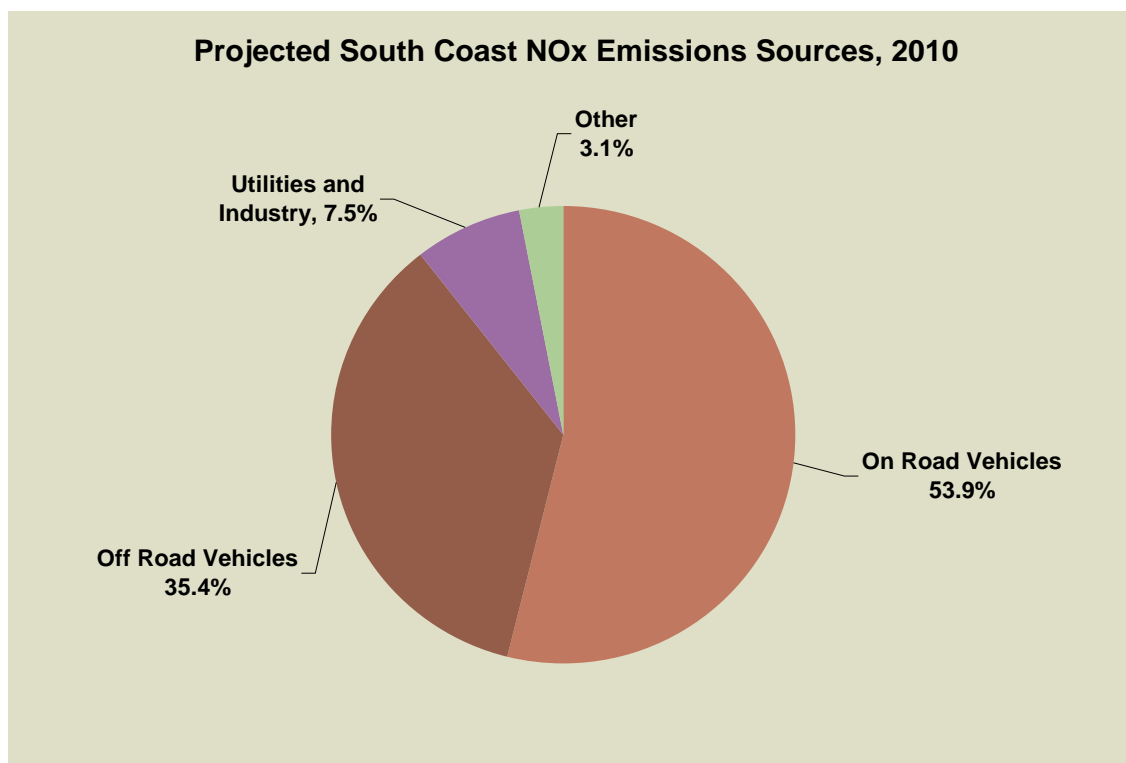


Figure C-2: Source: California Air Resources Board

For comparison, the average daily NOx emissions from LADWP’s in-basin generating stations (Harbor, Haynes, Scattergood, and Valley) combined was 0.65 short tons of NOx per day in 2008, which represents 0.08 percent of the 2008 average daily NOx emissions in the South Coast Air Basin. The low NOx emissions from LADWP’s in-basin generating stations are due to the use of natural gas at all facilities and the installation of advanced emissions control systems.

Forecasts project that South Coast Air Basin NOx emissions will continue to decrease over the next decade. Targets for 2015 are 580 tons per day, while the 2020 target is 468 tons per day. The majority of this reduction is expected to come from a reduction in vehicle emissions; total tons emitted from stationary sources during this time period are only projected to decrease from 56 tons per day to 52 tons per day.

A major tool employed by the SCAQMD to reduce NOx emissions from stationary sources is the RECLAIM (Regional Clean Air Incentives Market) trading program. RECLAIM is a market-driven regulatory program started in 1994 that superseded the SCAQMD’s existing NOx rules for facilities with NOx emissions exceeding 4 tons per year. These “command and control” rules limited the emission rates of stationary combustion equipment and have been replaced by a facility-wide emissions cap, which gradually declines each year. Facilities receive emission allocations, called RECLAIM Trading Credits (RTCs), in which one credit grants the right to emit one pound of NOx. Facilities must have sufficient RTCs in their RECLAIM facility accounts to cover their actual emissions. RECLAIM is a market-driven program because the RTCs can

be bought and sold, which allows for the emissions reductions to be made in the most cost-effective manner.

All of LADWP's in-basin power plants now have advanced pollution control equipment, which reduces NOx emissions by at least 90 percent. However, the allocation of RTCs to each of LADWP's power plants declines over time, and the entire future allocation of RTCs was reduced about 22.5 percent by the SCAQMD in 2005. Using the resource planning studies and other considerations, the environmental assessment results show that the projections meet LADWP's NOx goals.

C.3 Greenhouse Gas Emissions and Climate Change

C.3.1 Federal Efforts To Address Climate Change

Federal Climate Change Legislation

Several key Congressional bills have been proposed over the past several years to regulate GHG emissions. In June 2009, the U.S. House of Representatives took historic action with the passage of H.R. 2454: The American Clean Energy and Security Act of 2009, introduced by Representatives Waxman (D-CA) and Markey (D-MA), which set a goal of 17 percent below 2005 levels by 2020, 83 percent by 2050. The U.S. Senate considered a similar cap-and-trade bill, S. 1733: The Clean Energy Jobs and American Power Act, introduced by Senators Kerry (D-MA) and Boxer (D-CA), which set a goal of 20 percent below 2005 levels by 2020, 83 percent by 2050. S. 1733 passed out of the Senate Environment and Public Works Committee, but to date lacks adequate support for further consideration by the full Senate. Other proposals have since emerged that suggest different approaches such as the Discussion Draft introduced by Sens. John Kerry (D-MA) and Joseph Lieberman (I-CT) as a step in building consensus in the Senate. Another recent proposal, the Carbon Limits and Energy for America's Renewal Act, introduced by Senators Cantwell (D-WA) and Collins (R-ME), focuses on a cap-and-dividend approach that returns a portion of auction revenues to consumers directly.

