Ratepayers for Affordable Clean Energy

AB32 Scoping Plan Comments

California Air Resources Board - Electricity and Natural Gas Sector

Submitted by Ratepayers for Affordable Clean Energy

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Ratepayers for Affordable Clean Energy

I. Introduction – Ratepayers for Affordable Clean Energy (RACE) is a partnership of over 30 organizations working towards a clean energy future for the West Coast of North America. We envision that in the coming years, the West Coast's energy supply will be increasingly clean, efficient, and affordable for all. RACE works to develop progressive energy policies, supports grassroots campaigns, analyzes state and local energy policies, and works to influence lawmakers to make the best choices on energy issues. Our members represent communities from Baja California, Mexico, to British Columbia, Canada, though most of our partners are located in California and Oregon. A complete list of our partners is at the end of this comment letter.

We applaud the State of California for its leadership in reducing global warming, and are grateful to live in a state that has recognized the reduction of carbon emissions as one of the most important public policy challenges our society faces. As California has a large and influential economy and populace, what happens here has global implications.

II. The Case for Urgency – The case for urgency was made most clear by simply breathing in much of California on the day of the release of the Draft Climate Change Draft Scoping Plan (Draft Plan). On that day, June 26, 2008, countless brush and forest fires were burning out of control throughout the state. The scale of this year's fire season is yet to be fully comprehended as it is still on-going as this is being written. But what is clear is that the severity, quantity, and the earliness of the fires are unprecedented in recorded history. The full impacts and costs to public health, to essential natural resources, and to property from these fires are yet to be known, but it is likely to be very high. While fires rage in California, much of the Mid West is recovering from unprecedented flooding which has damaged a large volume of crops. This is contributing to the rising price of food staples that Californians are now enduring.

On page 6 of the Draft Plan, the current and projected impacts of global warming are outlined. The summer of '08 fires in California, as well as floods in the Mid West, are an illustration that these impacts have begun, and they will take a significant toll on our state's quality of life and economy. This underscores the critical importance of getting the implementation of AB32 right. Given that the impacts of global warming are here, and by all accounts will get worse, it is critical that California's agencies realize that there is no room for error in this endeavor to reduce greenhouse gas emissions from one of the largest economies in the world. Action on global warming needs to be swift, decisive and real. There is simply no time for half-measures, creative accounting of carbon emissions, or any measure that is experimental or unproven.

III. Lifecycle Emissions in the Electricity Sector – In its decision 07-01-039, the California Public Utilities Commission issued its order institute rulemaking regarding greenhouse gas emissions standards in the electricity sector. This was issued in January of 2007. In response to an argument made by the Community Environment Council, the CPUC denied the Council's request for a preliminary "lifecycle" analysis of net emissions for natural gas plants that may use liquefied natural gas (LNG). The CPUC went on to argue that there was no reason to single out LNG, writing in a footnote,

"...the lifecycle emissions concept could encompass the process for extracting fuel (e.g., uranium for nuclear powerplants), transportation of fuel to the powerplant, as well as the fabrication of the generation facility (e.g., the wind turbine, photovoltaic cells, etc.) that produces the electric power and any associated fuel disposal processes. We have no record in Phase 1 on the various approaches and methods for conducting a lifecycle analysis of GHG emissions to consider in making this determination."[1]

These comments will outline why this approach to lifecycle emissions is flawed and, given the impacts on the climate of uncounted emissions, dangerous. We will outline another sector where the state does count lifecycle emissions, as well as science-based policies and statements that indicate that other agencies and one of the state's utilities have acknowledged that these emissions do indeed warrant regulation.

IV. New scholarship reveals full lifecycle impacts: When AB32, and the accompanying law SB1368, were being written, the scientific body of work for evaluating LNG's full impacts was still unfolding. In fall of 2007, however, researchers at Carnegie-Mellon University released a rigorous study on the lifecycle emissions of LNG. As the authors state, "If, as the DOE estimates suggest, larger percentages of the supply of natural gas will come from (LNG) imports, emissions from these steps in the fuel cycle could influence the total fuel cycle emissions. Thus, comparisons between coal and natural gas that concentrate only on the emissions at the utility plant may not be adequate."[2]

In the report, the authors detail different scenarios of natural gas and coal production, and find that indeed, there is a significant energy penalty which adds in the range of 15 to 25 percent extra emissions to the production and combustion of domestic natural gas (see figure 1). Once these are accounted for, LNG becomes comparable to coal on a lifecycle basis.

