

3.0 ENVIRONMENTAL EFFECTS FOUND NOT TO BE SIGNIFICANT

3.1 Effects Found Not Significant as Part of the EIR Process

3.1.1 Global Greenhouse Gases

HELIX prepared the Greenhouse Gases Analyses Report (HELIX ~~2015f~~2016) ~~in conformance with the County's 2015 GHG Guidance—Recommended Approach to Addressing Climate Change in CEQA Documents (County 2015),~~ to evaluate potential environmental impacts associated with the Proposed Project's emissions of greenhouse gases (GHGs), and the effects of global climate change on the Proposed Project. ~~With regards to GHG significance conclusion and analysis, current County Guidance (2015) was used.~~ The Greenhouse Gases Analyses Report is summarized in the following discussion, with the complete report included as Appendix J of this EIR.

3.1.1.1 *Existing Conditions*

Background

Global climate change is a change in the average weather of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. The earth's climate is in a state of constant flux with periodic warming and cooling cycles. Extreme periods of cooling are termed "ice ages," which may then be followed by extended periods of warmth. For most of the earth's geologic history, these periods of warming and cooling have been the result of many complicated and interacting natural factors, including: volcanic eruptions which spew gases and particles (dust) into the atmosphere; the amount of water, vegetation, and ice covering the earth's surface; subtle changes in the earth's orbit; and the amount of energy released by the sun (sun cycles). Since the beginning of the Industrial Revolution around 1750, however, the average temperature of the earth has been increasing at a rate that is faster than can be explained by natural climate cycles alone.

With the Industrial Revolution came an increase in the combustion of carbon-based fuels such as wood, coal, oil, natural gas, and biomass. Industrial processes have also created emissions of substances that are not found in nature. This in turn has led to a marked increase in the emissions of gases that have been shown to influence the world's climate. These GHGs influence the amount of heat that is trapped in the earth's atmosphere. Because recently observed increased concentrations of GHGs in the atmosphere are related to increased emissions resulting from human activity, the current cycle of "global warming" is generally believed to be largely due to human activity. Of late, the issue of global warming or global climate change has arguably become the most important and widely debated environmental issue in the U.S. and the world. Because climate change is caused by the collective human actions taking place throughout the world, it is quintessentially a global, or cumulative issue.

Global climate change refers to changes in Earth's temperature, wind patterns, precipitation and storms. Global temperatures are moderated by naturally occurring atmospheric gases, including

water vapor, carbon dioxide (CO₂), methane (CH₄), N₂O, hydrofluorocarbons (HFCs, such as HFC-23), perfluorocarbons (PFCs, such as CF₄), and sulfur hexafluoride (SF₆), which are known as GHGs.

The potential of a gas to trap heat and warm the atmosphere is measured by its global warming potential (GWP). GHGs either breakdown or are absorbed over time. Thus, the potential of a gas to contribute to global warming is limited by the time it is in the atmosphere, its “atmospheric lifetime.” To account for these effects, GWPs are calculated over a 100-year time horizon (USEPA 2010a). Because of its relative abundance in the atmosphere and its relatively long atmospheric lifetime, carbon dioxide has been designated the reference gas for comparing GWPs. Thus, the 100-year GWP of CO₂ is equal to “one” and the GWP of other GHGs are expressed as multiples of the GWP of CO₂ (see Table 3.1.1-1, *Global Warming Potentials and Atmospheric Lifetimes*). GHG emissions are expressed in terms of carbon dioxide equivalent (CO₂e) when normalized by their respective GWPs.

Types of GHGs

Water vapor is the most abundant and variable GHG in the atmosphere. It is not considered a pollutant; it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves.

CO₂ is an odorless, colorless GHG. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human-caused) sources of CO₂ include the burning of fuels such as coal, oil, natural gas and wood. Concentrations are currently around 379 ppm. Some scientists say that concentrations may increase to 1,130 CO₂ equivalent (CO₂e) ppm by 2100 as a direct result of anthropogenic sources (Intergovernmental Panel on Climate Change [IPCC] 2007). Some predict that this will result in an average global temperature rise of at least 7.2°Fahrenheit (°F) (IPCC 2007).

CH₄ is a gas and is the main component of natural gas used in homes. It has a GWP of about 21, or 21 times the GWP of CO₂. A natural source of CH₄ is from the decay of organic matter. Geological deposits known as natural gas fields contain CH₄, which is extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure, and cattle digestion.

N₂O, also known as laughing gas, is a colorless gas and has a GWP of about 310. N₂O is produced by microbial processes in soil and water, including reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (e.g., nylon and nitric acid production) also emit N₂O. It is used in rocket engines, as an aerosol spray propellant, and in race cars. During combustion, NO_x (NO_x is a generic term for mono-nitrogen oxides, NO and NO₂) is produced as a criteria pollutant and is not the same as N₂O. Very small quantities of N₂O may be formed during fuel combustion by nitrogen and oxygen.

Fluorocarbons are gases formed synthetically by replacing all hydrogen atoms in CH₄, or ethane, with chlorine and/or fluorine atoms. Chlorofluorocarbons (CFCs) are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at Earth's surface). Chlorofluorocarbons were first synthesized in 1928 for use as refrigerants, aerosol propellants and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped by requirements of the Montreal Protocol. Fluorocarbons have a GWP of between 140 and 11,700, with the lower end being for HFC-152a and the higher end being for HFC-23.

SF₆ is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest GWP of any gas – 23,900. SF₆ is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Ozone is a GHG, although unlike the other GHGs, it is relatively short-lived in the troposphere and therefore is not global in nature. According to the California Air Resources Board (CARB), it is difficult to make an accurate determination of the contribution of ozone precursors (NO_x and volatile organic compounds [VOCs]) to global warming (CARB 2006).

A summary of the most common naturally occurring and artificial GHGs is provided in Table 3.1.1-1. Of the gases listed in Table 3.1.1-1, CO₂, CH₄ and N₂O, are produced by both natural and anthropogenic (human) sources. The remaining gases HFCs, chlorofluorides (CFs), and SF₆, are the result of solely human processes.

Regulatory Setting

All levels of government have some responsibility for the protection of air quality, and each level (international, federal, state, and regional/local) has specific responsibilities relating to air quality regulation. GHG emissions and the regulation of GHGs is a relatively new component of air quality.

International Greenhouse Gas Legislation

Montreal Protocol

The Coordinating Committee on the Ozone Layer was established by the United Nations Environment Program (UNEP) in 1977, and UNEP's Governing Council adopted the World Plan of Action on the Ozone Layer in 1977. Continuing efforts led to the signing of the Vienna Convention on the Protection of the Ozone Layer in 1985. This in turn led to the creation of the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol), an international treaty designed to protect the stratospheric ozone layer by phasing out production of ozone-depleting substances (ODCs). The Montreal Protocol was adopted on September 16, 1987 and became effective on January 1, 1989.

By the end of 2006, the 191 parties to the treaty had phased out over 96 percent of ODCs (UNEP 2007). Because of this success, scientists are now predicting that the ozone hole will "heal" later this century (UNEP 2007a). The substantial reduction of ODCs also has benefits

relative to global climate change because these substances are potent GHGs. As noted, however, the phasing out of the ODCs has led to increased use of non-ozone depleting substances, such as HFCs, which, although not detrimental to the ozone layer, also are potent GHGs.

United Nations Framework Convention on Climate Change

The U.S. participates in the United Nations Framework Convention on Climate Change (UNFCCC), which was signed on March 21, 1994. The Kyoto Protocol is a treaty adopted under the UNFCCC, and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated five percent from 1990 levels during the first commitment period of 2008 to 2012. Notably, while the U.S. is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol's commitments.

In December 2012, the United Nations representatives met in Doha, Qatar to attempt to develop a framework for addressing global climate change issues in the future. The Doha Conference produced a package of documents collectively titled *The Doha Climate Gateway*. The documents collectively contained an amendment to the Kyoto Protocol (to be ratified before entering into force) featuring a second commitment period running from 2012 until 2020, was limited in scope to 15 percent of the global CO₂ emissions, due to the lack of commitments by Japan, Russia, Belarus, Ukraine, and New Zealand (nor the U.S. and Canada, which were not parties to the Protocol in that period), and due to the fact that developing countries like China (the world's largest emitter), India and Brazil are not subject to emissions reductions under the Kyoto Protocol.

Federal Greenhouse Gas Regulations

Federal Clean Air Act

~~In the past, the USEPA has not regulated GHGs under the CAA. The U.S. Supreme Court, however, ruled on April 2, 2007, in *Massachusetts v. U.S. Environmental Protection Agency*,² that CO₂ is an air pollutant, as defined under the CAA, and that the USEPA has the authority to regulate GHG emissions. After a thorough examination of the scientific evidence and careful consideration of public comments, the USEPA announced on December 7, 2009 that GHGs threaten the public health and welfare of the American people (with the associated findings summarized below):~~

- ~~• **Endangerment Finding:** The USEPA Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (CO₂, CH₄, N₂O, HFC, PFC, and SF₆) in the atmosphere threaten the public health and welfare of current and future generations.~~
- ~~• **Cause or Contribute Finding:** The USEPA Administrator finds that the combined emissions of these well-mixed GHGs from motor vehicles and motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.~~

~~The endangerment findings do not themselves impose any requirements on industry or other entities. This action was a prerequisite to the finalizing the USEPA's GHG emissions standards for light duty vehicles, which are were jointly implemented proposed by the USEPA and the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA). The standards were established on April 1, 2010 for 2012 through 2016 model year vehicles and on October 15, 2012 for 2017 through 2025 model year vehicles.~~

Mandatory Reporting Rule of GHGs

~~On January 1, 2010, the USEPA started requiring, for the first time, large emitters of heat-trapping emissions to begin collecting GHG data under a new reporting system. This new program covers approximately 85 percent of the nation's GHG emissions and applies to roughly 10,000 facilities. Fossil fuel and industrial GHG suppliers, motor vehicle and engine manufacturers, and facilities that emit 25,000 metric tons (MT) or more of CO₂e per year, are required to report GHG emissions data to the USEPA annually. This reporting threshold is equivalent to the annual GHG emissions from approximately 4,600 passenger vehicles. Vehicle and engine manufacturers outside of the light-duty sector began phasing in GHG reporting with vehicle/engine model year 2011.~~

Corporate Average Fuel Economy Standards

~~The USEPA and the NHTSA have been working together on developing a national program of regulations to reduce GHG emissions and to improve fuel economy of light-duty vehicles. The USEPA is finalizing the first-ever national GHG emissions standards under the CAA, and the NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. On April 1, 2010, the USEPA and NHTSA announced a joint Final Rulemaking that established standards for 2012 through 2016 model year vehicles. This was followed up on October 15, 2012, when the agencies issued a Final Rulemaking with standards for model years 2017 through 2025. The rules require these vehicles to meet an estimated combined average emissions level of 250 grams per mile by 2016, decreasing to an average industry fleet-wide level of 163 grams per mile in model year 2025. The 2016 standard is equivalent to 35.5 miles per gallon (mpg), and the 2025 standard is equivalent to 54.5 mpg if the levels were achieved solely through improvements in fuel efficiency. The agencies expect, however, that a portion of these improvements will be made through improvements in air conditioning leakage and the use of alternative refrigerants that would not contribute to fuel economy. These standards would cut GHG emissions by an estimated 2 billion metric tons (MT) and 4 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2017–2025). The combined USEPA GHG standards and NHTSA CAFE standards resolve previously conflicting requirements under both federal programs and the standards of the State of California and other states that have adopted the California standards. The federal Corporate Average Fuel Economy (CAFE) standard determines the fuel efficiency of certain vehicle classes in the U.S. First enacted by Congress in 1975, CAFE's purpose is to reduce energy consumption by increasing the fuel economy of cars and light trucks. The NHTSA has set standards to increase CAFE levels rapidly over the next several years, which will improve the fuel consumption rates in motor vehicles across the United States. In 2007, as part of the Energy and Security Act of 2007, CAFE standards were increased for new light-duty vehicles to 35 miles per~~

~~gallon (mpg) by 2020. In May 2009, President Obama announced plans to increase CAFE standards to require light duty vehicles to meet an average fuel economy of 35.5 mpg by 2016. On May 21, 2010, following the direction set by President Obama, NHTSA and USEPA issued joint Final Rules for CAFE and GHG emissions regulations for model years 2017 and beyond.~~

Prevention of Significant Deterioration/Title V Greenhouse Gas Tailoring Rule

The USEPA will apply a tailored approach to the applicability of major source thresholds for GHGs under the Prevention of Significant Deterioration (PSD) and Title V programs of the CAA by temporarily raising those thresholds and setting a PSD significance level for GHGs. The USEPA is anticipating that GHG emissions may soon be subject to regulation pursuant to the CAA. One consequence of subjecting GHG emissions to regulatory controls is that the requirements of existing air permit programs, namely the PSD preconstruction permitting program for major stationary sources and the Title V operating permits program, would be triggered for GHG emission sources. At the current applicability levels under the CAA, tens of thousands of projects every year would need permits under the PSD program, and millions of sources would become subject to the Title V program. These numbers of permits are orders of magnitude greater than the current number of permits under these permitting programs and would vastly exceed the administrative capacity of the permitting authorities. By tailoring the applicability thresholds, actions can be taken by the USEPA and states to build capacity and streamline permitting.