Federal Regulation of Greenhouse Gases Under the Clean Air Act

In the absence of federal legislation, GHG emissions may still be regulated administratively through the U.S. EPA through its authority under the Clean Air Act. In April 2007, the Supreme Court ruled in *Massachusetts v. EPA* that the U.S. EPA must make a determination when it comes to regulating motor vehicle emissions. The Supreme Court ruling gives the U.S. EPA the authority to regulate GHGs under the Clean Air Act for mobile and stationary sources. On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator found that the current and projected concentrations of the six key well-mixed GHGs--carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)--in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG emissions which threatens public health and welfare.

In December 2009, U.S. EPA published its findings in the *Federal Register*, stating: “The Administrator finds that greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare.” The impacts of climate change that will cause harm to human health and welfare of current and future generations include but are not limited to: increased drought; more heavy downpours and flooding; more frequent and intense heat waves and wildfires; greater sea level rise; more intense storms; and harm to water resources, agriculture, wildlife, and ecosystems.

EPA Tailoring Rule for Regulating Stationary Sources under the Clean Air Act:

The Environmental Protection Agency finalized its “Tailoring Rule,” which establishes a phased timetable for implementing Clean Air Act permitting requirements for GHG emissions from large stationary sources. The rule provides that Prevention of Significant Deterioration (PSD) requirements will first apply to GHG emissions effective January 2, 2011. This initial phase will apply to new and modified facilities that would already be required to obtain PSD permits as a result of their non-GHG emissions, and whose construction will result in an increase in GHG emissions of at least 75,000 tons CO_{2e} per year. A second phase of the program will commence on July 1, 2011, and will impose PSD requirements on new facilities that emit at least 100,000 tons CO_{2-e} per year, as well as modified facilities whose emissions will increase by at least 75,000 tons CO_{2-e} per year. EPA will initiate a new rulemaking in 2011 to establish emission thresholds and permitting requirements to take effect beginning in 2013. In addition to these PSD requirements, the Tailoring Rule sets comparable emission thresholds and timetables for new and existing facilities to obtain operating permits under Title V of the Clean Air Act. It is anticipated that LADWP’s Scattergood generating station will be subject to the new permitting requirements under the EPA’s Tailoring Rule insofar as the permit will be completed in the 2011 timeframe.

C.3.2 Western Climate Initiative (WCI)

Originally established by the Western Governor’s Association in February 2007, the WCI is currently a collaboration of California and four Canadian provinces (British Columbia, Manitoba, Quebec, and Ontario) to reduce GHG emissions 15 percent below 2005 levels by 2020 from their power generation, industrial, petrochemical, and transportation sectors. The primary mechanism for achieving this reduction would be through a regional cap-and-trade program.

The WCI released its design recommendations for implementing a regional cap-and-trade program in September 2008.⁵ Under this draft plan, entities and facilities annually emitting 10,000 metric tons or more of the regulated GHGs, measured in CO_{2e}, will have to begin reporting their 2010 emissions in early 2011. The cap-and-trade program will begin in 2012 for power generation, industrial, and petrochemical companies emitting 25,000 metric tons or more of CO_{2e} each year. Regulation of transportation sector emissions will not begin until 2015. A final model trading rule is due to be released in 2010.

⁵ Western Climate Initiative, *Design Recommendations for the WCI Regional Cap-and-Trade Program*, (September 2008), available at <http://www.westernclimateinitiative.org/component/remository/func-startdown/14/>.

C.3.3 California Efforts To Address Climate Change

This section describes California’s GHG emissions inventory and policies and actions to reduce GHG emissions.

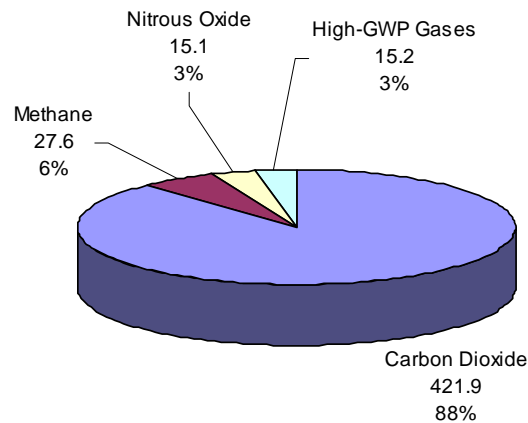


Figure C-3: California GHG Emissions by GHG (2006)
 Source: California Air Resources Board

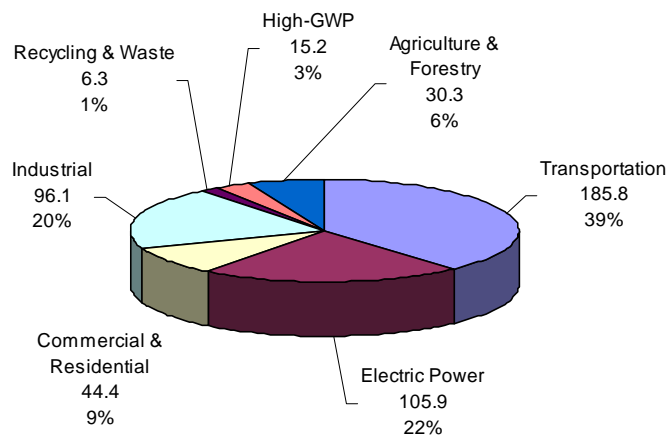


Figure C-4: California GHG Emissions by Sector (2006)
 Source: California Air Resources Board

Figure C-3 and Figure C-4 show California's 2006 statewide GHG emissions by pollutant and by sector. Based on the CARB GHG emissions inventory, California's statewide GHG emissions were 426 million metric tons CO₂ equivalent in 1990, 473 million metric tons CO₂ equivalent in 2000, and 480 million metric tons in 2006. If California did nothing to control GHG emissions, it was projected that GHG emissions would be 532 million metric tons CO₂ equivalent in 2010, and 600 million metric tons CO₂ equivalent in 2020.

California Governor's Executive Order S-3-05

On the state level, Governor Schwarzenegger signed Executive Order #S-3-05 on June 1, 2005 which established the following GHG targets:

- By 2010, reduce emissions to 2000 levels
- By 2020, reduce emissions to 1990 levels
- By 2050, reduce emissions to 80 percent below 1990 levels.

