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Appendix A to PG&E Comments on Climate Adaptation in the Energy Sector (Joint Workshop 7.27.15)

Additional submitted attachment is included below.

PG&E Corporation and Pacific Gas and Electric Company

Recent SEC disclosure regarding climate change regulation, risks, and our mitigation and adaptation strategies:

From 2014 Form 10-K/Joint Annual Report to Shareholders (filed February 10, 2015):

pp. 19-22—Item 1. Description of Business.

Environmental Regulation

The Utility's operations are subject to extensive federal, state and local laws and requirements relating to the protection of the environment and the safety and health of the Utility's personnel and the public. These laws and requirements relate to a broad range of activities, including the remediation of hazardous and radioactive substances; the discharge of pollutants into the air, water, and soil; the reporting and reduction of carbon monoxide (CO₂) and other GHG emissions; the transportation, handling, storage and disposal of spent nuclear fuel; and the environmental impacts of land use, including endangered species and habitat protection. The penalties for violation of these laws and requirements can be severe and may include significant fines, damages, and criminal or civil sanctions. These laws and requirements also may require the Utility, under certain circumstances, to interrupt or curtail operations. (See Item 1A. Risk Factors.) Generally, the Utility has recovered most of the costs of complying with environmental laws and regulations in the Utility's rates, subject to reasonableness review.

Environmental costs associated with the clean-up of most sites that contain hazardous substances are subject to a special ratemaking mechanism described in Note 14: Contingencies—Environmental Remediation Contingencies, of the Notes to the Consolidated Financial Statements in Item 8.

Hazardous Waste Compliance and Remediation

The Utility's facilities are subject to the requirements of the federal Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended (CERCLA). The Utility is also subject to the regulations adopted by the EPA, the federal agency responsible for implementing the federal environmental laws. The Utility also must comply with environmental laws and regulations adopted by the State of California and various state and local agencies. These federal and state laws impose strict liability for the release of a hazardous substance on the (1) owner or operator of the site where the release occurred, (2) on companies that disposed of, or arranged for the disposal of, the hazardous substances, and (3) in some cases, their corporate successors. Under CERCLA these persons (known as "potentially responsible parties") may be jointly and severally liable for the costs of cleaning up the hazardous substances, paying for the harm caused to natural resources, and paying for the costs of required health studies.

The Utility has a comprehensive program in place to comply with these federal, state, and local laws and regulations. Under federal and California laws, the Utility may be responsible for remediation of hazardous substances even if it did not deposit those substances on the site. The Utility's remediation activities are overseen by the California Department of Toxic Substances Control, several California regional water quality control boards, and various other federal, state, and local agencies. The Utility has incurred significant environmental remediation liabilities associated with former manufactured gas plant sites, power plant sites, gas gathering sites, sites where natural gas compressor stations are located, and

sites used by the Utility for the storage, recycling, or disposal of potentially hazardous substances. Groundwater at the Utility's Hinkley and Topock natural gas compressor stations contains hexavalent chromium as a result of the Utility's past operating practices. The Utility is responsible for remediating this groundwater contamination and for abating the effects of the contamination on the environment.

For more information about environmental remediation liabilities, see Note 14: Commitments and Contingencies—Environmental Remediation Contingencies, of the Notes to the Consolidated Financial Statements in Item 8.

Air Quality and Climate Change

The Utility's electricity generation plants, natural gas pipeline operations, fleet, and fuel storage tanks are subject to numerous air pollution control laws, including the federal Clean Air Act, as well as state and local statutes. These laws and regulations cover, among other pollutants, those contributing to the formation of ground-level ozone, CO₂, sulfur dioxide (SO₂), mono-nitrogen oxide (NO_x), particulate matter, and other GHG emissions.

In December 2009, the EPA concluded that GHG emissions contribute to climate change and issued a finding that GHG emissions cause or contribute to air pollution that endangers public health and welfare. In May 2014, the United States released its third National Climate Assessment, which stated that the global climate is changing and that impacts related to climate change are already evident in many sectors and are expected to become increasingly disruptive across the nation throughout this century and beyond.