California Greenhouse Gas Regulations

California Code of Regulations, Title 24, Part 6

California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels.

The Title 24 standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The 2013 update to the 2008 standards went into effect in July 2014. The California Energy Commission's 2013 Building Energy Efficiency Standards are expected to achieve 25 percent more efficient than previous standards for residential homes. The next scheduled update in 2016 will continue to improve upon the current 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2016 Standards will go into effect on January 1, 2017. The Building Energy Efficiency Standards offer includes better windows, insulation, lighting, ventilation systems and other features that reduce energy consumption in homes.

California Code of Regulations, Title 24, Part 11

The California Green Building Standards Code (CALGreen Code; 24 CCR, Part 11) is a code with mandatory requirements for new residential and nonresidential buildings (including buildings for retail, office, public schools, and hospitals) throughout California. The current

version of the code went into effect on July 1, 2014, and includes energy efficiency updates resulting in energy usage reductions of 25 percent for residential buildings and 30 percent for nonresidential building. The code is Part 11 of the California Building Standards Code in Title 24 of the CCR. Workshops are currently being held for the next triennial update of the CALGreen Code.

~~The development of the CALGreen Code is intended to (1) cause a reduction in GHG emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to the directives by the Governor. In short, the code is established to reduce construction waste; make buildings more efficient in the use of materials and energy; and reduce environmental impact during and after construction. California Code of Regulations, Title 24, Part 11, outlines the CALGreen code. CALGreen is the first in the nation statewide mandatory green building code. California now requires new buildings to reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and to install low pollutant emitting finish materials. CALGreen has approximately 52 mandatory measures and additional measures designed to allow local cities to adopt codes that go beyond the state mandatory provisions. Some key mandatory measures for commercial buildings include specified parking for clean air vehicles, a 20 percent reduction of potable water use within buildings, a 50 percent construction waste diversion from landfills, use of building finish materials that emit low volatile organic compounds, and building commissioning. Other key components include increased reduction in energy usage by 15 percent and increased reduction in potable water use. The CALGreen code includes the critical issue of compliance verification by utilizing the existing building code enforcement infrastructure, and allows local public agencies to incorporate the CALGreen code provisions into their construction field inspections. The mandatory CALGreen measures will be inspected and verified by local building departments. A 2013 update to the CALGreen code was adopted in 2013 and went into effect in July 2014.~~

Senate Bill 1771

~~Senate Bill (SB) 1771 (Sher) was enacted on September 30, 2000, and requires the Secretary of the Resources Agency to establish a nonprofit public benefit corporation, to be known as the “California Climate Action Registry,” for the purpose of administering a voluntary GHG emission registry. The California Energy Commission (CEC) is required to develop metrics for use by the Registry and to update the state’s inventory of GHG emissions by January 1, 2002, and every five years thereafter.~~

Executive Order S 7 04

~~This Executive Order (EO), signed by Governor Schwarzenegger on April 20, 2004, designated California’s 21 interstate freeways as the “California Hydrogen Highway Network,” and directed the CalEPA and all other relevant state agencies to “plan and build a network of hydrogen fueling stations along these roadways and in urban centers that they connect, so that by 2010, every Californian will have access to hydrogen fuel, with a significant and increasing percentage from clean, renewable sources.”~~

~~The EO also directed the CalEPA, in concert with the State Legislature and in consultation with the CEC and other relevant state and local agencies, to develop California Hydrogen Economy Blueprint Plan by January 1, 2005. The plan is to be updated biannually, with recommendations to the Governor and State Legislature to include the following:~~

~~Promoting environmental benefits (including global climate change) and economic development opportunities resulting from increased utilization of hydrogen for stationary and mobile applications; policy strategies to ensure hydrogen generation results in the lowest possible emissions of GHGs and other air pollutants.~~

Executive Order S-3-05

~~On June 1, 2005, Executive Order (EO) S-3-05 proclaimed that California is vulnerable to climate change impacts. It declared that increased temperatures could reduce snowpack in the Sierra Nevada, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. In an effort to avoid or reduce climate change impacts, EO S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. Executive Order S-3-05, signed by Governor Schwarzenegger on June 1, 2005, calls for a reduction in GHG emissions to 1990 levels by 2020, and for an 80 percent reduction in GHG emissions below 1990 levels by 2050.~~

~~EO S-3-05 also calls for the CalEPA to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy. The first of these reports, "Scenarios of Climate Change in California: An Overview," was published in February 2006. The 2006 report used a range of emissions scenarios developed by the IPCC to project a series of potential warming ranges (i.e., temperature increases) that may occur in California during the 21st century. Specifically, these include a lower warming range (3.0 to 5.5°F); medium warming range (5.5 to 8.0°F); and higher warming range (8.0 to 10.5°F). The report then presents analyses of future climate in California under each warming range.~~

~~As noted above, each emissions scenario would result in substantial temperature increases for California. According to the report, these substantial temperature increases would result in a variety of impacts to the people, economy, and environment of California in association with a projected increase in extreme conditions. While the severity of these impacts would depend upon actual future emissions of GHGs and associated warming, identified potential impacts from global warming in California include, but are not limited to, public health, biology, rising sea levels, hydrology and water quality, and water supply.~~

Assembly Bill 32 – Global Warming Solutions Act of 2006

~~The California Global Warming Solutions Act of 2006, widely known as AB 32, requires that the CARB develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. The~~

California Global Warming Solutions Act of 2006, widely known as Assembly Bill (AB) 32, requires the CARB to develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill sets a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

The heart of the bill is the requirement that statewide GHG emissions must be reduced to 1990 levels by the year 2020; this goal was identified in December 2007, and the reporting and verification requirements concerning GHG emissions were adopted on January 1, 2008. California needs to reduce GHG emissions by approximately 28.3 percent below the business as usual (BAU) predictions to achieve this goal. The bill requires the CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost effective GHG reductions. On January 1, 2011, specific GHG emission limits and reduction measures in line with AB 32 were adopted; these became enforceable on January 1, 2012.

As of October 31, 2011, 18 of 30 CARB regulations had been approved, including nine discrete early actions, as required by AB 32. The current estimate for the necessary GHG emissions reductions to attain the goals of AB 32 (i.e., 1990 levels by 2020) is 174 million metric tons of CO₂e (MMT CO₂e). It is estimated that nine proposed discrete early actions identified by CARB will provide approximately 16 MMT CO₂e of GHG reductions while the other early actions will provide approximately 26 MMT CO₂e of GHG reductions. It also is anticipated that an additional 30 MMT CO₂e in reductions will be achieved from the passage of anti idling measures and AB 1493 (described below). The remaining 102 MMT CO₂e are expected to be achieved through CARB's Scoping Plan and other emission reduction efforts by members of the CAT.

In March 2011, a San Francisco Superior Court enjoined the implementation of CARB's Scoping Plan, finding the alternatives analysis and public review process violated both CEQA and CARB's certified regulatory program (*Association of Irrigated Residents, et al v. California Air Resources Board*, Case No. CPF 09 509562, March 18, 2011). In response to this litigation, the CARB adopted the new CEQA document (*Final Supplement to the AB32 Scoping Plan Functional Equivalent Document*) on August 24, 2011. CARB staff re-evaluated the baseline in light of the economic downturn and updated the projected 2020 emissions to 545 MMT CO₂e. Two reduction measures (Pavley I and the Renewables Portfolio Standard (RPS) [12%—20%]) not previously included in the 2008 Scoping Plan baseline were incorporated into the updated baseline, further reducing the 2020 Statewide emissions projection to 507 MMT CO₂e. The updated forecast of 507 MMT CO₂e is referred to as the AB 32 2020 baseline. Reduction of an estimated 80 MMT CO₂e are necessary to reduce Statewide emissions to the AB 32 target of 427 MMT CO₂e by 2020 (CARB 2011).

Executive Order B-30-15

On April 29, 2015, EO B-30-15 established a California GHG reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG reduction targets with those of leading international governments, including the 28 nation European Union. California is on track to meet or exceed the target of reducing greenhouse gas emissions to 1990 levels by 2020,

as established in AB 32. California’s new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal established by EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050.

Senate Bill 32

As a follow up to AB 32 and in response to EO B-30-15, SB 32 was passed by the California legislature in August 2016 and signed by Governor Brown in September 2016 to codify the EO’s California GHG reduction target of 40 percent below 1990 levels by 2030.

Assembly Bill 197

A condition of approval for SB 32 was the passage of AB 197. AB 197 requires that CARB consider the social costs of GHG emissions and prioritize direct reductions in GHG emissions at mobile sources and large stationary sources. AB 197 also gives the California legislature more oversight over CARB through the addition of two legislatively appointed members to the CARB Board and the establishment a legislative committee to make recommendations about CARB programs to the legislature.

Senate Bill 1078

~~Established in 2002 under SB 1078, accelerated in 2006 under SB 107 and expanded in 2011 under SB 2, California’s RPS is one of the most ambitious renewable energy standards in the country. The RPS program originally required investor-owned utilities, electric service providers, and community choice aggregators to procure 20 percent of electricity from eligible renewable energy resources by 2010. On November 17, 2008, Governor Arnold Schwarzenegger signed EO S 14 08 requiring that all retail sellers of electricity procure 33 percent of their electricity from renewable energy sources by 2020. The following year, EO S 21 09 directed the CARB, under its AB 32 authority, to enact regulations to achieve the goal of 33 percent renewables by 2020. In April 2011, Governor Edmund G. Brown, Jr., signed SB X1 2 in an effort to codify the 33 percent by 2020 goal. This new RPS preempts the CARB’s 33 percent Renewable Electricity Standard (RES) and applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must adopt the new RPS goals of 20 percent of retails sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020.~~

Assembly Bill 1493 – Vehicular Emissions of Greenhouse Gases

AB 1493 (Pavley) requires that CARB develop and adopt regulations that achieve “the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State.” On September 24, 2009, CARB adopted amendments to the Pavley regulations that intend to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments bind California’s enforcement of AB 1493 (starting in 2009), while providing vehicle manufacturers with new compliance flexibility. The amendments

~~also prepare California to merge its rules with the federal CAFE rules for passenger vehicles. In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single packet of standards called Advanced Clean Cars. In a response to the fact that transportation sector accounts for more than half of California's CO₂ emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 (also referred to as Pavley or the California Light Duty Vehicle Greenhouse Gas Standards) requires the CARB to set statewide GHG emission standards for passenger vehicles and light duty trucks (and other vehicles determined to be vehicles whose primary use is noncommercial personal transportation) manufactured in model year 2009 and all subsequent model years. These standards were adopted in September 2004, and considered cost effectiveness, technological feasibility, and economic impacts. When fully phased in, the near-term (2009 to 2012) standards would reduce GHG emissions by approximately 22 percent compared with the emissions from the 2002 fleet, while the mid-term (2013 to 2016) standards would result in a reduction of approximately 30 percent. Some currently used technologies that achieve GHG reductions include small engines with superchargers, continuously variable transmissions, and hybrid electric drives. To set its own GHG emissions limits on motor vehicles, California required a waiver from the USEPA, and this waiver was issued in June 2009. With this action, it was expected in 2008 that the new regulations (Pavley I and II) would reduce GHG emissions from California passenger vehicles by about 18 percent statewide.~~

Assembly Bill 75

AB 75 was passed in 1999, and mandates state agencies to develop and implement an integrated waste management plan to reduce GHG emissions related to solid waste disposal and diversion (recycling). In addition, the bill mandates that community service districts providing solid waste services report the disposal and diversion information to the appropriate city, county, or regional jurisdiction. Since 2004, the bill requires diversion of at least 50 percent of the solid waste from landfills and transformation facilities, and submission of an annual report to the California Integrated Waste Management Board of an annual report describing the diversion rates.

