Nos. 12-1146 and consolidated cases

IN THE

Supreme Court of the United States

UTILITY AIR REGULATORY GROUP, et al.,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

On Writs of Certiorari to the United States Court of Appeals for the District of Columbia Circuit

BRIEF OF CALPINE CORPORATION AS *AMICUS CURIAE* IN SUPPORT OF RESPONDENT

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INTEREST OF THE AMICUS CURIAE[1]

Calpine Corporation ("Calpine") is among the largest generators of electricity in the nation. Operating a fleet of 93 natural gas-fired and geothermal power plants, Calpine is capable of delivering more than 28,000 megawatts of electricity to utilities and industrial customers in twenty U.S. states and Canada. Calpine is the nation's largest operator of "combined-cycle" natural gas-fired power plants, which increase fuel efficiency by utilizing two power generation cycles in tandem, harnessing energy that would otherwise be wasted and significantly reducing emissions of air pollutants, including greenhouse gases ("GHGs"). Calpine is also the nation's largest producer of renewable geothermal power.

Over the last decade, Calpine has completed one of the biggest power plant development and construction programs in recent United States history, investing billions of dollars to construct highly efficient electricity generating plants with low emissions of GHGs. In doing so, Calpine has successfully been through the preconstruction permitting process under the Clean Air Act's Prevention of Significant Deterioration ("PSD") program as applied to GHGs six times. Calpine plans continued growth in the future, which will subject it to further such permitting.

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[1] All counsel of record have consented to the filing of this brief and those consents are on file with the Clerk of the Court. No counsel for any party authored this brief either in whole or in part. No persons other than *amicus* or its counsel has made any monetary contribution to the preparation or submission of this brief.

Calpine submits this amicus brief for two purposes. First, Calpine is well-situated to describe for the Court its experiences as a regulated entity with the application of the PSD program to GHGs under the Tailoring Rule, 75 Fed. Reg. 31,514 (June 3, 2010). Second, Calpine will demonstrate by its experiences that—contrary to statements of some of the petitioners and the *amici* supporting them—applying the PSD review and permitting process to GHGs is neither overly burdensome nor unworkable. Furthermore, Calpine's experiences show that the program is designed to identify and mandate control requirements that are available and cost-effective. Instead of stifling development, the program, if upheld, should lead to the identification of better technologies, energy efficiency improvements, and environmental benefits.

INTRODUCTION AND SUMMARY OF ARGUMENT

Calpine supports the Environmental Protection Agency's ("EPA") regulation of GHG emissions from major stationary sources under the Clean Air Act as an important step in improving air quality and protecting the environment at a reasonable cost. As one of the largest generators of electric power in the nation, Calpine has long recognized and acted upon its responsibility to minimize its plants' emissions of air pollutants, including GHGs, focusing its operations on highly efficient natural gas-fired generation and geothermal resources.[2] Calpine is committed to

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[2] The electricity sector is the largest source of domestic GHG emissions, accounting for nearly a third of the U.S. total. *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks:*

protecting and preserving the environment and human health, and to ensuring the safety and welfare of its employees, neighbors, and the communities where it operates.

Calpine has already been through the PSD permitting process for GHG emissions for six projects and, if EPA's determination is upheld, will continue to apply for GHG permits in the future for both new and modified major sources. Specifically, in 2008 and *prior* to the promulgation of the Tailoring Rule, Calpine voluntarily obtained the first PSD permit for GHGs in the country for its Russell City Energy Center, a combined-cycle natural gas-fired plant in Hayward, California, thereby gaining valuable experience with the process. In 2011, after the Tailoring Rule took effect for plants already subject to PSD for other, non-GHG pollutants ("anyway" sources), Calpine completed GHG PSD permitting at two additional natural gas-fired facilities, the Channel Energy Center and the Deer Park Energy Center, both in Harris County, Texas. In 2012, when the Tailoring Rule applied to all major sources of GHGs, Calpine obtained the first GHG permits under the PSD program for geothermal plants, in connection with two proposed facilities at the Geysers complex in Sonoma County, California. Lastly, in 2012, Calpine received a PSD permit, which included review for GHG emis-

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1990-2011 2-20 (2013), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf. Another twenty percent of GHG emissions come from the industrial sector. *Id.* The Tailoring Rule is explicitly designed to decrease emissions from these largest sources of such emissions. 75 Fed. Reg. at 31,516.

sions, authorizing the construction of the Garrison Energy Center in Dover, Delaware.