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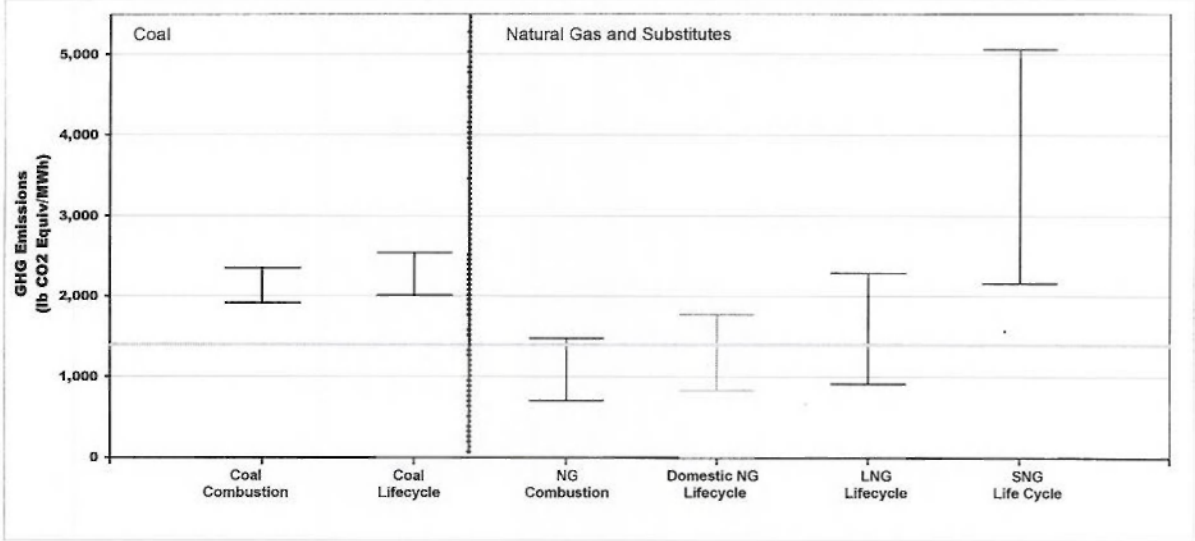
[1] California Public Utilities Commission. "Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies." Decision 07-01-039, January 25, 2007

[2] Paulina Jaramillo, W. Michael Griffin, H. Scott Matthews. Comparative Life Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation. Carnegie-Mellon University. 2007

Figure 1: Fuel Combustion and Life Cycle GHG Emissions for Current Power Plants[3]