Assembly Bill 341

In 2011, the State legislature enacted AB 341, increasing the diversion target to 75 percent statewide. AB 341 also requires the provision of recycling service to commercial and residential facilities that generate four cubic yards or more of solid waste per week. In addition, multi-family apartments with five or more units are also required to implement a recycling program. The final regulation was approved by the Office of Administrative Law on May 7, 2012, and went into effect on July 1, 2012.

Senate Bill 1368

~~In 2006, the California Legislature passed SB 1368, which requires the Public Utilities Commission (PUC) to develop and adopt a "GHGs emission performance standard" by February 1, 2007 for the private electric utilities under its regulation. On November 14, 2011, the Natural Resources Defense Council and Sierra Club jointly filed a Petition requesting the~~

~~CEC initiate a rulemaking proceeding to ensure the current practices of California publicly owned utilities meet the requirements of SB 1368 and California's Emission Performance Standard. On January 12, 2012, the CEC adopted the Emission Performance Standard. These standards apply to all long-term financial commitments (five years or longer) entered into by electric utilities and the emissions must be limited to 1,100 pounds of CO₂ per megawatt-hour of electricity delivered (California SB 2006).~~

Senate Bill 1505

~~Largely in response to EO S-7-04, SB 1505 (Lowenthal) requires the CARB to adopt regulations by July 1, 2008 that ensure the production and use of hydrogen fuel for transportation purposes, thereby contributing to the reduction of GHG emissions, criteria air pollutants, and toxic air contaminants. SB 1505 was passed by the legislature and signed by the governor on September 30, 2006.~~

Executive Order S-01-07

Executive Order S-01-07 was signed by Governor Schwarzenegger on January 18, 2007 and directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. It orders that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California, and directs CARB to determine whether an LCFS can be adopted as a discrete early action measure pursuant to AB 32. The CARB approved the LCFS as a discrete early action item with a regulation adopted and implemented in 2010. It was expected to result in a reduction of 15 MMT CO₂e by 2020 (based on the original 2008 Scoping Plan estimates). On December 29, 2011, District Judge Lawrence O'Neill in the Eastern District of California issued a preliminary injunction blocking CARB from implementing LCFS for the remainder of the *Rocky Mountain Farmers Union* litigation. Plaintiffs argued that the LCFS is unconstitutional because it violates the interstate commerce clause, which was intended to stop states from introducing laws that would discriminate against businesses located in other states.

In January 2012, however, the CARB appealed that decision to the Ninth Circuit Court of Appeals (Ninth Circuit), and then moved to stay the injunction pending resolution of the appeal. On April 23, 2012, the Ninth Circuit granted the CARB's motion for a stay of the injunction while it continues to consider CARB's appeal of the lower court's decision. On September 18, 2013, the Ninth Circuit reversed the District Court's opinion and rejected arguments that implementing LCFS violates the interstate commerce clause. Therefore, the LCFS enforcement injunction has been removed, and CARB is continuing to implement the LCFS statewide.

Senate Bill 97 – CEQA: Greenhouse Gas Emissions

In August 2007, Governor Schwarzenegger signed into law SB 97 – CEQA: Greenhouse Gas Emissions, stating: "This bill advances a coordinated policy for reducing GHG emissions by directing the Office of Planning and Research (OPR) and the Resources Agency to develop CEQA guidelines on how state and local agencies should analyze, and when necessary, mitigate GHG emissions." Specifically, SB 97 requires the OPR to prepare, develop, and transmit to the

Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, including but not limited to, effects associated with transportation or energy consumption. The Resources Agency certified and adopted the guidelines on December 31, 2009. The new CEQA guidelines provide the lead agency with broad discretion in determining what methodology is used in assessing the impacts of GHG emissions in the context of a particular project. This guidance is provided because the methodology for assessing GHG emissions is expected to evolve over time. The OPR guidance also states that the lead agency can rely on qualitative or other performance-based standards for estimating the significance of GHG emissions, although the new CEQA Guidelines did not establish a threshold of significance.

Senate Bill 375

~~SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO's Regional Transportation Plan (RTP). Qualified projects consistent with an approved SCS or Alternative Planning Strategy categorized as "transit priority projects" would receive incentives to streamline CEQA processing. was signed and passed into law on September 30, 2008 to enhance CARB's ability to reach AB 32 goals. Specifically, SB 375 requires CARB to set regional targets for the purpose of reducing GHG emissions from passenger vehicles for 2020 and 2035. If regions develop integrated land use, housing and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain CEQA review requirements. The targets apply to the regions in the state covered by 18 Metropolitan Planning Organizations (MPOs).~~

~~Per SB 375, CARB appointed a Regional Targets Advisory Committee (RTAC) to provide recommendations and methodologies to be used in the CARB's target setting process on January 23, 2009. The RTAC provided its recommendations in a report to the CARB on September 29, 2009. CARB released their draft targets on June 30, 2010, and adopted their final targets on September 23, 2010. For the San Diego area, CARB and SANDAG agreed to adopt 7 percent and 13 percent in per capita GHG emission reductions from passenger vehicles by the years 2020 and 2035, respectively. If MPOs had not met the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.~~

~~On October 28, 2011, the SANDAG Board of Directors approved the 2050 Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS) for the San Diego region, becoming the first large region in California to prepare an RTP under California climate change legislation (SANDAG 2014).~~

~~On December 4, 2012, Superior Court ruled that the SANDAG violated state law by failing to fully account for, and take steps to reduce, climate change in its environmental review of the region's long-term transportation plan. As a response, San Diego Forward would unite two of SANDAG's major planning efforts into one: with the next update of the RTP/SCS and an update of the Regional Comprehensive Plan (RCP) that was adopted in 2004. San Diego Forward's: Regional Plan is scheduled to be adopted in July 2015 (SANDAG 2014).~~

Executive Order S-13-08

~~Executive Order S-13-08, signed by Governor Schwarzenegger on November 14, 2008, enhances the state's management of climate impacts from sea level rise, increased temperatures, shifting precipitation and extreme weather events. One key benefit of EO S-13-08 is that it has facilitated California's first comprehensive climate adaptation strategy. This strategy will improve coordination within state government so that better planning can more effectively address climate impacts to human health, the environment, the state's water supply and the economy. Another benefit of EO S-13-08 includes providing consistency and clarity to state agencies on how to address sea level rise in current planning efforts; reducing time and resources unnecessarily spent on developing different policies using different scientific information.~~

California Greenhouse Gas Programs and Plans

California Energy Commission: New Solar Homes Partnership

~~The New Solar Homes Partnership is a component of the California Solar Initiative, and has a goal to produce 400 megawatts of solar electricity on approximately 160,000 homes by 2017. To qualify for the program, a new home must achieve energy efficiency levels greater than the requirements of the 2005 Building Title 24 Standards. The builder can choose to comply with either of two tiers of energy efficiency measures: Tier I, which requires a 15 percent reduction from Title 24 Standards; or Tier II, which requires a 35 percent reduction overall and a 40 percent reduction in the building's space cooling (air conditioning) energy compared to Title 24 (CEC 2008). In addition, all appliances must have an Energy Star rating, which indicates that the appliance is consistent with the international standard for energy efficient consumer products.~~

California Air Resources Board: Interim Significance Thresholds

~~In October 2008, the CARB released draft interim guidance on significance thresholds for industrial, commercial, and residential projects (CARB 2008a). The draft proposal for residential and commercial projects states that a project would not be significant if it complies with a previously approved plan that addresses GHG emissions, or meets an energy use performance standard defined as CEC's Tier II Energy Efficiency goal (specified as 35 percent above Title 24 requirements). CARB, however, did not define performance standards for water, waste, and transportation; or develop threshold for GHG emissions in tons per year in the interim guidance. As such, CARB did not establish a threshold of significance. As of January 22, 2009, CARB has halted all work efforts on the draft *GHG Threshold of Significance under CEQA*.~~

California Air Resources Board: Scoping Plan

~~On December 11, 2008, CARB adopted a Scoping Plan (CARB 2008b), as directed by AB 32. The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California to the levels required by AB 32. Measures applicable to development projects include those related to energy-efficiency building and appliance standards, the use of renewable sources for electricity generation, regional transportation targets, and green building strategy. Relative to~~

transportation, the Scoping Plan includes nine measures or recommended actions related to reducing vehicle miles traveled and vehicle GHGs through fuel and efficiency measures. These measures would be implemented statewide rather than on a project-by-project basis.

The CARB released the First Update to the Climate Change Scoping Plan in May 2014 to provide information on the development of measure-specific regulations and to adjust projections in consideration of the economic recession (CARB 2014a). To determine the amount of GHG emission reductions needed to achieve the goal of AB 32 (i.e., 1990 levels by 2020) CARB developed a forecast of the AB 32 Baseline 2020 emissions, which is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. CARB estimated the AB 32 Baseline 2020 to be 509 MMT CO₂e. The Scoping Plan's current estimate of the necessary GHG emission reductions is 78 MMT CO₂e (CARB 2014b). This represents an approximately 15.32 percent reduction. The CARB is forecasting that this would be achieved through the following reductions by sector: 25 MMT CO₂e for energy; 23 MMT CO₂e for transportation; 5 MMT CO₂e for high-GWP GHGs, and 2 MMT CO₂e for waste. The remaining 23 MMT CO₂e would be achieved through Cap-and-Trade Program reductions. This reduction is flexible; if CARB receives new information and changes the other sectors' reductions to be less than expected, the agency can increase the Cap-and-Trade reduction (and vice versa). CARB is currently working on developing a Scoping Plan to meet the 2030 target established under EO B-30-15 and SB 32. The measures in the Scoping Plan approved by CARB are in place, with further implementation details and regulations to be developed, followed by the rulemaking process to meet the 2012 deadline. Measures applicable to development projects include the following:

- Maximum energy efficiency building and appliance standards, including more stringent building codes and appliance efficiency standards, and solar water heating;
- Use of renewable sources for electricity generation, such as photovoltaic solar associated with the Million Solar Roofs program;
- Regional transportation targets, including integration of development patterns and the transportation network to reduce vehicle travel, as identified in SB 375; and
- Green Building strategy, including siting near transit or mixed use areas; zero net energy buildings; "beyond code" building efficiency requirements; and the use of the CEC's Tier II Energy Efficiency goal.