California SB 1368: Greenhouse Gas Emissions Performance Standard

SB 1368 was signed into law on September 29, 2006 and requires the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) to establish a GHG emissions performance standard and implement regulations for all long-term financial commitments in baseload generation made by load serving entities (LSEs) including local publicly-owned electric utilities (POUs). The CPUC adopted its regulations for the investor-owned utilities and other LSEs in January, 2007. The CEC adopted similar regulations for POUs in August 2007. Strategies implemented by the CPUC and CEC under SB 1368 are expected to result in a combined GHGs emissions reduction of over 15 million metric tons (MMT) CO_{2e} by 2020. The GHG emissions performance standard is based on the emissions profile of combined-cycle, natural gas fired generating units. The CEC's regulations establish an emissions performance standard of 1,100 pounds (0.5 metric tons) of CO₂ per megawatt hour (MWh) of electricity. This standard was established in consultation with the CPUC and the CARB and is the same as the emissions performance standard adopted by the CPUC for the LSEs.

The broad objectives of these regulations are to internalize the significant and under-recognized cost of emissions and to reduce potential financial risk to California consumers for future emission control costs. Specifically, these regulations are intended to prohibit any LSE from entering into or renewing a long-term financial commitment for baseload generation that exceeds the GHG emissions performance standard, currently set at 1,100 pounds per MWh.

These regulations would require POUs, within 10 days of making a long-term financial commitment in a baseload facility, to certify to the CEC that such a commitment complies with these regulations and provide back-up material to support such commitment. The regulations then provide for CEC review of these compliance filings and a determination of whether or not the commitment, and the underlying facility as described in the commitment, complies with these regulations. Additionally, the CEC may open an investigatory proceeding and gather additional information if it believes that covered procurements made by a POU do not comply with these regulations.

AB 32: The California Global Warming Solutions Act of 2006

In 2006, the California Legislature passed and Governor Schwarzenegger signed Assembly Bill 32, the Global Warming Solutions Act of 2006, which declared that global warming poses a serious threat to the economic well-being, public health, natural resources, and environment of California. It set into law a 2020 GHG emissions reduction goal that would require the reduction of statewide emissions of GHGs⁶. In 2007, the ARB established a 1990 statewide greenhouse gas emissions baseline of 427 MMT of carbon dioxide equivalent (CO_{2e})⁷ and adopted a regulation for mandatory emissions reporting from the most significant sources that contribute to statewide emissions, including all electricity consumed in the state as well as imported electricity. The 2020 target was set at the 1990 baseline level of 427 MMT CO_{2e}, which requires the reduction of 169 MMT CO_{2e} or approximately 30 percent, from the state's projected 2020 emissions of 596 MMT CO_{2e} (business-as-usual) and the reduction of 42 MMT CO_{2e}, or about 15 percent from 2008 levels.⁸

The Legislature also directed the CARB to develop discrete early actions to reduce GHGs and also develop a scoping plan to identify how best to reach the 2020 limit. The reduction measures to meet the 2020 target are to be adopted by January 1, 2011, including regulations for a California cap-and-trade program that is linked to other WCI partner programs to create a regional market system.

The AB 32 Scoping Plan

In December 2008, the CARB adopted the AB 32 Scoping Plan, which serves as California's blueprint for reducing greenhouse GHG emissions. Key elements of the AB 32 Scoping Plan's recommendations for reducing California GHG emissions to 1990 levels by 2020 include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
- Achieving a statewide renewables energy mix of 33 percent.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system.
- Expand use of Combined Heat and Power (CHP) by 30,000 GWh statewide.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard.

⁶ GHGs covered by AB 32 include the following: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

⁷ Carbon dioxide equivalent (CO_{2e}) means the amount of carbon dioxide by weight that would produce the same global warming impact as a given weight of another greenhouse gas, based on the best available science, including from the Intergovernmental Panel on Climate Change.

⁸ The 2008 Scoping Plan 'business-as-usual' emission estimates for 2020 predated the current economic downturn. CARB staff is revising projections in conjunction with WCI efforts and is evaluating external sources of emission projections, such as the Energy Information Administration's projection of GHG emissions for the Pacific region.

- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state’s long term commitment to AB 32 implementation.

The AB 32 Scoping Plan calls for essential complementary measures along with the creation of a cap-and-trade program. The proposed cap-and-trade system covers 85 percent of California's largest emission sources including electricity generation, large industrial sources, transportation fuels, and residential and commercial use of natural gas. Total reductions from the capped sectors is 146.7 MMT, of which 112.3 MMT, or 76 percent, come from specific complementary measures included in the Scoping Plan.

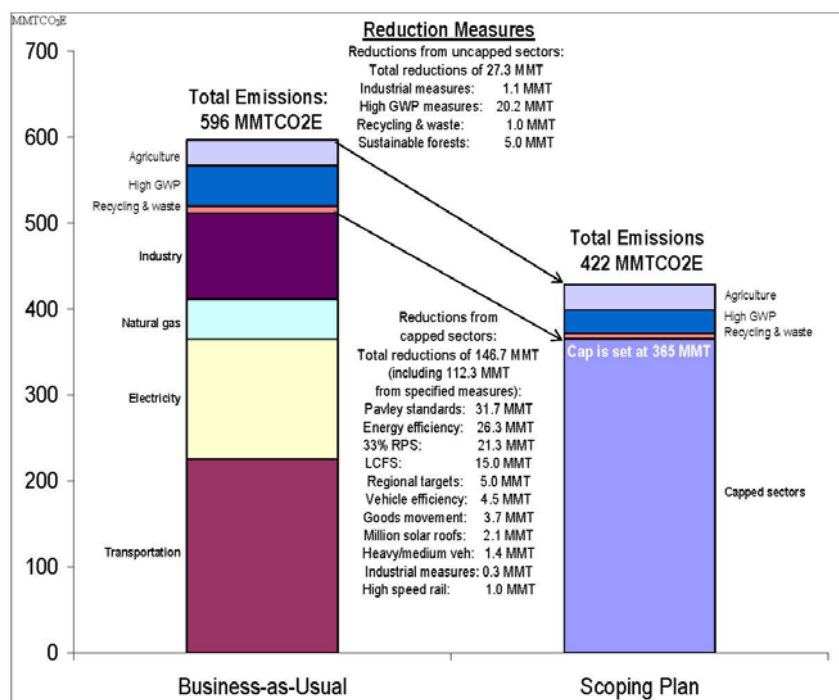


Figure C-5: California Greenhouse Gas Emissions in 2020 and Recommended Reduction Measures

Executive Order S-21-09

On September 15, 2009, Governor Schwarzenegger signed Executive Order S-21-09, which, among other things, ordered CARB to work with the Commissions to ensure that a regulation adopted under authority of AB 32 to encourage the creation and use of renewable energy sources shall build upon the RPS program developed to reduce GHG emissions in California and shall regulate all California publicly owned utilities, like LADWP. In addition, Executive Order S-21-09 provides that CARB may delegate policy development and implementation to Commissions, that CARB is to consult with the CAISO and other balancing authorities on impacts on reliability, renewable integration requirements and interactions with wholesale power markets in carrying out the provisions of Executive Order S-21-09, and that CARB is to establish the highest priority for those resources with the least environmental costs and impacts on public

health that can be developed most quickly and that support reliable, efficient, and cost-effective electricity system operations including resources and facilities located throughout the Western Interconnection.

