

APPENDIX TO GUIDELINES FOR DETERMINING SIGNIFICANCE CLIMATE CHANGE

Approach

The development of greenhouse gas (GHG) significance thresholds for the County of San Diego involves both efficiency based threshold development (i.e., how GHG efficient is the project at hand relative to reduction targets per person and per employee?), as well as a “bright line” threshold.

The bright line threshold is set at a level that would capture enough projects so that, through feasible mitigation, GHG emissions would be reduced through the CEQA process at a level sufficient to achieve the San Diego region’s fair-share of GHG emissions reductions for land use sectors.

This effort involved substantial research and analysis related to the details of the state’s inventory, as well as the effectiveness of various statewide reduction measures (Pavley, Renewable Portfolio Standard, etc.). AECOM disaggregated the 1990 and 2020 statewide GHG inventory estimates for local application.

Conceptually, both the efficiency-based and the bright line approaches rely on determining the proportional or fair-share of emission reductions required to meet the legislative mandate established in The Global Warming Solutions Act (AB 32) that would be required within San Diego County. AB 32 requires that statewide GHG emissions must be reduced to 1990 levels by 2020. Future planning efforts that do not consider GHG emissions reduction strategies could conflict with AB 32, impeding California’s ability to comply with the statewide mandate.

This guidance document allows the County to assess the extent to which projects account for their “fair share” of the statewide emissions reductions necessary to achieve the AB 32 legislative mandate. This fair share approach can be used to assess the significance of impacts for special project types, as well, consistent with CEQA Guidelines Section 15130(c)(3):

(3) An EIR may determine that a project’s contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project’s contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The lead agency shall identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable.

In the case of GHG emissions, the fair share of mitigation may come through the selection of a project site, design, incorporation of emissions reducing technologies, and other elements that may be built into the project description, as well as adopted mitigation measures.

Cumulatively Considerable Greenhouse Gas Emissions

The approach summarized the County's guidance document allows a comparative assessment of whether proposed land use projects would meet their fair share of the state's overall GHG emissions reduction mandate. Plans or projects that emit more than their fair share of GHG emissions could have a cumulatively considerable contribution to the significant cumulative impact of global climate change.

The efficiency approach allows projects to demonstrate rates of GHG emissions that, if applied statewide, would achieve the AB 32 emissions target and support efforts to reduce emissions beyond 2020. The intent of AB 32 is to accommodate population and economic growth in California, but do so in a way that achieves a lower rate of GHG emissions. With a reduced rate of emissions per capita and per employee, California can accommodate expected population growth and achieve economic development objectives, while also abiding by AB 32's emissions target and supporting efforts to reduce emissions beyond 2020. The Efficiency Threshold is presented as annual emissions per service population (population + employment).

The bright line approach assesses mass emission levels that could be cumulatively considerable. Projects below the bright line would not be required to incorporate mitigation measures, although emissions of these projects would still be reduced through compliance with codes and regulations that would directly or indirectly increase energy efficiency or otherwise reduce GHG emissions.

Existing and New Emissions

The methods and analysis provided as a part of the development of this guidance document allow the County to assess the significance of GHG emissions in the context of proposed plans and projects that would require discretionary action. The focus of development of thresholds is on new emissions, although existing emissions levels are also being factored into the analysis. The continued operation of existing buildings and development patterns would not represent "projects" subject to review under CEQA.

The fair-share approach summarized in the County's guidance document assumes that *existing* development would be responsible for a share of GHG emission reductions needed to achieve AB 32 targets. This would occur through infill and reinvestment, as well as federal and state actions related to emissions standards, renewable energy generation, and other regulations over activities beyond local authority, but that would apply to both existing and new development. Improvements in the efficiency of existing development could also occur through actions described in climate action plans (also known as greenhouse gas reductions plans). Such actions could include requirements for new development and prescriptive, incentive-based, or strictly voluntary measures to reduce emissions from on-the-ground existing land uses. These measures and similar measures are routinely required as a part of local GHG reduction plans (also called climate action plans) and the implementation of these GHG reduction plans through revisions to codes and standards and other actions.

Land Use Related Emissions

Both the efficiency based and bright line thresholds are focused on emissions associated with typical land development projects, such as residential, retail, commercial service, office, and light industrial developments. The focus on land use related emissions reflects the nature of local government entitlement authority. Rather than considering explicitly *all* sources of GHG emissions, the focus here is on transportation; electricity; natural gas; water and wastewater; and recycling and waste.

GHG emissions produced by manufacturing processes and other sources that are mostly outside of the control of local jurisdictions are not included as a part of the efficiency or bright line thresholds. Lead agencies approving CEQA projects would not typically review or condition projects to include or prohibit specific manufacturing processes or certain materials used as a part of an industrial use. State and federal regulatory actions would more typically control industrial process and selection of materials. The thresholds will instead be keyed to those sectors over which the County would exercise some influence through typical planning, development, or environmental policies and standards. Light industrial uses that do not have industrial process related emissions could be treated using the thresholds developed for land development projects.

CEQA Analytical Protocols

The CEQA thresholds approach is also structured to be consistent with typical CEQA analysis. Based on direction from air districts and ARB, as well as industry standard CEQA practice, certain emissions sources for land use projects are included and excluded from analysis. The thresholds will explicitly take into account those emissions sources that are included in CEQA analysis that is prepared consistent with current CEQA practice. The thresholds exclude those emissions sources that are not analyzed as a part of CEQA documentation. In so doing, the County will have an appropriate “apples to apples” comparison for proposed CEQA projects – a theme that is woven throughout the County’s guidance document. This will be an aspect of the CEQA thresholds that may need to evolve over time as new emissions sources are embodied in typical CEQA analysis. For example, until recently, it was unusual for CEQA project analysis to fully consider landfill-related emissions. The Bay Area Air Quality Management District Guidelines recommends not including landfill related emissions in CEQA analysis, in fact. Previous CEQA project analysis did not always include project-related wastewater emissions. The County’s approach allows a project comparison to certain parts of the state’s inventory. The more types of emissions included in CEQA project analysis, the more emissions sources need to be included in the comparison version of the statewide inventory.

Lifecycle Emissions

“Life cycle” emissions – those emissions that are embodied in manufactured materials, for example – are not taken into account. GHG emissions embedded in construction materials or other materials used in projects may be manufactured to meet general market demand, regardless of whether one particular project proceeds. In order to clarify whether lifecycle emissions should be a part of CEQA analyses, 2010 amendments to the CEQA Guidelines removed the term “lifecycle,” since “the term could refer to emissions beyond those that could

be considered indirect effects of a project as that term is defined in section 15358 of the State CEQA Guidelines.”¹

The 1990 GHG Emissions Inventory

The level of emissions in 1990 represents the goal of AB 32 (i.e., reduce 2020 emissions to 1990 levels). For CEQA assessment purposes, the County isolated land use related components of the 1990 emissions inventory.² The statewide inventory in 1990 for land use related emissions was approximately 264.1 million metric tons (MMT) of carbon dioxide equivalent (CO₂e) (Table 1). Using 1990 emissions levels and 2020 forecast population and employment, this equates to 4.3 to 4.4 MT CO₂e emissions per resident + employee (service population).³ Details regarding the development of the land-use emissions in 1990 are provided below.

Emissions Sector/Subcategory	Emissions (MMT CO₂e/yr)	Notes/Adjustments	Omitted Emissions (MMT CO₂e/yr) (Percent of Sector Total)
Electricity (In State and Imports)	74.3	Applied CEC 1990 electricity consumption rates for industrial land uses to remove industrial electricity consumption.	36.3 (33%)
Transportation	138.0	Removed aviation, non specified transportation, rail, and water borne transportation.	12.7 (8%)
Landfills	5.5	Removed industrial solid waste disposal.	0.8 (12%)
Wastewater Treatment	2.8	Removed industrial wastewater treatment emissions (i.e., fruits and vegetables, poultry, and red meat processing).	0.3 (11%)
Commercial	13.9	Removed national security emissions.	0.6 (4%)
Residential	29.7	Includes all emissions.	none
Total	264.1		
GHG Efficiency Target per Service Population	4.32 MT		

¹ California Natural Resources Agency. 2009 (December). *Final Statement of Reasons for Regulatory Action. Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB97.*

² California Air Resources Board. 2010. *Inventory Data Archive – 1990 to 2004 Inventory.* Available: <http://www.arb.ca.gov/cc/inventory/archive/archive.htm>

³ “Service population” measures the number of residents plus the number of employees in a specified area.

Notes: GHG = greenhouse gas; MMT CO₂e/yr = million metric tons of carbon dioxide equivalent per year; CEC = California Energy Commission. Totals may not appear to add exactly due to rounding.

Source: ARB 2010a, CEC 2009, AECOM 2011

Non-land use sectors in the ARB inventory that were removed include agriculture, forestry, and “not specified”. Other sectors (e.g., development of energy sources) include both land use related emissions (residential, commercial), as well as emissions related to industrial processing. Industrial process related emissions have been disaggregated, wherever possible, to allow CEQA analyses of land use projects to focus only on relevant emissions sources. As noted earlier, light industrial uses could be addressed using the thresholds developed for land use projects.

The AB 32 emissions limit applies to statewide emissions levels. Through implementation of ARB’s Scoping Plan, various emissions sources will be reduced over time, with the ultimate objective of achieving this statewide target. Overall, implementation of the Scoping Plan has been shown to benefits related to overall economic production, gross state product, personal income, per-capita income, household cost savings, and business cost savings. But these economic benefits and cost savings will not necessarily be evenly distributed. The legislation directs the State to implement AB 32 in a way that minimizes costs and maximizes benefits, but not in a way that necessarily distributes costs and benefits equally across the regions of the State. An important element of the language of this legislation relates to the economic feasibility of different GHG reduction approaches. From the language of the legislation (Health and Safety Code Section 38501 (h):

“It is the intent of the Legislature that the State Air Resources Board design emissions reduction measures to meet the statewide emissions limits for greenhouse gases established pursuant to this division in a manner that minimizes costs and maximizes benefits for California’s economy...”

So, while the County recognizes that the costs, benefits, and GHG reductions under AB 32 will not be experienced at the same proportion for each county, the Efficiency Threshold is focused on assessing whether projects do their “fair share” of emissions reductions required statewide. The Efficiency Threshold allows projects to demonstrate consistency in a straightforward way with the AB 32 mandate, without any taking into account any specific adjustments for local conditions. However, other Thresholds in the County’s document envision a more locally tailored approach, in order to provide options and flexibility. The Bright Line Threshold, for example, was developed using regional growth forecasts and the San Diego region’s emissions profile. The County has also developed a Climate Action Plan that establishes measures that would achieve an overall unincorporated County emissions reduction. Through this process, the County was able to, among other things, balance between those measures that are more or less efficient, given the specific local context.

With the various options outlined in the Thresholds document, the County has provided both approaches that are directly connected to the AB 32 emissions limit (Efficiency Threshold,

Contingency Threshold) and those that take into account local conditions (Bright Line Threshold, Climate Action Plan Threshold).

