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Mr. Mike Tollstrup
California Air Resources Board
Office of Climate Change
1001 I Street
Sacramento, CA 95814

RE: 2013 AB 32 Scoping Plan Update

Dear Mr. Tollstrup:

San Diego Gas and Electric Company (SDG&E) appreciates the opportunity to submit these written comments concerning the proposed AB 32 Scoping Plan Update as described in the Air Resources Board (ARB) workshops. Based on the workshop discussions, SDG&E would advocate for four modifications to the AB 32 Scoping Plan Update.

- First, the Scoping Plan Update should condition its longer-term recommendations not only based on 2050 State goals, but the degree to which California's plans have influenced and can influence national or international Greenhouse Gas (GHG) reductions.
- Second, while the AB 32 Scoping Plan Update will not relook at measures adopted in the 2008 Scoping Plan addressed in separate proceedings, it should revisit the GHG emissions reduction target for the Combined Heat and Power (CHP) Scoping Plan measure to provide updated guidance to the California Public Utilities Commission (CPUC) for the implementation of the CHP Settlement Agreement.
- Third, the Energy section of Scoping Plan Update should provide a consistent vision for the roles of electricity and natural gas, based not only on 2050 State goals, but also on the prospects for national and international GHG reductions.
- Fourth, the Scoping Plan Update should detail past efforts and future efforts to curb the growth of high Global Warming Potential (GWP) gases, which are forecast to double by 2020 and be 80 percent as large as GHG emissions from all residential and commercial combustion of natural gas in the State.

I. Scoping Plan Update Long-term Recommendations

As SDG&E understood the workshop presentations, ARB desires the Scoping Plan Update to be "more than a document on a shelf." To be more than a dust collector, the long-term perspective of the Scoping Plan Update needs to be understood in the context of national and international GHG reduction activities and goals. As indicated by participants in workshop discussions, California could reach the 2050 State goal of 80 percent reduction below 1990 GHG levels and have no impact on climate change at all if other states and nations do not join in the effort to curb GHG emissions. And, again as mentioned in the first workshop, if California's consumption of GHG-intensive goods does not change, but the location of the production of those goods simply shifts elsewhere, there is no real, long-term climate benefit of AB 32 policies.

The Scoping Plan Update should highlight successes that are transferrable such as in the areas of electricity production, energy efficiency, recycling and waste management. In its leadership role, the ARB should have the Scoping Plan Update discuss measures implemented to reach 2020 goals, the degree to which they have been successful, have been demonstrated to be transferrable elsewhere, and the challenges being presented and addressed, such as the challenge of integrating renewables into the electric grid in a way that does not threaten grid reliability.

SDG&E has been an active participant in AB 32 and agrees with the objectives of AB 32 to develop a balanced approach to address climate change, to improve air quality and public health, to provide a consistent policy approach to drive investment in clean technology, and to provide a model for future national and international climate change efforts.

Energy-efficiency measures represent a cost-effective way to reduce GHG emissions. SDG&E has undertaken significant energy efficiency programs under the auspices of the California Public Utilities Commission. GHG savings are difficult to achieve in California given the high standards of efficiency already required by State building and appliance standards. Energy efficiency measures have to go above and beyond the standards. Just as the appliance and building standards have impacted U.S. standards in the past, the types of energy efficiency programs delivered to SDG&E customers can influence national efforts in the future. Over the last 3 years alone, SDG&E customers have reduced their electricity use by over 1.4 billion kWh and their gas use by over 7.9 million therms, enough energy to serve more than 237,000 homes.

In 2012, SDG&E opened its Energy Innovation Center to the public to teach customers how to become more energy efficient, save money and improve the environment. The facility showcases a wide variety of green building technologies including the newest efficient lighting, a demonstration kitchen, energy-saving heating, ventilation and air-conditioning technology and even drought-tolerant landscaping. The 27,000 square foot facility has been certified Leadership in Energy & Environmental Design (LEED) Platinum for achieving the highest level of sustainable building design and construction, as determined by the U.S. Green Building Council. In its first full year of existence, the Center hosted more than 24,000 visitors, 125 demonstration tours and 772 energy-related seminars to encourage energy efficiency as a way of life. While focused on customers, these education efforts have included individuals and organizations beyond the SDG&E service area.