AB 32 Preliminary Draft Cap-and-Trade Regulation (November 2009)

The CARB released a preliminary draft regulation (PDR) for a California cap-and-trade program in November 2009 that reflects an approach that is consistent with the AB 32 Scoping Plan. The approach taken in the PDR includes:

- Requiring sources of GHG emissions to manage their emissions under an aggregate declining emissions cap that supports achieving the 2020 emissions target mandated by AB 32.
- Starting the program in 2012 with about 600 of the state's largest GHG-emitting stationary sources (primarily industrial sources and electricity generators), along with electricity imports.
- Including emissions from transportation fuel combustion (e.g., gasoline, diesel, ethanol), and from fuel combustion at stationary sources that fall below the threshold for direct inclusion in the program (e.g. residential and commercial natural gas combustion) by covering the suppliers of fuel to these sources.
- Requiring a minimum number of allowances to be auctioned at program start.
- Allowing limited use of high quality offsets outside of capped sectors to cover a portion of the overall emissions reductions.
- Establishing clear rules for emissions trading, monitoring, and enforcement.

C.3.4 The City of Los Angeles GREEN LA Plan

On May 15, 2007, Los Angeles Mayor Antonio Villaragosa released the "GREEN LA – An Action Plan to Lead the Nation in Fighting Global Warming" (GREEN LA Plan) that has an overall goal of reducing the GHG emissions by 35 percent below 1990 levels by 2030. This goal exceeds the targets set by both California and the Kyoto Protocol and is the greatest reduction target of any large U.S. city. Key strategies listed in the GREEN LA Plan related to energy and water include the following:

Energy

Green the Power from the Largest Municipal Utility in the United States

- Meet the goal to increase renewable energy from solar, wind, biomass, and geothermal sources to 20 percent by 2010.
- Increase use of renewable energy to 35 percent by 2020.
- Increase the efficiency of natural gas-fired power plants.
- Increase biogas co-firing of natural gas-fired power plants.

Make Los Angeles a Worldwide Leader In Green Buildings

- Establish a comprehensive set of green building policies to guide and support private sector development designed to reduce carbon dioxide emissions by 80,000 tons by 2012. Approved on April 22, 2008, the Private Sector Green Building Plan makes Los Angeles the largest city in the nation to adopt such a plan.
- Implement other related Green Buildings efforts. For example, (e.g., all City-owned buildings over 7,500 square feet will be required to meet LEED Silver Standards). Other efforts, including the adoption of respective ordinances and updating of applicable building codes, will enable the City of Los Angeles to transform its building stock in both the public and private sector thereby facilitating all buildings to operate in a more energy efficient manner consistent with technological innovations and economic incentives whenever possible.

Transform Los Angeles Into the Model of an Energy Efficient City

- Reduce energy use by all City departments to the maximum extent feasible.
- Complete energy efficiency retrofits of all City-owned buildings to meet a 20 percent or more reduction in energy consumption.
- Install the equivalent of 50 “cool roofs” per year by 2010 on new or remodeled City buildings.
- Install solar heating for all City-owned swimming pools.
- Improve energy efficiency at drinking water treatment and distribution facilities. Maximize energy efficiency of wastewater treatment equipment.
- Replace 140,000 conventional street lights with light emitting diode (LED) green street lights, reducing carbon emissions by 40,500 tons per year and saving the city \$10 million annually

Help Angelenos Be “Energy Misers”

- Distribute two compact fluorescent light (CFL) bulbs to each of the 1.2 million households in the City.
- Increase the level and types of customer rebates for energy efficient appliances, windows, lighting, and heating and cooling systems.
- Increase the distribution of energy efficient refrigerators to qualified customers.
- Create a fund to “acquire” energy savings as a resource from LADWP customers.

Water

- Decrease Per Capita Water Use.
- Meet all additional demand for water resulting from growth through water conservation and recycling.

- Reduce per capita water consumption by 20 percent.
- Implement the City’s innovative water and wastewater integrated resources plan that will increase conservation and maximize use of recycled water, including capture and reuse of storm water.
- Meet city directives and ordinances with respect to water conservation. Monitor technological improvements with respect to equipment, appliances, and engineered systems that would reduce the water consumption of various buildings and related need to adopt relevant ordinances and update municipal codes consistent with cost-effective technology available in the marketplace.

C.3.5 LADWP’s Efforts To Address Climate Change

Since 1998, LADWP has taken steps to move away from dependence on coal generating resources, including the divestiture of power purchase agreements with Colstrip and Coronado Generating Stations, the shutdown of Mohave Generating Station in December 2005, and the discontinuation of involvement in the development of Unit 3 at Intermountain Generating Station. Table C-2 shows the downward trajectory in LADWP’s power generation portfolio CO₂ emissions and CO₂ emissions intensity between 1990 and 2008.

Table C-2. Historical LADWP Power Generation CO₂ Emissions

Year	Total CO ₂ Emissions from Owned & Purchased Generation (metric tons)	Total CO ₂ Emissions from Owned & Purchased Generation minus Wholesale Power Sales (metric tons)	Total Owned & Purchased Generation (MWh)	LADWP System CO ₂ Intensity Metric (lbs CO ₂ /MWh)
1990	17,925,410	17,764,874	25,481,532	1,551
2000	18,464,480	16,992,238	28,806,750	1,413
2001	18,086,034	16,663,305	28,032,375	1,422
2002	16,873,841	16,237,832	26,808,569	1,388
2003	17,274,623	16,710,232	27,337,694	1,393
2004	17,609,759	16,604,943	28,138,391	1,380
2005	16,928,681	15,854,278	28,301,700	1,319
2006	16,838,147	15,885,136	29,029,883	1,279
2007	16,461,774	15,523,035	29,141,703	1,245
2008	16,232,608	15,650,115	29,394,809	1,217
2009	14,651,016	13,834,001	28,041,998	1,152
% Change from 1990	-18%	-22%	10%	-26%

Notes:

- 1) Calculated CO₂ emissions using fuel data and fuel-specific emission factors from the California Registry's reporting protocols.
- 2) Used source specific data where available, and 1100 lbs CO₂/MWh for unspecified power purchased.