Electricity

ARB's 1990 inventory did not separate out electricity generation by end use sector. A portion of electricity generated is used by industrial land uses. The County researched data sources that could be used to separate the land use-related electricity consumption from the industrial.

The California Energy Commission's (CEC) California Energy Demand 2010-2020 Commission-Adopted Forecast was used to determine the amount of electricity consumption associated with residential, commercial, and industrial land uses in the year 1990.⁴ The CEC's California Energy Demand report provides the amount of electricity consumption by land use sector for years 1990 to 2020. According to this report, land use sectors accounted for 67% of electricity consumption in 1990 (i.e., residential 29%; commercial 32%; transportation, communication, utilities 5%; and streetlights 1%). The remaining 33% consists of industrial (21%), mining (3%), and agriculture (9%). Therefore, this analysis removed 33% of electricity-related emissions as non-land-use. It should be noted that the CEC report only identifies industrial as one entity and does not separate industrial process emissions from industrial building/office emissions.

Transportation

For 1990 transportation sector, all on-road emissions are assumed to be associated with land use projects. All other transportation subcategories such as aviation, rail, water-borne, and non-specified transportation were removed from the inventory. Although these transportation emission sources can be related to land use projects, these emissions are not quantified as part of typical CEQA analyses of residential, commercial retail, commercial services, and office developments. Therefore, aviation, rail, water-borne, and non-specified transportation emissions are not included. These sources collectively comprise approximately 8% of the total 1990 transportation emissions.

Fuel Combustion

The 1990 residential and commercial fuel combustion sectors (e.g., natural gas for water and space heating) were both included in the analysis. For the commercial emission sector, the national security natural gas combustion subcategory was removed from the inventory since these emissions would not be associated with land use projects.

For the 1990 industrial sector, all fuel combustion emissions (e.g., natural gas, coal, distillate, etc.) were removed from the inventory with the exception of landfill and wastewater treatment emissions.

⁴ California Energy Commission. 2009. *California Energy Demand 2010-2020 Commission-Adopted Forecast: Statewide Demand Forecast Forms*. Available: < <http://www.energy.ca.gov/2009publications/CEC-200-2009-012/index.html>>.

Landfill and Wastewater Treatment

Both the landfill and wastewater treatment subcategories include activities associated with land use projects and industrial uses. The County investigated the potential to separate the land use related portion of these subcategories in order to allow San Diego jurisdictions to have a more “apples to apples” comparison for land use projects.

For landfills, the County researched solid waste tonnage reporting from CalRecycle. However, CalRecycle separates solid waste disposal by residential and commercial land uses. The commercial category includes both commercial and industrial land uses. The County separated the industrial solid waste disposal using the California Integrated Waste Management Board’s (CIWMB) *California 1999 Statewide Waste Composition Study*.⁵ (CIWMB is now known as CalRecycle).

It was determined from the CIWMB report that industrial solid waste makes up approximately 12.4% of the total waste disposed in landfills. For wastewater, the County researched the method used to develop 1990 wastewater treatment inventory emissions, which is based on population (i.e., domestic wastewater) and tons of fruits and vegetables, poultry, and red meat processed in the year (i.e., industrial wastewater). For this analysis, the GHG emissions associated with industrial wastewater (i.e., fruits and vegetables, poultry, and red meat processing) were removed from the inventory, which represented approximately 10.5% of the total wastewater emissions. Therefore, only the land use portions of the landfill gas and wastewater treatment sectors were included in the inventory.

The 2020 GHG Inventory

The next step to develop the “bright line” threshold is to determine the amount of GHG emissions anticipated to occur in 2020 associated with land use projects under ARB’s “Business as Usual” scenario.

The County evaluated ARB’s 2020 GHG emissions inventory to isolate the emissions associated with comparable residential and commercial land uses.⁶ Similar to the 1990 inventory analysis described above, the County evaluated the 2020 inventory to remove the industrial-related emissions for threshold development purposes. There are slight differences in how the 1990 and 2020 inventories were assembled. Where possible and applicable, the County used the same methods to separate industrial emissions from land use-related emissions were used for both the 1990 and 2020 inventory.

Total land use related emissions in 2020, as calculated below, are estimated to be approximately 311 MMT CO₂e/yr (Table 2).

⁵ California Integrated Waste Management Board. 1999 (December). *California 1999 Statewide Waste Composition Study*. Available: <<http://www.calrecycle.ca.gov/publications/LocalAsst/34000009.pdf>>. Accessed March 29, 2011.

⁶ California Air Resources Board. 2010. *Greenhouse Gas Inventory – 2020 Emissions Forecast*. Available: <<http://www.arb.ca.gov/cc/inventory/data/forecast.htm>>

Table 2
Statewide Land Use-Adjusted 2020 GHG Emissions Inventory

Emissions Sector/Subcategory	Emissions (MMT CO₂e/yr)	Notes/Adjustments	Omitted Emissions (Percent of Sector Total) (MMT CO₂e/yr)
Electricity	86.4	Applied CEC 2020 electricity consumption rates for industrial land uses to remove industrial electricity consumption.	24.0 (22%)
Transportation	168.2	Removed ships and commercial boats, aviation, rail, and unspecified transportation. Includes on-road passenger and heavy-duty vehicles.	15.8 (9%)
Commercial and Residential	45.3	Includes all emissions.	none
Recycling and Waste	7.5	Removed industrial solid waste disposal.	1.1 (12.4%)
Wastewater Treatment	2.8	Originally embedded within the "Other Process Emissions" industrial sector. Worked with ARB to separate emissions and used same 1990 proportion of industrial versus land use projects to isolate land use wastewater treatment emissions.	4.2 (59%)
High GWP	0.8	Only include electricity grid SF ₆ losses with application of CEC 2020 electricity consumption rates for land use-related uses.	37.1 (98%)
Total	311.0		
Notes: GHG = greenhouse gas; MMT CO ₂ e/yr = million metric tons of carbon dioxide equivalent per year; CEC = California Energy Commission; SF ₆ = sulfur hexafluoride; GWP = global warming potential Totals may not appear to add exactly due to rounding. Source: ARB 2010b, CEC 2009, AECOM 2011			

Non Land Use Emissions for 2020

For the forecasted 2020 electric power sector, the CEC's California Energy Demand Forecast (described above) was also used to separate industrial-related electricity consumption.⁷ For the transportation sector, all on-road emissions were included, while ships and commercial boats, aviation, rail, and unspecified transportation were removed.

⁷ CEC. 2009. California Energy Demand 2010-2020 Commission-Adopted Forecast: Statewide Demand Forecast Forms. Available: < <http://www.energy.ca.gov/2009publications/CEC-200-2009-012/index.html>>.

Similar to the 1990 inventory, the entire agriculture and forestry sectors were removed from the inventory. All emissions from the commercial and residential fuel combustion sector were included in the inventory, while all emissions associated with the industrial fuel combustion sector were removed. The industrial portion of the recycling and waste sector was removed using similar methods to those described above for landfill emissions.

For the High Global Warming Potential (GWP) sector, the electricity grid sulfur hexafluoride (SF₆) losses subcategory was included since it relates to electricity use. However, all other portions of the high GWP sector were removed. The electricity grid SF₆ losses subcategory was separated by land use using the CEC's California Energy Demand Forecast. It was assumed that the amount of SF₆ loss is proportional to the amount of electricity consumed.

A majority of the high global warming potential (GWP) emissions were removed in either the 1990 or 2020 inventories for this analysis. ARB's 1990 inventory does not list high GWP emissions as a separate line item in the inventory. It is anticipated that a significant portion of high GWP emissions are attributable to land use projects, such as homes, motor vehicles, supermarkets, and commercial storage facilities. However, the question is not only whether or not high GWP conceptually fits within land use development projects for the purposes of CEQA assessment. It also depends on current CEQA protocols for GHG analysis. Today, high GWP emissions are not normally analyzed as a part of most CEQA projects. If these emissions were incorporated into the "bright line" development, all future CEQA GHG analyses would be required to quantify high GWP emissions in order to maintain consistency between the threshold and evaluated emissions.

The County contacted ARB to explore to possibility of separating the industrial portion of high GWP emissions. However, high GWP emissions for the statewide inventories are developed using end use equipment (e.g., chillers, cold storage, transport refrigeration), which do not provide a clear indication of the land use type. ARB will be developing the high GWP portion of the statewide inventory using more refined methods for the new statewide inventory.

Lead agencies and air districts could work to develop a standardized statewide methodology for quantifying high GWP emissions and attributing emissions for land use projects. Once ARB has refined its methods, the high GWP emissions could be incorporated into modified inventory estimates, a modified bright line threshold, and future CEQA analysis. In addition, all interested parties should continue to work with ARB to develop inventories with consistent methodologies and levels of detail for future analysis and comparison efforts.

Statewide Reduction Measures

The next step towards the "bright line" threshold is to determine what future emission reductions will be achieved through the implementation of statewide GHG reduction measures.

Many measures and potential measures are outlined in the AB 32 Scoping Plan. Statewide measures associated with the AB 32 Scoping Plan will achieve some portion of the emission reduction goal (i.e., achieve 1990 levels by 2020), while the remaining emissions would be

achieved through mitigation within the context of land use development projects, improvements to existing buildings and development patterns, investments in transit and non-vehicular transportation facilities, and other measures. The 2020 inventory is estimated to be reduced by approximately 39.08 MMT CO₂e/yr through implementation of statewide GHG reduction measures (Table 3).

As additional measures from the Scoping Plan or other sources are implemented, this estimate should be revised when new measures would change the level of GHG reduction substantially.

Emissions reductions associated with the AB 32 Scoping Plan measures should be taken into account to accurately identify the portion of emission reductions that are the responsibility of land use projects. The County accounted for all known statewide measures that would reduce emissions from land use projects (i.e., residential and commercial) and existing development.

Table 3 Additional Statewide AB 32 Scoping Plan GHG Emission Reductions		
Scoping Plan Measure	Emission Reductions (MMT CO₂e/yr)	Notes/Adjustments
Pavley II	4.0	Represents additional emission reductions beyond Pavley I as stated in the Scoping Plan.
Low Carbon Fuel Standard	16.0	As identified for fuel combustion only (not all lifecycle related emissions) by ARB.
Tire Pressure Program	0.6	Represents fuel efficiency benefits from program as stated in the Scoping Plan.
Tire Tread Standard	0.30	Represents fuel efficiency benefits from standard as stated in the Scoping Plan.
Heavy-Duty Vehicle GHG Emission Reduction Program ⁸	0.7	Aerodynamic efficiency requirement that will improve fuel efficiency in heavy-duty trucks as stated in the Scoping Plan.
Landfill Methane Control Measure	1.50	Represents enhanced control and monitoring of methane emissions from municipal solid waste landfills.