Relative to transportation, the Scoping Plan includes nine measures or recommended actions. One of these is measure T-3, Regional Transportation Related Greenhouse Gas Targets, which relies on SB 375 implementation to reduce GHG emissions from passenger vehicles through reducing VMT. The other measures are related to vehicle GHG emissions, fuel, and efficiency measures and would be implemented statewide rather than on a project-by-project basis.

To assess the scope of the reductions needed to return to 1990 emissions levels, the CARB first estimated 2020 BAU GHG emissions. These are the GHG emissions that would be expected to occur in the absence of any state GHG reduction measures. In 2008, after estimating that statewide 2020 BAU GHG emissions would be 596 metric tons, CARB developed a Scoping

~~Plan that identified measures to reduce GHG emissions by approximately 174 metric tons (an approximate 29 percent reduction) by 2020. As indicated in Table 3.1.1 2, CARB Scoping Plan Recommended GHG Reduction Measures, the majority of reductions are directed at the sectors with the largest GHG emissions contributions (transportation and electricity generation) and involve statutory mandates affecting vehicle or fuel manufacture, public transit, and public utilities.~~

~~In August 2011, CARB revised its 2020 BAU projections to account for the economic downturn and other factors in their Supplement to the AB 32 Scoping Plan Functional Equivalent Document (CARB 2011). The CARB's revised estimate calculated that 2020 BAU emissions would be approximately 507 MMT CO₂e per year. Thus, in order to reach the 1990 emissions level of 427 MMT CO₂e, an 80 MMT CO₂e (16 percent) reduction was determined to be needed by 2020 (CARB 2011).~~

~~It was expected that the new regulations (Pavley I) would reduce GHG emissions from California passenger vehicles by about 31.7 MMT CO₂e (or 18 percent), counted toward the total statewide reduction target (CARB 2008b; see Table 3.1.1 2). However, the revised 2011 projections estimate that Pavley I will reduce GHG emissions from passenger vehicles by about 29.9 MMT CO₂e (or 17 percent), for 37 percent of the total 80 MMT CO₂e reduction target.~~

~~The CARB has adopted a second, more stringent, phase of the Pavley regulations, termed "Pavley II" [now known as "Low Emission Vehicle (LEV) III"], that covers model years 2017 to 2025. Pavley II was estimated in 2008 to add an additional 4.0 MMT CO₂e for 2 percent of the then estimated 174 MMT CO₂e reduction total. The revised 2010 projections estimate that Pavley II will reduce GHG emissions from passenger vehicles by 3.8 MMT CO₂e, for 5 percent of the total 80 MMT CO₂e reduction target (per CARB's 2010 revised projections). These reductions are to come from improved vehicle technologies such as small engines with superchargers, continuously variable transmissions, and hybrid electric drives.~~

~~An 18 percent reduction in the intensity of transportation fuels is expected to equate to a reduction of 16.5 MMT CO₂e in 2020 (based on the original 2008 Scoping Plan estimates). However, in order to account for possible overlap of benefits between LCFS and the Pavley GHG standards, CARB has discounted the contribution of LCFS to 15 MMT CO₂e (CARB 2008b).~~

~~The First Update to the Scoping Plan was approved by the Board on May 22, 2014, and builds upon the initial Scoping Plan with new strategies and recommendations. The First Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The First Update defines CARB's climate change priorities for the next five years, and also sets the groundwork to reach long term goals set forth in EOs S 3 05 and B 16 2012. The Update highlights California's progress toward meeting the "near term" 2020 GHG emission reduction goals defined in the initial Scoping Plan. It also evaluates how to align the State's "longer term" GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.~~

Local Policies and Plans: County of San Diego

County of San Diego General Plan

The County 2011 General Plan includes a plan to balance population growth and development with infrastructure needs and resource protection. The current General Plan is based on smart growth and land planning principles that will reduce VMT, and thus result in a reduction of GHGs. This will be accomplished by locating future development within and near existing infrastructure. The General Plan ~~also includes a number of policies in the Conservation Element that encourage the design of new buildings that incorporate principles of sustainability and reduced vehicle and utility usage, an implementation plan related to the reduction of GHGs, including the following actions:~~

- ~~• Prepare a climate change action plan based on this inventory and emissions reduction targets for GHG emissions from all sources (adopted June 2012);~~
- ~~• Develop regulations and procedures to encourage the design and construction of new buildings in accordance with “green building” programs; and~~
- ~~• Develop regulations that encourage the use of energy recovery, as well as photovoltaic and wind energy in appropriate areas.~~

~~More specifically, the General Plan will direct population capacity to the western portions of the County and reduce the potential for growth in the eastern areas. The general population distribution is intended to: (1) facilitate efficient, orderly growth by containing development within areas potentially served by the SDCWA and in proximity to existing infrastructure; (2) protect natural resources through the reduction of population capacity in sensitive areas; (3) reduce overall VMT and associated GHG emissions that contribute to climate change; and (4) retain or enhance the character of communities within the unincorporated County.~~

San Diego County Green Building Incentive Program

The County has a Green Building Incentive Program designed to promote the use of resource efficient construction materials, water conservation, and energy efficiency in new and remodeled residential and commercial buildings. The program offers incentives of reduced plan check turnaround time and a 7.5 percent reduction in plan check and building permit fees for projects meeting minimum program requirements, which include options for natural resource conservation, water conservation, and energy conservation.

County of San Diego Construction and Demolition Recycling Ordinance

The County has a construction and demolition recycling ordinance that is designed to divert debris from construction and demolition projects away from landfill disposal in the unincorporated County of San Diego. The ordinance requires that 90 percent of inerts and 70 percent of all other construction materials from a project be recycled. In order to comply with the ordinance, applicants must submit a Construction and Demolition Debris Management Plan and a fully refundable Performance Guarantee prior to building permit issuance.

County of San Diego: The Climate Action Plan

~~The 2011 County General Plan EIR outlined a specific mitigation measure (Mitigation Measure CC-1.2) that called for the preparation of a Climate Action Plan (CAP) as discussed above. The County of San Diego developed and adopted (June 2012) the CAP to address the issues of climate change as it relates to growth in the County, and to protect the environment for visitors and residents alike (County 2012a). After the CAP was adopted by the County, a lawsuit was filed by the Sierra Club in April 2013 and the San Diego County Superior Court set aside the approval of the County CAP. Therefore, this analysis does not rely on the CAP.~~

San Diego Association of Governments: ~~Climate Action Strategy~~San Diego Forward: The Regional Plan

The Regional Plan (SANDAG 2015) is the long-range planning document developed to address the region's housing, economic, transportation, environmental, and overall quality-of-life needs. The Regional Plan establishes a planning framework and implementation actions that increase the region's sustainability and encourage "smart growth while preserving natural resources and limiting urban sprawl." The Regional Plan encourages the regions and the County to increase residential and employment concentrations in areas with the best existing and future transit connections, and to preserve important open spaces. The focus is on implementation of basic smart growth principles designed to strengthen the integration of land use and transportation. The SANDAG Climate Action Strategy serves as a guide to help policymakers address climate change as they make decisions to meet the needs of growing populations, as well as to maintain and enhance quality of life, and promote economic stability (SANDAG 2010). The purpose of the strategy is to identify land use, transportation, and other related policy measures that could reduce GHG emissions from passenger cars and light duty trucks as part of the development of the Sustainable Communities Strategy for the 2050 Regional Transportation Plan, in compliance with SB 375. Additional policy measures are identified for buildings and energy use, protecting transportation and energy infrastructures from climate impacts, and assisting SANDAG and other local agencies in reducing GHG emissions from their operations.

Existing Greenhouse Gas Emission Levels

Worldwide and U.S. GHG Inventory

The IPCC has concluded that a stabilization of GHGs at 400 to 450 ppm CO₂e concentration is required to keep global mean warming below 3.6°F. This is projected to be the threshold necessary to avoid dangerous climate change (AEP 2007).

In 2004, total GHG emissions worldwide were estimated at 20,135 MMT CO₂e (UNFCCC 2006). The U.S. contributed the largest portion (35 percent) of global GHG emissions in 2004. The CEC (2006a) identifies the following breakdown of GHG emissions in California: approximately 84 percent of CO₂, 5.7 percent of CH₄, 6.8 percent of N₂O, and 2.9 percent of other pollutants. As noted above, the transportation sector is the single largest category of California's GHG emissions, accounting for 41 percent of statewide emissions. CARB estimates that the 1990 statewide CO₂e emissions level was 427 MMT (CARB 2007b).

In 2004, California produced 492 MMT CO₂e emissions. The total U.S. GHG emissions was 7,260 MMT CO₂e emissions in 2005, of which 84 percent was CO₂ (USEPA 2006). On a national level, approximately 33 percent of GHG emissions were associated with transportation and about 41 percent were associated with electricity generation (USEPA 2006).

State and Regional GHG Inventory

CARB performed statewide inventories for the years 1990 to 2008. The inventory was divided into nine broad sectors of economic activity, including agriculture, commercial, electricity generation, forestry, high GWP emitters, industrial, recycling and waste, residential, and transportation. Emissions are quantified in million metric tons of CO₂ equivalent (MMT CO₂e).

The statewide GHG source emissions totaled 433 MMT CO₂e in 1990, 458 MMT CO₂e in 2000, 484 MMT CO₂e in 2004, and 478 MMT CO₂e in 2008. According to data from the CARB, it appears that statewide GHG emissions peaked in 2004, and are now beginning to decrease (CARB 2010a). Transportation-related emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions.

The forestry sector is unique because it not only includes emissions associated with harvest, fire, and land use conversion (sources), but also includes removals of atmospheric CO₂ (sinks) by photosynthesis, which is then bound (sequestered) in plant tissues. ~~As shown in Table 3.1.1-2,~~ The forestry sector consistently removes more CO₂ from the atmosphere statewide than it emits. As a result, although decreasing over time, this sector represents a net sink, removing a net 6.7 MMT CO₂e from the atmosphere in 1990, a net 4.7 MMT CO₂e in 2000, a net 4.3 MMT CO₂e in 2004, and a net 4.0 MMT CO₂e in 2008.

A San Diego regional emissions inventory was prepared by the University of San Diego School of Law, Energy Policy Initiative Center (EPIC), that took into account the unique characteristics of the region. According to the EPIC inventory, San Diego County emitted 34 MMT CO₂e emissions in 2006. The largest contributor of GHGs in the County was on-road transportation (46 percent, or 16 MMT CO₂e). The second highest contributor was electricity, which contributed 9 MMT CO₂e (25 percent). Together, the on-road transportation and electricity categories comprised 71 percent of the total GHG emissions for the County. The remaining amount was contributed by natural gas consumption, civil aviation, industrial processes, off-road equipment, waste, agriculture, rail, water-borne navigation, and other fuels. By 2020, regional GHG emissions are expected to be 43 MMT CO₂e (a 26 percent increase over 2006 levels and a 48 percent increase over 1990 levels).

On-site GHG Inventory

The Proposed Project site is currently vacant with the exception of one occupied residential structure and the equestrian center. In its largely vacant state, the Project site is not a significant source of GHG emissions. Natural vegetation and soils temporarily store carbon as part of the terrestrial carbon cycle. Carbon is assimilated into plants as they grow, and then dispersed back into the environment when they die. Soil carbon accumulates from inputs of plants, roots, and other living components of the soil ecosystem (i.e., bacteria, worms, etc.). Soil carbon is lost

through biological respiration, erosion, and other forms of disturbance. Existing GHG emissions are considered negligible.

3.1.1.2 Analysis of Project Effects and Determination as to Significance

Greenhouse Gas Emissions

Guidelines for the Determination of Significance

The Proposed Project would have a cumulatively considerable contribution to climate change impacts if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment or ~~would~~
- Conflict with an applicable plan, policy, or regulation that was adopted for the purpose of reducing the emissions of greenhouse gases.