SF6 Emissions

In February 2010, CARB adopted a new regulation to reduce SF6 emissions from gas insulated electrical switchgear as part of the AB 32 program. This new regulation, which is scheduled to take effect starting Jan 1, 2011, imposes a declining limit on a utility's annual average SF6 emissions rate starting at 10 percent in 2011 and decreasing to 1 percent in 2020, as well as new recordkeeping and reporting requirements.

Over the past decade, LADWP has been proactive in reducing SF6 emissions by implementing its own internal program to reduce emissions through equipment replacement, repair, and process improvements. As a result, LADWP's 2008 SF6 emissions rate was slightly under 1 percent. This voluntary effort to reduce SF6 emissions demonstrates LADWP's commitment to environmental stewardship and puts LADWP in a good position to comply with the new emission limits imposed by the SF6 regulation.

LADWP's Historical Accomplishments in Reducing GHG Emissions

In 1995, LADWP signed a Climate Challenge Participation Accord with the U.S. Department of Energy (DOE), voluntarily committing to reduce GHG emissions from power generation to keep LADWP's average CO₂ emissions from 1991 - 2000 below its 1990 baseline. LADWP achieved this goal. In addition, LADWP voluntarily participated in DOE's EIA-1605b "Voluntary Reporting of Greenhouse Gases" program from 1995 – 2005, annually reporting CO₂ emissions from power generation as well as programs to reduce emissions.

In 2000, LADWP set a new goal in its Integrated Resource Plan to reduce GHG emissions five percent below 1990 levels by 2008. LADWP exceeded this goal (actual 2008 power generation portfolio CO₂ emissions were 9.3 percent lower than our 1990 baseline).

In 2002, LADWP became a charter member of the California Climate Action Registry, and has since reported and certified eight annual entity-wide GHG emissions inventories with the Registry.

C.3.6 LADWP Programs and Projects to Reduce CO₂ Emissions

Since 1990, LADWP has undertaken numerous programs to reduce CO₂ emissions. Tables C.3 and C.4 below show the variety of LADWP's emission reduction programs and reductions achieved.

Table C-3: Current Emission Reduction Programs

Years	Program	Description	Cumulative CO ₂ Emissions Avoided or Sequestered (short tons)
Renewable Energy			
2004-2008	Renewable Energy	LADWP's goals are to achieve 20% RPS by 2010 and 35% RPS by 2020.	3,521,102
Water Conservation			3,129,099
1991-2008	Water Conservation Program	Encourage customers to conserve water with rebates for installing hardware such as ultra-low-flush toilets and low-flow shower heads, a rate structure that rewards conservation, and public education.	Hardware: 1,771,814 Behavior: <u>1,311,324</u> 3,083,139
1999-2008	High efficiency clothes washers	Rebates for purchase of energy efficient residential & commercial clothes washers.	45,960
Energy Efficiency			1,738,544
1999-2008	Refrigerator Replacement	Sale of high efficiency refrigerators at discount prices to multi-family residential units and non-profit organizations that are DWP customers, and removal & recycling of old refrigerators.	27,606
1999-2008	Commercial Lighting	Incentives for small commercial customers to install lighting equipment that exceeds Title 24 standards.	935,781
1999-2008	HVAC Replacement	Incentives for small commercial customers to install HVAC equipment that exceeds Title 24 standards. Expanded to include residential HVAC units from 2000-2002.	236,440
2000-2008	Chiller Replacement	Incentives for businesses and hospitals to install new high-efficiency water or air-cooled chillers that exceed Title 24 standards.	285,894
2002-2008	Consumer Rebate	Rebates to residential customers for purchase & installation of Energy Star appliances, lighting, windows, and HVAC.	105,737
2004-2008	Refrigerator Retirement	Free pick-up and recycling of old spare refrigerators for residential customers.	54,164
2004-2008	CFL Distribution	Free compact florescent light bulbs to residential customers.	42,818
2006-2008	Non-Residential Refrigeration	Rebates for non-residential customers to improve the energy efficiency of refrigeration equipment, reduce energy consumption in cold storage facilities, and install high efficiency refrigerated cases and equipment.	4,142
2006-2008	Small Business Direct	Provide free energy assessments,	30,001

Years	Program	Description	Cumulative CO ₂ Emissions Avoided or Sequestered (short tons)
	Install	recommend lighting improvements, and install lighting upgrades to assist small business customers become more energy efficient.	
2007-2008	New Construction	Incentives for building to LEED or CHPS 2006 standards, or for installing equipment from an approved list of energy efficient products.	133
2007-2008	Custom Performance	Incentives for non-residential customers to install energy saving measures, equipment or systems that exceed Title 24 or minimum industry standards such as equipment controls, industrial processes and other innovative energy saving strategies.	15,826
Digester and Landfill gas-to-energy			1,152,479
1995-2008	Scattergood	Burn digester gas from Hyperion Wastewater Treatment Plant at Scattergood Generating Station to generate electricity.	1,139,881
2002-2007	Lopez Canyon	Burn landfill gas in micro turbines at Lopez Canyon Landfill to generate electricity.	12,599
Recycling			159,034
1998-2008	Recycling Program	Recycling of paper, cardboard, metals and other materials from LADWP facilities.	440,136
Electricity Generation & Distribution System			61,497
1999-2008	Solar Power	LADWP's Solar Power Program includes: <ul style="list-style-type: none"> • Customer systems (net metered) • LADWP and City facilities (grid connected). 	61,497
Tree Planting (Urban Forestry)			195,545
1998-2008	Cool Schools	Planted 9274 trees (cumulative) at LA Unified School District campuses.	48,187
2001-2008	Trees for a Green LA	Distributed 114,427 trees (cumulative) for planting around customer homes and in community areas.	138,793
2007-2008	Million Trees LA	Distributed 23,958 trees (cumulative) for planting around the City of Los Angeles.	8,565
Miscellaneous			3,638
2000-2008	Energy Star Office Equipment	Use of Energy Star office equipment (computers & monitors, printers, copiers and FAX machines).	3,638
Total CO₂ Emissions Avoided / Sequestered (Current Programs)			6,436,197