These experiences enable Calpine to respond directly to criticisms of the PSD program for GHGs.[3] First, in Calpine's experience, complying with the procedural requirements of the PSD program for GHGs has not resulted in the insurmountable burdens or excessive delays for applicants predicted by the rule's critics.[4] Rather than the drastic revolution critics suggest, application of the PSD review process to GHGs represents a natural evolution of the program.

Second, Calpine's experiences demonstrate that the emission control technologies found appropriate through application of the PSD program to GHGs are feasible as a matter of engineering or cost and do not require changes to the applicant's purpose or objective for the proposed facility or other significant project modifications. None of the six permits Calpine has obtained so far has resulted in the imposition of infeasible technologies or unreasonable costs on the affected plants. To the contrary, the technologies found appropriate through application of the PSD program are energy-efficient technologies that make the most sense for the company's bottom line.

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[3] Regulation by the EPA of GHGs at issue in this case also implicates Title V permitting. However, Title V's permitting program imposes no new substantive requirements. *See* Timing Rule, 75 Fed. Reg. 17,004, 17,023 (Apr. 2, 2010).

[4] *See, e.g.*, Patricia Sharkey, et al., *BACT, in the Future*, LAW360.COM (Nov. 29, 2010), *available at* http://www.law360.com/energy/articles/211547/bact-in-the-future.

The PSD program, as applied to GHGs through the Tailoring Rule, focuses on technologies that contribute to energy and resource efficiency. These technologies reduce plant expenditures and waste, while minimizing emissions of GHGs, and therefore enhance profitability. The PSD program, by its nature, drives the development of the most effective of these controls, since its requirement of the "Best Available Control Technology" ("BACT") encourages operators like Calpine to take the lead in implementing technologies to reduce GHG emissions. Instead of creating "severe economic harm to the country," Brief of Petitioners in No. 12-1254, the Energy-Intensive Manufacturers Working Group on Greenhouse Gas Regulation and the Glass Packaging Institute ("EIM Br.") at 30, EPA's application of the PSD program to GHGs through the Tailoring Rule is an achievable and economically-sound step toward reducing the nation's emissions of GHGs.

ARGUMENT

I. PSD Permitting for GHGs Does Not Dramatically Change the Burdens of the Permitting Process for Regulated Entities or Agencies.

Critics of EPA's rule wrongly warn that the economic impacts of applying PSD review to GHGs will be "devastating," Brief of State and Local Chambers of Commerce and Other Business Associations as *Amici Curiae* in Support of Petitioners ("Chambers as Amici Br.") at 11, with "the potential for almost unlimited harm." EIM Br. at 11. To the contrary, EPA has consciously (and successfully) addressed concerns that complying with the permitting process

will be excessively burdensome by phasing in compliance through the Tailoring Rule.[5] *See* 75 Fed. Reg. at 31,516.

Under the Tailoring Rule, most sources that are required to obtain GHG permits are subject to the PSD program for other regulated pollutants "anyway"—*i.e.* if they are "major" for non-GHG pollutants because they are in excess of statutory and regulatory limits. *Id.* at 31,540. In addition to "anyway" sources, the Tailoring Rule sets a GHG threshold of 100,000 tons[6] per year, above which sources become "major" for GHG emissions under the PSD program ("threshold" sources).[7] This threshold limits the PSD

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[5] EPA has phased in PSD permitting requirements under the Tailoring Rule in two steps. 75 Fed. Reg. 31,514; *see also* EPA, *PSD and Title V Permitting Guidance for Greenhouse Gases* (2011) ("PSD Guidance for GHGs"). Initially, only new or modified sources that would otherwise be subject to PSD for the emissions of other conventional pollutants were subject to permitting requirements for GHGs if those GHG emissions exceeded 75,000 tons of GHGs per year. PSD Guidance for GHGs at 12-15. Later, the permitting requirements were expanded to any new major sources or major modifications that emit at least 100,000 tons of GHGs per year. *Id.* These two phases can be referred to as regulating "anyway" and "threshold" sources, respectively.

