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Considering Alternatives: The Case for Limiting CO_2 Emissions From New Power Plants Through New Source Review

by Gregory B. Foote

Anthropogenic emissions of carbon dioxide (CO_2) and other greenhouse gases are changing the earth's climate in ways that could lead to catastrophe.[1] The United States is the largest emitter of these gases, producing almost one-fourth of worldwide emissions of CO_2, the dominant greenhouse gas.[2] Power plants alone account for one-third of total U.S. emissions of CO_2.[3] A prompt transition to economies based on efficient use of renewable, nonpolluting energy sources rather than carbon-based fuels might avoid the worst effects of climate change by stabilizing greenhouse gases at acceptable levels.[4] But even if that transition begins now, world energy forecasts predict that for the next several decades, fossil fuel use will greatly increase. Of special concern, many new coal-fired power plants may be built in the United States—and elsewhere, particularly in China and other developing countries.[5] In order to limit further harm to the global environment, these plants—if they are built at all—should be constructed in a way that minimizes CO_2 emissions and facilitates future capture and safe storage of those emissions.[6] This Article outlines a way of accomplishing that task under current U.S. law.

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1. *See, e.g.*, Summary for Policymakers: A Report of Working Group I of the Intergovernmental Panel on Climate Change (IPCC) (IPCC Secretariat, Geneva, 2001).
2. *See* U.S. Environmental Protection Agency (EPA), Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990--2001—Final Version 2-1 (2003) (EPA 430-R-03-004), *available at* http://yosemite.epa.gov/OAR/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2003.html.
3. *See id*. tbl. 1-11.
4. *See id*. at 12-14 (CO_2 emissions would need to decline to a small fraction of current levels to stabilize atmospheric levels at 450 parts per million (ppm), a level needed to avoid very substantial adverse environmental consequences, although still involving a significant amount of such effects).
5. Energy Information Administration, International Energy Outlook 2003 (2004), *available at* http://www.eia.doe.gov/oiaf/ieo/world.html; *id*. tbl. A2; "World Total Energy Consumption by Region and Fuel, Reference Case, 1990-2025," *available at* http://www.eia.doe.gov/oiaf/ieo/tbl_a2.html.
6. *See, e.g.*, Patricia Glick, The Toll From Coal: How Emissions From the Nation's Coal-Fired Power Plants Devastate Wildlife and Threaten Human Health (National Wildlife Fed'n 2000), *available at* http://caddodefense.org/download/toll_from_coal.pdf (visited Feb. 20, 2004).
7. For a general description of UNFCCC provisions, obligations, and implementation measures, see United Nations (U.N.) Climate Change Secretariat, A Guide to the Climate Change Convention Process (2002), *available at* http://unfccc.int/resource/process/guideprocess-p.pdf.
8. *See* U.S. Climate Action Report 2002, Third National Communication of the United States of America Under the United Nations Framework Convention on Climate Change [hereinafter Climate Action Report 2002]. Chapter 6 of *Climate Action Report 2002* spells out the adverse impacts on the United States, including temperature and sea level rises, increase in severe weather events, and loss of sensitive ecosystems.
9. *See* U.S. Department of Energy (DOE), Notice of Intent to Prepare a Programmatic Environmental Impact Statement for Implementation of the Carbon Sequestration Program, 69 Fed. Reg. 21514, 21515 (Apr. 21, 2004) ("even modest stabilization scenarios would eventually require a reduction in worldwide greenhouse gas emissions of 50 to 90[%] below current levels").
10. *See id.* (discussing the Administration's Global Climate Change Initiative and Carbon Sequestration Program).
11. *See id.*
12. *See id.*

The ultimate goal of the United Nations Framework Convention on Climate Change (UNFCCC) is to stabilize atmospheric concentrations of greenhouse gases at levels that would prevent dangerous human interference with the climate system.[7] The United States ratified the UNFCCC in 1992, and the Bush Administration officially endorsed the scientific consensus on the threat posed by climate change with its submission to the United Nations (U.N.) of *Climate Action Report 2002*.[8] The Administration has also acknowledged that drastic reductions in total greenhouse gas emissions are needed to stabilize atmospheric concentrations,[9] and has funded technological developments toward this end.[10] Many believe that comprehensive programs imposing mandatory CO_2 limits are needed to meet climate change goals. But the United States has declined to ratify the Kyoto Protocol, a first step in market-based, global CO_2 regulation. Instead, the Administration has adopted a program calling for only voluntary reductions in "carbon intensity"—the ratio of CO_2 emissions to economic output—before 2012.[11] Meanwhile, actual U.S. emissions have risen 12% since adoption of the UNFCCC, and are expected to rise another 30% in the next two decades, even assuming very substantial increases in energy efficiency and renewable energy resources.[12] The immensity of the task, and the absence of any program of comprehensive domestic CO_2 regulation, compels consideration of other available mechanisms for making progress on climate change *right now*. This Article proposes one such tool, which requires enactment of no new laws, but merely compliance with provisions of existing law that have been overlooked.