Table C-4: Completed Projects / Discontinued Programs for Emission Reduction

Years	Program	Description	Cumulative CO2 Emissions Avoided or Sequestered (short tons)
Energy Efficiency			175,526
1999-2001	Neighborhood Bill Reduction Service	Provide free CFLs, clean refrigerator condenser coils, distribute low-flow shower heads & aerators, and check for toilet leaks for residential low income customers.	154,108
1999-2001	Commercial Refrigeration Tune-up	Free audits and tune-ups of refrigeration equipment for small commercial customers.	3,856
2000-2002	HVAC Tune-up	Low cost tune-ups of A/C equipment for commercial and residential customers.	17,510
2005	Efficient Motors	Incentives for commercial & industrial customers to install premium efficiency electric motors.	52
Building Energy Efficiency Retrofits			101,056
1999-2004	John Ferraro Building Lighting Retrofit	Eliminated 50% of the light fixtures, replaced the remaining fixtures with energy efficient equipment, and installed automatic lighting controls in LADWP's corporate office building.	89,220
2001-2002	Cool Roofs	Incentives to install Energy Star roofing product on commercial or multi-family residential buildings (state funded).	4,164
2001-2004	Reflective Window Film	Incentives to install reflective film on windows to reduce building solar heat gain and reduce A/C load.	3,848
2004-2005	City Building Retrofit	Retrofit 37 City of LA facilities with energy efficient lighting.	2,604
2006	City Energy Efficiency Loan	Loans to other city departments to implement energy efficiency measures.	1,220
Electricity Generation & Distribution System			9,266
1996-2005	Energy Efficient Transformers	1592 Energy Star transformers were purchased in 1995 & installed in LADWP's distribution system.	9,266
Total CO₂ Emissions Avoided (Completed Projects / Discontinued Programs)			297,610

Additional actions and changes in LADWP's generation resource mix from 1990 to 2009 include:

- Replacement of two steam generators in each of Palo Verde Nuclear Generating Station's (PVNGS) three generating units, to provide for the continued use of the units to the end of their projected 40-year life and possibly through their 20-year extended life. The project began in 2003 and was completed in 2007. The replacement of the steam generators and the turbine rotors resulted in an increase in power output of approximately 210 MWs for PVNGS.
- The seven units of the Castaic Pump Storage Power Plant (Castaic Plant) are currently being rotated out of service for modernization. This multi-phase process, began in 2004 and is expected to continue through 2013. To date, modernization to five units have been completed. The refurbishment is projected to increase the efficiency of the units and add up to 80 MWs of capacity to the Castaic Plant.
- Certain IPP participants have a right under the IPP Excess Power Sales Agreement to recall from LADWP up to 18.2 percent of the capacity of IPP (currently equal to approximately 327 MWs) for defined future summer or winter seasons or both, following no less than 45 days notice and up to 43 MWs of such capacity on a seasonal basis following no less than 90 days notice. Such participants are currently recalling 48 MWs of winter season capacity from LADWP. Future capacity of IPP subject to recall from LADWP under the Excess Power Sales Agreement can vary.
- Recent drought conditions and low lake levels have reduced the LADWP's capacity entitlement at the Hoover Plant from 491 MWs of capacity (calculated based on 25.16 percent of 1,951 MWs of total contingent capacity) to an annual average of approximately 411 MWs (calculated based on 25.16 percent of 1,634 MWs annual average output capability). Future available capacity from Hoover Plant will depend on future drought condition.
- The LADWP Power RPS Policy was established to increase the amount of energy LADWP generates from renewable power sources to 20 percent of its energy sales to retail customers by 2010 and 35 percent renewable energy by 2020. Acquisitions of the renewable energy are based on a competitive bidding process through the issuance of Requests for Proposals. To date, renewable projects in-service or under construction, provide a total of 5,300 gigawatt per hour (GWh) of renewable energy annually.
- The Power Reliability Program (PRP) is a comprehensive, long-term power reliability program developed by LADWP to replace aging infrastructure or make permanent repairs to generation, transmission and distribution infrastructure that has failed during recent outages. Through the program, LADWP plans to accelerate the management and replacement of transformers, poles, underground cables, underground vaults, station transformers, new distribution and receiving stations, and modifications to existing stations. LADWP also plans to install new control, integrated central monitoring and dispatch systems needed to facilitate reliable and secure system operations and modify its staff training programs and increase staffing

- The LADWP continued its commitment to energy efficiency through numerous programs and services for customers to encourage the installation and use of energy efficient measures and equipment LADWP establish annual efficiency targets reducing total forecasted electricity consumption by 10 percent over the next 10 years. LADWP is on track to meet the requirements established under AB 2021. Since 2000, the LADWP energy efficiency programs have reduced long-term peak period demand and consumption by approximately 271.1 MWs and 894.1 GWh of energy savings. LADWP has budgeted funding for fiscal year 2009-10 to renew and expand its commitment to energy efficiency.
- The LADWP offers its customers an opportunity to participate in a Green Power Program (GPP). “Green Power” is produced from renewable resources such as wind energy and geothermal resources, rather than fossil-fueled or nuclear generating plants. Over 22,795 LADWP customers participated in the program during 2007. These participants receive approximately 66,000 MWhs of renewable energy resources annually. This number is expected to increase to approximately 100,000 MWhs by 2016.
- Completion of the Pine Tree Wind Project which is a 135 megawatt wind generating facility north of Mohave, California, consisting of 90 wind turbines. The project was put in commercial operation on June 16, 2009.
- Numerous environmental laws and regulations, specifically those relating to air and water quality, affect the LADWP Power System’s facilities and operations. LADWP monitors its compliance with laws and regulations and reviews its remediation obligations on an ongoing basis.

C.4 Power Plant Once-Through Cooling Water Systems

Power plants with "once-through cooling" (OTC) systems draw or take in water from coastal/estuarine water, via intake pipes, to cool turbines used to generate electricity. After the water is used for cooling it is discharged to a nearby water body. OTC systems can impact the marine environment.

LADWP has three coastal generating plants that utilize OTC. The new state wide OTC Policy and upcoming 316 b Federal Rule requires minimizing and/or reducing the impacts on marine life.