[6] The Tailoring Rule refers to GHG emissions on a carbon dioxide equivalent basis, or CO_2e. 75 Fed. Reg. at 31,522. Some GHGs, such as methane (CH_4) and sulfur hexafluoride (SF_6) have a GHG potential many times higher than CO_2. *Id.* Expressing GHGs as CO_2e ensures that the varying impacts of these different gases are taken into account. *Id.*

[7] EPA has since promulgated a third phase of the Tailoring Rule. 77 Fed. Reg. 41,051 (July 12, 2012). However, this step retains the permitting thresholds established by the first two phases, subjecting no additional sources to regulation.

permitting requirement to only those major sources that emit very large quantities of GHGs, equivalent to the carbon dioxide emissions from 390 railcars of coal burned per year,[8] a far cry from subjecting "bakeries" and "large private homes" to regulation as EPA's critics suggest. Chambers as Amici Br. at 8. These relatively few, large facilities, like Calpine's Geysers plants, will typically be familiar with Clean Air Act permitting and subject to other forms of environmental review.

A. Critics' Response to the Application of the PSD Permitting Process to GHGs is Overstated and Typical of Unfounded Complaints about Environmental Regulations Generally.

In fact, critics' prediction that application of PSD permitting to GHGs will "endanger[] the nation's economic health and welfare," Chambers as Amici Br. at 27, is not a new response. This overstatement of the economic consequences of environmental regulation is a common refrain, one that historically has failed to come true, and will likely not come true in this case if the rule is upheld. Critics have in the past repeatedly overestimated the costs of complying with new air pollution regulations. For example, the Edison Electric Institute predicted that the acid rain provisions in the 1990 Clean Air Act Amendments would cost the electric utility industry between $5.0

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[8] *See* EPA, Greenhouse Gas Equivalencies Calculator, *available at* http://www.epa.gov/cleanenergy/energy-resources/calculator.html. The Tailoring Rule does not apply to non-major sources below these thresholds. 75 Fed. Reg. at 31,516.

and $7.1 billion per year by 2010,[9] while a senior executive at a leading power generator claimed the Amendments could cause "the potential destruction of the Midwest economy."[10]

In fact, the costs of compliance ended up being far lower than these predictions, and EPA has estimated that the benefits of the 1990 amendments are 30 times greater than the costs of compliance.[11]

This pattern of exaggerated predicted costs has played out again and again, from the regulation of asbestos and benzene in the 1970s, through chlorofluorocarbons and acid rain in the 1990s, to the recent Mercury and Air Toxics Standards for power plants.[12] In fact, even the proponents of regulations have tended to systematically overestimate the antic-

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[9] II Comm. on Environment and Public Works, Legislative History of the Clean Air Act Amendments of 1990, at 2553 (Cong. Info. Serv. 1993) (statement of Rep. Waxman, House Debate, May 21, 1990).

[10] Michael Kranish, *Stakes Are High at Acid Rain Source*, BOSTON GLOBE, Feb. 18, 1990.

[11] EPA, Office of Air and Radiation, *The Benefits and Costs of the Clean Air Act from 1990 to 2020, Summary Report* 2 (2011).

[12] Eban Goodstein & Hart Hodges, *Polluted Data; Overestimating Environmental Costs*, AMERICAN PROSPECT, Nov./Dec. 1997, at 64; Mandy Warner, *The Cost to Meet Clean Air and Environmental Standards Comes Down (Again)*, CLIMATE 411 (June 11, 2013), http://blogs.edf.org/climate411/2013/06/11/the-cost-to-meet-clean-air-and-environmental-standards-comes-down-again (summarizing several companies' declining estimates of their costs of complying with Mercury and Air Toxics standards).

ipated costs.[13] This pattern occurs because both proponents and opponents of regulations fail to take into account that "the very act of enacting the regulation lowers the cost,"[14] as companies innovate and drive down the cost of compliance. In Calpine's experience as the first electricity generator to obtain a PSD permit for GHGs, compliance with EPA's regulation was not burdensome in the first instance and is becoming easier and cheaper as the company and permitting authorities gain experience with the process.

The reality of compliance with environmental regulations like the PSD program is that as more entities participate in it, costs associated with the regulatory process go down, because applicants and permitting authorities alike gain experience with the permitting process.[15] As the permitting process becomes more streamlined over time, it will be easier to for regulated entities to navigate.

B. Calpine's Experience with the PSD Program Under the Tailoring Rule Confirms That It Does Not Result in Material Delays or Significant Additional Costs.

Concerns about the burden of PSD permitting for GHG emissions have not materialized in practice.

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[13] DAVID M. DRIESEN, THE ECONOMIC ANALYSIS OF ENVIRONMENTAL LAW 22-23 (2003).

[14] *Id.* at 23.