The determination of significance is governed by CEQA Guidelines 15064.4, entitled “Determining the Significance of Impacts from Greenhouse Gas Emissions.” CEQA Guidelines 15064.4(a) states, “[t]he determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to ... [use a quantitative model or qualitative model]” (emphasis added). In turn, CEQA Guidelines 15064.4(b) clarifies that “[a]n iron clad definition of significant effect is not always possible because the significance of an activity may vary with the setting.”

Therefore, the analysis contained herein relies upon a threshold not based on the future County CAP and not based upon a threshold adopted by a public hearing process, but rather a threshold after the exercise of careful judgment about the setting of the project, believed to be appropriate in the context of this particular project.

“A project’s contribution is less than cumulatively considerable if the project is required to implement...its fair share of a mitigation measure or measures designed to alleviate the cumulative impact” (CEQA Guidelines 15130(a)(3)). Measures to mitigate a project’s GHG impacts broadly include “reductions in emissions resulting from a project through implementation of project features, project design, or other measures” and that such measures must have an “essential nexus” and be “roughly proportionate” to the project (CEQA Guidelines 15126.4 (a)(4),(c)(2)). Finally, “[t]he mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project’s incremental effects are cumulatively considerable” (CEQA Guidelines 15064 (h)((4)).

Quantitative analysis is appropriate through the first year of full operation for a project. OPR’s Technical Advisory on CEQA and Climate Change (OPR 2008) states, “As with any environmental impact, lead agencies must determine what constitutes a significant impact. In the

absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a “significant impact,” individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice.” The Sacramento Metropolitan Air Quality Management District (SMAQMD) recommended that project emissions be estimated for the first fully operational year (SMAQMD 2009). Operational emissions for projects are generally highest during the first year of operation and continue to decline in the future. Therefore, OPR’s guidance coupled with guidance from the SMAQMD provides sufficient scientific evidence for using the buildout year to assess GHG emissions quantitatively.

One method for determining a fair share contribution quantitatively is to determine if the Project’s per service person (i.e., residents and employees of the project) GHG efficiency level is more or less than the GHG efficiency level that would be needed for the state’s estimated service population for each corresponding year, to achieve the state’s 2020 GHG target set forth in AB 32 and the state’s 2030 GHG target set forth in Executive Order (EO) B-30-15 recently codified in SB 32. California’s 2020 GHG efficiency target is to reduce GHG emissions to 1990 levels by 2020. To develop an efficiency threshold that satisfies the requirements of AB 32, the California statewide 1990 land use emissions inventory is divided by the California statewide 2020 population and employment projection. Data used to develop this metric is shown in Table 3.1.1-4 below and Appendix J. Based on these data, the 2020 efficiency metric is 4.9 MT CO₂e/SP/year.

The impact significance determination in this report relies upon an efficiency threshold based on compliance with the California’s target of reducing 2020 GHG emissions to 1990 levels, consistent with AB 32 and an interpolated efficiency metric for project buildout in 2021. The efficiency threshold, adjusted for anticipated Project buildout in 2021, is 4.6 MT CO₂e per service population (SP) per year, in keeping with the 2030 emissions reduction goal of EO B-30-15 and SB 32.

Project emissions take into account applicable standards and regulations that the Project would need to comply with for buildout in 2021. These include effects on vehicle emissions due to Pavley I, Pavley II, LCFS, effects on energy emissions due to energy code enforcements and the Renewable Portfolios Standard (RPS) (to 33 percent), and applicable County policies.

~~Consistent with the County’s 2015 GHG Guidance, the Proposed Project would not result in a significant impact to climate change if the Proposed Project would:~~

~~Result in a net increase of construction and operational greenhouse gas emissions, either directly or indirectly, and if the project would incorporate mitigation (and Project Design Features) that achieves a 16 percent or greater total reduction compared to unmitigated emissions (Project without Project Design Features).~~

Guideline Source

~~This guideline is based on the County 2015 GHG Guidance for Climate Change (County 2015).~~

~~The County General Plan and Guidance documents provide the overall framework for assessing significance.~~

~~The 2015 County Guidance's 16 percent reduction goal is based on current adjustments to the 2008 Scoping Plan forecasts for 2020 that adjusted the quantities of reductions coming from the Scoping Plan GHG reduction measures. Per the County's GHG Guidance, unmitigated project GHG emissions (without Project Design Features) attributable to a project at full buildout in 2020 are compared to project GHG emissions with mitigation/Project Design Features. "Unmitigated" GHG emissions assume a project complying with applicable standards and regulations at baseline conditions (2008). This would include effects on vehicle emissions due to Pavley I, and effects on energy emissions due to current energy code enforcements and the RPS (to 20 percent).~~

~~Proposed Project Design Features identified toward the 16 percent requirement thus cannot also include the effects of the Pavley I or the 20 percent RPS because these programs are already included in the calculations that support the 16 percent reduction requirement. Other statewide measures, however, can be included without risk of double counting. This includes the RPS beyond 20 percent (up to 33 percent with the additional 13 percent referred to as the RES), LCFS, and Pavley II, which can be included toward the minimum 16 percent mitigation requirement for a project.~~

~~The Proposed Project's Project Design Features would be included as D designator Site Plan conditions and verified prior to the issuance of final certificate of occupancy, as follows:~~

- ~~• The Proposed Project would be designed in accordance with the Building Industry Association's California Green Builder program, a professionally recognized green building program that identifies building performance standards to achieve improved energy efficiency, water conservation, sustainable materials use, waste reduction, lumber conservation, indoor air quality, and heat island avoidance.~~
- ~~• The Proposed Project would be designed to meet or exceed the 2013 Title 24 energy code requirements. It would accomplish this through improved HVAC systems and duct seals; enhanced ceiling, attic and wall insulation; Energy Star appliances; high-efficiency water heaters (with 19 percent of residential water heating needs accommodated by solar water heaters); energy-efficient three-coat stucco exteriors; energy-efficient lighting; and high-efficiency window glazing. These energy features would undergo independent third party inspection and diagnostics as part of the CGB verification and commissioning process. The energy features would also be demonstrated/verified in the Project's Title 24 Compliance Report submitted during the building permit process.~~
- ~~• Renewable energy would supply 100 percent of residential electricity needs per planning area (Neighborhoods 1-5), which may include but not be limited to, rooftop solar or mandatory continued enrollment in SDG&E's SunRate, or equivalent, renewables program.~~
- ~~• The residential units would be designed to be "solar ready."~~

- The residential units would be designed with sufficient electrical capacity and appropriate circuitry in proximity to parking areas and/or garages, to support residential electric vehicle charging stations.
- The Proposed Project would incorporate advanced plumbing systems, such as parallel hot water piping or hot water recirculation systems, and fixtures such as ultra-low flow toilets, water-saving showerheads and kitchen faucets, and buyer-optional high-efficiency clothes washers.
- The Proposed Project's outdoor landscaping plan would minimize turf, maximize drought-tolerant plants, and incorporate weather-based irrigation controllers, multi-programmable irrigation clocks, and high efficiency drip irrigation systems. At the time of final inspection, a manual shall be placed in each building that includes, among other things, information about water conservation.
- The Proposed Project would utilize reclaimed water from the proposed WTWRF for outdoor irrigation.
- The Proposed Project would implement lumber and other materials conservation during construction (as part of the California Green Builder Program) and prepare a Construction and Demolition Debris Management Plan that requires 90 percent of inerts and 70 percent of all other materials to be recycled during construction, in compliance with the County's Municipal Code. ~~In accordance with CALGreen criteria and Assembly Bill (AB) 75, at least 50 percent of on-site construction waste and ongoing operational waste would be diverted from landfills through reuse and recycling. Areas for storage and collection of recyclables and yard waste would be provided for each residence.~~
- To maximize shade and reduce heat island effects, the landscape plan includes strategic location of deciduous trees and other vegetation. Impervious surfaces would also be minimized and pervious pavers used instead where practical.
- No CFC-based refrigerants would be used, and interior finishes, adhesives, sealants, paints and coatings, and carpet systems would be low in VOCs, and they would meet the testing and product requirements of one or more nationally recognized green product labeling programs.
- The Proposed Project would include natural gas fireplaces only.
- Construction of the Proposed Project would utilize Tier 4 certified equipment.
- The Proposed Project would use building products that have at least 10 percent recycled content.

Analysis

Effects of Climate Change

The increase in the earth's temperature is expected to have wide ranging effects on the environment. Although global climate change is anticipated to affect all areas of the globe, there are numerous implications of direct importance to California. Statewide average temperatures are anticipated to increase by between 3 and 10.5°F by 2100. Some climate models indicate that this warming may be greater in the summer than in the winter. This could result in widespread adverse impacts to ecosystem health, agricultural production, water use and supply, and energy demand. Increased temperatures could reduce the Sierra Nevada snowpack and put additional strain on the state's water supply. In addition, increased temperatures would be conducive to the formation of air pollutants, resulting in poor air quality.

It is also important to note that even if GHG emissions were to be eliminated or dramatically reduced, it is projected that the effect of those emissions would continue to affect global climate for centuries.

Future residents of the Proposed Project site could be exposed to increased risk of dehydration, heat stroke, heat exhaustion, heart attack, stroke, and respiratory disease. These risks, however, would be no different from those experienced by the San Diego region as a whole under the described scenario. Increased temperatures would result in more frequent use of air conditioning that would increase energy costs to residents, and could put a strain on the area's energy supplies. Because the Proposed Project is located inland well above sea level, no impacts related to sea level rise are anticipated.

Effects of GHG Emissions

~~To serve as a guide for determining when a project triggers the need for a GHG significance determination, the County has established a Screening Level of 900 MT CO₂e per year for GHG emission analysis (County 2015). This screening threshold is based on a report by the California Air Pollution Control Officers Association (CAPCOA) entitled "CEQA & Climate Change," dated January 2008. The 900 MT CO₂e per year screening threshold was developed by analyzing the capture of 90 percent or more of future discretionary development for residential and commercial projects. County guidance also recommends including construction emissions (amortized over a typical duration of 20 years) in the screening threshold.~~

~~If a project generates more than 900 MT CO₂e per year, the significance of the GHG emissions are evaluated against the reductions from the "unmitigated" condition. The unmitigated scenario represents a proposed project as described in the application, in compliance with any applicable standards and regulations.* The County has proposed a threshold of 16 percent below unmitigated conditions to evaluate the significance of GHG emissions attributable to a project. If, compared to the unmitigated project, proposed mitigation would reduce GHG emissions by at~~

* ~~For the purposes of the analysis in this report, the unmitigated condition also represents the Project's GHG emissions without consideration of Project design features or statewide measures that are allowed to be counted towards the 16 percent reduction target per County guidelines.~~

~~least 16 percent, this level of mitigation would represent a fair share of what is necessary statewide to achieve AB 32 target.~~

~~The method of quantifying and evaluating GHG emissions in the Project Greenhouse Gases Analysis Report (HELIX 2015f) was based on methodologies recommended in the County Guidance (County 2015). To evaluate the reductions in GHG emissions from Project Design Features relative to the unmitigated scenario, emissions from each source of GHGs were estimated for two scenarios: first, the Project without GHG reducing design features (i.e., the unmitigated Project Equivalent) and; second, the Project with GHG reducing green building design. Emissions calculations for both methods started with the following land use assumption: the 238.8 acre Proposed Project would include the construction of 326 single family residential units; park and recreational uses; biological and agricultural open space; and an on site WTWRF. The first construction phase focuses on overall site grading, the second phase includes infrastructure installation (utility pipelines, roadways, and the construction of the WTWRF), and the third phase addresses “vertical” development of the Project (residential building construction, asphalt paving, and architectural coating).~~

Construction Greenhouse Gas Emissions

Construction activities emit GHGs primarily through the combustion of fuels (mostly diesel) in the engines of off-road construction equipment and through the combustion of diesel and gasoline in the on-road construction vehicles and in the commute vehicles of the construction workers. Smaller amounts of GHGs are also emitted through the energy use embodied in any water use (for fugitive dust control) and lighting for the construction activity. Every phase of the construction process, including grading, building, and paving, emits GHGs, in volumes proportional to the quantity and type of construction equipment used. The heavier equipment typically emits more GHGs per hour of use than the lighter equipment because of their greater fuel consumption and engine design.