⁸ Based on the Scoping Plan documentation (pages 53-54), 1.4 MMT CO₂e is the estimated total GHG reductions in 2020 from two measures (T-7 and T-8). Measure T-7 HDV GHG Emission Reduction Measure – Aerodynamic Efficiency was estimated to provide a reduction of 0.93 MMT CO₂e and Measure T-8 Medium/Heavy-Duty Vehicle Hybridization 0.5 MMT CO₂e. Measure T-7 is based on US EPA SmartWay program and was adopted, but during the rulemaking (in 2010), the benefits were revised to be 0.7 MMT CO₂e based on updated VMT and vehicle population operating in California, which went down because of the economic recession. Measure T-8 is not yet adopted and therefore the County has elected not to include this measure as a part of the Bright Line Threshold calculation process. According to Daniel Hawelti of the California Air Resources Board, scaling the inventory down to a local jurisdiction (e.g., based on VMT proportions) would be appropriate if the fleet characteristics and activity for the local jurisdiction is similar to that used to estimate the statewide inventory (Daniel Hawelti, California Air Resources Board, Personal Correspondence with Cheryl Laskowski of AECOM, July 20th, 2011).

Renewable Electricity Standard ⁹	9.847	Adjusted to remove industrial portion of emission reduction.
Water Efficiency	1.40	Likely includes some portion of industrial water efficiency reductions. Water districts are currently actively implementing efficiency measures to achieve this target.
2008 Title 24 Standards ¹⁰	4.737	Represents the annual CO ₂ emissions saved from incorporation of 2008 Title 24 building standards from electricity and natural gas consumption for land use projects as calculated by CEC.
Total Emission Reductions	39.08	
Notes: GHG = greenhouse gas; MMT CO ₂ e/yr = million metric tons of carbon dioxide equivalent per year Values may not appear to add exactly due to rounding. Source: ARB 2010c, ARB 2010d, CEC 2009, AECOM 2011		

The County conducted research into ARB's 2020 forecasted emissions inventory methodology to determine which AB 32 Scoping Plan measures were already accounted for in the forecast. It is important not to "double count" measures that were already assumed in the statewide 2020 inventory estimate. Voluntary measures, measures that did not have regulatory support, and incentive-based programs without funding were not included.

The thresholds approach will need to be updated over time as new measures become fixed in regulation and as future GHG emissions inventory estimates are revised.

⁹ The previous ARB calculations for RPS (20%) and RES (33%) were 7.9 and 13.4 MMT, respectively (see ARB's "Scoping Plan Measures Implementation Timeline, October 28, 2010, authors: Dave Mehl (RES) and Paul Douglas (RPS). The total of these was updated to be 20 MMT. However, to reflect a recent revision for the estimated reduction for this measure, the County took the proportion of each RPS (7.9/(7.9+13.4)) and RES (13.4/(7.9+13.4)) and multiplied by the new estimate of 20 MMT. In addition, the County only used the land use emission related portion of total electricity consumption (78.26%) to avoid an overestimate of reductions from this statewide measure for the purpose of calculating the Bright Line Threshold.

¹⁰ Page 7 of the California Energy Commission's (CEC) document entitled "Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings" states that the implementation of 2008 Title - 24 energy efficiency standards will reduce approximately 473,282 tons of carbon dioxide for each year of construction activity (in both newly constructed buildings and alterations to existing buildings). Assuming that 2008 T-24 standards apply to construction between 2010 and 2020, the total reductions in 2020 would be 5.2 million tons of carbon dioxide. Converting short tons to metric tons results in total reduction of 4.737 MMT CO₂e. See California Energy Commission (CEC). 2007 (November 7). Impact Analysis, 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Available online at: http://www.energy.ca.gov/title24/2008standards/rulemaking/documents/2007-11-07_IMPACT_ANALYSIS.PDF. Last accessed December 3, 2011.

Pavley I and Renewable Portfolio Standard

ARB's forecasted 2020 emission inventory incorporated the emission reductions associated with Pavley I and Renewable Portfolio Standard. Therefore, no further emission reductions were taken for these programs.

Pavley II, Low Carbon Fuel Standard, Renewable Electricity Standard, and Water Efficiency

The County evaluated the list of AB 32 Scoping Plan measures for feasibility and applicability to land use projects. It was determined that emission reductions from Pavley II,¹¹ Low Carbon Fuel Standard,¹² Renewable Electricity Standard (RES) (ARB 2010d),¹³ and Water Efficiency¹⁴ should be applied to adjust the forecasted 2020 emission level.

It is anticipated that for some of these programs, a portion of the emission reductions would occur from industrial land uses. For example, RES and Water Efficiency would also affect electricity and water efficiency, respectively, for industrial land uses. The County used the CEC's Energy Demand Forecast to separate the amount of RES emission reductions that would affect industrial versus land use projects, similar to the method described above for 1990 and 2020 inventories.¹⁵

For Water Efficiency, the County evaluated the potential to separate industrial water efficiency emission reductions from land use reductions. It is not currently possible to differentiate industrial from land use related emission reductions for Water Efficiency Measures. Therefore, a portion of the Water Efficiency emission reductions included in the estimate would actually apply to industrial land uses. However, Water Efficiency is a very small portion (i.e., approximately 7%) of the total emission reductions applied to the 2020 inventory.

The State's Low Carbon Fuel Standard (LCFS) will reduce the carbon intensity of transportation-related fuels purchased in California.^{16,17} This program has the potential to provide substantial GHG reduction benefits throughout the period of implementation. ARB has provided a tool (i.e., EMFAC Postprocessor) for estimating the benefits of the LCFS at the project level. Other attempts to estimate the benefits of statewide measures for reducing land use-related emissions have included LCFS reductions.

¹¹ California Air Resources Board. 2010. *Updated Economic Impacts Analysis by the Economic Impacts Subcommittee of the Economic and Allocation Advisory Committee*. Available:

<http://www.climatechange.ca.gov/eaac/documents/eaac_reports/2010-04-19_EAAC_REPORT_Appendix.pdf>.

¹² California Air Resources Board. 2010. *Updated Economic Impacts Analysis by the Economic Impacts Subcommittee of the Economic and Allocation Advisory Committee*. Available:

<http://www.climatechange.ca.gov/eaac/documents/eaac_reports/2010-04-19_EAAC_REPORT_Appendix.pdf>.

¹³ California Air Resources Board. 2010. *Scoping Plan Measures Implementation Timeline*. Sacramento, CA.

¹⁴ California Air Resources Board. 2010. *Scoping Plan Measures Implementation Timeline*. Sacramento, CA.

¹⁵ California Energy Commission. 2009. *California Energy Demand 2010-2020 Commission-Adopted Forecast: Statewide Demand Forecast Forms*. Available: <<http://www.energy.ca.gov/2009publications/CEC-200-2009-012/index.html>>.

¹⁶ California Air Resources Board, 2011, *AECOM Personal Communication with John Courtis and Kevin Cleary, of ARB on April 13, 2011*. Sacramento, CA.

¹⁷ California Air Resources Board. 2010. *Updated Economic Analysis of AB 32 Scoping Plan*. Pg 37. Sacramento, CA.

It is important in the context of a thresholds development effort focused land use, however, to carefully consider what aspects of LCFS would apply to fuel production-related lifecycle emissions versus what portion would relate to direct transportation emissions. The County communicated extensively with ARB staff regarding estimates of the GHG reduction benefits of the LCFS and reviewed reports made available by ARB on this program. GHG emissions reductions from LCFS would result from:

“production and use of lower carbon transportation fuels in California and changes in the vehicle fleet composition due to new, lower carbon fuels being available to the transportation fuel pool. [ARB] staff has estimated the GHG emissions reductions for the combustion of transportation fuels to be about 16 MMT CO₂e by 2020.”¹⁸

The above mentioned ARB estimate (16 MMT) was used in the assessment of the effectiveness of statewide measures.

Tire Pressure and Tire Tread Standard

The Tire Pressure Program and Tire Tread Standard are part of the AB 32 Scoping Plan and would affect land use projects, as well as industrial projects, to some extent.¹⁹ The Tire Pressure Program is a Discrete Early Action and enforcement of the program commenced in January 2010. The Tire Tread Standard is enforced by regulations. Although a portion of these measures would affect industrial land uses, similar to Water Efficiency, these measures represent a very small portion of the overall statewide emission reductions (i.e., approximately 4%).

Heavy-Duty Vehicle GHG Emissions Reduction Program

The Heavy-Duty Vehicle GHG Emission Reduction program will be enforced by regulation and require existing trucks/trailers to be retrofitted with aerodynamic efficiency technologies.¹² This measure is a Discrete Early Action and requires trucks and trailers to comply through a phase-in schedule starting in 2010 and achieve 100% compliance by 2014.

Landfill Methane Capture Control Measure

The Landfill Methane Control Measure will require owners and operators of municipal solid waste landfills and other uncontrolled landfills to install gas collection and control systems¹². Additionally, all affected landfills will be required to satisfy enhanced methane monitoring requirements to ensure that their gas collection and control system is operating optimally and that fugitive emissions are minimized. The measure is a Discrete Early Action and is enforced by regulation. The measure will likely have a phase-in period to become fully effective.

¹⁸ California Air Resources Board. 2009 (March). Proposed Regulation to Implement the Low Carbon Fuel Standard. Volume I. Staff Report: Initial Statement of Reasons. Page VII-1. Available: <<http://www.arb.ca.gov/regact/2009/lcfs09/lcfsisor1.pdf>>

¹⁹ California Air Resources Board. 2008. *Climate Change Scoping Plan Appendices Volume I: Supporting Document and Measure Detail*. Available: <http://www.arb.ca.gov/cc/scopingplan/document/appendices_volume1.pdf>. Accessed April 4, 2011.

Title 24

The County investigated the GHG reduction potential of implementing the 2008 Title 24 standards into land use projects. CEC quantified the GHG emissions saved from reduced electricity and natural gas consumption with implementation of 2008 Title 24 Standards.²⁰

Total Effect of Reliable Statewide Measure

Following application of the additional feasible and reasonably foreseeable AB 32 Scoping Plan measures, the gap to achieve the AB 32 emission reduction goal can be calculated by subtracting 1990 emissions (Table 1) from 2020 emissions with AB 32 Scoping Plan reductions (Table 2 minus Table 3). This gap represents the amount of emissions in the land use sectors that would need to be filled in order to meet the emission reduction goal of AB 32.

At the statewide level, land use projects would need to reduce 2020 emissions by approximately 2.87% to meet the emission reduction goal of AB 32. This percentage can be considered a fair-share reduction goal for land use projects throughout the state. Therefore, applying the 2.87% reduction to San Diego County's 2020 forecasted land use-related emissions would provide an estimate of the land use related mass emissions reductions needed to achieve the emission reduction goal of AB 32.

Statewide 2020 Land Use Emissions	⇒	Statewide 1990 Land Use Emissions	⇒	Statewide GHG Reduction Measures
311.0 MMT CO ₂ e/yr		264.1 MMT CO ₂ e/yr		39.08 MMT CO ₂ e/yr

Percent Reduction Required to get to 1990 Emissions by 2020	Percentage Reduction Achieved from Statewide Measures	Land Use Emissions Reduction "Gap"
15%	12%	3%

Equations

The following equations show the reductions needed to get to 1990 emissions by 2020, the share attributable to statewide measures, and the "gap" left for land use emissions.

$$\text{Statewide 2020} - \text{Foreseeable AB} - \text{Statewide 1990} = \text{Emission}$$

²⁰ CEC. 2007. Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Available: <http://www.energy.ca.gov/title24/2008standards/rulemaking/documents/2007-11-07_IMPACT_ANALYSIS.PDF>.