[15] *See* Frank Ackerman, *The Unbearable Lightness of Regulatory Costs*, 33 FORDHAM URB. L.J. 1071, 1084 (2006).

Calpine has had extensive, direct experience with the Tailoring Rule, in application to both "anyway" and "threshold" sources. Thus far, Calpine has completed the process six times for six different plants and in three different states. In all six cases, Calpine's plants have been able to meet the energy demands of its customers on time and without significant additional costs or changes in proposed technology.

Four of Calpine's plants have obtained permits that satisfy PSD requirements for GHGs as "anyway" sources according to the first phase of the Tailoring Rule. All four facilities, the Russell City Energy Center in California, the Channel Energy Center and Deer Park Energy Center in Texas, and the Garrison Energy Center in Delaware would have been[16] or were required to obtain PSD permits "anyway" for emissions of other regulated pollutants above statutory and regulatory thresholds under the Clean Air Act, either as major new or modified sources. *See* 42 U.S.C. § 7475. For all four plants, the only additional burden of GHG permitting was applying the PSD analysis to an additional set of pollutants.

Indeed, in Calpine's experience with "anyway" sources, the GHG analysis was only a small part of the overall permitting process. This is despite the

[16] As noted above, Calpine elected to undergo the permitting process for GHGs at the Russell City plant voluntarily, prior to the promulgation of the regulations at issue, anticipating that they would likely come into effect in the future. Calpine correctly reasoned that its proposal for this state-of-the-art facility would satisfy PSD requirements.

fact that the Russell City plant was the first facility in the nation to undergo PSD permitting for GHGs. Even with all the administrative growing pains of early adoption for both Calpine and the permitting authority, the Bay Area Air Quality Management District ("BAAQMD"), permitting did not result in significant additional costs or material delays in construction. The same was true for the two Texas plants. At all three plants, the majority of the time and effort spent on the PSD process was for the other, traditionally regulated pollutants that required PSD permitting "anyway." Adding GHGs to the analysis did not require reinventing the wheel, but rather was a logical extension of that analysis. Permitting has been a fact of life for Calpine and other regulated entities for decades, and EPA's application of the PSD program to GHGs does not fundamentally alter that landscape.[17] Calpine's plans for continued growth and development have not changed as a result of the application of the PSD program to GHGs.

Calpine has also been through the PSD permitting process twice for plants that were *not* required to obtain PSD permits for other regulated pollutants, but emitted sufficient GHGs to subject them to regulation as major sources under the Tailoring Rule's regulatory threshold ("threshold" sources). Calpine's

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[17] Respondents note, and Calpine reemphasizes, that "BACT has been successfully applied to an eclectic variety of [criteria and non-criteria] pollutants, from particulate matter to chlorofluorocarbons to acid gases." Brief of Environmental Organization Respondents at 22. Calpine has successfully complied with these applications of the PSD program, just as it has with GHGs.

two proposed geothermal facilities, the Buckeye and Wild Horse Power Plants at the Geysers in California, have both obtained PSD permits for GHGs, even though they would not have been required to undergo PSD review as "anyway" sources of other conventional pollutants prior to the second phase of the Tailoring Rule. At the two Geysers facilities, gases naturally occurring within the steam reservoir contain enough GHGs to push the proposed plants past the emissions threshold of 100,000 tons per year, triggering PSD permitting requirements for GHGs. Having triggered the rule for GHGs, the plants also had to undergo PSD review for two other pollutants the plants emit, hydrogen sulfide (H_2S) and particulate matter (PM).

Despite this application of the PSD program, the permitting process at Geysers was not "devastating." The two Geysers facilities obtained all required approvals in a timely fashion, without unreasonable administrative burdens or costs. The PSD process was only one component of the local agencies' review of GHG impacts and no more complex than the GHG impacts analysis required by the California Environmental Quality Act as a prerequisite for the County's issuance of use permits under local land use laws. Calpine, like any other facility that emits 100,000 tons per year of GHGs, is already in a highly regulated business. Protecting air quality through compliance with state and federal environmental regulation is a large part of Calpine's—and others'—business. Calpine believes that paying the same attention to GHGs as to other pollutants is both achievable and the responsible thing to do. It is con-

sistent with the business goal of operating with maximum efficiency while protecting the environment.

II. Technologies Required by the PSD Program Have Not, and Should Not, Impose Unreasonable Costs on Affected Facilities or Fundamentally Change the Proposed Projects.