For the purpose of the analysis, Proposed Project construction was broken down into three main construction phases, assuming that construction duration period would begin in ~~January 2016~~March 2018 and last until ~~mid-2019~~September 2021. The first phase focuses on overall site grading and rock blasting, which would begin in ~~2016~~2018 and last approximately two years. The second phase would be the infrastructure installation, which includes the construction of the WTWRF, utility connections, and roadways. The infrastructure phase would last approximately ~~one-two~~two years. The third phase addresses “vertical” development of the Project, which includes constructing the residential buildings and coating the pavement/architecture. Each individual neighborhood area would be constructed separately (with the exception of Neighborhoods 1 and 2, which would be constructed together), which would take approximately 2.5 years.

Minor amounts of blasting may be required at the site during initial site preparation and grading activity on site. It is currently unknown the amount of blasting would occur however, it was assumed that approximately two to three blasting event may occur each week. Blasting operations would be conducted by a licensed blasting contractor, in strict compliance with pertinent federal, state and County requirements. All blasting materials would be transported to the site for each blasting sequence and no explosives would be stored at the site.

Construction emissions from the demolition, site grading, and the construction of the residences and WTWRF were calculated using CalEEMod computer program version 2013.2.2 developed by the SMAQMD/SCAQMD. The emissions from the construction activities for the off-site roadway areas were calculated using the Road Construction Emissions Model Version, 7.1.5.1 developed by the SMAQMD. ~~Based on the construction schedule, emissions related to the construction of the WTWRF and roadway would occur during 2016; these emissions are included in the total 2016 construction emissions.~~

As shown in Table 3.1.1-32, *Estimated Construction Emissions*, the Project-related construction activities are estimated to generate approximately ~~4,0564,966~~ MT of CO₂e emissions. For construction emissions, the County ~~guidance~~ recommends that the emissions be amortized over 20 years and added to operational emissions, as appropriate. Amortized over 20 years, construction equipment would contribute ~~203-248~~ metric tons per year of CO₂e emissions to the Project's total. These emissions are added to the expected annual operational GHG emissions below.

~~Unmitigated (Project Without Design Features)~~ Operational Greenhouse Gas Emissions

Operational sources of GHG emissions include: (1) vehicle use; (2) energy use (electricity and natural gas) and area sources (landscaping equipment; (3) solid waste generation; and (4) water conveyance and treatment.

Vehicle Emissions. The Project would generate 3,786 average daily trips (ADT) (Linscott, Law & Greenspan Engineers [LLG] 2015). CalEEMod assumed an annual total of 9,744,642 miles would be traveled each year by Project residents, visitors to the public neighborhood park, and WTWRF workers. This total annual VMT was based on the average trip length calculated for this Project which was 7.05 miles per trip (LLG 2016). Trip rates were based on the Traffic Impact Analysis, which estimated 10 daily trips per DU for Neighborhoods 1, 2, 4, and 48 units in 5; 12 daily trips per DU for Neighborhoods 3 and the remaining units in 5; a total of 324 daily trips from multi-generational second units in neighborhoods 2, 3, and 5; and 10 total daily trips for the WTWRF (associated with hauling of sludge, screenings, and grit, delivery of chemicals, delivery of recycled water, as well as facility maintenance, management, and supervision of the site). The Project would result in vehicle-related emissions of 3,577 MT CO₂e annually.

Area Source Emissions. Area sources included emissions from residential fireplaces (i.e., hearths), landscaping equipment, architectural coatings, and household consumer products. GHG emissions associated with area sources were estimated using the CalEEMod default values for the Proposed Project.

Energy Emissions. Buildings use electricity for lighting, heating and cooling. Electricity generation entails the combustion of fossil fuels, including natural gas and coal, which are then stored and transported to end users. A building's electricity use is thus associated with the off-site or indirect emission of GHGs at the source of electricity generation (power plant). Due to the nature of the electrical grid, it is not possible to say with certainty where energy consumed will be generated. Therefore, GHG emissions resulting from electricity generation were estimated using the CalEEMod default values for the San Diego Gas and Electric (SDG&E)

region. The electricity energy use is in kilowatt-hours per size metric for each land use subtype and natural gas use is in kiloBritish Thermal Units (kBtu) per size metric for each land use subtype. The CalEEMod model default values are based on the CEC-sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies (SCAQMD 2013).

The Proposed Project would comply with the 2016 California Title 24 Energy Code (which goes into effect on January 1, 2017). These standards exceed the current 2013 efficiency standards by 28 percent. The following energy efficient items are planned for the housing development: improved HVAC systems and duct seals; enhanced ceiling, attic and wall insulation; Energy Star appliances; high-efficiency water heaters; energy-efficient three-coat stucco exteriors; energy-efficient lighting; and high-efficiency window glazing.

The residential units would be prewired with sufficient electrical capacity and appropriate circuitry in proximity to vehicle parking areas and/or garages, to support residential electric vehicle charging stations.

The Project would also include the use of renewable energy which would provide 100 percent of residential electricity needs per planning area (Neighborhoods 1-5). Renewable energy would be provided through renewable sources to include, but not be limited to, rooftop solar or enrollment in SDG&E's SunRate, or equivalent, renewables program. Using renewable energy displaces electricity demand which would ordinarily be supplied by the local utility. Since zero GHG emissions are associated with renewable energy, the GHG emissions reductions from this measure are equivalent to the emissions that would have been produced had electricity been supplied by the local utility.

With the implementation of energy-reducing project design features, the Project would result in the indirect emission of 396 MT CO₂e annually from energy usage.

Water Use and Wastewater Treatment Emissions. The provision of potable water consumes large amounts of energy associated with source and conveyance, treatment, distribution, end use, and wastewater treatment. This type of energy use is known as embodied energy. The electricity intensities are multiplied by the utility intensity factors for the GHGs and are classified as indirect emissions. The default electricity intensity is from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for Northern and Southern California. The GHG emissions associated with water use are calculated by multiplying the embodied energy in a gallon of potable water by the total number of gallons projected to be consumed by the Project and then by the electricity generation GHG emissions factors.

The amount of wastewater generated by the Proposed Project would emit CH₄ and N₂O emissions. Biogenic GHG emissions are generated from both aerobic and anaerobic processes, as well as from the combustion of digester gas, but CalEEMod only calculates combustion emissions from digester gas because there are currently no authoritative emission factors for process CO₂ emissions. The GHG emissions associated with the WTWRF process and potable water conveyance are provided together in this water usage category.

The Proposed Project would produce tertiary filtered effluent that meets Title 22 standards for disinfected secondary recycled water, which could be used for end uses in the Rincon Municipal Water District for landscape irrigation. In general, the use of recycled water instead of potable water uses less energy in the long term, relative to alternative water sources such as imported water and desalinated water.

Imported water delivered through the state water project (SWP) consumes a substantial amount of energy to convey water to southern California from the Colorado River in Arizona/Nevada or Sacramento-San Joaquin River Delta in northern California. A recent study by California Regional Water Control Board has shown that the energy required to import water is over six times the energy requirement for Title 22 recycled water when considering kilowatt-hours per acre-foot. In addition, the same study indicates that Title 22 recycled water produces 338 tons of CO₂ for every 1,000 acre-foot of water produced, while the SWP produces 2,250 tons of CO₂ for every 1,000 acre-foot of water imported (West Basin 2007; USEPA 1995). Based on this analysis, the Proposed Project would reduce the relative amount of GHG emissions produced for every acre-foot of recycled water provided by the WTWRF to offset potable imported water and would be considered to be inherently energy efficient in this respect.

Additionally, Project water emissions were adjusted to account for the recent 2013 CALGreen mandate to reduce water consumption by up to 20 percent. The Project would meet this reduction with the installation of low flow water features. With the discussed water conservation measures, the Project would result in 124 MT CO₂e per year.

Solid Waste Emissions. The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. For the Project calculations, a countywide average waste disposal rate was used and was obtained from the California Department of Resources Recycling and Recovery (CalRecycle). This analysis assumes that the countywide average already accounts for the 50 percent diversion requirement from AB 75, considering that the County has been meeting its goals.

In 2012, the State legislature enacted AB 341, increasing the diversion target to 75 percent statewide by 2020. Therefore, a 25 percent diversion rate over the countywide average was applied to the Project in this analysis. This would result in the emission of 145 MT CO₂e annually from solid waste. In addition, the Proposed Project would implement lumber and other materials conservation during construction (as part of the California Green Builder Program) and prepare a Construction and Demolition Debris Management Plan that requires 90 percent of inerts and 70 percent of all other materials to be recycled during construction, in compliance with the County's Municipal Code.

Emissions Associated with Off-road Equipment. The Project would include the use of off-road equipment during operations. This equipment consists of two generators; one would be needed at the WTWRF and one would be needed for the fire pump station. GHG emissions associated with this off-road equipment are included in this analysis.

In summary, as shown in Table 3.1.1-3, the Project would result in total GHG emissions of 4,741 MT CO₂e per year.

~~Direct GHG emissions from operation of the Proposed Project would include those associated with natural gas combustion (furnace), use of other fuel consuming equipment, refrigeration, emergency stand by generators, etc. Indirect emissions would be associated with electrical generation, water consumption, solid waste disposal, and vehicle trips.~~

~~Unmitigated GHG emissions represent the Proposed Project without design features in compliance with any applicable standards and regulations that were included in the calculations that support the County's 16 percent reduction requirement, including Pavley I and the 20 percent RPS. Table 3.1.1-4, *Estimated Unmitigated Operational Emissions*, presents the summary of the annual unmitigated emissions for the Project (including emissions associated with the WTWRF and off road equipment such as generators). The emissions also include the amortized annual construction emissions anticipated for the Project.~~

~~Area Emissions. Emissions from residential fireplaces, landscaping equipment, architectural coatings, and household consumer products are considered area sources and were estimated for the Project using CalEEMod.~~

~~Energy Emissions. Electricity generation entails the combustion of fossil fuels including natural gas and coal. A building's electricity use is thus associated with the off-site or indirect emission of GHGs at the source of electricity generation (power plant). GHG emissions resulting from electricity generation were estimated using the CalEEMod default values for the SDG&E region. The electricity energy use is in kilowatt hours per size metric for each land use subtype and natural gas use is in kilo British Thermal Units (kBtu) per size metric for each land use subtype; the Proposed Project consists of the following land use subtypes: Single Family Residential, City Park, and General Light Industry.~~

~~Water Use Emissions. The provision of potable water consumes large amounts of energy associated with source and conveyance, treatment, distribution, end use, and wastewater treatment. The GHG emissions associated with water use are calculated by multiplying the embodied energy in a gallon of potable water by the total number of gallons projected to be consumed by the Proposed Project and then by the electricity generation GHG emissions factors. GHG emissions associated with wastewater generation are calculated in the same manner and are included in the emissions shown for water use.~~

~~Solid Waste Emissions. The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. A County wide average waste disposal rate from the California Department of Resources Recycling and Recovery (CalRecycle) was used. The single-family residential waste generation rates range from 7.8 to 11.4 pounds per unit per day (CalRecycle 2009). To be conservative, the higher generation rate of 11.4 pounds per unit per day was used to determine the total volume of waste by weight. This value was then multiplied by emissions factors obtained from the USEPA report *Solid Waste Management and Greenhouse Gases* (USEPA 2006) for the different material classes (glass, metal, plastic, etc.) and two different waste streams (to landfill or to recycling). For the landfill estimates, landfill gas recovery for energy was assumed for both the landfill and recycling estimates. Local recycling and disposal (to landfill) percentages (of total waste generated) were~~

also obtained from CalRecycle and reflect current waste disposal practice in accordance with the statutory 50 percent diversion mandate (regulatory requirement).

