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Date: May 14, 2009

To: Veronica Tam

Organization: Veronica Tam & Associates

From: Rincon Consultants, Inc. (Contact: Matt Maddox, Associate Environmental Planner)

Email: mmaddox@rinconconsultants.com;

cc:

Re:

This memorandum provides a brief overview of greenhouse gases (GHGs) and estimates GHG emissions associated with projected future housing development in the City of Glendora. Total residential development potential in Glendora is estimated at 1,613 residential units (326 low density units and 1,287 medium/high density units). Existing international, federal and state GHG regulations are discussed in the Appendix.

Greenhouse Gases and Global Climate Change

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG), analogous to the way in which a greenhouse retains heat. Common GHG include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxides (N₂O_x), fluorinated gases, and ozone. GHG are emitted by both natural processes and human activities. Of these gases, CO₂ and CH₄ are emitted in the greatest quantities from human activities. The accumulation of GHG in the atmosphere regulates the earth's temperature. However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. The rate of Global Climate Change (GCC) has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. However, scientists have observed an unprecedented acceleration in the rate of warming during the past 150 years likely due to the observed increase in anthropogenic GHG concentrations (United Nations Intergovernmental Panel on Climate Change (IPCC), November 2007). Current annual anthropogenic GHG emitted from the world, United States, and California is listed in the table below.

Annual Anthropogenic GHG Emissions

Worldwide	United States	California
40,000 MM CDE	7,054 MM CDE	492 MM CDE

MM = million metric tons
CDE = carbon dioxide equivalent

Source: IPCC, 2007; USEPA, April 2008; CEC,
December 2006

California is the second largest emitter of GHGs among states and, if California were a country, it would be the sixteenth highest emitter among countries (AEP, 2007). Out of the 492 million metric tons of carbon dioxide equivalent (CDE¹) produced in California (7% of US total), 41% is associated with transportation. Electricity generation is the second largest source, contributing 22% of the state's GHG emissions (CEC, December 2006). Most, 81%, of California's 2004 GHG emissions (in terms of CDE) were CO₂ produced from fossil fuel combustion, with 2.8% from other sources of CO₂, 5.7% from methane, and 6.8% from nitrous oxide (CEC, December 2006).

GHG Emissions from City of Glendora Potential Residential Units

GHG emissions associated with residential development in Glendora have been calculated using methodologies recommended by the California Air Pollution Control Officer's Association [CAPCOA] (January 2008) *CEQA and Climate Change* white paper and the California Climate Action Registry General Reporting Protocol (March 2007). A more specific description of the methodology is contained in the Appendix. The analysis focuses on CO₂, N₂O, and CH₄ as these are those GHG emissions that the project would emit in the largest quantities as compared to other GHGs (such as chlorofluorocarbons [CFCs]).

Operational Indirect and Stationary Direct Emissions

Annual electricity emissions were calculated using the California Climate Action Registry General Reporting Protocol, which has developed emission factors based on the mix of fossil-fueled generation plants, hydroelectric power generation, nuclear power generation, and alternative energy sources associated with the regional grid. CO₂ emission estimates also take into account emissions from other operational sources such as natural gas use for space heating. Operational indirect and stationary direct emissions are estimated at 7,817 metric tons per year in CO₂ equivalency units.

Transportation Emissions

Mobile source GHG emissions were estimated based on total vehicle miles traveled (VMT) associated with projected residences. Daily VMT is estimated at 90,053 daily miles. Based on this VMT estimate, annual transportation emissions are estimated at 18,689 metric tons in CO₂ equivalency units.

Combined Stationary and Mobile Source Emissions

The table below combines the operational and mobile GHG emissions associated with the potential residential units in Glendora, which total approximately 26,506 metric tons per year in CO₂ equivalency units.