Emissions		32 Measures		Emissions		Reduction Gap
311.0 MMT CO ₂ e/yr	–	39.08 MMT CO ₂ e/yr	–	264.1 MMT CO ₂ e/yr	=	7.8 MMT CO ₂ e/yr
Emission Reduction Gap	÷	(Statewide 2020 Emission	–	Foreseeable AB 32 Measures)	=	Percent Reduction Gap
7.8 MMT CO ₂ e/yr	÷	(311.0 MMT CO ₂ e/yr	–	39.08 MMT CO ₂ e/yr)	=	2.87%

Notes: Numbers may not appear to exact due to rounding.

The County reviewed, in detail, all available documentation on the Countywide GHG inventory by the Energy Policy Initiatives Center (EPIC). This inventory includes several non land use emissions sources. The next step is to translate the statewide land use gap 3.05%) to the 2030 forecast GHG emissions inventory derived by EPIC. The total estimated 2020 emissions in San Diego County for land use related activities is estimated at 33.57 MMT CO₂e per year. Multiplying this total by the statewide land use gap of 2.87% yields 964,966 MT CO₂e per year. New development (between 2011 and 2020) represents approximately 10.54% of the total population and employment in San Diego County in 2020. Multiplying 10.54% by the mass land use gap of 964,966 million MT yields a share of the land use gap for new development of approximately 101,707 MT CO₂e per year. Assuming new development would account for twice its share of the needed regional GHG emissions reduction targets, the total reduction target to achieve through the Bright Line Threshold would be 203,415 MT CO₂e per year.

Development Projections Methodology

The County created growth projections for new development from 2011 to 2020 based on (1) the 2050 San Diego Association of Governments (SANDAG) Regional Growth Forecast; (2) the California Department of Finance (DOF) for population, household size, and residential unit distribution projections; and (3) the California Economic Development Department (EDD) for employment projections by North American Industry Classification System (NAICS) code. These data sources were selected primarily due to the accuracy of the projections, but also because the data is reported at a level of specificity that allows for simple translation into URBEMIS land use categories. DOF and SANDAG data were used for population estimates and EDD for employment. SANDAG data were used for population and housing projections, and DOF data were used to distribute future housing across more specific housing types. The DOF and EDD data were not at a fine enough resolution to develop projections for every URBEMIS land use category. In instances in which there were asymmetries between the DOF/EDD data and the URBEMIS land use categories, development projections were aggregated into the most similar category based on development density and trip capture assumptions in the URBEMIS model. Table 4 illustrates the conversion between industry classification and URBEMIS land uses.

Table 4
Lookup Table: NAICS Code to URBEMIS Code

NAICS Code	Industry Title	Urbemis
1133,21	Natural Resources and Mining	General Heavy Industry
1133	Logging	General Heavy Industry
21	Mining	General Heavy Industry
211	Oil and Gas Extraction	General Heavy Industry
212	Mining (except Oil and Gas)	General Heavy Industry
213	Support Activities for Mining	General Heavy Industry
23	Construction	General Light Industry
236	Construction of Buildings	General Light Industry
2361	Residential Building Construction	General Light Industry
2362	Nonresidential Building Construction	General Light Industry
237	Heavy and Civil Engineering Construction	General Light Industry
2371	Utility System Construction	General Light Industry
2372	Land Subdivision	General Light Industry
2373	Highway, Street, and Bridge Construction	General Heavy Industry
2379	Other Heavy and Civil Engineer Construction	General Heavy Industry
238	Specialty Trade Contractors	General Light Industry
2381	Foundation, Structure, and Building Exterior Contractors	General Light Industry
2382	BuildingEquipmentContractors	General Light Industry
2383	BuildingFinishingContractors	General Light Industry
2389	OtherSpecialtyTradeContractors	General Light Industry
2399	Residual-Other Heavy and Civil Engineering Construction (includes 2371-2372,2379)	General Heavy Industry
31-33	Manufacturing	General Heavy Industry
321	DurableGoods(321,327,331-339)	General Heavy Industry
321	WoodProductManufacturing	General Heavy Industry
3211	SawmillsandWoodPreservation	General Heavy Industry

Table 4
Lookup Table: NAICS Code to URBEMIS Code

3212	Veneer, Plywood, and Engineered Wood Product Manufacturing	General Heavy Industry
3219	Other Wood Product Manufacturing	General Heavy Industry
3299	Residual-Miscellaneous Manufacturing (includes 321, 327, 331-333, 335, 337, 339)	General Heavy Industry
327	Nonmetallic Mineral Product Manufacturing	General Heavy Industry
331	Primary Metal Manufacturing	General Heavy Industry
3311	Residual-Iron and Steel Mills and Ferrous Alloy (includes 3311-3312, 3314-3315)	General Heavy Industry
3313	Alumina and Aluminum Production	General Heavy Industry
332	Fabricated Metal Product Manufacturing	General Heavy Industry
3323	Architectural and Structural Metals Manufacturing	General Heavy Industry
	Residual-Forging and Stamping Mfg. (includes 3321-3322, 3324-3326)	General Heavy Industry
3327	Machine Shops, Turned Product, and Screw, Nut and Bolt Manufacturing	General Heavy Industry
3328	Coating, Engraving, Heat Treating, and Allied Activities	General Heavy Industry
3329	Other Fabricated Metal Product Manufacturing	General Heavy Industry
333	Machinery Manufacturing	General Heavy Industry
	Residual-Agriculture, Construction and Mining Machinery Mfg (includes 3331, 3334)	General Heavy Industry
3332	Industrial Machinery Manufacturing	General Heavy Industry
3333	Commercial and Service Industry Machinery Manufacturing	General Heavy Industry
3335	Metalworking Machinery Manufacturing	General Heavy Industry
3336	Engine, Turbine, and Power Transmission Equipment Manufacturing	General Heavy Industry
3339	Other General Purpose Machinery Manufacturing	General Heavy Industry
334	Computer and Electronic Product Manufacturing	Manufacturing

Table 4
Lookup Table: NAICS Code to URBEMIS Code

3341	ComputerandPeripheralEquipmentManufacturing	Manufacturing
3342	CommunicationsEquipmentManufacturing	Manufacturing
3343	AudioandVideoEquipmentManufacturing	Manufacturing
3344	SemiconductorandOtherElectronicComponentManufacturing	Manufacturing
3345	Navigational,Measuring,Electromedical,andControlInstrumentsManufacturing	Manufacturing
3346	ManufacturingandReproducingMagneticandOpticalMedia	Manufacturing
335	ElectricalEquipment,Appliance,andComponentManufacturing	Manufacturing
336	TransportationEquipmentManufacturing	Manufacturing
3361	MotorVehicleManufacturing	General Heavy Industry
3363	MotorVehiclePartsManufacturing	General Heavy Industry
3364	AerospaceProductandPartsManufacturing	General Heavy Industry
3366	ShipandBoatBuilding	General Heavy Industry
	Residual-OtherTransportationEquipmentManufacturing(includes3362,3365,3369)	Manufacturing
337	FurnitureandRelatedProductManufacturing	Manufacturing
3371	HouseholdandInstitutionalFurnitureManufacturing	Manufacturing
3372	Residual-OtherFurnitureRelatedProductManufacturing(includes3372,3379)	Manufacturing
339	MiscellaneousManufacturing	Manufacturing
3391	MedicalEquipmentandSuppliesManufacturing	Manufacturing
3399	OtherMiscellaneousManufacturing	Manufacturing
311	NondurableGoods(311-316,322-326)	Manufacturing
311	FoodManufacturing	Manufacturing
3119	Residual-AnimalFoodManufacturing(includes3111-3112,3117)	Manufacturing
3113	SugarandConfectioneryProductManufacturing	Manufacturing
3114	FruitandVegetablePreservingandSpecialtyFoodManufacturing	Manufacturing
3115	DairyProductManufacturing	Manufacturing
3116	AnimalSlaughteringandProcessing	Manufacturing
3118	BakeriesandTortillaManufacturing	Manufacturing
3119	OtherFoodManufacturing	Manufacturing
312	BeverageandTobaccoProductManufacturing	Manufacturing

**Table 4
Lookup Table: NAICS Code to URBEMIS Code**

313	TextileMills	Manufacturing
314	TextileProductMills	Manufacturing
315	ApparelManufacturing	Manufacturing
3151	ApparelKnittingMills	Manufacturing
3152	CutandSewApparelManufacturing	Manufacturing
3159	ApparelAccessoriesandOtherApparelManufacturing	Manufacturing
316	LeatherandAlliedProductManufacturing	General Heavy Industry
322	PaperManufacturing	General Heavy Industry
3221	Pulp,Paper.andPaperboardMills	General Heavy Industry
3222	ConvertedPaperProductManufacturing	General Heavy Industry
323	PrintingandRelatedSupportActivities	General Heavy Industry
324	PetroleumandCoalProductsManufacturing	General Heavy Industry
325	ChemicalManufacturing	General Heavy Industry
3254	PharmaceuticalandMedicineManufacturing	General Heavy Industry
3256	Soap,CleaningCompound,andToiletPreparationManufacturing	General Heavy Industry
	Residual-OtherChemicalProdsandPrepMfg(includes3251-3253,3255,3259)	General Heavy Industry
326	PlasticsandRubberProductsManufacturing	General Heavy Industry
3261	PlasticsProductManufacturing	General Heavy Industry
3262	RubberProductManufacturing	General Heavy Industry
22,42-49	Trade,Transportation,andUtilities	Warehouse
42	WholesaleTrade	Warehouse
423	Merchantwholesalers,DurableGoods	Warehouse
4231	MotorVehicleandMotorVehiclePartsandSuppliesMerchantWholesalers	Warehouse
4232	FurnitureandHomeFurnishingMerchantWholesalers	Warehouse
4233	LumberandOtherConstructionMaterialsMerchantWholesalers	Warehouse