SDG&E continues to build the infrastructure necessary to enable renewables necessary for a low-carbon future. Over 20 percent of SDG&E electricity supplied is currently comprised of renewables, up from 1 percent in 2002. In 2012, SDG&E completed and put into service the Sunrise Powerlink, a 500,000-volt transmission line which will deliver a significant amount of wind and solar power from the resource-rich Imperial Valley. In 2012 alone, the CPUC approved new contracts for a combined total of 1,088 MW of new renewable power paid for by SDG&E customers.

Innovation is a critical part of moving to a low carbon future. Innovation means adopting new technologies and adapting our businesses to a new, low carbon energy future. By the end of 2012, SDG&E had installed 99 percent of the planned smart meters in its service territory. Deploying smart meters will work with smart pricing programs to allow customers to shift energy use to off-peak periods with less GHG-intensive electricity since after 2013, SDG&E will have no more baseload coal in its resource portfolio.[1] Further, as more smart devices are installed inside the home, there is more opportunity for energy efficiency savings and further GHG reductions.

Research, Development, and Demonstration are also key elements toward the movement to a low carbon future. Smart Grid technologies, including microgrids and energy storage, are necessary to integrate a high level of local renewables into the electricity supply. SDG&E has been on the forefront of demonstrating the feasibility of these technologies. Likewise, in the transportation sector, electric and natural gas transportation technologies that provide significant GHG reductions have been successfully demonstrated and now are commercialized or on the brink of commercialization. SDG&E is at the forefront of the development of electric infrastructure for electric vehicle refueling to enable widespread deployment.

[1] If coal is a significant amount of off-peak power, it can be more GHG intensive than on-peak power.

AB 32 and the general goals of AB 32 have also impacted SDG&E operationally in the areas of water use, electricity use, natural gas use, fleet vehicles, and waste and recycling. Through a water conservation program, SDG&E has saved more than 110 million gallons water since January 2006. Electricity usage at SDG&E's facilities (excluding data centers) has been reduced cumulatively by more than 8.7 million kWhs since 2003, a more than a 27 percent reduction in annual electricity usage. SDG&E continues to add alternative-fuel vehicles to the vehicle fleet, including plug-in vehicles and their charging infrastructure. Roughly 88 percent of the fleet passenger cars are now alternative fueled (compressed natural gas, electric, hybrid, or biodiesel). A recycling program is now in place at company facilities and through a filtered water program, over 38,000 gallons of filtered water has replaced plastic bottles and delivery truck trips delivering bottled water.

SDG&E has worked to "green" its supply chain purchases by including sustainability questions in most high-value Requests for Proposals to work with vendors to reduce the collective environmental impact of purchases. Initiatives include development of lower carbon ways to build concrete vaults and optimizing in-bound freight shipments of equipment and supplies. While having no direct benefit for SDG&E in complying with AB 32, it is consistent with the State's goals of reducing GHG emissions.

In 2012, the U.S. Environmental Protection Agency and the others recognized two companies for the organizational climate leadership, SDG&E and IBM, in setting aggressive GHG emission reduction goals and creating a culture within the organization which supports environmental excellence. In February 2013, SDG&E received a "Supply Chain Leadership Award" from the US EPA and others. Likewise, in April 2013, the County of San Diego recognized SDG&E for its efforts in reducing the company's environmental footprint (reduced electricity, water and paper usage) and for creating a culture that continually looks to reduce the environmental impacts of conducting business.

Discussion of longer-term policies for California should look at what has been accomplished; what policies and programs have been cost effective and transferable. Policy discussions, such as whether California continues the cap-and-trade program or any other measures beyond 2020 should be conditional not only on its potential to move California toward 2050 goals, but also on its potential for global benefit - a showing of GHG reduction at a reasonable long-term economic cost.

The Scoping Plan Update should recognize that California is well beyond the rest of the U.S. in some areas such as in the electric generation sector – where emissions associated with California electricity consumption are 19 percent of Statewide GHG emissions (slide 18 of first presentation) compared to 33 percent nationwide[2] – due to the expanded use of natural gas generation and increased installation of renewable generation. The President's Climate Action Plan notes the success in reducing the U.S. GHG levels in electricity generation through the use of natural gas, the cleanest-burning fossil fuel. The President's Plan promotes this GHG reduction measure globally, so the Scoping Plan Update should acknowledge California's success in reducing coal use, and discuss policies related to natural gas not just in the context of 2050 goals, but also in the context of national and global impacts.[3]

Besides the leadership role, the 2013 Scoping Plan Update should also acknowledge California's role in national and global efforts. We are not an island and climate change is not a problem we can solve on our own. Therefore, longer-term policy discussions described in the Scoping Plan Update should not adopt any post -2020 targets or measures. If the United States embarks on a different path to achieve the objectives of the cap-and-trade program in the electric sector (e.g., power plant GHG emission standards and/or a clean energy standard), California should consider how to make its long-term GHG efforts in the sector as compatible as possible with national efforts - that may or may not include a continuation of the cap-and-trade program.