Federal Regulation. At the federal level, the EPA is charged with implementation and enforcement of the Clean Air Act. Although there have been several legislative attempts to address climate change through imposition of nationwide regulatory limits on GHG emissions, comprehensive federal legislation has not yet been enacted. In the absence of federal legislative action, the EPA has used its existing authority under the Clean Air Act to address GHG emissions.

In January 2014, the EPA published draft regulations under section 111(b) of the Clean Air Act to control CO₂, the most common GHG, from new fossil fuel-fired power plants. While these draft regulations as presently written do not apply to the Utility's power plants, it is possible that the final regulations may affect the design, construction, operation and cost of future fossil fuel-fired power plants. The EPA is expected to issue final regulations in 2015.

In June 2014, the EPA published draft federal regulations under section 111(d) of the Clean Air Act that are designed to reduce CO₂ emissions from existing fossil fuel-fired power plants on a national basis by as much as 30% by 2030, compared with 2005 levels. The EPA is expected to issue final regulations in 2015. As proposed, once the EPA has finalized regulations, states have up to two or three years to submit final plans depending on whether they work alone or in partnership with other states, and up to 15 years for full implementation of all emission reduction measures. It is uncertain whether and how these federal regulations will ultimately impact California, since existing state regulation currently requires, among other things, the gradual reduction of state-wide GHG emissions to 1990 levels by 2020. As described below, the Utility expects all costs and revenues associated with the state-wide, comprehensive cap-and-trade program to be passed through to customers.

State Regulation. California law requires the gradual reduction of state-wide GHG emissions to 1990 levels by 2020. The CARB has approved various regulations to implement AB 32, including GHG emissions reporting and a state-wide, comprehensive cap-and-trade program that sets gradually declining limits (or “caps”) on the amount of GHGs that may be emitted by major GHG emission sources within different sectors of the economy. The cap-and-trade program’s first compliance period, which began on January 1, 2013, applied to the electricity generation and large industrial sectors. The next compliance period, which began on January 1, 2015, expanded to include the natural gas and transportation sectors, effectively covering all the economy’s major sectors until 2020. The Utility’s compliance obligation as a natural gas supplier applies to the GHG emissions attributable to the combustion of natural gas delivered to the Utility’s customers other than natural gas delivery customers that are separately regulated as covered entities and have their own compliance obligation. During each year of the program, the CARB issues emission allowances (i.e., the rights to emit GHGs) equal to the amount of GHG emissions allowed for that year. Emitters can obtain allowances from the CARB at quarterly auctions or from third parties or exchanges. Emitters may also satisfy a portion of their compliance obligation through the purchase of offset credits; e.g., credits for GHG reductions achieved by third parties (such as landowners, livestock owners, and farmers) that occur outside of the emitters’ facilities through CARB-qualified offset projects such as reforestation or biomass projects. The Utility expects all costs and revenues associated with the GHG cap-and-trade program to be passed through to customers. The California RPS program that requires the utilities to gradually increase the amount of renewable energy delivered to their customers is also expected to help reduce GHG emissions in California.

Climate Change Mitigation and Adaptation Strategies. During 2014, the Utility continued its programs to develop strategies to mitigate the impact of the Utility’s operations (including customer energy usage) on the environment and to plan for the actions that it will need to take to adapt to the likely impacts of climate change on the Utility’s future operations. The Utility regularly reviews the most relevant scientific literature on climate change such as sea level rise, temperature changes, rainfall and runoff patterns, and wildfire risk, to help the Utility identify and evaluate climate change-related risks and develop the necessary adaptation strategies. The Utility also engages with leaders from business, government, academia, and non-profit organizations to share information and plan for the future.

With respect to electric operations, climate scientists project that, sometime in the next several decades, climate change will lead to increased electricity demand due to more extreme, persistent, and frequent hot weather. The Utility believes its strategies to reduce GHG emissions—through energy efficiency and demand response programs, infrastructure improvements, and the use of renewable energy and energy storage—are effective strategies for adapting to the expected increase in demand for electricity. The Utility’s vegetation management activities also reduce the risk of wildfire impacts on electric and gas facilities. Over the long-term, the Utility also faces the risk of higher flooding potential at coastal and low elevation facilities due to sea level rise.