¹ Carbon dioxide equivalent (CDE or CO₂E) is a quantity that describes, for a given mixture and amount of GHGs, the amount of CO₂ (usually in metric tons; million metric tons [megatonne] = MMTCO₂E = terragram [Tg] CO₂ Eq; 1,000 MMT = gigatonne) that would have the same global warming potential (GWP) when measured over a specified timescale (generally, 100 years).

Combined Annual Emissions of Greenhouse Gases

Emission Source	Annual Emissions
Operational	7,817 metric tons CDE
Mobile	18,689 metric tons CDE
Total Emissions	26,506 metric tons CDE

CDE = carbon dioxide equivalents

Sources: Calculation Methodology per California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 2.2, March 2007, page 30-35.

See Appendix for GHG emission factor assumptions

This total represents roughly 0.005% of California's total 2004 emissions of 492 million metric tons. These emission projections indicate that approximately 30% of the project GHG emissions are associated with electricity and natural gas usage, while the other 70% are associated with vehicular travel. Please note that, as discussed further in the *Methodology* in the Appendix, the mobile emissions are in part a redirection of existing travel to other locations, and so already a part of California's GHG inventory.

Appendix

Methodology

GHG Calculation Worksheet

URBEMIS 2007Worksheet

Summary of GHG Regulations

GHG Analysis Methodology

This analysis is based on the methodologies recommended by the California Air Pollution Control Officer's Association [CAPCOA] (January 2008) *CEQA and Climate Change* white paper and includes the use of the California Climate Action Registry General Reporting Protocol (March 2007). Calculations of carbon dioxide, methane, and nitrous oxide are provided for full disclosure of the magnitude of potential project effects. The analysis focuses on carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄) as these are those GHG emissions that the project would emit in the largest quantities as compared to other GHGs (such as chlorofluorocarbons [CFCs]).

Indirect Emissions. Operational emissions of CO₂ associated with space heating and landscape maintenance were quantified using the California Air Resource Board's URBEMIS 2007 (version 9.2.4) computer model. Nitrous oxide (N₂O) and methane (CH₄) emissions were quantified using the California Climate Action Registry General Reporting Protocol (March 2007) indirect emissions factors for electricity use (see Appendix for calculations). The calculations and emission factors contained in the General Reporting Protocol were selected based on technical advice provided to the Registry by the California Energy Commission. This methodology is considered to be reasonable and reliable for use as it has been subjected to peer review by numerous public and private stakeholders and in particular by the California Energy Commission, and is recommended by CAPCOA (January 2008).

Direct Emissions from Mobile Combustion. Emissions of CO₂ from transportation sources were quantified using the California Air Resource Board's URBEMIS 2007 (version 9.2.4) computer model. Nitrous oxide (N₂O) and methane (CH₄) emissions were quantified using the California Climate Action Registry General Reporting Protocol (March 2007) direct emissions factors for mobile combustion (see Appendix B for calculations). Total daily mileage was calculated in URBEMIS 2007 and extrapolated to derive total annual mileage. Emission rates were based on the vehicle mix output generated by URBEMIS and the emission factors found in the California Climate Action Registry General Reporting Protocol.

It should be noted that one of the limitations to a quantitative analysis is that emission models such as URBEMIS evaluate aggregate emissions and do not demonstrate, with respect to a global impact, how much of these emissions are "new" emissions specifically attributable to the proposed project in question. For most projects, the main contribution of GHG emissions is from motor vehicles and the total vehicle miles traveled (VMT), but the quantity of these emissions appropriately characterized as "new" is uncertain. Traffic to the retail component of this project can be comprised of diverted trips from other retail stores (and depending on location, either result in an increase or decrease in VMT), pass-by trips (where the store is en route to another primary location), or an additional, fully new trip associated with consumer choice to travel to the store in addition to other retail stores. In addition, the traffic associated with the residential portion of the project may be relocated trips from other locales, and consequently, may result in either higher or lower net VMT. In this instance, it is likely that some of the proposed project-related GHG emissions associated with traffic and energy demand would be truly "new" emissions; but, it is also likely that some of the emissions represent diversion of emissions from other locations. Thus, although GHG emissions are associated with the project, it is not possible to discern how much diversion is occurring or what fraction of those emissions represents global increases. In the absence of information regarding the different types of trips, the VMT generated by URBEMIS is used as a conservative estimate.