Critics of the rule also argue that the technologies required to limit GHG emissions will "impose almost unlimited costs," EIM Br. at 30, forcing energy generation facilities to close. *See* Chambers as Amici Br. at 14. In Calpine's experience, this grim prediction is at best hyperbole. In fact, by the conclusion of the BACT analysis, which evaluates available technologies, energy efficiency controls emerge as the "best available control technology." These measures do not result in excessive compliance costs or requirements that proposed projects change fundamentally.

A. By Definition, the BACT Process is Designed to Avoid Excessive Compliance Costs, Both Through Its Case-By-Case Analysis and Its Top-Down Approach.

The BACT analysis employed to identify PSD permit limits is specifically designed to avoid the shut-down scenarios critics foresee. Under the Clean Air Act, a PSD permit must contain emissions limitations that are based on the application of the "best *available* control technology" for each pollutant subject to regulation. 42 U.S.C. § 7475(a)(4) (emphasis added).

For the past twenty years, to determine BACT, EPA has developed and used a "top-down" approach that entails five steps.[18] Working through these steps, the applicant and the permitting authority first identify all available control options, and then winnow out those technologies that are technically infeasible or have excessive economic, energy, or environmental costs. PSD Guidance for GHGs at 18. At the last step, the most effective option that has not been eliminated by these considerations is selected as BACT.[19] *Id.*

This five-step process allows the applicant's expertise and knowledge about the specific facility to guide the review, and ensures that technologies selected as BACT are "achievable" in light of their costs.[20] By definition, BACT only requires the im-

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[18] EPA, *New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting* (1990); *see also* PSD Guidance for GHGs at 17-18.

[19] The five steps are:

Step 1: Identify all available control technologies.

Step 2: Eliminate technically infeasible options.

Step 3: Rank remaining control technologies.

Step 4: Evaluate most effective controls and document results.

Step 5: Select the BACT.

PSD Guidance for GHGs at 18.

[20] Section 169(3) of the Clean Air Act defines BACT as "an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this chapter emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking

plementation of controls that are technically feasible and explicitly takes into account their economic, energy, and ancillary environmental impacts. *Id.*

Two specific elements of the BACT definition guard against petitioners' and their *amici's* dire predictions of the harms allegedly resulting from the application of PSD to GHGs under the Tailoring Rule. First, the permitting authority determines BACT on a case-by-case basis for each pollutant and source. *Id.* This approach ensures that the complexities of each individual facility, with its varying requirements and challenges, are taken into account. Additionally, the analysis precludes the selection of technologies whose costs are disproportionately high compared to their emissions-reducing potential. PSD Guidance for GHGs at 43. For GHGs in particular, EPA notes that the costs at which emissions-reducing technologies are cost-effective will be "significantly lower" than controls for conventional pollutants that have evolved over time. *Id.*

All of Calpine's facilities that have obtained PSD permits for GHGs have gone through this five-step process, resulting in emissions limits that are readily and economically achievable by the technologies selected as BACT. For example, in 2011, Calpine submitted a PSD permit application for GHGs to EPA Region 6 for a major modification at its Deer Park Energy Center in Harris County, Texas.[21] Deer

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into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques." 42 U.S.C. § 7479(3).

[21] In Texas, EPA Region 6 is currently the PSD permitting

Park is a combined-cycle cogeneration facility that produces electricity from the combustion of natural gas.[22] Calpine's proposed modification of the plant required PSD permitting for other regulated pollutants "anyway," so the plant's GHG emissions triggered permitting requirements for GHGs under the first phase of the Tailoring Rule.

During the permitting process, Calpine and EPA Region 6 worked through each of the five steps to determine BACT for GHG emissions from the plant.[23] EPA's Statement of Basis for the permit

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authority for GHG emissions under a federal implementation plan ("FIP"). Determinations Concerning Federal Implementation Plan Regarding Texas's Prevention of Significant Deterioration Program, 75 Fed. Reg. 25,178 (May 3, 2011). The Texas Commission on Environmental Quality (TCEQ) retains PSD permitting authority for non-GHG pollutants. In May 2013, Texas enacted legislation directing TCEQ to adopt regulations providing for TCEQ to become the permitting authority for GHGs. Public commenting for TCEQ's rulemaking closed on December 9, 2013. *See* TCEQ Rule Project Number 2013-040-116-AI, *available at* http://www.tceq.texas.gov/rules/prop.html.