Climate scientists also predict that climate change will result in significant reductions in snowpack in parts of the Sierra Nevada Mountains. This could, in turn, affect the Utility’s hydroelectric generation. To plan for this potential change, the Utility is engaging with state and local stakeholders and

also adopting strategies such as maintaining higher winter carryover reservoir storage levels, reducing discretionary reservoir water releases, and developing new modeling tools for forecasting runoff.

With respect to natural gas operations, both safety-related pipeline strength testing and normal pipeline maintenance and operations release the GHG methane into the atmosphere. The Utility has taken steps to reduce the release of methane by implementing techniques including drafting and cross-compression, which reduce the pressure and volume of natural gas within pipelines prior to venting. In addition, the Utility continues to replace a substantial portion of its older cast iron, steel and plastic distribution pipelines and steel gas transmission mains with new pipe, which reduces leakage.

Emissions Data

PG&E Corporation and the Utility track and report their annual environmental performance results across a broad spectrum of areas. The Utility reports its GHG emissions to the CARB and the EPA on a mandatory basis. On a voluntary basis, the Utility reports a more comprehensive emissions inventory to The Climate Registry, a non-profit organization. The Utility's third-party verified voluntary GHG inventory reported to The Climate Registry for 2013 totaled more than 57 million metric tonnes of CO₂-e, two-thirds of which came from natural gas use. The following table shows the 2013 GHG emissions data the Utility reported to the CARB under AB 32. PG&E Corporation and the Utility publish additional GHG emissions data in their annual Corporate Responsibility and Sustainability Report.

Source	Amount (metric tonnes CO₂ – equivalent)
Fossil Fuel-Fired Plants ⁽¹⁾	2,382,463
Natural Gas Compressor Stations ⁽²⁾	325,701
Distribution Fugitive Natural Gas Emissions	213,858
Customer Natural Gas Use ⁽³⁾	43,506,493

⁽¹⁾ Includes nitrous oxide and methane emissions from the Utility's generating stations.

⁽²⁾ Includes compressor stations emitting more than 25,000 metric tonnes of CO₂-e annually.

⁽³⁾ Includes emissions from the combustion of natural gas delivered to all entities on the Utility's distribution system, including entities that have their own compliance obligation under AB 32. The Utility's compliance obligation under AB 32 (discussed above under "State Regulation") applies to the combustion of natural gas delivered to customers other than customers that have their own compliance obligation. Excluding the GHG emissions of entities that have their own compliance obligation, the Utility's GHG emissions for 2013 were approximately 19 million metric tonnes, as calculated by the CARB.

The following table shows the Utility's third-party-verified CO₂ emissions rate associated with the electricity delivered to customers in 2013 as compared to the national and California averages for electric utilities:

	Amount (Pounds of CO ₂ per MWh)
U.S. Average ⁽¹⁾	1,232
California's Average ⁽¹⁾	611
Pacific Gas and Electric Company ⁽²⁾	427

⁽¹⁾ Source: EPA eGRID.

⁽²⁾ Since the Utility purchases a portion of its electricity from the wholesale market, the Utility is not able to track some of its delivered electricity back to a specific generator. Therefore, there is some unavoidable uncertainty in the Utility's emissions rate.

Air Emissions Data for Utility-Owned Generation

In addition to GHG emissions data provided above, the table below sets forth information about the air emissions from the Utility's owned generation facilities. The Utility's owned generation (primarily nuclear and hydroelectric facilities) comprised approximately 36.4% of the Utility's delivered electricity in 2013. PG&E Corporation and the Utility also publish air emissions data in their annual Corporate Responsibility and Sustainability Report.