In order to reduce these impacts, LADWP has already implemented the following:

- ◆ In the 1970’s LADWP installed a velocity cap (a large disk-shaped structure just upstream of the ocean water intake pipe) at its Scattergood Generating Station to control IM. In 2006, LADWP conducted an effectiveness study on its velocity cap and the results showed that it is 96% effective.

- ◆ Over the past 15 years (1990 – 2005), LADWP has reduced the number of power plant units that utilize OTC from 14 to 9, reducing ocean water usage from 1904 MGD to 1571 MGD. An overall reduction of ocean water usage by 17%.
- ◆ To date, LADWP has spent over \$600 million dollars to replace the older generating units with more efficient generating units (known as “repowering”) at its Haynes and Harbor Generating Stations. This has resulted in a reduced use of coastal waters.

To further reduce impacts, LADWP plans to do the following:

- ◆ By 2013, reduce OTC units to 7. This will decrease ocean water usage from 1571 MGD to 1110.2 MGD, an overall reduction from the original (1975 – 1990) ocean water usage by 42%;
- ◆ by 2015, further reduce OTC units to 6, decreasing ocean water usage from 1110.2 MGD to 839.8MGD ocean water, an overall reduction from the original ocean water usage by 56%;
- ◆ by 2026, additional reduction of OTC units to 4, decreasing ocean water usage from 839.8 MGD to 563.3MGD; an overall reduction from the original ocean water usage by 70%;
- ◆ by 2031, another reduction of OTC units to 2, decreasing ocean water usage from 563.3 MGD to 338.7 MGD, an overall reduction from the original ocean water usage by 82%.

Figure C-6 shows LADWP’s reduction in OTC usage from 1975 to 2031.

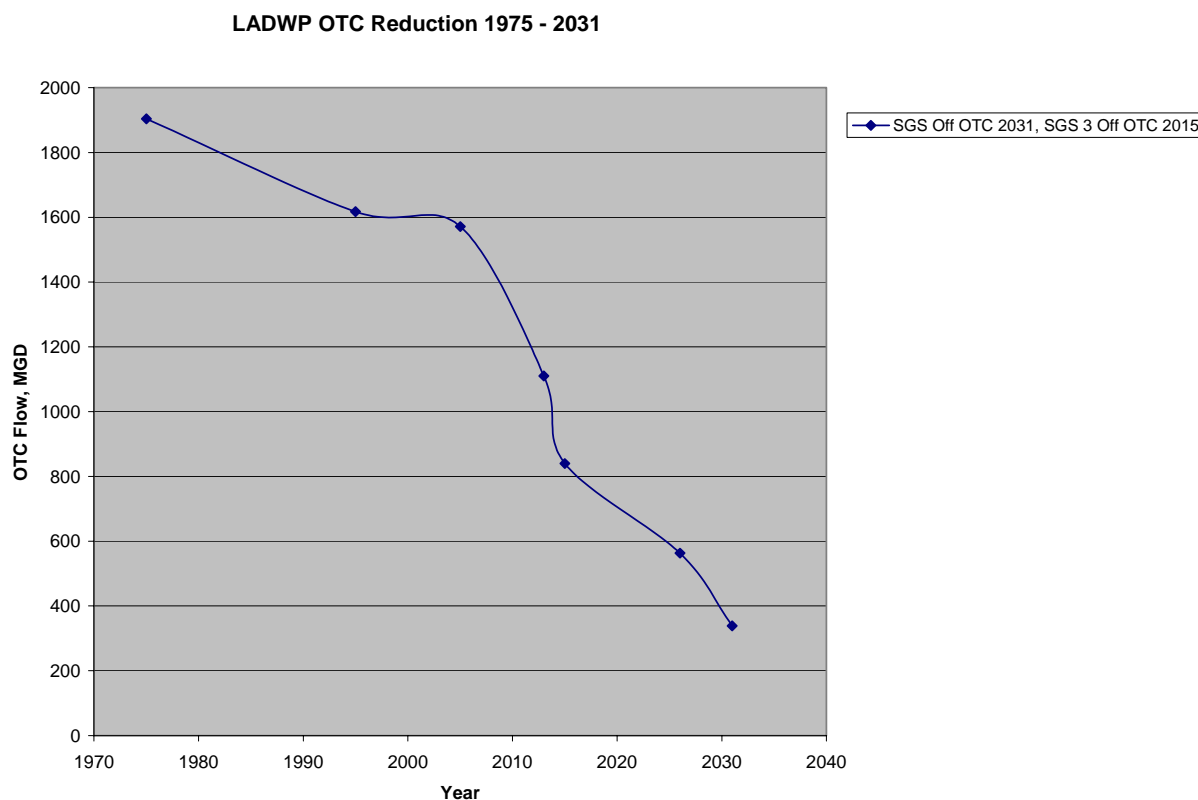


Figure C-6: LADWP OTC reduction from 1975 to 2031

C.4.1 USEPA 316(b) Requirements for Cooling Water Intake Structures

EPA’s Clean Water Act Section 316(b) Phase II Cooling Water Intake Structure Rule (Rule) released in 2004 was subsequently challenged and ultimately heard in both the Second Circuit Court and in the U.S. Supreme Court. The Second Circuit Court issued its decision on January 25, 2007, and determined that the restoration and cost-benefit elements of the original 2004 Rule were unlawful and that other fundamental components of the 2004 Rule, such as the impact reduction performance standards attainable for certain technologies, were to be remanded for further evaluation and demonstration by U.S. EPA. The U.S. Supreme Court was subsequently asked to weigh in on the ability to use the “wholly disproportionate” cost-benefit test in the application of the 316(b) regulations. On April 1, 2009, the Supreme Court affirmed that a cost-benefit analysis can be used by regulatory agencies. While the various challenges proceeded through the court processes, U.S. EPA gave the states permission to continue with implementation and enforcement of the Clean Water Act 316 (b) requirements using “Best Professional Judgment (BPJ) when reauthorizing facility National Pollutant Discharge Elimination System (NPDES) permits.

During this period, LADWP completed the required Characterization Study to identify baseline biological impacts in order to determine an appropriate impingement mortality (IM) and entrainment (E) reduction method. However, when the Rule was remanded to U.S. EPA to

re-study and then re-propose a rule, it essentially placed remanded Rule and the fulfillment of its associated requirements on hold. At that point, LADWP stopped any further work necessary to comply with the suspended Rule and has been awaiting the outcome of U.S. EPA's effort to re-propose a new rule. The use of BPJ by permitting authorities is still in effect.