[22] Combined-cycle plants operate by utilizing combustion turbine generators and heat recovery steam generators in tandem. First, a combustion turbine generator (CTG) burns natural gas to rotate an electrical generator to generate electricity. Then the hot exhaust gas from the combustion turbine is passed through a heat recovery steam generator (HRSG) to generate superheated steam from heat energy that would otherwise be wasted. This steam can then either be sold or used on site to rotate a steam turbine generator (STG), producing more electricity. Prior to the modification at issue, the Deer Park plant consisted of four CTGs, four HRSGs, and a single STG. The proposed modification for which Calpine sought permitting was the addition of one CTG and one HRSG.

[23] Calpine's experience with BACT analysis at the Deer Park

documents the results of this process.[24] In Step 1, Region 6 identified two types of potentially available control technologies: energy-efficient processes, practices, and designs, and the use of carbon capture and storage ("CCS"). Deer Park Statement of Basis at 7-13. In Step 2, some, but not all, CCS technologies, such as geologic storage in spent gas or oil fields, were eliminated as technically infeasible. *Id.* at 13-14. In Step 3, Region 6 ranked the remaining technically feasible options by control effectiveness. *Id.* at 14-16. In Step 4, Region 6 eliminated the remaining CCS technologies as not achievable due to their prohibitive costs. *Id.* at 16-17. This left energy efficiency as the only remaining "available" and "achievable" control technology, which was selected as BACT in Step 5.[25] *Id.* at 17.

Energy Center was indistinguishable from that for the nearby Channel Energy Center. The initial plant designs and the proposed modifications were virtually identical.

[24] *See* EPA Region 6, "Draft Statement of Basis for Greenhouse Gas Prevention of Significant Deterioration Permit for the Calpine Corporation, Deer Park Energy Center (DPEC), LLC," Permit No. PSD-TX-979-GHG (August 2012) ("Deer Park Statement of Basis"), *available at* http://www.epa.gov/earth1r6/6pd/air/pd-r/ghg/calpine-sob.pdf. EPA's Draft Statement of Basis was incorporated into the final permit without substantive changes. *See* EPA Region 6, "Summary of Revisions in Final Permit," (Nov. 28, 2012), *available at* http://www.epa.gov/region6/6pd/air/pd-r/ghg/calpine_deer_park_rev4finalpermit.pdf.

[25] BACT for the Deer Park facility required the use of the proposed combined-cycle design and additional efficient processes, practices, and designs such as periodic burner tuning, fuel gas preheating, automatic controls, and insulation to minimize heat loss from the combustion and steam generators. Deer Park

Calpine also performed the BACT analysis for its two proposed new geothermal plants at the Geysers in California.[26] Geothermal steam includes other gases besides water vapor which do not condense with the steam. At the two Geysers facilities, this non-condensable gas contains enough GHGs to push the plants past the emissions threshold of 100,000 tons per year, triggering PSD permitting requirements under the second phase of the Tailoring Rule. *See* Northern Sonoma County Air Pollution Control District, Buckeye Geothermal Power Plant Evaluation Report, Application No. 10-37.

For Step 1 of the BACT analysis, the local air district identified seven potentially available control technologies, including CCS, injection of the non-condensable gases into the geothermal reservoir, the installation of a waste heat boiler, and overall plant efficiency and optimization. *Id.* at 28. At Step 2, CCS, direct injection of the gases, and the waste heat boiler were all rejected as not technically feasible. *Id.* CCS was eliminated because the local air district determined that there was no currently available technology to successfully remove and sequester the

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Statement of Basis at 10-13. These technologies were enforced by an emissions limit expressed as output-based BACT limit of 7,727.9 Btu/kWh.

[26] Geothermal plants produce electricity from superheated steam delivered from geothermal wells deep in the earth's crust. At the plant, this steam is expanded across a turbine, which spins a generator to produce electricity. Afterwards, the steam passes from the turbine to a condensing system where it condenses into water. This water is then reinjected into the ground via injection wells to replenish the geothermal steam field, completing the cycle.

gas. *Id.* Direct injection of the non-condensable gases was also eliminated, because the process had been attempted unsuccessfully at another, unrelated plant in southern California. *Id.* Finally, the waste heat boiler was eliminated as BACT, even though it would have reduced more emissions of GHGs than other remaining technologies, because a source of boiler-quality water is not available at the Geysers complex. *Id.* The other remaining control options were selected as BACT because they did not have prohibitive economic impacts on the Geysers plants.[27] *Id.* at 29.