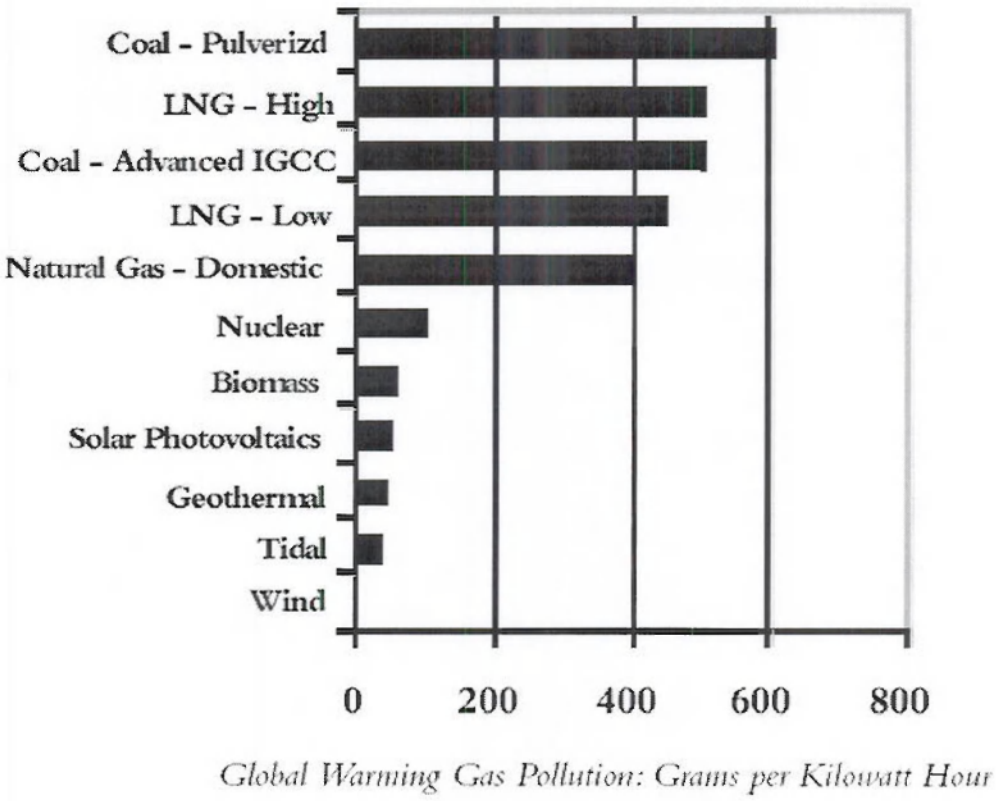


The Carnegie Mellon study reinforced conclusions reached by Richard Heede, who in 2006 analyzed the supply chain of LNG from Australia to a since-rejected terminal located off the coast of Southern California. Heede found that all aspects of the supply chain combined (liquefaction, transport and consumption of LNG) would have resulted in approximately 25 million tons of greenhouse gas emissions per year. About 20 percent of that, or about 5 million tons, would have been from the additional processing and transportation needed for an LNG supply chain. *This is roughly the emissions equivalent of 1 million cars per year for one LNG project, a significant volume of emissions that will not be accounted for if the lifecycle emissions are not considered in the implementation of the new greenhouse gas laws.*

The chart (Figure 2) below illustrates how various energy sources, including renewables, compare on a lifecycle basis. While the CPUC dismisses the task of evaluating all sources of electricity on a lifecycle basis, we believe that the only way to uphold the intent and spirit of AB32 is to do so.

[3] Ibid. Page 9.

Figure 2: Comparison of Lifecycle Greenhouse Gas Emissions in Electricity Production[4]



V. Costa Azul Case Study: An analysis of Sempra's Costa Azul LNG terminal illustrates why the high lifecycle GHG emissions of LNG make it incompatible with the state's Energy Action Plan and AB 32, the Global Warming Solutions Act. As stated in Energy Action Plan II:[5]

Governor Schwarzenegger signed Executive Order S-3-05 on June 1, 2005, clearly establishing California's leadership in and commitment to the fight against climate

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[4] Sources include: Jaramillo, Paulina; Griffin, W. Michael ; Matthews, H.Scott. *Comparitive Life Cycle Air Emissions of Coal, Domestic Natural Gas, LNG and SNG for Electricity Generation.* Carnegie Mellon University. 2007. Heeded, Richard. *LNG Supply Chain Greenhouse Gas Emissions for the Cabrillo Deepwater Port: Natural Gas from Australia to California.* Climate Mitigation Services. May 7, 2006; Orkustofnon – http://www.os.is/page/english; *IAE Greenhouse Gas R&D Program*; Powers Engineering, June 1, 2004. Global LNG Summit Presentation. Parliamentary Office of Science and Technology Postnote. *Carbon Footprint of Electricity Generation.* October 2006.

[5] CEC/CPUC, *Energy Action Plan II – Implementation Roadmap for Energy Policies*, September 21, 2005, p. 12.

change. The Executive Order establishes greenhouse gas (GHG) emission reduction targets that call for a reduction of GHG emissions to 2000 levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050.

Climate change is the most serious threat to our environmental future, and demands immediate action. Its symptoms are already evident in California.

AB 32 now mandates the GHG reduction targets established in Executive Order S-3-05 and referenced in Energy Action Plan II.

The CPUC now requires California investor-owned utilities (IOUs) to conduct GHG modeling of long-term procurement plan (LTPP) scenarios. The CPUC issued its final decision on the IOU's 2006 LTPPs in R.06-02-013 on December 20, 2007. The CPUC issued Decision D.07-12-052 by unanimous vote. The primary focus of D.07-12-052 is to determine whether the LTPPs will ensure that the IOUs are "procuring preferred resources as set forth in the Energy Action Plan" and are appropriately responding to "policies that promote the reduction of greenhouse gases, especially in the production and delivery of electric resources by the regulated utilities."[6]

Using Sempra's Costa Azul LNG project as an example, imported LNG carries a GHG burden in that project that is approximately 25 percent greater than domestic natural gas.[7] Sempra will import LNG from British Petroleum's (BP) Tangguh, Indonesia LNG liquefaction plant.[8] The additional GHG burden is related to the high CO_2 content (10 percent) of the Indonesian raw gas that will be removed during gas processing and the energy necessary to: 1) cryogenically liquefy natural gas into LNG, 2) transport the LNG across the Pacific in a specially-designed tankers, and 3) regasify the LNG back to