C.4.2 SWRCB 316(b) Requirements for Cooling Water Intake Structures

On June 30, 2009, the SWRCB released its draft Once-Through Cooling Water Policy for public review and comment, with the accompanying Supplemental Environmental Document released on July 14, 2009. Comments were due September 30, 2009. Subsequent policy drafts were issued on November 23, 2009 and March 22, 2010 with corresponding comment periods. The final Policy version was adopted on May 4, 2010. The adopted Policy has major implications for the coastal power plants making it extremely difficult to continue the use of OTC retrofitted with IM and E impact control technology; making the use of cooling towers the only certain compliance path. The Policy proposes a compliance schedule on a plant-by-plant basis with compliance dates for LADWP facilities of: 12/31/2015 for Harbor, 12/31/2019 for Haynes, and 12/31/2020 for Scattergood. The Policy proposes a two-track compliance pathway. Track I requires OTC flows to be reduced commensurate with wet closed cycle cooling (CCC) or a 93 percent flow reduction and essentially requires the installation of cooling towers. If Track I can be demonstrated as "not feasible" a Track II compliance option is available. A Track II compliance pathway requires the biological impacts to be reduced on a unit by unit basis to a level comparable with (i.e., within 10 percent) what would exist with CCC. New consecutive 36-month IM and E baseline studies will be required if a Track II compliance pathway is pursued. Until compliance is achieved, interim measures are required, which include flow reductions when there is no unit load and mitigation measures (commencing five years from the adoption date of the policy and continuing until the facility is in full compliance). Lastly, to prevent disruption in the state's electrical power supply during implementation of the Policy, a committee of state energy and resource agencies will assist the SWRCB in reviewing the required utility implementation plans and in monitoring the schedules.

Thermal Wastewater Power Plant Discharges

In addition to the proposed changes to state and federal 316(b) Intake Structure regulations, there are also requirements regarding power plant thermal discharges. The SWRCB and the RWQCB have made recent interpretations regarding the classification of the discharge type for the Haynes and Harbor Generating Stations. These LADWP facilities have been regulated since the inception of wastewater permitting as ocean discharges; however, during renewal of the Harbor Generating Station NPDES Permit in 2003, the discharge from this facility was reclassified as being into a bay. With regard to Haynes Generating Station, LADWP and RWQCB staff continue to evaluate the scientific data regarding the appropriate classification of the discharge. The California Thermal Plan has different thermal criteria for discharges into estuaries than it does for discharges into a bay or ocean. Therefore, should the final determination identify the Haynes discharge as estuarine, the need to conduct renewed thermal studies is likely.

The potential reclassification of Haynes as an estuarine discharge, is being disputed by LADWP

because Haynes, with its OTC system, would be unable to comply with the Thermal Plan. Absent a variance from the Thermal Plan, Haynes, as presently configured, would be unable to operate. In order to obtain a variance, LADWP may need to perform thermal studies to demonstrate that the thermal criteria are more stringent than necessary to protect the environment and receive concurrence from the RWQCB.

A reclassification to the more appropriate bay discharge will likely also necessitate mixing zone studies to determine appropriate effluent limit values and a discharge compliance evaluation under the new permitting regime. The potential exists that the outcome of the studies will indicate that Haynes may not be able to comply with effluent limits developed for bay discharges; therefore, discharge to the San Gabriel Flood Control Channel may not be possible.

An alternative to seeking a thermal variance or performing a mixing zone study would be to discontinue the use of OTC via the use of cooling towers which, aside from the significant cost considerations and spatial constraints, could very well be un-permittable due to the significant environmental impacts they would create, including impacts to the aquatic environment. For example, the Long Beach Marina from which the Haynes Generating Station draws its cooling water could go stagnant and the San Gabriel River Flood Control Channel into which the facility discharges cooling water could be markedly altered.

LADWP is presently evaluating the various impacts of the SWRCB policy in order to determine how to move forward.

C.5 Mercury Emissions

Mercury emissions are an issue for all coal fired power plants. However, the level of such emissions varies widely based on the type of coal burned and the type of emission controls on the plants.

Coal-burning power plants are the largest human-caused source of mercury emissions to the air in the United States, accounting for over 40 percent of all domestic human-caused mercury emissions. The EPA estimates that about 1/4 of U.S. emissions from coal-burning power plants are deposited within the contiguous U.S., and the remainder enters the global cycle.

The IGS in Utah, of which LADWP is the Operating Agent, has one of the lowest mercury emission rates in the country. This is due to the fact that the existing emission control devices, which are designed to reduce sulfur dioxide and particulate matter, have the co-benefit of removing about 96 percent of the mercury from bituminous coal which is burned at IGS.

On March 15, 2005 U.S. EPA promulgated the Clean Air Mercury Rule (CAMR), which established a nationwide cap-and-trade program for mercury emissions. CAMR was designed to reduce mercury emissions by 60 percent between 2010, 2018. Several legal challenges of the CAMR ensued. As a result, the D.C. Circuit vacated U.S. EPA's Clean Air Mercury Rule on February 18, 2008. U.S. EPA intends to propose air toxics standards for coal and oil fired electric generating units by March 2011 and finalize its rule by November 2011.

C.6 Coal Combustion Residuals

On May 4, 2010, the U.S. Environmental Protection Agency released pre-publication co-proposals to regulate the management of coal ash from coal-fired power plants.

Coal combustion residuals (CCRs), commonly known as coal ash, are byproducts of the combustion of coal at power plants and are typically disposed of in liquid form at large surface impoundments and in solid form at landfills, most often on the properties of power plants. There are almost 900 landfills and surface impoundments nationwide.

Due to the metal constituents of the CCRs, EPA's co-proposals will establish control measures, such as liners and groundwater monitoring, which would be in place at new landfills to protect groundwater and human health. Existing surface impoundments would also require liners, with incentives to close the impoundments and transition to landfills, which store coal ash in dry form.

The proposed regulations may change the way CCRs are handled and stored at Intermountain Power Plant and Navajo generating station. If implemented, the rules would require the phase-out of wet handling systems and surface impoundments of bottom ash and the subsequent permitting and installation of lining under fly ash landfills. The facilities would have to conduct additional groundwater monitoring, and provide closure and post-closure care of the surface impoundments and landfills. For Mojave generating station, the rules, as proposed are expected to have minimal impacts because the facility did not operate any surface impoundments.

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