A comparison of the two BACT analyses for Deer Park and the Geysers plants reveals that the permitting authorities each proposed additional control technologies at Step 1 of the BACT process as "available," but eventually eliminated them from BACT as either technically infeasible at Step 2 or prohibitively costly at Step 4. Calpine's experience with BACT demonstrates that the process works as intended, guiding the analysis to the most effective emissions reductions possible, while also taking into account the costs of such technologies on the operator.

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[27] BACT for the Geysers facilities included flaring of methane in the vent gas, injection of treated wastewater into the geothermal reservoir to reduce the GHGs in the steam over time, and efficient optimization of power plant operation, including obtaining LEED and Energy Star ratings on plant equipment. BACT resulted in an emissions limit of 740 lb/MWh CO_2e.

B. BACT for GHGs Promotes Energy Efficiency, Which Is Beneficial to Facilities' Business Interests.

Calpine's experiences with the BACT process and the resulting emissions limitations are not unique. Without commercially available, or technically or economically feasible add-on controls to remove GHGs post-combustion, energy efficiency is the chief control under BACT for natural gas-fired and geothermal plants.[28] Calpine's experience with BACT for GHGs in the power generation industry provides examples of why this is the case. Carbon dioxide (CO_2), a major GHG,[29] is an essential product of the chemical reaction between carbon in fossil fuel and the oxygen in which it burns, not the byproduct of imperfect combustion like carbon monoxide.[30] No technology currently exists for natural gas-fired power plants that can eliminate CO_2 generation by adjusting combustion conditions.

Instead, the most effective way to actually reduce the amount of CO_2 generated from the combustion of natural gas in a power plant is to efficiently generate

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[28] *See* Margaret E. Peloso & Matthew Dobbins, *Greenhouse Gas PSD Permitting: The Year in Review*, 42 TEX. ENVTL. L.J. 233 (2012).

[29] *See* IPCC, *Guidelines for National Greenhouse Gas Inventories* 1.20 (2006), *available at* http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf.

[30] *See* IPCC, *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* 2.8; 2.37 (2000) ("IPCC Good Practice Guidance"), *available at* http://www.ipcc-nggip.iges.or.jp/public/gp/english/2_Energy.pdf.

as much electricity as possible from the combustion of each unit of fuel, thereby reducing the amount of fuel needed to meet the plant's required power output.[31] These efficiencies apply both to the main generators and turbines at the plants and to ancillary equipment. Any efficiency, ancillary or otherwise, that reduces the amount of fuel required for each unit of electricity generated corresponds to a reduction in the facility's emissions of GHGs.[32] Similarly, given the lack of available, feasible, or cost-effective controls for non-condensable GHGs in geothermal plants, efficiency in the power generation process is logically a major area of focus for emissions reduction.

This reality of efficiency as an important component of BACT is not limited to the power industry, however. These basic facts apply to any facility that produces significant amounts of GHGs as the product of a physical or chemical reaction. Large chemical manufacturing facilities, like lime or cement plants, also produce large amounts CO_2 as a waste product.[33] The more efficiently these facilities use raw materials to meet their production needs, the fewer emissions of byproducts like GHGs are produced.

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[31] *See* Alexander Crockett, et al., *Implementing "Best Available Control Technology" Requirements For Green Gas Emissions Under the Clean Air Act: What Have We Achieved, What More Can We Expect?*, ENVTL. L. NEWS, Spring 2012, at 28.

[32] Energy efficiency is also used effectively to reduce non-GHG emissions in the PSD permitting process. *See* PSD Guidance for GHGs at 21.

[33] *See* IPCC Good Practice Guidance at 3.10, 3.20.

Hence, it is commercially sensible for all large industrial enterprises to focus on energy and resource efficiency. The less fuel or raw materials utilized to produce a plant's desired output of energy or product, the less that facility needs to spend on fuel or raw materials. A major expense at Calpine's natural gas-fired plants like Deer Park is the purchase of natural gas. Efficiently utilizing that gas is a key part of its success in the industry and an integral part of achieving Calpine's business objectives. Even for Calpine's geothermal plants like those at Geysers, which do not burn fossil fuels to produce electricity, efficiency is a serious concern. Extracting steam from the earth's crust is expensive, and the more efficiently plants can use that steam, the better the facility's profitability.