**Table 4
Lookup Table: NAICS Code to URBEMIS Code**

4234	Professional and Commercial Equipment and Supplies Merchantwholesalers	Warehouse
4235	Metal and Mineral (except Petroleum) Merchantwholesalers	Warehouse
4236	Electrical and Electronic Goods Merchantwholesalers	Warehouse
4237	Hardware, and Plumbing and Heating Equipment and Supplies Merchantwholesalers	Warehouse
4238	Machinery, Equipment, and Supplies Merchantwholesalers	Warehouse
4239	Miscellaneous Durable Goods Merchantwholesalers	Warehouse
424	Merchantwholesalers, Nondurable Goods	Warehouse
4241	Paper and Paper Product Merchantwholesalers	Warehouse
	Residual- Drug and Druggists Sundries Merch Wholesalers (includes 4242, 4245, 4247-4248)	Warehouse
4243	Apparel, Piece Goods, and Notions Merchant Wholesalers	Warehouse
4244	Grocery and Related Products Wholesalers	Warehouse
4246	Chemical and Allied Products Merchantwholesalers	Warehouse
4249	Miscellaneous Nondurable Goods Merchant Wholesalers	Warehouse
425	Wholesale Electronic Markets and Agents and Brokers	General Office Building
44-45	Retail Trade	Free-Standing Discount Superstore
441	Motor Vehicle and Parts Dealers	Free-Standing Discount Superstore
4411	Automobile Dealers	Free-Standing Discount Superstore
4412	Other Motor Vehicle Dealers	Free-Standing Discount Superstore
4413	Automotive Parts, Accessories, and Tire Stores	Free-Standing Discount Superstore
442	Furniture and Home Furnishings Stores	Free-Standing Discount Store
4421	Furniture Stores	Free-Standing Discount Superstore
4422	Home Furnishings Stores	Free-Standing Discount Superstore
443	Electronics and Appliance Stores	Electronic Superstore
444	Building Material and Garden Equipment and Supplies Stores	Home Improvement Superstore
4441	Building Material and Supplies Dealers	Home Improvement Superstore
4442	Lawn and Garden Equipment and Supplies Stores	Home Improvement Superstore
445	Food and Beverage Stores	Supermarket

**Table 4
Lookup Table: NAICS Code to URBEMIS Code**

4451	GroceryStores	Supermarket
4452	SpecialtyFoodStores	Convenience Market (24 Hour)
4453	Beer,Wine,andLiquorStores	Convenience Market (24 Hour)
446	HealthandPersonalCareStores	Pharmacy/Drugstore without drive-through
447	GasolineStations	Convenience Market with Gas Pumps
448	ClothingandClothingAccessoriesStores	Strip Mall
4481	ClothingStores	Strip Mall
4482	ShoeStores	Strip Mall
4483	Jewelry,Luggage,andLeatherGoodsStores	Strip Mall
451	SportingGoods,Hobby,Book,andMusicStores	Strip Mall
4511	SportingGoods,Hobby,andMusicalInstrumentStores	Strip Mall
4512	Book,Periodical,andMusicStores	Strip Mall
452	GeneralMerchandiseStores	Strip Mall
4521	DepartmentStores	Strip Mall
4529	OtherGeneralMerchandiseStores	Strip Mall
453	MiscellaneousStoreRetailers	Strip Mall
4531	Florists	Strip Mall
4532	OfficeSupplies,Stationery,andGiftStores	Strip Mall
4533	UsedMerchandiseStores	Strip Mall
4539	OtherMiscellaneousStoreRetailers	Strip Mall
454	NonstoreRetailers	Warehouse
4541	ElectronicShoppingandMail-OrderHouses	Warehouse
	Residual- VendingMachineOperatorsandDirectSellingEstablishmen ts(includes4542-4543)	Warehouse
22,48- 49	Transportation,Warehousing,andUtilities	General Heavy Industry
22	Utilities	General Heavy Industry
2211	ElectricPowerGeneration,TransmissionandDistribution	General Heavy Industry
2212	NaturalGasDistribution	General Heavy Industry
2213	Water,SewageandOtherSystems	General Heavy Industry
48-49	TransportationandWarehousing	Warehouse
481	Airtransportation	Warehouse
4811	ScheduledAirTransportation	Warehouse

**Table 4
Lookup Table: NAICS Code to URBEMIS Code**

4812	NonscheduledAirTransportation	Warehouse
482	RailTransportation	Warehouse
484	TruckTransportation	Warehouse
4841	GeneralFreightTrucking	Warehouse
4842	SpecializedFreightTrucking	Warehouse
485	TransitandGroundPassengerTransportation	Warehouse
4854	SchoolandEmployeeBusTransportation	Warehouse
	Residual- OtherTransitandGroundPassengerTransp(includes4851- 4853,4855,4859)	Warehouse
	Residual- Water,Pipeline,Scenic,andSightseeingTransp(includes48 3,486-487)	Warehouse
488	SupportActivitiesforTransportation	Warehouse
4883	SupportActivitiesforWaterTransportation	Warehouse
4884	SupportActivitiesforRoadTransportation	Warehouse
4885	FreightTransportationArrangement	Warehouse
	Residual- OtherSupportActivitiesforTransportation(includes4881- 4882,4889)	Warehouse
492	CouriersandMessengers	Warehouse
4921	Couriers	Warehouse
4922	LocalMessengersandLocalDelivery	Warehouse
493	WarehousingandStorage	Warehouse
51	Information	General Office Building
511	PublishingIndustries(exceptInternet)	General Office Building
5111	Newspaper,Periodical,Book,andDirectoryPublishers	General Office Building
5112	SoftwarePublishers	General Office Building
512	MotionPictureandSoundRecordingIndustries	General Office Building
5121	MotionPictureandVideoIndustries	General Office Building
5122	SoundRecordingIndustries	General Office Building
515	Broadcasting(exceptInternet)	Office Park
5151	RadioandTelevisionBroadcasting	Office Park
5152	CableandOtherSubscriptionProgramming	Office Park
517	Telecommunications	General Office Building
5171	WiredTelecommunicationsCarriers	General Office Building
5172	WirelessTelecommunicationsCarriers	General Office Building
5173	TelecommunicationsResellers	General Office Building
5174	SatelliteTelecommunications	General Office Building
5175	CableandOtherProgramDistribution	General Office Building
5179	OtherTelecommunications	General Office Building
518	InternetServiceProviders,WebSearchPortals,andDataPro	General Office Building

**Table 4
Lookup Table: NAICS Code to URBEMIS Code**

	cessingServices	
5181	InternetServiceProvidersandWebSearchPortals	General Office Building
5182	DataProcessing,Hosting,andRelatedServices	General Office Building
	Residual-OtherInformationServices(includes516,519)	General Office Building
52-53	FinancialActivities	General Office Building
52	FinanceandInsurance	General Office Building
522	CreditIntermediationandRelatedActivities	General Office Building
5221	DepositoryCreditIntermediation	General Office Building
5222	NondepositoryCreditIntermediation	General Office Building
5223	ActivitiesRelatedtoCreditIntermediation	General Office Building
523	Securities,CommodityContracts,andOtherFinclInvestmen tsandRelatedActivities	General Office Building
5231	SecuritiesandCommodityContractsIntermediationandBro kerage	General Office Building
5232	SecuritiesandCommodityExchanges	General Office Building
5239	OtherFinancialInvestmentActivities	General Office Building
524	InsuranceCarriersandRelatedActivities	General Office Building
5241	InsuranceCarriers	General Office Building
5242	Agencies,Brokerages,andOtherInsuranceRelatedActivitie s	General Office Building
	Residual-FinancialActiviities(includes521,525)	General Office Building
53	RealEstateandRentalandLeasing	General Office Building
531	RealEstate	General Office Building
5311	LessorsofRealEstate	General Office Building
5312	OfficesofRealEstateAgentsandBrokers	General Office Building
5313	ActivitiesRelatedtoRealEstate	General Office Building
532	RentalandLeasingServices	General Office Building
5321	AutomotiveEquipmentRentalandLeasing	General Office Building
5322	ConsumerGoodsRental	General Office Building
5323	GeneralRentalCenters	General Office Building
5324	CommercialandIndustrialMachineryandEquipmentRental andLeasing	General Office Building
533	LessorsofNonfinancialIntangibleAssets(exceptCopyrighte dWorks)	General Office Building
5399	Residual-Rental and Leasing Services (includes 532- 533)	General Office Building
54-56	ProfessionalandBusinessServices	General Office Building
54	Professional,Scientific,andTechnicalServices	Office Park
5411	LegalServices	General Office Building
5412	Accounting,TaxPreparation,Bookkeeping,andPayrollServ ices	General Office Building
5413	Architectural,Engineering,andRelatedServices	General Office Building

Table 4
Lookup Table: NAICS Code to URBEMIS Code

5414	SpecializedDesignServices	General Office Building
5415	ComputerSystemsDesignandRelatedServices	General Office Building
5416	Management,Scientific,andTechnicalConsultingServices	General Office Building
5417	ScientificResearchandDevelopmentServices	Office Park
5418	AdvertisingandRelatedServices	General Office Building
5419	OtherProfessional,Scientific,andTechnicalServices	General Office Building
5499	Residual-Other Professional, Scientific and Technical Services (includes 5411-5412,5414, 5416-5419)	General Office Building
55	ManagementofCompaniesandEnterprises	General Office Building
56	AdministrativeandSupportandWasteManagementandRe mediationServices	General Office Building
561	AdministrativeandSupportServices	General Office Building
5611	OfficeAdministrativeServices	General Office Building
5612	FacilitiesSupportServices	General Office Building
5613	EmploymentServices	General Office Building
5614	BusinessSupportServices	General Office Building
5615	TravelArrangementandReservationServices	General Office Building
5616	InvestigationandSecurityServices	General Office Building
5617	Services toBuildingsandDwellings	General Office Building
5619	OtherSupportServices	General Office Building
5699	Residual-Other Support Services (includes 5611-5612,5614-5615,5619)	General Office Building
562	WasteManagementandRemediationServices	General Office Building
61-62	EducationServices,HealthCareandSocialAssistance	Elementary School
61	EducationalServices(Private)	Elementary School
6111	ElementaryandSecondarySchools	Elementary School
6112	JuniorColleges	Junior College (2 years)
6113	Colleges,Universities,andProfessionalSchools	University/College (4 years)
	Residual-BusinessSchoolsandComputerandMgmt.Training(include s6114-6115,6117)	Government Office Building
6116	OtherSchoolsandInstruction	Elementary School
62	HealthCareandSocialAssistance	Hospital
621	AmbulatoryHealthCareServices	Hospital
6211	OfficesofPhysicians	Hospital
6212	OfficesofDentists	Hospital
6213	OfficesofOtherHealthPractitioners	Hospital
6214	OutpatientCareCenters	Hospital
6215	MedicalandDiagnosticLaboratories	Hospital
6216	HomeHealthCareServices	Hospital