Greenhouse Gas Emission Worksheet

Operational Emissions

City of Glendora Residential Development Potential

Electricity Generation *	(kWh)		Project units	Project Usage
Commercial consumption	16,750	per KSF	0	0
Residential Consumption	7,000	per unit	1,613	11,291,000
Total				11,291,000

* Generation Factor Source: CAPCOA, January 2008. CEQA and Climate Change.

Total Project Annual kWh: **11,291,000** kWh/year
 Project Annual MWh: **11,291** MWh/year

Emission Factors:

CO2 * 804.54 lbs/MWh/year
 CH4 ** 0.0067 lbs/MWh/year
 N2O ** 0.0037 lbs/MWh/year

**Total Annual Operational Emissions (metric tons) =
 (Electricity Use (kWh) x EF) / 2,204.62 lbs/metric ton**

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4 23 GWP
 N2O 296 GWP
 1 ton (short, US) = 0.90718474 metric ton.

Annual Operational Emissions:

	Total Emissions	Total CO2e Units
CO2 emissions, electricity:	4542.0306 tons	4120.5 metric tons CO2e
CO2 emissions***:	4068.0500 tons	3690.5 metric tons CO2e
CH4 emissions:	0.0343 metric tons	0.8 metric tons CO2e
N2O emissions:	0.0189 metric tons	5.6 metric tons CO2e
Project Total		7,817 metric tons CO2e

References

* Table C.1: EPA eGRID CO2 Electricity Emission Factors by Subregion (Year 2000)

** Table C.2: Methane and Nitrous Oxide Electricity Emission Factors by State and Region (Average years 2001-1003)

*** URBEMIS Annual Emissions output for Area Source emissions; includes natural gas combustion for heating.

Sources: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 2.2, March 2007.
 Third Assessment Report, 2001, U.S. Environmental Protection Agency, U.S. Greenhouse Gas Emissions and Sinks, 1990-2000 (April 2002).

Greenhouse Gas Emission Worksheet

Mobile Emissions

City of Glendora Residential Development Potential

From URBEMIS 2007 Vehicle Fleet Mix Output:

Daily Vehicle Miles Traveled (VMT): 90,053 (Net: Proposed - Existing)
 Annual VMT: 32,869,520

Vehicle Type	Percent Type	CH4 Emission Factor (g/mile)*	CH4 Emission (g/mile)	N2O Emission Factor (g/mile)*	N2O Emission (g/mile)
Light Auto	55.6%	0.4	0.2224	0.4	0.2224
Light Truck < 3750 lbs	15.1%	0.5	0.0755	0.6	0.0906
Light Truck 3751-5750 lbs	15.9%	0.5	0.0795	0.6	0.0954
Med Truck 5751-8500 lbs	7.0%	0.5	0.035	0.6	0.042
Lite-Heavy Truck 8501-10,000 lbs	1.1%	0.12	0.00132	0.2	0.0022
Lite-Heavy Truck 10,001-14,000 lbs	0.3%	0.12	0.00036	0.2	0.0006
Med-Heavy Truck 14,001-33,000 lbs	1.0%	0.12	0.0012	0.2	0.002
Heavy-Heavy Truck 33,001-60,000 lbs	0.9%	0.12	0.00108	0.2	0.0018
Other Bus	0.0%	0.5	0	0.6	0
Urban Bus	0.1%	0.5	0.0005	0.6	0.0006
Motorcycle	1.7%	0.09	0.00153	0.01	0.00017
School Bus	0.1%	0.5	0.0005	0.6	0.0006
Motor Home	1.2%	0.12	0.00144	0.2	0.0024
Total			0.42033		0.46077

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/mile).