While the inventory chart is informative (Chart 1), more detailed sector analysis would be useful. The 2013 Scoping Plan Update should also present the levels and trends in GHG per capita in the sectors related to energy

[2] Environmental Protection Agency, "Inventory of Greenhouse Gas Emissions and Sinks: 1990–2011," 2013.

[3] Executive Office of the President, "The President's Climate Action Plan," June 2013, pp. 18,20

consumption (electricity, natural gas, and transportation) compared to national trends and international trends for developed countries to put past accomplishments and future actions into context.

The baseline of GHG emissions and the amount of GHG reductions shown in slide 13 at the first workshop (and slide 12 in subsequent workshops) are substantially different than the amounts adopted in the original 2008 AB 32 Scoping Plan as shown in Table 1 below. The values presented in the workshops should be officially incorporated in the Scoping Plan Update as the 2008 emission reduction targets so that in the 2019 Scoping Plan Update, there is a correct baseline from which to measure progress.

Chart 1

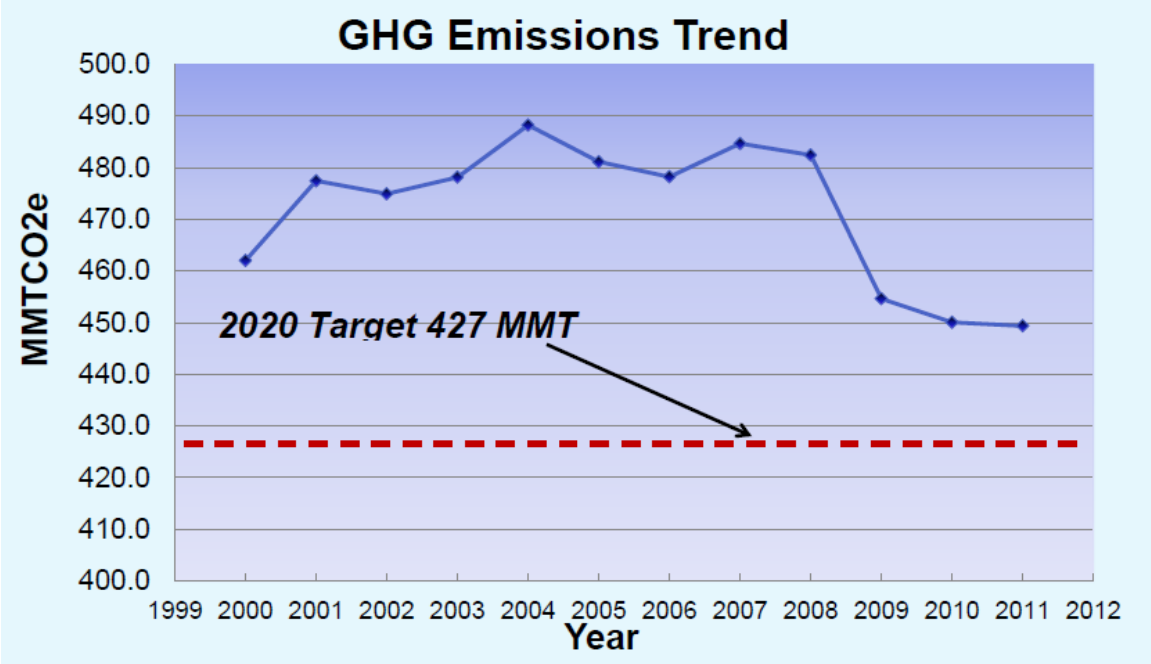

TABLE 1

AB 32 Scoping Plan Measure	2008 Scoping Plan Table 2	SPU Slide 13
Baseline	596.0	507.0
Cap and Trade	34.4	18.0
Low Carbon Fuel Standard	15.0	15.0
Light-Duty Vehicle Standards*	31.7	-
Advanced Clean Cars	4.5	4.0
SB 375 Sustainable Communities/Land Use	5.0	3.0
Renewable Portfolio Standard*	21.3	11.0
Energy Efficiency	26.3	12.0
Electric Energy Efficiency (Table 7)	*15.2*	*?*
Gas Energy Efficiency (Table 8)	*4.4*	*?*
CHP (Table 7)	*6.7*	*?*
High GWP Gases	20.2	6.0
All Other Measures	11.1	11.0
	426.5	427.0
* - Partially or fully moved into Baseline		