**Table 4
Lookup Table: NAICS Code to URBEMIS Code**

6219	Other Ambulatory Health Care Services	Hospital
622	Hospitals (Private)	Hospital
6221	General Medical and Surgical Hospitals	Hospital
6222	Psychiatric and Substance Abuse Hospitals	Hospital
6223	Specialty (except Psychiatric and Substance Abuse) Hospitals	Hospital
623	Nursing and Residential Care Facilities	Congregate Care (Assisted Living) Facility
6231	Nursing Care Facilities	Congregate Care (Assisted Living) Facility
6232	Residential Mental Retardation, Mental Health and Substance Abuse Facilities	Congregate Care (Assisted Living) Facility
6233	Community Care Facilities for the Elderly	Congregate Care (Assisted Living) Facility
6239	Other Residential Care Facilities	Congregate Care (Assisted Living) Facility
624	Social Assistance	Government Office Building
6241	Individual and Family Services	Government Office Building
6242	Community Food and Housing, and Emergency and Other Relief Services	Government Office Building
6243	Vocational Rehabilitation Services	Government Office Building
6244	Child Day Care Services	General Office Building
71-72	Leisure and Hospitality	Place of Worship1
71	Arts, Entertainment, and Recreation	Place of Worship1
711	Performing Arts, Spectator Sports, and Related Industries	Place of Worship1
7111	Performing Arts Companies	Place of Worship1
7112	Spectator Sports	Place of Worship1
7199	Residual-Promoters of Performing Arts, Sports, and Similar Events (includes 7113-7114)	Place of Worship1
7115	Independent Artists, Writers, and Performers	Place of Worship1
712	Museums, Historical Sites, and Similar Institutions	Place of Worship1
713	Amusement, Gambling, and Recreation Industries	Regional Shopping Center

Table 4
Lookup Table: NAICS Code to URBEMIS Code

7131	Amusement Parks and Arcades	Regional Shopping Center
7132	Gambling Industries	Regional Shopping Center
7139	OtherAmusementandRecreationIndustries	Regional Shopping Center
72	Accommodation and Food Services	Hotel
721	Accommodation	Hotel
722	Food Services and Drinking Places	High Turnover (sit-down) Restaurant
7221	Full-Service Restaurants	Quality Restaurant
7222	Limited-Service Eating Places	High Turnover (sit-down) Restaurant
7223	Special Food Services	Fast Food Restaurant without Drive Thru
7224	Drinking Places (Alcoholic Beverages)	High Turnover (sit-down) Restaurant
81	Other Services (excludes 814 - Private Household Workers)	General Light Industry
811	Repair and Maintenance	General Light Industry
8111	Automotive Repair and Maintenance	General Light Industry
8112	Electronic and Precision Equipment Repair and Maintenance	General Light Industry
8113	Commercial and Industrial Machinery and Equipment Repair and Maintenance	General Light Industry
8114	Personal and Household Goods Repair and Maintenance	General Light Industry
812	Personal and Laundry Services	General Light Industry
8121	Personal Care Services	General Light Industry
8122	Death Care Services	Medical Office Building
8123	Drycleaning and Laundry Services	General Light Industry
8129	Other Personal Services	General Light Industry
813	Religious, Grantmaking, Civic, Professional, and Similar Organizations	General Office Building
8131	Religious Organizations	Place of Worship
8132	Grantmaking and Giving Services	General Office Building
8133	Social Advocacy Organizations	General Office Building
8134	Civic and Social Organizations	General Office Building
8139	Business, Professional, Labor, Political, and Similar Organizations	General Office Building
9999	Government	Government Office Building
9999	Federal Government	Government Office

**Table 4
Lookup Table: NAICS Code to URBEMIS Code**

		Building
9999	State and Local Government	Government Office Building
9999	State Government	Government Office Building
9999	State Government Education	Government Office Building
9999	Other State Government	Government Office Building
9999	Local Government	Government Office Building
9999	Local Government Education	Government Office Building
9999	Other Local Government	Government Office Building
Note: 1 - Urbemis Trip Rate for "Place of Worship" most closely represents the trip for recreational entertainment areas		

For residential development, the DOF projections of population, household size, and residential unit distribution were used to develop population-driven residential square footage projections. For non-residential development, EDD projections for employment by NAICS code were used to develop employment-driven commercial, retail, and industrial development square footage projections.

Using project type and size distribution data from projects that passed through the CEQA process from 2000-2010 for the County of San Diego, the development size (dwelling units, square footage, rooms, etc.) annual projections were translated into units and project size distributions for each URBEMIS land use category. These projections were used to develop a “projected development inventory” for new development in San Diego County’s jurisdiction between 2012 and 2020.

The County researched available documentation, contacted Air District representatives, and assembled information on assembling a list of historic land use projects with different greenhouse gas (GHG) emissions profiles. This additional work helped to determine the appropriate methods to compile a CEQA database that can be used to develop CEQA thresholds for GHG emissions. For other efforts involving thresholds development, Air Districts have considered different strategies, including compiling data kept by the County Clerk’s office. The preferred method of assembling a CEQA database involves a search of records kept by the Office of Planning and Research (OPR) State Clearinghouse (SCH). The SCH was contacted to retrieve electronic files for San Diego County projects. The data were sorted and scrubbed to eliminate duplicative information, non land use projects, and projects without sufficient information to use in the frequency distribution analysis. Using a dataset of CEQA projects supplied by SCH, each application was coded for the URBEMIS land use

category and size of development being permitted. Using these data, frequency distributions and average project sizes were calculated. These calculations were used to translate the development projections described above into numbers of future projects by type and size category. These projections were used as a basis for the emissions modeling exercise described below.

2020 Emissions and Mitigation Modeling

Since URBEMIS does not contain emission assumptions specific to San Diego County, assumptions from the South Coast Air Quality Management District were used as a proxy. The County used the year 2020 to model all operational and area source emissions, and assumed an approximate 15 month construction period occurring over the years 2020 and 2021. This was a conservative estimate because year 2020 will have lower emission rates for vehicle and off-road construction equipment, which are the primary sources of GHG emissions for construction and operations. The reasoning for this assumption is that URBEMIS accounts for changes in emissions technology and fleet turnover. URBEMIS does not provide modeled emissions from indirect sources of emissions, such as those emissions that would occur off-site at utility providers associated with the project's energy and water demands. Estimates of these emissions were derived using methods described below.

URBEMIS2007 Version 9.2.4 was used to quantify mobile- and area-source GHG emissions associated with land use projects. URBEMIS2007 was primarily developed to evaluate regional air quality criteria air pollutants. However, when analyzing GHG emissions, long-term operational activities associated with land use projects also generate indirect GHG emissions. Indirect GHG emissions may not occur at the point of consumption, but would occur at an off-site location (e.g., wastewater treatment plant, power plant, landfill). Because of the global nature of GHG emissions, it is equally important to capture and account for indirect GHG emissions. For this analysis, supplemental GHG emissions were quantified and added to the URBEMIS mobile- and area-source GHG emissions to represent the total operational GHG emissions that would be analyzed to develop GHG thresholds. Supplemental GHG emissions include those occurring from electricity consumption, potable water consumption, wastewater generation, and solid waste disposal. The following section describes the methods used to quantify these supplemental GHG emissions.

Electricity

Electricity consumption and associated GHG emissions were added to the total operational emissions using information from the California Energy Commission (CEC) and the Local Government Operations Protocol Version 1.1. Electricity intensities for the various land uses in units of kilowatt-hours per dwelling unit or kilowatt-hours per thousand square feet were obtained from CEC's California Statewide Residential Appliance Saturation Study (CEC 2004) and California Commercial End-Use Survey (CEC 2006a), respectively.^{21,22} Electricity consumption by residential and commercial land uses were then used to calculate GHG emissions using electricity production emission factors specific to San Diego Gas and Electric

²¹ CEC. 2004 (June). California Statewide Residential Appliance Saturation Study, Vol 2 Study Results Final Report [KEMA-XENERGY, Itron, RoperASW]. CEC-300-00-004. Tables 2-3, 2-19.

²² CEC. 2006a (March). California Commercial End-Use Survey [prepared by Itron, Inc.]. CEC-400-2006-005. Table 11-1.

from the Local Government Operations Protocol.²³ Because the Local Government Operations Protocol only provides a CO₂ emission factor for San Diego Gas and Electric, California statewide factors for methane (CH₄) and nitrous oxide (N₂O) from USEPA's eGRID were used to quantify the carbon dioxide equivalent (CO₂e) emissions.

Potable Water

The electricity consumption and GHG emissions associated with supplying potable water to residential and commercial land uses were quantified using residential and commercial water consumption rates and water electricity intensity factors from CEC. For residential water consumption, statewide per capita water consumption per year was obtained from the Pacific Institute's Waste Not, Want Not study.²⁴ For commercial water consumption, statewide per employee water consumption (gallons per employee per year) for the various land uses were also obtained from the Waste Not, Want Not study. The commercial land uses in each size category were converted to number of employees using employee density factors (i.e., square feet per employee) from the Southern California Association of Governments (SCAG).²⁵ SCAG has developed employment density factors for various commercial and industrial land uses. The electricity consumption associated with residential and commercial water consumption was quantified using water supply electricity intensity factors developed by CEC.²⁶ CEC developed water supply intensity factors for Southern and Northern California that incorporates the supply, conveyance, treatment, distribution, and wastewater treatment. For this analysis, the Southern California factor was used. The GHG emissions associated with electricity consumption to supply potable water were quantified using the San Diego Gas and Electric factors described above.

Wastewater

The treatment of wastewater generates GHG emissions (i.e., methane and nitrous oxide) through the wastewater processing, as well as the energy required to treat water. As described above, the energy involved in wastewater treatment has been accounted for in the potable water emissions. The process emissions associated with wastewater processes were quantified using methodologies from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.²⁷ IPCC has developed methods and standard factors to quantify methane emissions during wastewater treatment and nitrous oxide emissions associated with effluent discharge. Standard factors for the US provided by IPCC were used to quantify emissions.

²³ ARB. 2010 (May). Local Government Operations Protocol Version 1.1. Available: <http://www.arb.ca.gov/cc/protocols/localgov/pubs/lgo_protocol_v1_1_2010-05-03.pdf>.

²⁴ Gleick, Peter. 2003 Waste Not, Want Not: The Potential for Urban Water Conservation in California Appendix A. Pacific Institute. November 2003.

²⁵ Southern California Association of Governments (SCAG). 2001. Employee Density Study. Table IIa and IIb.

²⁶ CEC. 2006b (December). Refining Estimates of Water-Related Energy Use in California [prepared by Navigant Consulting, Inc.] CEC-500-2006-118 Table C-5.

²⁷ IPCC. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 5, Chapter 6. Available: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_6_Ch6_Wastewater.pdf>

Solid Waste

Solid waste GHG emissions were quantified using statewide solid waste disposal rates and quantification methods from the Local Government Operations Protocol Version 1.1. Solid waste disposal rates per employee and per capita were obtained from the California Integrated Waste Management Board's (now known as CalRecycle) California 1999 Statewide Waste Characterization Study.²⁸ The study provided waste disposal rates in units of tons per employee per year for various commercial and industrial land uses. Similar to potable water, the SCAG Employment Density study was used to determine the number of employees for each land use and size category. Total waste generated by residential and commercial land uses was then inputted into the Local Government Operations Protocol equation to calculate solid waste GHG emissions.²⁹ Waste categorization (statewide) was also obtained from the Local Government Operations Protocol.

Feasible Mitigation

The County derived estimates of feasible mitigation to use with the modeled operational emissions, using a sensitivity analysis to determine the level of the bright line necessary to trigger feasible mitigation at a level necessary to achieve the "land use gap." Draft Climate Action Plan measures that could apply to development projects were used as a proxy for feasible mitigation measures. The bright line is set at a level that assumes that new land use development would achieve twice its fair share of the land use gap through mitigation.