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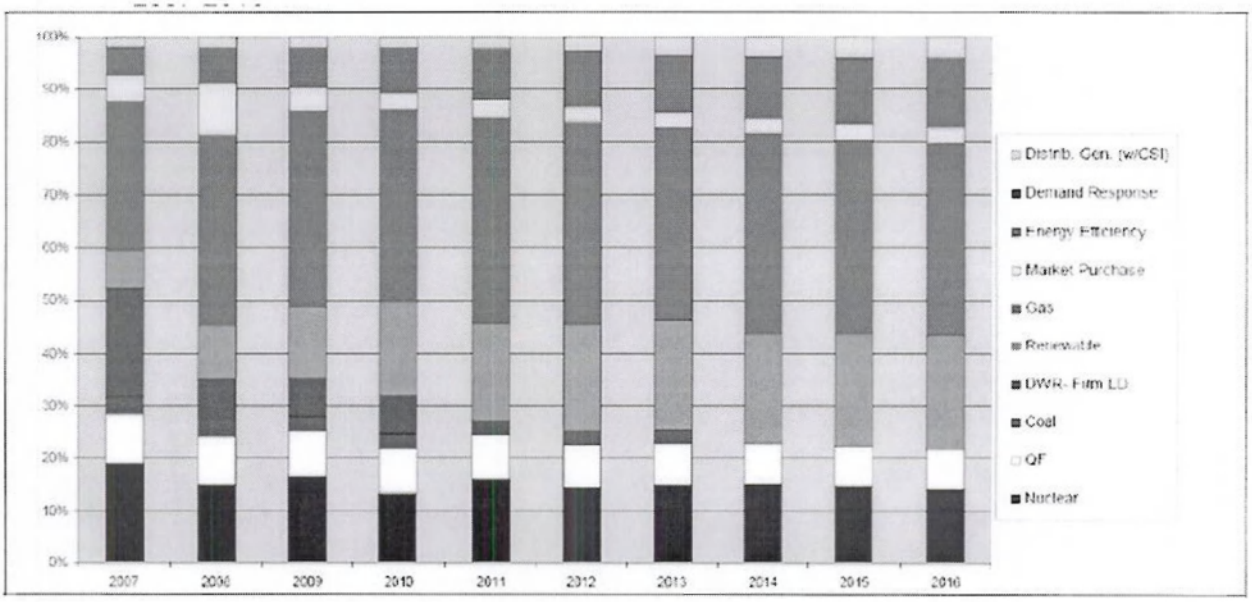
[6] R.06-04-009, Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies, *Opening Comments of the Center for Energy Efficiency and Renewable Technologies on E3 Modeling Methodology and Staff Workpaper on Emission Reduction Measures*, January 7, 2008.

[7] P. Jaramillo, Carnegie-Mellon University, *Comparative Life Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation*, Environmental Science & Technology, published online July 25, 2007, and "Supporting Information" document. All CO2 emission factors listed in this footnote are from the "Supporting
Information" document. Assume the LNG is shipped from BP liquefaction plant in Tangguh, Indonesia, 7,500-mile tanker roundtrip to Sempra LNG regasification terminal in Baja California. The raw gas feeding the Tangguh liquefaction plant contains 10 percent CO2 which will be vented to atmosphere at the plant (source: BP Indonesia webpage
http://www.bp.com/sectiongenericarticle.do?categoryId=9004748&contentId=7008786). This is equivalent to a CO2 emission rate of 12 lbs CO2 per MMBtu, per the Carnegie-Mellon estimate of 120 lbs CO2 per MMBtu of natural gas combusted. Assume average CO2 generation from liquefaction (14 lb CO2 per MMBtu without considering CO2 content in raw gas). 7,500 miles is the same distance as Oman to the Everett, Massachusetts LNG terminal route cited in report, which generates 8 lb CO2 per MMBtu in transport CO2 emissions. Assume CO2 generation from LNG regasification and storage is low due to use of seawater heating to regasify the LNG (1 lb CO2 per MMBtu). Domestic natural gas emits a maximum of 140 lb CO2 per MMBtu. Total additional CO2 associated with LNG from Tangguh, Indonesia is 35 lb CO2 per MMBtu. Incremental lifecycle CO2 emissions associated with LNG imported from Tangguh are 35 lb CO2 ÷ 140 lb CO2 = 0.25, or a 25 percent increase in lifecycle CO2 emissions.