II. Clarification of the CHP Emissions Reduction Target for Purposes of CPUC CHP Settlement

The CPUC promulgated Decision 10-12-035 in 2010 to approve a settlement on CHP that had been negotiated by utilities and CHP proponents. The settlement requires investor-owned utilities (IOUs), electrical service providers (ESPs), and community choice aggregators (CCAs) to reduce emissions from the electrical sector by retaining 3,000 MW of existing GHG-reducing CHP and contracting with new CHP to secure a portion of the 2008 AB 32 Scoping Plan's 6.7 MMTs of GHG reductions from CHP (the portion proportional with their sales of electricity in the State). The Settlement Agreement describes how the IOUs, ESPs, and CCAs will contribute to achieving the goals of the 2008 AB 32 Scoping Plan (In the Settlement this is referred to as the CARB Combined Heat and Power Recommended Reduction Measure, or CARB CHP RRM). Below is the exact language of the Settlement.

CHP Settlement Agreement Section 6.2 (Emphasis Added)

6.2 IOUs' GHG Emissions Reduction Targets

6.2.1 Existing: Maintaining GHG Emission Reductions from Existing CHP

6.2.1.1 The IOUs shall maintain an equivalent amount of GHG emissions reductions attributable to the gas-fired Topping Cycle CHP Facilities included in each IOU's July 2010 Semi-Annual Reports for PPAs that expire in the Initial Program Period.

6.2.2 New GHG Reductions: IOU GHG Emissions Reduction Targets

6.2.2.1 In addition to 6.2.1.1., this Settlement establishes a GHG target of 4.3 MMT **based on the CARB Scoping Plan estimates that, by 2020, the State can add 4,000 MW of additional efficient CHP. These 4,000 MW are estimated to reduce GHG emissions by 6.7 MMT**. The CARB CHP RRM does not have specific allocations to the IOUs.

The Settlement agreement allows for a change in this target if the ARB adjusts the Scoping Plan target "pursuant to an official CARB document" as described below.

CHP Settlement Agreement Section 6.7 (Emphasis Added)

6.7 Changes to the CARB CHP RRM

6.7.1 **If CARB, pursuant to an official CARB document modifies the CARB CHP RRM to revise the goal of securing 6.7 MMT of incremental GHG reductions from incremental CHP resources, the GHG Emissions Reduction Targets adopted by this Settlement will be adjusted accordingly**, so long as the CPUC adopts such modification in the LTPP process. The GHG Emissions Reduction Targets may also be adjusted by the CPUC in the LTPP process, provided that changes in the GHG Emissions Reduction Targets do not affect the MW Targets specified in this Settlement.

6.7.2 Changes to the GHG Emissions Reduction Targets resulting from a change to the CARB CHP RRM adopted between LTPP decisions may be implemented by the CPUC via a Tier III advice letter process.

While it is clear that the ARB has reduced the 2008 Scoping Plan goal for CHP, like almost all other measures as shown in slide 13 of the first workshop, it is somewhat unclear what target ARB has chosen for the CHP measure. Energy Efficiency, including CHP, was reduced from 26.1 MMT in the 2008 Scoping Plan to 12 MMT as shown in slide 13 of the first workshop presentation. However, there is no breakdown of the change from electricity energy efficiency measures, natural gas energy efficiency measures, and the CHP measure. SDG&E would request that the 2013 Scoping Plan Update provide clarification as to the GHG emissions reduction expected from the three efficiency measures, consistent with the value of 12 MMT for all energy efficiency in the Scoping Plan Update, to provide guidance to the CPUC in its implementation of the CHP Settlement.