Construction Emissions

Construction emissions for new development projects between present and 2020 were also modeled. Air districts typically recommend that construction of land use development projects should be estimated using the most recent version of URBEMIS. URBEMIS allows users to model construction criteria air pollutants and precursor emissions from demolition, site grading, asphalt paving, building construction, and architectural coating activities (SMAQMD 2009). The default values in URBEMIS tend to provide a conservative estimate of emissions. In other words, use of defaults normally would overestimate actual emissions.³⁰ The bright line operational threshold is set at a level such that feasible mitigation for projects above the bright line would make up the "land use gap" and construction emissions associated with all land use development projects.

Construction emissions were included as a part of the County's work on development of significance thresholds. For use of the efficiency threshold, total construction emissions should be quantified and amortized over the life of the project to estimate annual emissions. This average annual construction emissions rate should be used with annual operational emissions to assess the project, when using the efficiency threshold. The operational life of buildings will vary by building type and purpose. State Executive Order D-16-00 suggests that

²⁸ CIWMB. 1999 (December). Statewide Waste Characterization Study. Available: <<http://www.calrecycle.ca.gov/publications/LocalAsst/34000009.pdf>>.

²⁹ ARB. 2010 (May). Local Government Operations Protocol Version 1.1. Available: <http://www.arb.ca.gov/cc/protocols/localgov/pubs/lgo_protocol_v1_1_2010-05-03.pdf>.

³⁰ Sacramento Metropolitan Air Quality Management District. 2009 (December). Guide to Air Quality Assessment in Sacramento County. Page 3-5.

useful building lifetime is more than 25 years. A report commissioned for the Sustainable Building Task Force, a group of over 40 California state government agencies, estimates the life of a building to conservatively be 20 years. Average building life could change over time, with changes in building materials and construction techniques.

Construction emissions are built into the bright line threshold. As noted above, the bright line has been set at a level so that feasible mitigation will be required at a level that would meet or exceed the regional “land use gap” and construction emissions associated with regional land use projects between present and 2020.

Screening Criteria

The screening thresholds were developed based on conservative GHG emissions estimate for mobile sources; area sources including fireplace and landscaping equipment; and indirect emissions related to electricity use, water and wastewater use, and solid waste generation and disposal. Mobile and area source emissions were estimated using default assumptions in the Urban Land Use Emissions Model (URBEMIS). However, trip length data specific to San Diego County were used to develop for mobile source emissions. The County has estimated average trip lengths for different land uses in different locations. The longest applicable average trip length was used to develop these screening criteria. Electricity use, water and wastewater use, and solid waste generation and disposal were estimated using methodology consistent with the Local Government Operations Protocol.

Construction Screening Criteria

In addition to the project size screening levels, construction screening levels have been developed for use in assessing cumulative significance. Construction screening levels were developed for projects that ONLY have construction-related GHG emissions and would not have associated operational emissions. The screening criteria only apply to projects with typical construction techniques and schedules, and would not apply to projects that have characteristics that would produce unusually high GHG emissions from equipment use or other sources. If a project has significant earthmoving activities (greater than 20 acres per day), involves substantial demolition, or has additional haul trips associated with construction activities, the screening criteria would not apply. Construction screening criteria include:

- Grading and clearing of land involving no more than 1,285 acres of land per year with no soil hauling, and no other aspect of construction or site preparation.
- Grading and clearing of land involving no more than 100 acres per year, assuming up to 3,100 cubic yards per day of soil hauling.
- Based on an average truck size of 20 cubic yards and an average hauling distance of 30 miles round trip, a project that would haul less than 3,300 cubic yards per day, not including emissions from any other activities, including off-road construction equipment.

- San Diego County Department of Public Works roadway resurfacing or asphalt concrete overlay project involving less than 32 linear miles, 133 construction days, and 120 acres of land area disturbed.
- New pipeline or non-vehicular trail or pathway of no more than 11 miles that would disturb no more than 81 acres of land assuming no more than 3,100 cubic yards per day of soil hauling.
- Construction project that would use a total horsepower in all equipment of no more than 1,984 per day, not including any soil hauling; or a construction project that includes up to 3,100 cubic yards of soil hauling per day and has a total equipment horsepower of no more than 742 per day. These daily horsepower limits are based on a project that would take approximately one year and would involve 262 working days in this year. Projects with a shorter duration may increase these horsepower limits proportionally.

Several methodologies were used to estimate emissions for construction activities. Since various options and models (e.g., EMFAC 2011, Road Construction Emissions Model) are available, this approach would identify the most conservative (i.e., highest emissions and lowest project distance) applicable to the project type.

For the roadway resurfacing or asphalt concrete overlay screen, specific assumptions for equipment mix and schedule from the San Diego County Department of Public Works (DPW) were used to develop per-mile estimates for construction days, off-road equipment, and material hauled. These estimates were extrapolated to develop various scenarios for annual construction and then compared to the GHG threshold. The maximum scenario that did not exceed the proposed threshold of significance was identified as the screening criteria for roadway resurfacing/asphalt concrete overlay (AC overlay) projects. Per-mile total GHG emissions estimates were derived from a set of assumptions involving a 12-mile repaving project, including:

- 12 miles of roadway repaved per year;
- 50 construction days;
- Maximum disturbed acreage of 44.9 acres;
- Off-road equipment quantities and hours of operation provided directly by DPW;
- 30,000 cubic yards of material hauled (22 to 25 cubic yard capacity per truck); and
- Construction worker commute trips.

The equipment mix for this 12-mile scenario is presented in Table 5.

**Table 5
DPW Equipment Mix for 12-Mile Repaving Project**

Equipment: Make & Model	HorsePower	Hours/Day	Work Days
Pick up (3/4 Ton)	N/A	8	50
Flatbed Pick-up (2 Ton)	N/A	8	50
Air Compressor (1200 - 1500 CFM)	N/A	2	50
Water Truck (12,000 - 20000lb)	N/A	6	50
Self Propelled Sweeper (6-9 CY)	N/A	8	50
Motor Grader Cat 120M	138	8	50
3-Axle dump trucks On -Hwy	N/A	6	50
5-Axle dump truck On-Hwy	N/A	6	50
Pavement Grinder (Tungstein-Carbide Tip) CAT PM 200	575	6	50
Tractor-Skid Steer Cat 216B	50	6	50
Asphalt Paver CAT AP-1055B	225	6	50
Roller, Tandem Steel Wheel (4 - 8 Ton) Dresser 616	80	6	50
Roller, Vibratory self propelled (4 - 8 Tons) Volvo DD118HF	148	6	50
Backhoe Loader Cat 416E	87	N/A	N/A

Maintenance of 12 miles of AC overlay would not exceed the proposed threshold. Therefore, this scenario was translated into per-mile estimates to use for a sensitivity analysis that would determine the maximum size of an AC overlay project that would be below the Bright Line Threshold. Several different methods were used to “back into” this maximum project size. The maximum mileage using the daily horsepower (HP) limits would result in the most conservative estimate of 32 miles. Since these estimates are developed for the purposes of screening projects that would not require further analysis, the most conservative estimate was recommended as the screening criteria. If the proposed annual DPW mileage is similar in construction type to “typical” DPW repaving, and equal to, or smaller than the 32 miles per year, it is presumed that the construction GHG emissions for that project would not exceed 2,500 MT CO₂e per year, and it would result in a less-than-cumulatively considerable impact. This assumes that the project would have consistent off-road equipment, on-road motor vehicles and material hauling characteristics as those provided by DPW earlier.

Short-term construction-generated emissions were modeled using project-specific data and the Sacramento Metropolitan Air Quality Management District (SMAQMD) Road Construction

Emissions Model, Version 6.3.2. The model was developed to provide timelines and equipment necessary to estimate the emissions from linear projects, such as a roadway or pipeline. The design characteristics of the proposed project were input into the Road Construction Emissions Model to develop construction emission estimates.

On-site and off-site motor vehicles will produce combustion emissions. On-site equipment includes heavy-duty equipment such as rollers, pavers, and loaders. Motor vehicles traveling off-site are anticipated to include light-duty vehicles for construction worker commutes and heavy-duty trucks for material delivery. Emission factors based on the California Air Resources Board OFFROAD 2007 (OFFROAD) and EMFAC 2011 (EMFAC) models were used to calculate emissions from off-road construction equipment and on-road motor vehicles. Exhaust emission factors vary by calendar year, and the emission factors used for construction were the factors for calendar year 2020.

A screening spreadsheet based on total horsepower of construction equipment was created to determine if a proposed project would exceed the annual threshold of 2,500 MT CO₂e. The spreadsheet uses an average OFFROAD emission factor, on-road vehicle emissions, and number of construction days to estimate the maximum allowable GHG emissions per day. Off-road equipment information, including HP, is entered into the spreadsheet to determine if the proposed project would exceed the threshold of significance.

Grading projects were estimated using the Fine Site Grading Phase of URBEMIS. Emissions were estimated assuming a project timeframe of 12 months and converted to metric tons by multiplying by 0.91 to account for non-CO₂ emissions. Emissions were estimated for a variety of project sizes to determine a per-acre emission rate based on default equipment assumptions.

Construction screening levels for pipeline projects were estimated using the Roadway Construction Emissions Model, which is a spreadsheet-based model able to use basic project information (e.g., total construction months, project type, total project area) to estimate a construction schedule and quantify GHG emissions from heavy-duty construction equipment, haul trucks, and worker commute trips associated with linear construction projects. Since pipeline projects are anticipated to involve greater excavation activities and more intensive use of construction equipment per linear mile, new pathways and trail screens were developed (conservatively) based on the analysis for new pipelines. The model includes construction phases for (1) Grubbing/Land Clearing, (2) Grading/Excavation, (3) Drainage/Utilities/Sub-grade, and (4) Paving. New roadway and pipeline projects include all construction phases. Repaving projects only include emissions from the Paving phase. Default equipment assumptions were used for the analysis.

Emissions developed by the Roadway Construction Emissions Model are sensitive to both the length of the project and the disturbed area. Project examples from published environmental impact reports were used to develop a range of project sizes for repaving, new roadway, and pipeline projects. Emissions were estimated using the range of project sizes to determine the appropriate screening levels for linear construction projects. If a proposed

project is less than both the length and the disturbed acreage listed, the project would have a less than cumulatively considerable contribution.

Mitigation and Design Considerations

Many local, regional, and state agencies have produced lists of feasible mitigation strategies that can be used to reduce GHG emissions, including, but not limited to:

Governor's Office of Planning and Research. 2008. Technical Advisory. CEQA AND CLIMATE CHANGE: Addressing Climate Change through California Environmental Quality Act (CEQA) Review. See Attachment 3, "Examples of GHG Reduction Measures."

California Air Pollution Control Officer's Association (CAPCOA). 2008 (January). CEQA & Climate Change. Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. See page 79, "Mitigation Strategies for GHG."