[8] See Attachment A.

gaseous form at Sempra's receiving terminal in Baja California. All of the power sold by SDG&E in 2016 that produces CO_2 emissions will be generated by power plants burning natural gas. (See Figure 3.)

Figure 3: SDG&E Projection of Power Generation Sources to be Used to Meet Electricity Demand, 2007 – 2016.



Approximately 50 percent of the natural gas sold by SDG&E is used in electric generation plants.[9] The remaining 50 percent is used primarily by commercial and residential customers for space heating, water heating, and cooking and related uses.

Neither the CPUC nor the state's electric or gas utilities are currently forecasting the negative GHG emissions impact of switching from domestic sources of natural gas to LNG imports. However, to be consistent with/to follow state climate change reduction laws and policies, the IOUs and the CPUC must factor in/analyze/compare/consider all GHG emissions caused by changing from domestic natural gas to LNG sources for electricity production, heating, or other IOU natural gas requirements.

For example, SDG&E forecasts a 20 percent reduction in GHG emissions between 2007 and 2016 in its Dec. 11, 2006 LTPP submitted to the CPUC.[10] However, the SDG&E forecast does not account for the GHG impact of the reversal of flow on the SDG&E

[9] 2006 California Natural Gas Report, SDG&E Tabular Data, pp. 98-100. In 2010, electric generation consumes 175 mmcfd of 333 mmcfd total natural gas demand. In 2015, electric generation consumes 175 mmcfd of 348 mmcfd total demand. All other non-electric power generation combustion sources will consume 173 mmcfd in 2015.

[10] SDG&E 2007-2016 Long-Term Procurement Plan, December 11, 2006, p. 207.

natural gas pipeline system in 2009 to move imported LNG from Sempra's Costa Azul LNG import terminal in Baja California to San Diego.

All of the natural gas consumed in SDG&E territory will become natural gas derived from imported LNG if flow is permanently reversed on the SDG&E pipeline system in 2009. The 1,000 million cubic feet per day (mmcfd) Costa Azul LNG import terminal went on line in April 2008.[11] Sempra has preliminary approval from the CPUC to reverse flow on the SDG&E natural gas pipeline system to move this LNG from the Costa Azul LNG terminal directly into the San Diego market.[12] The CEC forecasts that this flow reversal will occur in 2009.[13,14] The forecast also does not address the cost of reversing flow on the SDG&E pipeline system, which will add at least $200 million in costs to ratepayers to move the gas from the LNG terminal to users north of the U.S.– Mexico border.[15]

The lifecycle GHG emissions from natural gas fired power plants in SDG&E service territory, and those served by the Baja California natural gas pipeline system which is interconnected with the Costa Azul LNG terminal, will increase by approximately 25 percent in 2009. As noted, all GHG emitting power generation sources identified in the 2016 SDG&E forecast are natural gas-fired. Therefore, all CO_2 emissions forecast for 2016 shown in Figure 3 are from natural gas-fired sources. The result of the additional GHG associated with the lifecycle GHG burden of imported LNG will be to increase the SDG&E basecase CO_2 emission estimates for power generation shown in Figure 3 by 25 percent from 2009 forward. See the adjusted CO_2 estimate (red line) in Figure 4. This will nullify the decline in GHG emissions from 2007 to 2016 currently projected by SDG&E.

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[11] Sempra LNG website, Energia Costa Azul – Project Overview. www.sempralng.com