One possible split would be based on a proportionate reduction from 26.3 MMT to 12 MMT, or 3.1 MMT of GHG reductions expected from CHP.[4] A second possible split based on ARB data would be from the Updated Economic Analysis prepared in 2010 that shows in Table 13 of that document that 70% of reductions are from electric and natural gas energy efficiency and 30% are from CHP.[5] This would reduce the expected CHP emissions reductions from 6.7 MMT to 3.6 MMT.[6] Or the split could be based on Appendix F to the Initial Statement of Reasons for the Cap-and-Trade Program (ISOR), Compliance Pathways.[7] This ARB document shows roughly 27 percent of the GHG savings coming from CHP, implying a 3.2 MMT emissions reduction target related to CHP.[8]

The above figures are also in line with the recent California Energy Commission report Combined Heat and Power: 2011-2030 Market Assessment.[9] To provide an estimate that could be compared to the ARB Scoping Plan, the report used the ARB assumptions for avoided emissions, electric line losses, and boiler efficiency. The electric and thermal performance of the combined heat and power systems were taken from multi-sector outputs of the ICF, Inc. CHP Market Model. Calculated on this basis, the avoided annual GHG emissions in 2020 were roughly 3.2 MMT associated with roughly 3,000 MW of new incremental CHP in 2020 in the mid-case.[10] Using the exact same metrics as used by ARB except for the efficiency of the CHP units, and without considering the interaction with the Renewable Portfolio Standard (RPS), the CEC report finds less than half the likely GHG reductions as in the original 2008 AB 32 Scoping Plan.

There is also one other possibility in interpreting the ARB CHP Emissions Reduction Target – that ARB has eliminated the CHP target altogether and subsumed it in the Cap-and-Trade program. This interpretation of the Cap-and-Trade ISOR would be based on the natural gas and electricity energy efficiency totaling 12 MMT in both the Updated Economic Analysis and Appendix F of the Cap-and-Trade ISOR, apart from CHP.

ARB should clarify the split of the 12 MMT of energy efficiency between electricity energy efficiency, natural gas energy efficiency, and CHP emissions reductions for purposes of the CHP Settlement to avoid conflicts in parties' interpretation of the CHP RRM "pursuant to an official CARB document." In addition, such clarification will allow ARB to be better able to assess progress toward those goals in this Scoping Plan Update.

III. The Energy Section of the Scoping Plan Update

Like the overall long-term recommendations of the Scoping Plan Update, the Energy section should reflect more than the 2050 vision, but the extent to which adopted policies or proposed policies are cost effective and transferrable. The Energy section in particular should acknowledge how past accomplishments affect future reductions and the cost of future reductions. Further, more emphasis should be placed on how complementary measures affect each other. If a program such as energy efficiency is reducing energy consumption and GHG

[4] 6.7/26.3 x 12 MMT = 3.1 MMT.

[5] Staff Report to the Air Resources Board, "Updated Economic Analysis of California's Climate Change Scoping Plan, March 24, 2010, Table 13, page 37. Energy Efficiency other than CHP accounted for 12 MMT and CHP 5 MMT (all the study found available per footnote 25). 5/(5+12)= 5/17 = 30%

[6] 30% x 12 MMT = 3.6 MMT

[7] Staff Report on Initial Statement of Reasons Proposed Regulation to Implement the California Cap-and-Trade Program, Part I Volume I, October 28, 2010, Appendix F, Tables F-7 and F-10.

[8] Calculation – CHP 4.6 MMT; Electric EE – 9.7 MMT; Gas EE – 2.6 MMT. 4.6 MMT/ 16.9 MMT = 27%. 27% x 12 MMT = 3.2 MMT

[9] Hedman, Bruce, Ken Darrow, Eric Wong, Anne Hampson. ICF International, Inc., Combined Heat and Power: 2011-2030 Market Assessment, California Energy Commission report CEC-200-2012-002, 2012.

[10] Hedman, Bruce, Ken Darrow, Eric Wong, Anne Hampson. ICF International, Inc., Combined Heat and Power: 2011-2030 Market Assessment, California Energy Commission report CEC-200-2012-002, 2012, table ES-2 and figure ES-5.

emissions more than previously projected, it may influence policies aimed at the GHG reductions from changing the fuel content of fossil combustion. In the general discussion of complementary measures of the Energy sector, the Scoping Plan Update should highlight both the progress of complementary policies and the interactions of those policies.

The role of various energy policies going forward to 2020 and beyond should be evaluated in light of expected technological change, cost effectiveness, and transferability.

Technological Change - Technology change is a key to movement toward long-term goals and should be factored into the State's direction outlined in the Scoping Plan Update. Natural gas technologies, for example, in many areas have had substantial increases in efficiency and reductions in emitted criteria pollutants over the past three decades. In the future, further reductions in natural gas' GHG and criteria pollutants emissions should be factored into the Update.