~~Off-road Equipment Emissions.~~ Off road equipment would be needed during operation of the Proposed Project and would consist of two generators; one would be necessary for the WTWRF and one would be needed for the fire pump station. This equipment requires diesel fuel; associated GHG emissions were estimated using CalEEMod.

~~Transportation Emissions.~~ GHG emissions from vehicles come from the combustion of fossil fuels (primarily gasoline and diesel) in vehicle engines. The quantity/type of transportation fuel consumed, amount of vehicle trips, and trip distances that motorists travel are relevant in analyzing GHG emissions from vehicles.

~~The Proposed Project without GHG-reducing design features would generate 3,786 ADT (LLG 2015). CalEEMod assumed an annual total of 10,815,031 miles would be traveled each year by Project residents, visitors to the public neighborhood park, and WTWRF workers. This total annual VMT was based on CalEEMod default trip lengths, and the gross daily ADT multiplied by 365 days per year (to obtain an annual value for the Project). The unmitigated Project would result in vehicle-related emissions of 4,534 MT CO₂e annually.~~

~~In summary, as shown in Table 3.1.1-4, the unmitigated Project would result in total GHG emissions of 6,883 MT CO₂e per year.~~

~~Operational Greenhouse Gas Emissions with Implementation of Applicable Regulations and Project Design Features~~

~~Per the County's Guidance, projects may take a reduction credit on vehicle emissions due to LCFS, Pavley II, and effects on energy emissions due to current energy code enforcements and the RES. Table 3.1.1-5, *Estimated Greenhouse Gas Emissions Reductions from Applicable Regulations*, summarizes the reduction in emissions from applicable regulations.~~

~~The Proposed Project would incorporate design features to conserve energy and water; promote recycling and waste reduction; and encourage pedestrian, bicycle and equestrian mobility. Such Project Design Features are presented in Table 1-4 of this EIR. These measures can also be counted towards the 16 percent reduction goal, and associated emissions reductions are summarized in Table 3.1.1-6, *Estimated Greenhouse Gas Emissions Reductions from Project Design Features*. In addition, the Proposed Project would obtain electricity from SDG&E, which is increasing its share of energy generated by renewable sources as mandated by AB 32.~~

~~Table 3.1.1-7, *Estimated Operational Emissions with Applicable Regulations and Project Design Features*, presents anticipated Project GHG emissions with the state mandated measures and Project Design Features.~~

~~Energy Emissions.~~ The RES (up to 13 percent) can be included toward the minimum 16 percent mitigation requirement. Therefore, the electricity emissions calculated for the unmitigated Project in the CalEEMod model were reduced by an additional 11.4 percent to account for implementation of the RES.

The Proposed Project would meet the 2013 California Energy Code's energy efficiency standards thereby exceeding the 2008 California Energy Code's energy efficiency standards by 15 percent and would implement the following energy efficiency measures: improved HVAC systems and duct seals; enhanced ceiling, attic and wall insulation; Energy Star appliances; high-efficiency water heaters; energy efficient three-coat stucco exteriors; energy efficient lighting; and high-efficiency window glazing. The residential units would also be designed with sufficient electrical capacity and appropriate circuitry in proximity to parking areas and/or garages, to support residential electric vehicle charging stations.

Additionally, the Proposed Project would include solar PV systems which would provide a minimum of 30 percent of residential electricity needs in each neighborhood. Using electricity generated from PV systems displaces electricity demand which would ordinarily be supplied by the local utility. Since zero GHG emissions are associated with electricity generation from PV systems, the GHG emissions reductions from this measure are equivalent to the emissions that would have been produced had electricity been supplied by the local utility. According to the Scoping Plan, the California Solar Initiative would reduce the GHG emissions statewide by approximately 10 percent. By using the same percent GHG reduction, it was conservatively assumed that approximately 30 percent of the total electricity demand for the Proposed Project would be provided by the PV system. The Proposed Project's solar PV would result in a 19 percent reduction in GHG emissions by 253 MT CO₂e. With the implementation of the statewide 13 percent RES, energy efficiency improvements, and roof solar panels, the Project would result in the indirect emission of 906 MT CO₂e annually from energy usage.

Water Use Emissions. Proposed Project water emissions were adjusted to account for the recent 2013 CALGreen mandate to reduce water consumption by up to 20 percent. The installation of the low flow water features would result in the reduction of GHG emissions associated with water usage by approximately 14 percent, resulting in an annual reduction of 29 MT CO₂e.

Additionally, the Proposed Project would utilize reclaimed water from the WTWRF for landscape irrigation. This feature would greatly reduce the energy associated with the conveyance of water from outside sources. Based on California Air Pollution Control Officers Association (CAPCOA) Measure WSW 1, this feature would reduce emissions associated with outdoor water use by 65 percent, resulting in a reduction of 55 MT CO₂e per year (CAPCOA 2010).

Solid Waste Emissions. AB 75 bill requires diversion of at least 50 percent of the solid waste from landfills and implementation of county wide solid waste recycling practices to achieve this goal would result in a 50 percent reduction from Project generated solid waste (95 MT CO₂e). This would result in the emission of 95 MT CO₂e annually from solid waste.

Transportation Emissions. As discussed above, Pavley II and LCFS can be included toward the minimum 16 percent reduction requirement. The LCFS (9.51 percent) and Pavley II (2.38 percent) would result in 12 percent reduction in vehicular emissions. This would result in the emission of 3,995 MT CO₂e annually from the Project.

Summary

~~As detailed above, the efficiency threshold for the year 2020 is 4.9 MT CO₂e/SP/year, and assuming a 5.2 percent reduction for each year following 2020, the 2021 threshold (Project buildout) is 4.6 MT CO₂e/SP/year. On average, 2.92 residents will reside in each single-family dwelling unit. It was further assumed that one resident will reside in each Second Dwelling Unit, for a total service population of 1,029 persons. As shown in Table 3.1.1-4, at full buildout the Proposed Project would result in emissions of 4.6 MT/SP/year. Therefore, the Project would result in **less than significant** GHG impacts. As shown in Tables 3.1.1-5 and 3.1.1-6, state-mandated measures and Proposed Project design features would result in annual emission reductions of 731 MT CO₂e and 436 MT CO₂e, respectively. Table 3.1.1-7 shows that with these reductions, the Proposed Project would result in annual GHG emissions of 5,717 MT CO₂e per year. This would represent a reduction of 17 percent when compared to the 6,883 MT CO₂e per year estimated for the unmitigated Project without design features.~~

~~As evaluated per the County's Guidance, the Proposed Project would achieve the County's GHG reduction goals, and would therefore be consistent with the goals and strategies of local and state plans, policies, and regulations aimed at reducing GHG emissions from land use and development. Impacts would be **less than significant**.~~

Applicable Plans, Policies and Regulations

Analysis

The regulatory plans and policies discussed in Subsection 3.1.1.1 above aim to reduce national, state, and local GHG emissions by primarily targeting the largest emitters of GHGs: the transportation and energy sectors. Plan goals and regulatory standards are thus largely focused on the automobile industry and public utilities. For the transportation sector, the reduction strategy is generally three-pronged: to reduce GHG emissions from vehicles by improving engine design; to reduce the carbon content of transportation fuels through research, funding, and incentives to fuel suppliers; and to reduce the miles these vehicles travel through land use change and infrastructure investments.

For the energy sector, the reduction strategies aim to reduce energy demand; impose emission caps on energy providers; establish minimum building energy and green building standards; transition to renewable non-fossil fuels; incentivize homeowners and builders; fully recover landfill gas for energy; expand research and development; and so forth.

State Plans

EO S-3-05 established GHG emission reduction targets for the state, and AB 32 launched the Climate Change Scoping Plan that outlined the reduction measures needed to reach these targets. The Project, by achieving the 4.6 MT CO₂e/SP/year efficiency threshold in 2021, would be considered consistent with the AB 32's 2020 reduction target, and on track for meeting EO S-3-05's reduction target. ~~The Scoping Plan and its implementing and complementary regulations are discussed in Section 3.1.1.1. As described in Section 3.1.1.2, the 16 percent reduction in GHG~~

~~emissions goal relative to an unmitigated project is derived from CARB's 2010 updated 2020 emissions projections and 2011 Scoping Plan. The revised 2011 projections and Scoping Plan account for less overall growth and less energy/fuel consumption due to the long term dampened economic conditions. The Project, by achieving a 16 percent reduction goal relative to an unmitigated project, would be considered consistent with the 2011 Scoping Plan and AB 32's 2020 reduction target.~~

Local Plans

As discussed above, the Proposed Project would achieve GHG reductions through green building design that includes improved energy efficiency, water conservation, sustainable materials use, and waste reduction. Verification and commissioning of these features would occur through independent third-party inspection and diagnostics.

~~As a condition of the D-designator Site Plan building permit approval, however, the Proposed Project would be required to comply with 2016 improve energy efficiency to meet or exceed the 2013 Title 24 energy code requirements (which surpass the 2013 Title 24 Energy Efficiency Standards by 28 percent), reduce indoor water consumption by up to 20 percent, and have at least 30-100 percent of residential electricity generated by solar panels renewable sources. Verification of increased water and energy efficiencies would be demonstrated based on a performance approach, using a CEC-approved water and energy compliance software program, in the Title 24 Compliance Reports provided by the Project applicant to the County ~~in accordance with the D-designator Site Plan~~ prior to issuance of the building permit.~~

~~The Project would result in 4.6 MT CO₂e/SP/year, which would be consistent with statewide GHG reduction targets established by AB 32 and EO S-3-05. The Proposed Project would meet the 16 percent reduction goal relative to an unmitigated project without Project Design Features and would thus be consistent with the County's General Plan goals for private land use development. The Project's consistency with specific General Plan Conservation Element policies is analyzed in Section 3.1.4, *Land Use*.~~

Summary

The Proposed Project would not conflict with applicable plans because design features would conform to the primary regulations and policies governing the control of GHG emissions stated above. Accordingly, with implementation of the Project Design Features identified above, impacts associated with GHG emissions would be **less than significant**.

Horizon Year (2030 and 2050) Emissions Inventories

Analysis

~~Beyond Project buildout, the Project's GHG emissions would reduce with the continued implementation of the 2020 reduction strategies and increased stringency of state reduction measures based on actions included in the 2014 Scoping Plan related to energy use and transportation that transition the state towards meeting its longer term GHG emission reduction~~

goals. In addition to the 2020 reduction measures, the following assumptions were included in the reduced 2030 GHG emissions:

- Mobile source reductions resulting from fleet wide emissions improvements over current standards were estimated using the EMFAC2014 emissions inventories. Emissions were modeled using Project specific assumptions for fleet mix and VMT as detailed the CalEEMod output files provided in Appendix G.
- Through compliance with AB 341, a total of 75 percent of the Project's solid waste would be diverted from landfills.

The emissions by source for 2030 were calculated by modeling 2030 mobile source emissions using EMFAC2014 and applying a percent reduction to the 2020 emissions inventory for the waste reduction measure. Table 3.1.1-8, *Estimated 2030 Operational Emissions*, summarizes the 2030 emissions as broken down by emissions category. Construction emissions are included in the summary provided in Table 3.1.1-8 and are expected to be fully amortized by 2040.

Beyond 2030, the Project's GHG emissions would reduce with the continued implementation of the 2020 reduction strategies and increased stringency of state reduction measures, primarily associated with mobile sources. The following assumption was included in the reduced 2050 GHG emissions:

- Mobile source reductions resulting from fleet wide emissions improvements over current standards were estimated using the EMFAC2014 emissions inventories. Emissions were modeled using Project specific assumptions for fleet mix and VMT as detailed the CalEEMod output files provided in Appendix G.