Assume Model year 2000-present, gasoline fueled.

Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 2.2, March 2007.

<p>Total Emissions (metric tons) = Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g</p>

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4 23 GWP
 N2O 296 GWP
 1 ton (short, US) = 0.90718474 metric ton.

Annual Mobile Emissions:

	Total Emissions	Total CO2e units
CO2 Emissions* :	15308.8 tons CO2	13,888 metric tons CO2e
CH4 Emissions:	13.8 metric tons CH4	318 metric tons CO2e
N2O Emissions:	15.1 metric tons N2O	4,483 metric tons CO2e

Project Total:	18,689 metric tons CO2e
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* From URBEMIS 2007 results for mobile sources

Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: L:\ESP\State or Regional\09-64110 V Tam & Asscts GHG Analysis\City of Glendora\Document\Drafts\Glendora.urb924

Project Name: City of Hayward Residential Development Potential

Project Location: Bay Area Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2010 TOTALS (tons/year unmitigated)	0.16	1.24	0.64	0.00	8.55	0.06	8.62	1.79	0.06	1.84	120.00
2011 TOTALS (tons/year unmitigated)	25.25	5.10	15.33	0.02	2.57	0.26	2.83	0.55	0.24	0.78	1,877.31

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	26.61	3.15	36.75	0.10	5.40	5.20	4,068.05

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	17.18	21.41	197.40	0.16	28.26	5.41	15,308.77

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	43.79	24.56	234.15	0.26	33.66	10.61	19,376.82

Urbemis 2007 Version 9.2.4

Detail Report for Annual Area Source Unmitigated Emissions (Tons/Year)

File Name: L:\ESP\State or Regional\09-64110 V Tam & Asscts GHG Analysis\City of Glendora\Document\Drafts\Glendora.urb924

Project Name: City of Hayward Residential Development Potential

Project Location: Bay Area Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.19	2.52	1.07	0.00	0.00	0.00	3,212.99
Hearth	9.35	0.61	34.23	0.10	5.40	5.20	852.70
Landscape	0.25	0.02	1.45	0.00	0.00	0.00	2.36
Consumer Products	14.40						
Architectural Coatings	2.42						
TOTALS (tons/year, unmitigated)	26.61	3.15	36.75	0.10	5.40	5.20	4,068.05

Area Source Changes to Defaults

Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: L:\ESP\State or Regional\09-64110 V Tam & Asscts GHG Analysis\City of Glendora\Document\Drafts\Glendora.urb924

Project Name: City of Hayward Residential Development Potential

Project Location: Bay Area Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	4.89	6.34	58.47	0.05	8.37	1.60	4,534.40
Apartments mid rise	12.29	15.07	138.93	0.11	19.89	3.81	10,774.37
TOTALS (tons/year, unmitigated)	17.18	21.41	197.40	0.16	28.26	5.41	15,308.77

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	108.67	9.57	dwelling units	326.00	3,119.82	26,673.52
Apartments mid rise	33.87	5.76	dwelling units	1,287.00	7,413.12	63,379.96
					10,532.94	90,053.48

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	53.7	1.3	98.3	0.4
Light Truck < 3750 lbs	12.9	2.3	94.6	3.1
Light Truck 3751-5750 lbs	19.8	0.5	99.5	0.0
Med Truck 5751-8500 lbs	6.6	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.9	0.0	77.8	22.2
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.4	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.2	68.8	31.2	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commuter	Commercial	
	Home-Work	Home-Shop	Home-Other		Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

Travel Conditions

Residential			Commercial		
Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer

% of Trips - Commercial (by land use)

Operational Changes to Defaults

Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: L:\ESP\State or Regional\09-64110 V Tam & Asscts GHG Analysis\City of Glendora\Document\Drafts\Glendora.urb924