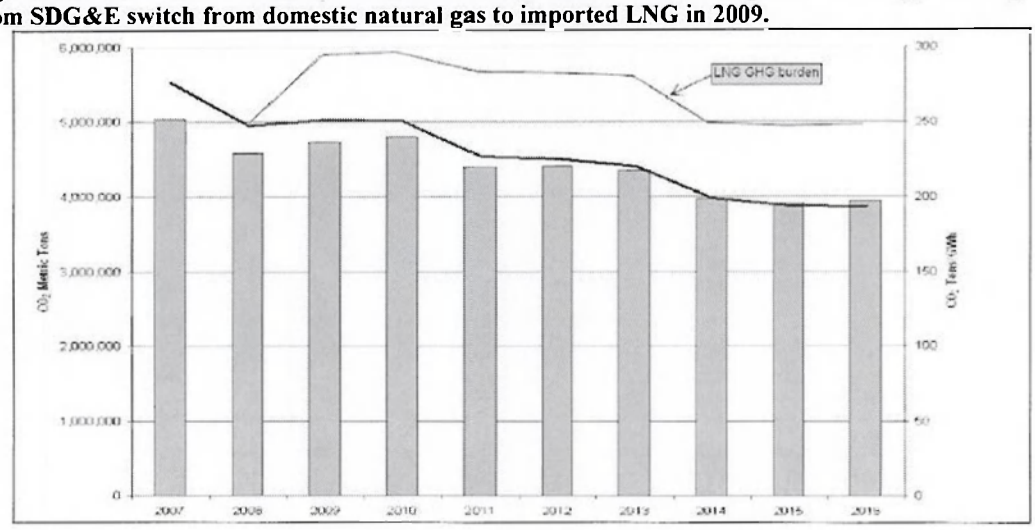
[12] CPUC Decision 04-09-022, *Rulemaking 04-01-025 to Establish Policies and Rules to Ensure Reliable, Long-Term Supplies of Natural Gas to California*, Phase I, Sept. 2, 2004. Findings of Fact (p. 89): 38. There is potential California customer access to LNG supplies through Otay Mesa, Ehrenberg/Blythe, Oxnard and Long Beach. 39. Designating OtayMesa as a common receipt point for both the SoCalGas and SDG&E systems will send a signal to potential LNG suppliers that the gas they provide will have access to the utilities' systems.

[13] California Energy Commission, *Natural Gas Market Assessment – Preliminary Results*, staff draft report, in support of CEC 2007 Integrated Energy Policy Report, CEC-200-2007-009-SD, May 2007, p. 23. "*Major findings regarding natural gas supply are: Importation of LNG is expected from Mexico into San Diego through the Transportadora De Gas Natural De Baja California (TGN) pipeline beginning in 2009. Gas imported from Costa Azul is projected to grow from zero to more than 1,500 MMcf per day by 2017.*"

[14] J. Fore - CEC Natural Gas Unit, *2007 IEPR Natural Gas Forecast – Revised Reference Case*, PowerPoint presentation, August 16, 2007. Graphic on p. 26 shows natural gas from Costa Azul LNG terminal coming northward through Otay Mesa receipt point to San Diego at rate of 350 million cubic feet per day (mmcfd) in beginning in mid-2009. This flowrate is greater than the average daily natural gas demand forecast by SDG&E for 2010 of 333 mmcfd (see footnote 3). The revised August 16, 2007 LNG flow forecast shows LNG imports rising to 400 mmcfd through Otay Mesa in 2016, significantly less than the initial June 2007 reference case forecasting 1,000 mmcfd of LNG imports by 2016 (this case is also shown in the graphic on p. 26 of the PowerPoint).

[15] CPUC Decision 04-09-022, *Rulemaking 04-01-025 to Establish Policies and Rules to Ensure Reliable, Long-Term Supplies of Natural Gas to California*, Phase I, Sept. 2, 2004.