Cost Effectiveness - Cost effectiveness should guide policies and programs to provide a path for other states and countries to follow, but nowhere is it mentioned in the Energy section of the Scoping Plan Update presentation as a factor in evaluating existing goals or targets. Of course, there are exceptions to using cost effectiveness as a guide such as with pilot programs for demonstrating new technologies or assisting in viable market transformation.

Transferability – The Energy section should provide information on the potential for successful implementation of a policy to be transferrable nationally and internationally. For example, the lessons learned in California in creating a "highly flexible and robust distribution and transmission structure" will be of interest to others as California integrates a high level of renewables over the next few years.

SDG&E appreciates the multi-agency approach to the development of the Scoping Plan Update. Once the Scoping Plan Update is in place, SDG&E hopes that agencies will continue to work together to achieve the outlined goals. For example, the Scoping Plan Update Energy section supports CHP, but local air quality districts' implementation of their requirements have often been a barrier to CHP installation.[11] Likewise, in the Scoping Plan Update workshops, Environmental Justice groups have been focused on the reductions in co-pollutants and the associated health benefits. In the case of electricity production from solid waste and biomass, there may be significant GHG benefits, but local co-pollutants may also increase at the same time.[12] The ARB Scoping Plan Update goals should reflect a multi-agency consensus view on the goals and all agencies should support those goals by helping projects meet all local area requirements and working toward approving such projects as expeditiously as possible.

a. Technological Change and Cost Effectiveness

ARB should consider long-term changes expected in technologies when considering goals. In the Scoping Plan, natural gas thermal applications were assumed to be 80 percent efficient. But efficiencies have improved with ARB using 85 percent efficiency in the cap-and-trade regulation in 2010 and the CEC appliances data base currently showing over 200 natural gas boiler models with efficiencies exceeding 90%.[13] While a 10 percentage point increase sounds small, waste energy loss is cut in half. Increasing efficiency reduces the emissions reductions and the cost effectiveness of policies that substitute alternate zero-carbon emissions technologies for natural gas technologies.

Similarly, gas-fired base load electric generation has improved efficiency tremendously over the last several decades, moving from efficiencies in the 20-30 percent range for steam plant generation to close to 50 percent for modern combined cycle gas turbines. The new gas generation technologies are also much more flexible and can help accommodate an increased penetration of renewables.

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[11] Neff, Bryan, *A New Generation of Combined Heat and Power: Policy Planning for 2030*, 2012, California Energy Commission, CEC-200-2012-005, page 41, and comments at CEC workshops.

[12] This would be the case if it was not replacing an older baseload fossil electric generation facility in the same local area.

[13] Initial Statement of Reasons Supporting the Cap-and-Trade Regulation, Appendix J, page J-53 for the 85% figure. CEC Appliances Database, Heating Products, Boilers, subset of natural gas boilers.

The impact of the new combined cycle technology has substantially increase the GHG emission reductions and cost effectiveness of substituting natural gas for baseload coal generation. However, these efficient, flexible gas technologies also reduce the emissions reductions associated with renewables, thus reducing the cost effectiveness of these technologies as GHG reduction measures. If the costs remain the same, but the amount of GHG reduction is less, the cost per MT of GHG reduction is higher.

b. Interactions of Complementary Policies and Cost Effectiveness

As the ARB lays out the Scoping Plan Update, it needs to consider the interactions of policies - their impact on cost effectiveness and their desirability. For example, the substantial expansion of solar energy has created a situation for SDG&E where it expects its service area peak load net of solar to occur after dark by 2020, and as early as 2016. This fact creates a substantial change in the cost effectiveness of additional solar since it will provide no energy at the net load peak and therefore no capacity benefit, which is a substantial portion of the value of solar. The cost effectiveness of the technology is substantially reduced with the increased penetration counteracting some of the improved cost effectiveness due to cost reductions resulting from technological change.[14]

As mentioned above, as energy efficient increases, the cost effectiveness of additional reductions may be much less cost effective. For example, increased efficiency of electric and natural gas appliances reduces the cost effectiveness of zero net energy buildings and solar space and water heating. As we move toward additional GHG reductions beyond 2020 through technologies installed today, tracking reductions in costs and reductions in benefits will allow an assessment of the desirability of various policies.