California Air Pollution Control Officer's Association (CAPCOA). 2010 (August). Quantifying Greenhouse Gas Mitigation Measures. A Resource for Local Government to Assess Emission Reduction from Greenhouse Gas Mitigation Measures.

Attorney General of the State of California. 2008 (December). The California Environmental Quality Act. Addressing Global Warming Impacts at the Local Agency Level.

Existing Regulations and Policy

Federal, state, regional, local, and even international governmental efforts have addressed greenhouse gas emissions and climate change. The following is a brief summary of these efforts.

National and International Efforts

International and federal legislation have been enacted to address climate change issues. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change (IPCC) to assess the scientific, technical, and socioeconomic information needed to understand the scientific basis for human-induced climate change, potential impacts, and options for adaptation and mitigation. IPCC reports have provided the scientific consensus on measurable changes to the climate; have established that these changes are caused by human activity; and have identified that have significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable. The IPCC's Fifth Assessment Report is now underway, to be completed in 2013 or 2014.³¹

In October 1993, President Clinton introduced the Climate Change Action Plan, which had a goal of returning GHG emissions to 1990 levels by the year 2000. This was to be

³¹ Intergovernmental Panel on Climate Change. Available: <http://www.ipcc.ch/>. Accessed: July 13, 2011.

accomplished through 50 initiatives that relied on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in GHG emissions. This Plan includes measures to reduce all significant greenhouse gases in all sectors of the economy that emit greenhouse gases, with the intent to stimulate investments in technologies that can generate additional economic activity.³²

In 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments agreed to gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

The Supreme Court of the United States ruled on April 2, 2007 that CO₂ is an air pollutant as defined under the CAA, and that the Environmental Protection Agency (EPA) has the authority to regulate GHG emissions. In 2009, EPA published their Endangerment Finding and Cause or Contribute Finding for GHGs under the CCA in the Federal Register. The Endangerment Finding is based on Section 202(a) of the Clean Air Act, which states that the Administrator (of EPA) should regulate and develop standards for “emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The Cause or Contribute Finding establishes that GHG emissions from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.³³ These Findings do not directly create new regulations for automobile manufacturers or other industrial users. However, EPA is required to make these Findings prior to adopting new regulations, such as emission standards for light-duty vehicles.

State Regulations and Standards

Assembly Bill 32, California Global Warming Solutions Act of 2006³⁴

The California Global Warming Solutions Act of 2006 (AB 32) recognizes that global climate change poses a serious threat to the economy, public health, and natural resources of California and that there are substantial amounts of GHG emissions associated with activities in California. AB 32 enacted Sections 38500–38599 of the California Health and Safety Code. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires reduction of statewide GHG emissions to 1990 levels by 2020. AB 32 requires ARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it

³² President William J. Clinton and Vice President Albert Gore, Jr. 1993 (October). The Climate Change Action Plan. Available: <http://www.gcrio.org/USCCAP/toc.html>.

³³ United States Environmental Protection Agency (U.S. EPA). 2011. Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act. Available: <http://www.epa.gov/climatechange/endangerment.html>. Accessed: July 21, 2011.

³⁴ Health and Safety Code Section 38500 *et seq.*

arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

In 2008, ARB adopted the Climate Change Scoping Plan, which identifies the main strategies California will implement to achieve reduction of approximately 169 million metric tons (MMT) of CO₂e. The Scoping Plan includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing improved emissions standards for light-duty vehicles, the Low-Carbon Fuel Standard, energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems, and a renewable portfolio standard for electricity production. The Scoping Plan states that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions.

Senate Bill 97

SB 97 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Natural Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA. The California Natural Resources Agency adopted amendments to the CEQA Guidelines (California Code of Regulations, title 14, sections 15000-15387) to address GHG emissions, consistent with Legislature's directive in Public Resources Code section 21083.05 (enacted as part of SB97 (Chapter 185, Statutes 2007)). These changes took effect in 2010.

Senate Bill 375

SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and fair-share housing allocations under state housing law. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) to address GHG reduction targets in the context of that MPO's Regional Transportation Plan (RTP).³⁵ City or County land use policies (including General Plans) are not required to be consistent with the RTP (and associated SCS or APS).³⁶ The ARB targets for the San Diego Association of Governments (SANDAG) region

³⁵ This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle to create a closer match with the timelines for revising RTPs (for the Metropolitan Planning Organizations affected by the bill). The RNHA is used to guide the amount of housing to be accommodated for the full range of household incomes in mandatory local housing plans (Housing Elements).

³⁶ Provisions of CEQA directed under this legislation create streamlining for certain projects that are consistent with an approved SCS or APS. Residential or mixed-use projects that are consistent with the SCS/APS and incorporate mitigation measures from relevant prior CEQA document/s are not required to reference, describe, or discuss growth-inducing impacts

call for a 7% reduction in GHG CO₂ emissions per capita from automobiles and light duty trucks compared to 2005 levels by 2020, and a 13% reduction by 2035.³⁷

Executive Order #S-3-05

Executive Order S-3-05 proclaims that California is vulnerable to the impacts of climate change, including increased temperatures that could reduce the Sierra Nevada's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established targets for emissions reductions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.

Local Policy

Legislation and executive orders related to climate change in California have established a statewide context and process for evaluating GHG emissions. Different GHG emission sectors would experience varying degrees of state regulation and would be reduced overall on a statewide level. Legislation already in effect will achieve statewide reductions of GHG emissions associated with electricity production, industry, vehicle miles traveled (VMT), and motor vehicle emission rates. Certain GHG emission sectors regulated by statewide or federal measures are beyond the control of local government (e.g., vehicle emissions standards, renewable energy portfolio standards). However, other sources of GHG emissions are strongly influenced by local policy.

Local land use entitlement authority guides development patterns, community design, transportation facilities planning, and other factors known to influence VMT, which, in turn, influences GHG emissions associated with the transportation sector. Although local government does not have control over vehicle emissions technology or fuel economy standards, cities and counties can promote development patterns that expand mobility options for residents and hold down VMT. Similarly, while energy facility permitting and renewable energy requirements are outside of local government's control, cities and counties can participate in energy efficiency incentive programs, guide solar orientation of buildings, and implement other measures related to improving energy efficiency (and therefore reduce GHG emissions). Local lead agencies will play a role in achieving statewide emission reduction goals through managing land use change and transportation planning to reduce VMT, providing more GHG efficient services (e.g., recycling service, waste management, and wastewater treatment), providing public education and incentives (e.g., energy and water conservation), along with other strategies, many of which are already being implemented by agencies in San Diego County. A brief set of examples follows.

The City of San Marcos comprehensive General Plan update is incorporating state-of-the-art, dynamic land use, transportation, and emissions modeling to develop long-term strategies

or impacts of cars and light-duty truck trips on climate change or on the regional transportation network. "Transit priority projects," as defined in this legislation and future RTPs, are exempt from CEQA review.

³⁷ San Diego Association of Governments (SANDAG). Draft 2050 Regional Transportation Plan. Available: <http://www.sandag.org/index.asp?projectid=349&fuseaction=projects.detail#RTP>. Accessed July 13, 2011.

that ensure a vibrant environment for future generations, while also addressing greenhouse gas emissions reduction and environmental sustainability.³⁸

The City of San Diego's General Plan (City of Villages) places great emphasis on enhancing its communities and neighborhoods by encouraging growth in mixed-use, pedestrian-friendly activity centers that are served by transit. Among other social, economic, and environmental benefits, this planning framework can help minimize GHG emissions.³⁹

The City of Chula Vista's General Plan – Vision 2020 – is built on a vision that includes neighborhood design that promotes walking, a variety of local housing and job opportunities, expanded transit accessibility, and other complementary framework policy emphases that help to minimize GHG emissions.⁴⁰

The City of El Cajon revised its Downtown Specific Plan, in part, to encourage development in the Transit Center and the Main Street/Civic Center areas.⁴¹ The City of La Mesa endorsed the U.S. Mayor's Climate Protection Agreement and directed staff to report back on the City's actions towards climate protection, including preparation of a GHG inventory.⁴² The City of Encinitas has adopted a Climate Action Plan (CAP) that outlines a series of measures to reduce GHG emissions.⁴³ The City of Solana Beach participated in SANDAG's Sustainable Region's Program, which is intended to assist with energy efficiency projects and programs, including building retrofits, new building design, and policy development.⁴⁴ The policy initiatives outlined above are just a sampling of the recent activities by local governments within San Diego County related to GHG emissions.

The County's updated General Plan incorporates smart growth and land planning principles intended to 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 directs preparation of a climate action plan with reduction targets, development of regulations to encourage energy efficient building design and construction, and development of regulations that encourage energy recovery and renewable energy facilities, among other actions.⁴⁵

³⁸ City of San Marcos. General Plan Update – News. Available:

http://www.ourcityyourfuture.com/documents/newsletter_1.pdf. Accessed May 7, 2012.

³⁹ City of San Diego. City of San Diego General Plan: City of Villages. Available:

<http://www.sandiego.gov/planning/genplan/pdf/generalplan/fullversion.pdf>. Accessed May 7, 2012.

⁴⁰ City of Chula Vista. Chula Vista Vision 2020. Available:

http://www.chulavistaca.gov/City_Services/Development_Services/Planning_Building/General_Plan/documents.asp.

Accessed May 7, 2012.

⁴¹ City of El Cajon. Downtown El Cajon Specific Plan 182. Available: [http://www.ci.el-](http://www.ci.el-cajon.ca.us/dept/comm/Forms/SP%20182.pdf)

[cajon.ca.us/dept/comm/Forms/SP%20182.pdf](http://www.ci.el-cajon.ca.us/dept/comm/Forms/SP%20182.pdf). Accessed May 7, 2012.

⁴² City of La Mesa. Update on La Mesa's Climate Protection Actions. Available:

<http://www.cityoflamesa.com/DocumentView.aspx?DID=1734>. Accessed May 7, 2012.

⁴³ City of Encinitas. Climate Action Plan. Available: <http://www.ci.encinitas.ca.us/index.aspx?page=285>. Accessed May 7, 2012.

⁴⁴ City of Solana Beach. Sustainable Regions Program – News. Available: [http://www.ci.solana-](http://www.ci.solana-beach.ca.us/csite/cms/321.htm)

[beach.ca.us/csite/cms/321.htm](http://www.ci.solana-beach.ca.us/csite/cms/321.htm). Accessed May 7, 2012.

⁴⁵ San Diego County. General Plan Update – News. Available: <http://www.sdcounty.ca.gov/dplu/gpupdate/>. Accessed July 13, 2011.

Currently, the County has a number of assistance programs that promote ways to reduce air and water pollution, including a Green Building Program designed to educate builders and provide incentives for the incorporation of green building standards.⁴⁶ Additionally, there are outreach programs that focus on the importance of reducing air quality impacts (e.g. lawn mower trade-in program) and reducing solid waste by recycling (subsidized compost bin programs and transfer station events).

⁴⁶ San Diego County. The Green Building Program. Available: <http://www.sdcounty.ca.gov/dplu/greenbuildings.html>. Accessed May 7, 2012.