Project Name: City of Hayward Residential Development Potential

Project Location: Bay Area Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2010 TOTALS (lbs/day unmitigated)	24.70	142.10	70.08	0.04	712.95	7.34	720.30	148.91	6.76	155.67	14,510.82
2011 TOTALS (lbs/day unmitigated)	2,326.16	190.22	251.43	0.23	713.87	9.74	723.61	149.24	8.92	158.16	36,981.07

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	96.01	13.97	21.97	0.00	0.07	0.07	17,631.60

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	93.47	100.73	1,058.01	0.88	154.87	29.63	87,787.17

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	189.48	114.70	1,079.98	0.88	154.94	29.70	105,418.77

Urbemis 2007 Version 9.2.4

Summary Report for Winter Emissions (Pounds/Day)

File Name: L:\ESP\State or Regional\09-64110 V Tam & Asscts GHG Analysis\City of Glendora\Document\Drafts\Glendora.urb924

Project Name: City of Hayward Residential Development Potential

Project Location: Bay Area Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2010 TOTALS (lbs/day unmitigated)	24.70	142.10	70.08	0.04	712.95	7.34	720.30	148.91	6.76	155.67	14,510.82
2011 TOTALS (lbs/day unmitigated)	2,326.16	190.22	251.43	0.23	713.87	9.74	723.61	149.24	8.92	158.16	36,981.07

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	321.69	33.95	843.07	2.47	132.19	127.25	45,213.90

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	95.53	150.64	1,128.91	0.75	154.87	29.63	76,076.69

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	417.22	184.59	1,971.98	3.22	287.06	156.88	121,290.59

Existing GHG Regulations

International and Federal. The United States is, and has been, a participant in the United Nations Framework Convention on Climate Change (UNFCCC) since it was signed on March 21, 1994. The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. However, although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the United States has not bound itself to the Protocol's commitments (UNFCCC, 2007). The United States is currently using a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (which is led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative (CCTP, December 2007; <http://www.epa.gov/climatechange/policy/cctp.html>).

California Regulations. Assembly Bill (AB) 1493, requiring the development and adoption of regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the State was signed into law in September 2002 by Governor Gray Davis. Governor Schwarzenegger issued Executive Order S-3-05 in 2005 that established statewide GHG emissions reduction targets. S-3-05 provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent of 1990 levels (CalEPA 2006).

Governor Schwarzenegger signed AB 32, the "California Global Warming Solutions Act of 2006," into law in the fall of 2006. AB 32 required the California Air Resources Board (ARB) to adopt regulations by January 1, 2008 that required reporting and verification of statewide GHG emissions. In addition, AB 32 requires the ARB to adopt regulations by January 1, 2010, to implement the early action GHG emission reduction measures identified in 2007, including a comprehensive framework of regulatory and non-regulatory elements that will result in significant and effective GHG emission reductions. The bill requires achievement by 2020 of a statewide GHG emissions limit equivalent to 1990 emissions (essentially a 25% reduction below 2005 emission levels; same requirement as under S-3-05), and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions.

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CEQA. This bill directs the California Office of Planning and Research to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, by July 1, 2009. The Resources Agency is required to certify or adopt those guidelines by January 1, 2010.

Executive Order (EO) S-01-07 was enacted by Governor Schwarzenegger on January 18, 2007. The order mandates that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In addition, a Low Carbon Fuel Standard ("LCFS") for transportation fuels will be established for California. The LCFS regulation is in draft form and is scheduled for consideration in late April 2009.

In response to EO S-3-05, the CalEPA created the Climate Action Team (CAT), which, in March 2006, published the Climate Action Team Report (the "2006 CAT Report"). The 2006 CAT Report identifies

a recommended list of strategies that the State could pursue to reduce climate change greenhouse gas emissions. These are strategies that could be implemented by various State agencies to ensure that the Governor's targets are met and can be met with existing authority of the State agencies. The strategies include the reduction of passenger and light duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, landfill methane capture, etc.