Similarly, as the separate production of heat and power become more efficient and as the RPS modifies the level of grid emissions, the GHG reductions from conventional CHP are reduced and the cost effectiveness is reduced.[15] The CEC report on CHP cited above, states "Analyzing greenhouse gas emissions in the context of all the other statewide reduction programs moving forward concurrently, particularly the RPS renewable percentage generation targets, results in a declining contribution to greenhouse gas emissions reductions over time. The reason for this reduction is that on-site CHP reduces utility demand for electricity. This demand reduction, in turn, reduces the amount of renewable energy capacity needed for utilities to meet their percentage targets. Therefore, with the RPS in place, the avoided utility emissions are only 67 percent of avoided emissions of the marginal fossil fuel electric system."[16] In other words, the long-term marginal emissions are only two-thirds of natural gas generation once the 33 percent renewable target is reached, so that new CHP may provide little or no long-term GHG reduction.

Unlike national electricity generation situation where there are substantial GHG reductions by replacing coal baseload generation with CHP, utilities like SDG&E may have limited long-term GHG benefits from conventional topping cycle CHP replacing efficient gas-fired boilers and grid electricity.[17] Again, the cost effectiveness of CHP policies should look at GHG reductions from improved efficiency of the technology compared to the reduced benefit from the lower GHG emissions from the separate production of heat and power.

Another type of interaction occurs with the RPS and gas-fired electric generation. Because of the large increase in renewables, California is planning for the problem of integrating a large number of renewables with variable generation (wind and solar) into the grid. In looking at the now famous "Duck Chart" (Chart 2), it shows that as more solar resources are added, the load net of these renewables will decline substantially in the middle of the day in non-summer months beginning as early as 2015. Gas-fired electric generation will play a critical role in enabling

[14] Mills, Andrew and Ryan Wiser, Ernest Orlando Lawrence Berkeley National Laboratory, "Changes in the Economic Value of Variable Generation at High Penetration Levels: A Pilot Case Study of California," Prepared for U.S. Department of Energy, June 2012.

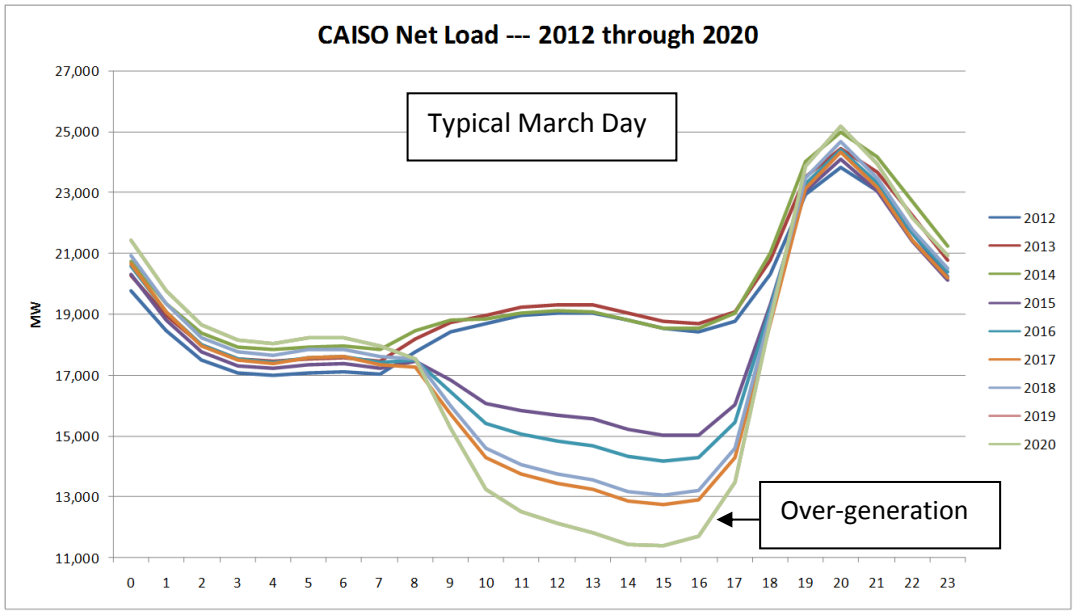
[15] This statement does not apply to renewable CHP or to bottoming cycle CHP.

[16] Hedman, Bruce, Ken Darrow, Eric Wong, Anne Hampson. ICF International, Inc., Combined Heat and Power: 2011-2030 Market Assessment, California Energy Commission report CEC-200-2012-002, 2012, page 123.