Mobile source emissions for 2050 were calculated by modeling 2030 through 2050 mobile source emissions using EMFAC2014. Table 3.1.1-9, *Estimated 2050 Operational Emissions*, summarizes the 2050 emissions as broken down by emissions category.

Through implementation of the 2014 Scoping Plan Measures, it is expected that additional reductions would occur. Strengthening of the LCFS and expansion of the zero emissions vehicles program will likely result in further reductions to mobile source emissions. Additionally, the RPS would likely continue beyond the 2020 goal of 33 percent. However, because the design of any such measures has yet to be finalized, any reduction credit associated with these measures has not been included. As such, the analysis presented above reflects a conservative set of assumptions.

Summary

As shown in Tables 3.1.1-8 and 3.1.1-9, Project emissions would continue to decrease beyond 2030 and 2050 through implementation of 2014 Scoping Plan Measures.

3.1.1.3 Cumulative Impact Analysis

As described in Section 3.1.1.1 of this discussion, the entire issue of global climate change requires cumulative review. As a result, additional discussion is not required.

3.1.1.4 Significance of Impacts

Based on the analysis provided above, the Proposed Project would have **less than significant** impacts related to GHG emissions.

Table 3.1.1-1 GLOBAL WARMING POTENTIALS (GWP) AND ATMOSPHERIC LIFETIMES (years)		
Gas	Atmospheric Lifetime (years)	100-year GWP*
CO ₂	50-200	1
CH ₄ **	9-15	21
N ₂ O	120	310
HFC-23	264	11,700
HFC-125	32.6	2,800
HFC-134a	14.6	1,300
HFC-143a	48.3	3,800
HFC-152a	1.5	140
HFC-227ea	36.5	2,900
HFC-236fa	209	6,300
HFC-4310mee	17.1	1,300
CF ₄	50,000	6,500
C ₂ F ₆	10,000	9,200
C ₄ F ₁₀	2,600	7,000
C ₆ F ₁₄	3,200	7,400
SF ₆	3,200	23,900

Source: USEPA 2010

* GWPs used here are calculated over a 100-year time horizon.

** The methane GWP includes direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO₂ is not included.

Table 3.1.1-2 CARB SCOPING PLAN RECOMMENDED GHG REDUCTION MEASURES	
Recommended Reduction Measures	Estimated 2020 Reductions (MMT CO₂e)/Percent²
California Light Duty Vehicle Greenhouse Gas Standards Implement Pavley I Standards ⁴ <ul style="list-style-type: none"> • Develop Pavley II light duty vehicle standards 	31.7 (18.22%)
Energy Efficiency <ul style="list-style-type: none"> • Building/appliance efficiency, new programs, etc. • Increase CHP generation by 30,000 GWh • Solar Water Heating (AB 1470 goal) 	26.3 (15.11%)
Renewables Portfolio Standard (33% by 2020) ⁴	21.3 (12.24%)
Low Carbon Fuel Standard	15 (8.62%)
Regional Transportation Related GHG Targets ¹	5 (2.87%)
Vehicle Efficiency Measures	4.5 (2.59%)
Goods Movement <ul style="list-style-type: none"> • Ship Electrification at Ports • System-wide Efficiency Improvements 	3.7 (2.13%)
Million Solar Roofs	2.1 (1.21%)
Medium/Heavy Duty Trucks <ul style="list-style-type: none"> • Heavy Duty Vehicle GHG Reduction (Aerodynamic Efficiency) • Medium and Heavy duty Vehicle Hybridization 	1.4 (0.80%)
High Speed Rail	1.0 (<1.0%)
Industrial Measures (for sources covered under cap & trade program) <ul style="list-style-type: none"> • Refinery Measures • Energy Efficiency and Co-benefits Audits 	0.3 (<0.5%)
Additional Reductions Necessary to Achieve the Cap	34.4 (20%)
Industrial Measures (for sources not covered under cap & trade program) <ul style="list-style-type: none"> • Oil and Gas Extraction and Transmission 	1.1 (<1%)
High Global Warming Potential Gas Measures	20.2 (12%)
Sustainable Forests	5.0 (3%)
Recycling and Waste (landfill methane capture)	1.0 (0.6%)
TOTAL ESTIMATED REDUCTIONS COUNTED TOWARDS 2020 TARGET³	174
State Government Operations	1-2%
Local Government Operations	TBD
Green Building	26 (14.94%)
Recycling and Waste	9 (5.17%)
Water Sector Measures	4.8 (2.76%)
Methane Capture at Large Dairies	1.0 (<1%)

Source: CARB 2008b

¹—This number represents an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target. CARB will establish regional targets for each MPO following input of the Regional Targets Advisory Committee and a public stakeholders consultation process per SB 375.

²—Percentages are relative to the total of 174 MMT CO₂e, and may not total 100 due to rounding.

³—The total reduction for the recommended measures slightly exceeds the 169 MMT CO₂e of reductions estimated in CARB's BAU 2020 Emissions Forecast made in 2008. This is the net effect of adding several measures and adjusting the emissions reduction estimates for some other measures.

⁴—CARB's 2010 revised BAU 2020 projections of 507 MMT CO₂e, based on the economic downturn and incorporation of Pavley I and 20% RPS, indicate that the total reduction for the recommended measures is now 80 MMT CO₂e.

Table 3.1.1-32 ESTIMATED CONSTRUCTION EMISSIONS (MT/year)	
<u>Year</u><u>Phase</u>	CO₂ CH₄ N₂O CO₂e MT/year
2016 <u>Site Preparation, Grading, and Blasting</u>	979 0.23 0.05 <u>1,000691</u>
2017 <u>Backbone Infrastructure</u>	1,888 0.47 0.05 <u>1,913669</u>
2018 <u>WTWRF</u>	568 0.15 0.00 <u>57173</u>
2019 <u>Road Construction</u>	569 0.13 0.00 <u>572174</u>
<u>Vertical Development</u>	3,359
TOTAL CONSTRUCTION GHG EMISSIONS	<u>4,0564,966</u>

Source: HELIX ~~2015~~2016

Table 3.1.1-43				
ESTIMATED UNMITIGATED OPERATIONAL EMISSIONS				
(MT/year)				
Source	CO ₂	CH ₄	N ₂ O	CO ₂ e
	MT/year			
<i>Residential Development</i>				
Area	241	0.01	0.00	243
Energy	334	0.01	0.01	336
Mobile	3,564	0.13	-	3,567
Solid Waste	63	3.75	-	142
Water Usage (including Wastewater Treatment)	91	0.41	0.01	103
<i>Residential Subtotal</i>	<i>4,294</i>	<i>4.31</i>	<i>0.02</i>	<i>4,391</i>
<i>Wastewater Treatment and Water Reclamation Facility</i>				
Area	0	0.00	0.00	0
Energy	60	0.00	0.00	60
Mobile	11	0.00	-	11
Solid Waste	1	0.08	-	3
Water Usage	18	0.13	0.00	21
Off-road Equipment	7	0.00	-	7
<i>WTWRF Subtotal</i>	<i>97</i>	<i>0.21</i>	<i>0.00</i>	<i>102</i>
<i>Total Operations</i>	<i>4,390</i>	<i>4.52</i>	<i>0.02</i>	<i>4,493</i>
<i>Amortized Construction</i>				
Amortized Construction	200	0.05	0.01	203
Area	241	0.01	0.00	242
Energy	1,348	0.04	0.02	1,354
Mobile	4,490	0.17	0.00	4,534
Solid Waste	85	5.02	0.00	190
Water Usage	187	0.88	0.02	213
Off road Equipment	147	0.01	0.00	147
TOTAL	6,6974,636	6.194.58	0.050.03	6,8834,741

Source: HELIX 2015-2016

Note: Mobile source emissions were adjusted to remove the GHG reductions from the LCFS.

Table 3.1.1-54	
ESTIMATED GREENHOUSE GAS EMISSIONS SIGNIFICANCE DETERMINATION REDUCTIONS FROM APPLICABLE REGULATIONS (MT/year)	
Measure Category	Source Percent Reduction from Unmitigated^a Unmitigated CO₂e^b Value CO₂e Reduced^c
Total Project Emissions (MT CO ₂ e)	4,741
Project Service Population (residents)	1,029
Project Emissions per Service Population (MT CO ₂ e/SP/year)	4.6
2020 Efficiency Threshold (MT CO ₂ e/SP/year)	4.9
2021 Efficiency Threshold (MT CO ₂ e/SP/year)	4.6
Significant Impact?	No
Renewable Electricity Standard	Energy 11.4 844 ^d 96
Executive Order S-1-07 (Low Carbon Fuel Standard)	Mobile 9.51 4,534 431
Assembly Bill 1493 (Pavley II Standards)	Mobile 2.38 4,534 108
AB-75	Waste 50.0 190 95
Subtotal — MTCO₂e Reduced	
731	

Source: HELIX 2015~~f~~2016

^a Source: CARB 2014

^b Emissions available from Table 3.1.1-4, *Estimated Unmitigated Operational Emissions*, by source.

^c CO₂e Reduction is quantified by multiplying the Percent Reduction from Unmitigated by the Unmitigated CO₂e value.

^d Emissions related to natural gas were removed, so that only electricity-related GHG emissions were included.

Note: Totals may not add up exactly due to rounding.

Table 3.1.1-6 ESTIMATED GREENHOUSE GAS EMISSIONS REDUCTIONS FROM PROJECT DESIGN FEATURES (MT/year)					
Feature	Source	2010 CAPCOA* Report Measure	Percent Reduction from Unmitigated	Unmitigated CO₂e	CO₂e Reduced
Energy Efficient Features	Energy	BE-1	7.2	1,354	98
On-site Renewables	Energy	AE-1	30.0	844	253
Low Flow Fixtures	Water	WUW-1	13.9	213	29
Reclaimed Water	Water	WSW-1	65.0	85	55
Subtotal – MTCO₂e Reduced					436

Source: HELIX 2015f

*—California Air Pollution Control Officers Association

Note: Totals may not add up exactly due to rounding.

Table 3.1.1-7 ESTIMATED OPERATIONAL EMISSIONS WITH APPLICABLE REGULATIONS AND PROJECT DESIGN FEATURES (MT/year)				
Source	CO₂	CH₄	N₂O	CO₂e
	MT/year			
Amortized Construction	200	0.05	0.01	203
Area	241	0.01	0.00	242
Energy	902	0.03	0.01	906
Mobile	3,993	0.15	0.00	3,995
Solid Waste	42	2.51	0.00	95
Water Usage	114	0.49	0.01	128
Off-road Equipment	147	0.01	0.00	147
TOTAL	5,639	3.25	0.03	5,717

Source: HELIX 2015f

Table 3.1.1-8				
ESTIMATED 2030 OPERATIONAL EMISSIONS (MT/yr)				
Source	CO₂	CH₄	N₂O	CO₂e
	MT/yr			
Area	241	0.01	0.00	242
Energy	902	0.03	0.01	906
Mobile	3,723	0.12	0.00	3,725
Solid Waste	21	1.26	0.00	48
Water Usage (including Wastewater Treatment)	114	0.49	0.01	128
Off road Equipment	147	0.01	0.00	147
Construction	203	—	—	203
TOTAL	5,148	1.91	0.03	5,196

Source: HELIX 2015f

Table 3.1.1-9				
ESTIMATED 2050 OPERATIONAL EMISSIONS (MT/yr)				
Source	CO₂	CH₄	N₂O	CO₂e
	MT/yr			
Area	241	0.01	0.00	242
Energy	902	0.03	0.01	906
Mobile	3,214	0.09	0.00	3,216
Solid Waste	21	1.26	0.00	48
Water Usage (including Wastewater Treatment)	114	0.49	0.01	128
Off road Equipment	147	0.01	0.00	147
TOTAL	4,638	1.89	0.03	4,687

Source: HELIX 2015f