	2013	2012
Total NO _x Emissions (tons)	153	158
NO _x Emissions Rate (pounds/MWh)	0.01	0.01
Total SO ₂ Emissions (tons)	17	15
SO ₂ Emissions Rate (pounds/MWh)	0.0011	0.0009

pp. 29-30—Item 1A. Risk Factors

The Utility's future operations may be affected by climate change that may have a material impact on PG&E Corporation's and the Utility's financial condition, results of operations, and cash flows.

The Utility has been studying the potential effects of climate change (increased temperatures, reduced precipitation, rising sea levels) on the Utility's operations and is developing contingency plans to adapt to those events and conditions that the Utility believes are most significant. Scientists project that climate change will increase electricity demand due to more extreme, persistent and hot weather. Increasing temperatures and lower levels of precipitation in the Utility's service territory would reduce snowpack in the Sierra Mountains. If the levels of snowpack were reduced, the Utility's hydroelectric generation would decrease and the Utility would need to acquire additional generation from other sources at a greater cost. Should the Utility increase reliance on conventional generation resources to replace

hydroelectric generation and to meet increased customer demand, it may become more costly for the Utility to comply with GHG emissions limits. In addition, increasing temperatures and lower levels of precipitation could increase the occurrence of wildfires in the Utility's service territory causing damage to the Utility's facilities or the facilities of third parties on which the Utility relies to provide service. In addition, flooding caused by rising sea levels could damage the Utility's facilities, including hydroelectric assets such as dams and canals, and the electric transmission assets that are located on levees throughout the Utility's service territory. The Utility could incur substantial costs to repair or replace facilities, restore service, compensate customers and other third parties for damages or injuries. The Utility anticipates that the increased costs would be recovered through rates, but as rate pressures increase, the likelihood of disallowance or non-recovery may increase.

Events or conditions caused by climate change could have a greater impact on the Utility's operations than the Utility's studies suggest and could result in lower revenues or increased expenses, or both. If the CPUC fails to adjust the Utility's rates to reflect the impact of events or conditions caused by climate change, PG&E Corporation's and the Utility's financial condition, results of operations, and cash flows could be materially affected.

p. 64—Cautionary Language Regarding Forward-Looking Statements

(NOTE: These factors also are contained in our Q1 Form 10-Q (*filed April 29, 2015*) and our Q2 Form 10-Q (*filed July 29, 2015*).)

CAUTIONARY LANGUAGE REGARDING FORWARD-LOOKING STATEMENTS

This report contains forward-looking statements that are necessarily subject to various risks and uncertainties. These statements reflect management's judgment and opinions which are based on current estimates, expectations, and projections about future events and assumptions regarding these events and management's knowledge of facts as of the date of this report. These forward-looking statements relate to, among other matters, estimated costs, including penalties and fines, associated with various investigations and proceedings; forecasts of pipeline-related expenses that the Utility will not recover through rates; forecasts of capital expenditures; estimates and assumptions used in critical accounting policies, including those relating to regulatory assets and liabilities, environmental remediation, litigation, third-party claims, and other liabilities; and the level of future equity or debt issuances. These statements are also identified by words such as "assume," "expect," "intend," "forecast," "plan," "project," "believe," "estimate," "predict," "anticipate," "may," "should," "would," "could," "potential" and similar expressions. PG&E Corporation and the Utility are not able to predict all the factors that may affect future results. Some of the factors that could cause future results to differ materially from those expressed or implied by the forward-looking statements, or from historical results, include, but are not limited to...(other factors omitted here)

- the impact of droughts or other weather-related conditions or events, climate change, natural disasters, acts of terrorism, war, or vandalism (including cyber-attacks), and other events, that can cause unplanned outages, reduce generating output, disrupt the Utility's service to customers, or damage or disrupt the facilities, operations, or information technology and systems owned by the Utility, its customers, or third parties on which the Utility relies; and subject the Utility to third-party liability for property damage or personal injury, or result in the imposition of civil, criminal, or regulatory penalties on the Utility;

- the impact of environmental laws and regulations aimed at the reduction of CO₂ and GHGs, and whether the Utility is able to continue recovering associated compliance costs, such as the cost of emission allowances and offsets under cap-and-trade regulations and the cost of renewable energy procurement;....