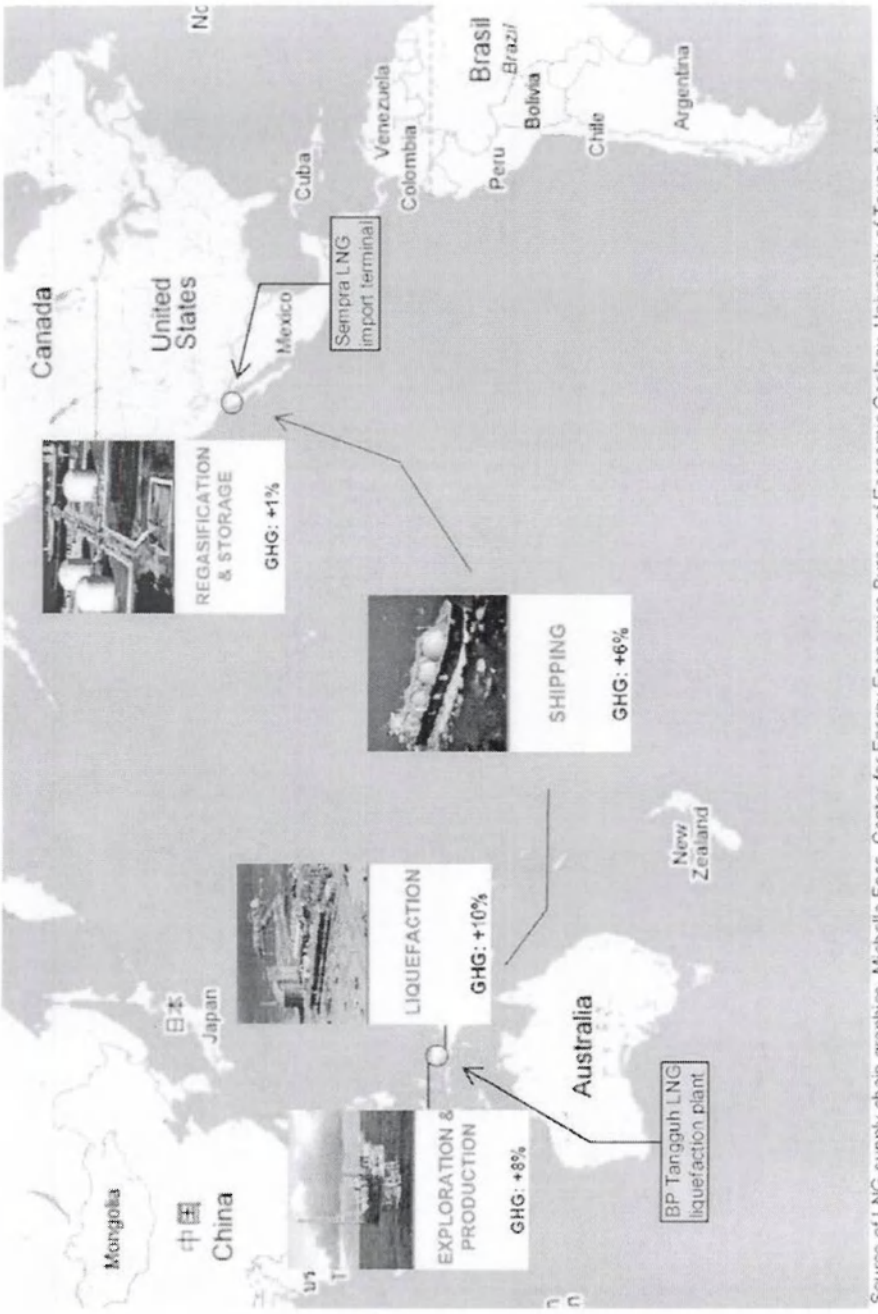
Figure 4. SDG&E projection of greenhouse gas emissions trends, 2007-2016, and Powers Engineering adjustment that reflects the lifecycle CO2 increase (from electric power generation only) resulting from SDG&E switch from domestic natural gas to imported LNG in 2009.



The lifecycle GHG emissions associated with imported LNG will eliminate the GHG reduction benefits of reaching 20 percent renewable energy generation by 2010 as mandated by AB 107. AB 32 requires a return to the 1990 GHG emission level by 2020. This is an estimated GHG reduction of 25 percent by 2020. The post-2020 phase of AB 32 is even more ambitious, targeting an 80 percent reduction in GHG by 2050. It is unlikely that SDG&E can achieve the 2020 AB 32 target if there is no net lifecycle reduction in GHG emissions from natural gas-fired combustion sources in SDG&E service territory in the 2007-2016 timeframe. Thus, the CPUC is willfully allowing the intent and spirit of AB32 to be violated by not accounting for the full emissions impact in electricity generation.

Figure 5 shows a graphic of the route from the liquefaction plant to Sempra's LNG import terminal near Ensenada, Baja California. Figure 4 also shows a breakdown of the 25 percent increase in lifecycle GHG emissions from each stage in the LNG process, from production of raw gas near Tangguh, processing and liquefaction of this gas, transport 7,500 miles to the LNG receiving terminal in Baja California, and regasification of the LNG for pipeline delivery to SDG&E service territory.

Figure 5. LNG versus domestic natural gas: +25% increase in lifecycle greenhouse gas emissions.



Source of LNG supply chain graphics: Michelle Foss, Center for Energy Economics Bureau of Economic Geology, University of Texas-Austin. *LNG Access*: PowerPoint presentation. California Energy Commission LNG Access Workshop, June 1-2, 2005.
Source of Tangguh raw gas CO_2 content estimate: BP Indonesia webpage (www.bp.com) - "Greenhouse gas emissions - The natural gas in the Tangguh fields contains approximately 10% CO_2 - relatively high by industry standards."
Source of LNG supply chain greenhouse gas contribution estimates: P. Jaramillo, Carnegie-Mellon University. *Comparative Life Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation*. Environmental Science & Technology, published online July 25, 2007

VII. Precedents For the Consideration of Lifecycle Emissions – While the CPUC refuses to recognize lifecycle emissions for electricity production in the emissions performance standards for California's new greenhouse gas laws, other agencies in California and Oregon, as well as a utility with an interest in an LNG project have all recognized the impact that the lifecycle emissions that LNG has on the climate, as well as on new laws to curb greenhouse gases.