[17] Choudhary, Sonika, Sam Wade, and Ray Williams, "Evaluating the Greenhouse Gas Performance of Combined Heat and Power Systems: A Summary for California Policymakers," June 2013, Tables 9 and 10 and page 21. An exception is noted for bottoming cycle CHP and renewable CHP.

the electric grid to remain reliable with this substantial increase in renewable generation. In addition, flexible gas-fired resources are needed to accommodate the intermittency of variable generation renewables (solar and wind) that fluctuates minute-by-minute and second-by-second due to cloud cover and wind speed variations. Both the California Independent System Operator (CAISO) and the CPUC are preparing for this system impact in defining products such as "flexible capacity" to be acquired to handle the issues presented by the State's policies to promote renewable energy.

Chart 2



Baseload CHP generation is not part of that story. Baseload CHP lowers the entire net load profile, increasing the likelihood of over-generation during the middle of the day, while at the same time not supporting the afternoon ramp of resources needed as the sun sets (as shown by the duck's neck). CHP is not a substitute for flexible gas-fired conventional generation.[18] These interactions of policies should be factored into long-term Scoping Plan Update assessment of policies.

c. Consistency of Policies

The Scoping Plan Update should treat energy use consistently to find the highest valued and most cost effective applications instead of basing policies on preferences for certain technologies. As an example, the Scoping Plan Update looks to "[s]hift away from natural gas power plants as the primary mechanism to integrate renewables" (slide 32 of the first workshop presentation) while at the same time desiring to add non-dispatchable baseload natural gas-fired CHP generation (slide 34). The two policies - displacing flexible gas-fired generation with expensive storage technologies, while at the same time adding gas-fired generation with a large GHG footprint that cannot integrate renewables - seem contradictory. In 2011, existing CHP, including both use for electricity and thermal production, had GHG emissions equal to 70 percent of all other natural gas electric generation in California. And even assuming half the energy is used for thermal purposes, it has almost 10 times the emissions of peaking generation, a primary gas-fired technology for integrating renewables, because it is required to operate around the

[18] CHP that can be made dispatchable through thermal storage can provide GHG benefits while providing some flexibility. CHP that is simply oversized to provide dispatchability provides no GHG benefits since it is based the same new technologies as used for conventional electric generation.

clock to provide thermal energy.[19] It seems odd to limit peaking generation used for integrating renewables by replacement with expensive storage technologies, while adding baseload MWs with 10 times the expected GHG emissions.

III. High GWP Gases

Given the significant growth expected in the GHG emissions associated with high GWP gases (a doubling in the next 7 years to more than 80% as large as all GHG emissions related to residential and commercial natural gas usage), the Scoping Plan Update should have a more prominent discussion of this sector. While including "Natural and Working Lands," ARB has excluded significant discussion of this important area. The President's Climate Action Plan devotes an entire section to reducing methane emissions by improving gas infrastructure and curbing hydro fluorocarbons.[20] The ARB has undertaken many activities in these areas that should be highlighted such as landfill regulations, SF6 reduction measures and EPA reporting protocols, the dairy methane reduction offset protocol, use of low-GWP refrigerants in new vehicles, goods movement emissions reductions, and improvements in the leak-tightness of new vehicle systems that use HFC-134a.

The Scoping Plan Update should provide more detail on all the actions taken in reducing fugitive methane emissions including technologies and best practices in gas production and distribution and in the agricultural area, and additional actions that can potentially be taken such adding an offset protocol for anaerobic digestion. A full accounting of the technologies and best practices in cost-effective fugitive methane emissions reductions could be of use nationally and globally.

While a number of measures have reduced methane nationally by 8 percent since 1990, hydro fluorocarbons (HFCs) are expected to increase substantially, tripling between now and 2030 in the U.S.[21] This rate of increase is true for California as well, more than doubling by 2020. To promote fairness among sectors, the Scoping Plan Update should provide a technological and economic feasibility assessment of additional ways to limit the growing effect of HFCs on the GHG inventory. ARB should undertake discussion of potential regulatory measures and/or offset protocols to limit HFC leakage; to develop low-emissions, climate-friendly chemical alternatives to HFCs; and to develop efficient, leak-proof HFC disposal systems.

Thank you for the opportunity to comment.

Sincerely,

[19] Nyberg, Michael. 2013. Thermal Efficiency of Gas---‐Fired Generation in California: 2012 Update. California Energy Commission. CEC‐200‐2013‐002, Tables 2 and 5.

[20] Executive Office of the President, "The President's Climate Action Plan," June 2013, pp. 10-11.

[21] Executive Office of the President, "The President's Climate Action Plan," June 2013, p. 10.