In fact, the BACT analysis for other regulated pollutants, such as nitrogen oxides (NO_x), already drives many of the same considerations as those used for GHGs. Even when there are other control technologies available, such as selective catalytic reduction for the control of NO_x emissions, use of highly energy-efficient combustion turbines is an important design consideration under BACT for NO_x, with the added benefit that it is inherently lower-emitting for GHGs as well.

As a result, more energy efficient designs were already promoted by the BACT analysis prior to EPA's application of the PSD program to GHGs. Indeed, Calpine was not required to fundamentally change any of its planned generation technologies as a result of the BACT analysis. Instead, the limitations imposed by BACT on GHG emissions, ex-

pressed, in the case of the combined-cycle plants, as pounds of CO_2e or any other pollutant per MWh generated, make economic sense and help to ensure the best possible plant performance through enhancing and improving energy efficiency. Thus, BACT for GHGs is not a fundamental redefinition of the economic order, but instead an occasion where the environmental and economic interests of industrial facilities can be directly consonant.

C. In Calpine's Experience, BACT Has Not Imposed Control Measures that Fundamentally Alter or "Redefine" the Source.

BACT is not intended to fundamentally alter or redefine the applicant's proposed source of emissions. *In re Pennsauken County, New Jersey, Resource Recovery Facility*, 2 E.A.D. 667 at *4 (E.A.B. Nov. 10, 1988); *see also* PSD Guidance for GHGs at 26 ("BACT should generally not be applied to regulate the applicant's purpose or objective for the proposed facility."). For example, last year EPA's Environmental Appeals Board upheld Region 9's decision to exclude a combined-cycle design at Step 2 of the BACT analysis for a natural gas-fired plant intended to be peaking rather than base-load[34]—because the

[34] Combined-cycle systems are the most efficient configurations for base-load natural gas-fired power plants. However, other types of plant designs exist to meet specialized types of electrical needs, such as peaking power plants. "Peakers" provide additional power at times of peak electricity demands, and require faster start-up times than base-load plants to meet these sudden demands. "Simple cycle" plants, although less efficient than combined-cycle-designs when operating at full capacity, can start up and shut down more quickly, and thus work better as peaking plants.

"longer startup times [of combined-cycle plants] are incompatible with the purpose of the Project to provide quick response to changes in the supply and demand of electricity." *In re Pio Pico Energy Center*, 2013 WL 4038622 at *29 (E.A.B Aug. 2, 2013).

Pio Pico demonstrates that fears that requiring BACT for GHGs will force operators to fundamentally alter their development plans—or else not develop at all—are unfounded. Calpine's experience confirms this.[35] For example, in the permitting process for the Russell City plant in California, commenters suggested that Calpine could achieve greater efficiency by upgrading its proposed F-Class turbine to a next-generation G-class model. The local Air District disagreed, finding that installation of a G-Class turbine would require a substantially greater power output than an F-Class to achieve similar energy efficiency, and did not require Calpine to reconsider its overall generating capacity to make a G-Class turbine worthwhile. Commenters also recommended a reconsideration of the project as a whole, preferring the construction of a non-fossil-fuel-fired alternative. The District again disagreed, finding that such reconsideration would alter the fundamental business purpose of the facility.

As long as a facility's permitting application explains the "fundamental purpose or basic design" of

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[35] *See* BAAQMD, "Additional Statement of Basis for Draft Federal 'Prevention of Significant Deterioration' Permit, Russell City Energy Center," Application No.15487 (August 3, 2009), *available at* http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2009/15487/B3161_nsr_15487_fsb_080309.ashx?la=en.

the plant, BACT is not intended to mandate the use of technologies that alter this basic purpose. 42 U.S.C. § 7479(3); *see also* PSD Guidance for GHGs at 26-27. The broad initial consideration of all available control options at Step 1 of the BACT analysis ensures that as technology develops and costs come down, more options will become available and achievable by proposed projects. BACT in this way acts as a technological backstop, ensuring that the control technologies employed by operators improve as development continues, while only requiring the installation of new technologies when they become technically feasible and economically achievable. This encourages operators like Calpine to lead the way in state-of-the-art, clean, and efficient plants designs, driving cost savings and environmental improvements. Far from the "comprehensive scheme of regulation of industrial operations" predicted by naysayers, EIM Br. at 23, EPA's regulations are an achievable and economically-sound step in furtherance of the goal of cleaner air, and should be upheld.

CONCLUSION

For the reasons presented herein, the Court should uphold the judgment of the Court of Appeals.

Respectfully submitted,

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