- AB1007, the Alternative Fuels law signed into law in 2007, is intended to diversify transportation fuel in the state in order to reduce oil dependency and pollution. According to the law, the evaluation of any fuel for transportation must be measured on a lifecycle basis in order to understand the full impact of the fuel. This requirement is explicit in the law.

- In April, 2007, the Cabrillo Port LNG project proposed near Oxnard, California was rejected by both the California State Lands and Coastal Commissions. Among the reasons given by both agencies were the questionable wisdom of such a project in the face of a new, unfolding regulatory regime regarding greenhouse gas emissions. State Lands Commissioner John Chiang, in his rejection statement, said, "We all know that the Governor and the Legislature have enacted statutes to reduce California's carbon footprint and move us away from fossil fuels toward cleaner, renewable alternatives. I do not think this is something that carries out the promise of our new, groundbreaking laws."

- The CPUC is currently considering the nature of contracts between LNG suppliers and utilities. In comments filed at the CPUC on January 24, 2008 in regards to this proceeding, PG&E writes, "PG&E acknowledges that LNG imports raise environmental issues which should be addressed as part of the determination for the need for West Coast LNG supplies. In particular, further review may be necessary to quantify the carbon footprint associated with *liquefaction, transportation, and regasification* and identify strategies that can help mitigate environmental impacts associated with West Coast LNG supplies."[16] We find that, given the amount of research already done, there is no need for further review. However, it is worth noting that this utility, which is a partner in a proposed LNG project in Southern Oregon, explicitly acknowledges LNG's lifecycle emissions, including the LNG stages which add to the emissions over domestic natural gas.

- In May 2008, the Oregon Department of Energy (ODOE) responded to a request by Governor Ted Kulongoski with an assessment of the need and impacts for LNG in Oregon. The ODOE writes, "Liquefied natural gas supplied to Oregon would have significantly more life cycle CO2 costs than North American natural gas, because of the large transportation distances involved in shipping LNG to Oregon and because of the processes used to liquefy and to re-gasify the natural

[16] Posted by Pacific Gas & Electric at http://docs.cpuc.ca.gov/Published/proceedings/R0711001.htm on January 24, 2008.

> gas....It is likely that CO2 emissions from regasification at an LNG terminal in Oregon would be included in a regional or national cap-and-trade system. This could adversely affect Oregon's ability to meet its CO2 reduction targets under state law passed in 2007 (House Bill 3543) and under the Western Climate Initiative. It is possible that liquefaction and transport emissions of LNG will be included in future international agreements as well."

Conclusion – AB32 demonstrated that California leads in the fight against global warming. But the CPUC's implementation plan threatens to undermine that effort, and compromise the state's leadership on the issue. The amount of emissions that will not be counted is in the millions of tons, a highly significant amount. As such, we find it absolutely critical that the implementation of AB32 cover all of the emissions generated by electricity production from all fuels, measured on a lifecycle basis.

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Ratepayers for Affordable Clean Energy partners:

- Amazon Watch
- Border Power Plant Working Group
- California Alternative Energies Corporation
- Californians for Renewable Energy - CARE
- Central Coast Alliance United for a Sustainable Economy (CAUSE)
- Center for Biological Diversity
- Citizens Against LNG (Coos Bay)
- Coalition for a Safe Environment
- Energy Options
- Environment California
- Environmental Protection Information Center (EPIC)
- Friends of Living Oregon Waters (FLOW)
- Green Guerrillas Against Greenwash
- Greenpeace

Ratepayers for Affordable Clean Energy

- Local Power
- Long Beach Citizens for Utility Reform
- Marin Clean Alternative Energy Now
- No LNG Community Alliance (Oxnard)
- Northcoast Environmental Center
- Pacific Environment
- Public Citizen
- Renewables 100 Policy Institute
- Rivervision
- Saviers Road Design Team
- Stewards of the Earth
- Texada Action Now
- Vallejo Community Planned Renewal (VCPR)
- Ventura LNG Task Force
- Wildcoast
- Women's Energy Matters

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