For the first time in a generation, large numbers of new coal-fired power plants are being planned in the United States.[13] These plants are the largest emitters of greenhouse gases, and under business as usual, each would release hundreds of millions of tons of CO_2 over an expected lifespan of half a century or more. These plants are not entitled to a free pass on greenhouse gases. Instead, they should be seen as a prime opportunity for both limiting CO_2 emissions using currently available production processes and stimulating future technological advancement here and in the developing world. The Clean Air Act's (CAA's) new source review (NSR) permit program can fulfill these purposes.

The NSR program embodies a basic congressional judgment that proposed major new sources of air pollution should assess their environmental impacts—including adverse effects from unregulated pollutants such as CO_2 and mercury—and mitigate those impacts. Considering reasonable alternatives to proposed sources is a key component of this scheme. Due to their huge CO_2 emissions and longevity, new coal-fired power plants merit careful scrutiny because there is no regulatory structure in place to remedy the problem of climate change. In these circumstances, both sound policy and the legal obligation of permitting authorities to make reasonable decisions, call for a "pay-as-you-go" approach that minimizes CO_2 emissions using available technologies and provides offsetting CO_2 reductions elsewhere for emissions that cannot be avoided.

The balance of this Article is divided into five sections:

Section I introduces the general principle of administrative law requiring decisionmaking that is reasonable under the specific regulatory context presented. The section then outlines the relevant statutory and regulatory authorities, purposes, and procedures under NSR provisions of the CAA. It summarizes the requirements for emissions minimization, advocating that available means for reducing emissions should be addressed in a hierarchical fashion. The section then provides an overview of NSR provisions requiring assessment of environmental impacts, including emissions of "unregulated" pollutants such as CO_2 and mercury, and consideration of alternatives to a proposed new source. It highlights the flexible and comprehensive nature of this inquiry.

Section II synthesizes NSR permit cases that address conflicts over the basic parameters of a proposed new source, explaining why there is no basis in law for excluding consideration of alternatives that would "redefine the source" as proposed by a permit applicant. It also addresses the allocation of burdens in considering alternatives to a proposed source, focusing on the insights provided by cases arising in the context of environmental justice. This section also discusses the role of environmental analyses conducted for other purposes in NSR permitting.

Section III outlines generally how alternatives to a proposed new power plant can be appropriately considered, applying the Article's recommended hierarchy of methods for reducing emissions. This section emphasizes the need for permitting authorities to consider all available production processes, and to take into account production efficiency as a means of emissions reduction.

Section IV provides a specific model by which permitting authorities can use NSR to address CO_2 emissions at a new coal-fired plant, by requiring Integrated Gasification Combined Cycle (IGCC) technology to minimize emissions and emissions offsets to mitigate remaining CO_2 emissions. It begins by explaining why the U.S. Environmental Protection Agency's (EPA's) 2003 determination that CO_2 is not an "air pollutant" subject to mandatory CAA regulation has no effect on the need to address CO_2 as an "unregulated" pollutant for NSR purposes. This section also explains how adopting CO_2 measures through NSR would assist the U.S. in complying with commitments under international law to reduce CO_2 emissions pursuant to the UNFCCC, and to follow policies that are consistent with the principles of sustainable development.

Section V is an appendix summarizing the remedies available in the event that permitting authorities fail to make reasoned NSR decisions.

I. Prevention of Significant Deterioration (PSD) and Nonattainment Area NSR Permitting Requirements of the CAA

A. The Requirement for Reasoned Decisionmaking

In explaining the need to consider alternatives in NSR permitting, this Article refers throughout to two key tenets of administrative law. First, with deceptive simplicity, the Administrative Procedure Act (APA) calls upon agencies to make reasonable decisions. Second, what qualifies as reasonable depends on the circumstances of the particular action in question. These principles apply to NSR permit decisions—and most other final agency action—through the "arbitrary and capricious" standard of judicial review under the APA and analogous state laws.[14] The single arbitrary and capricious standard actually encompasses a sliding scale of review. Under that standard the degree of discretion afforded to the decisionmaker and, hence, the degree of scrutiny of the agency decision by a reviewing tribunal, varies depending on the specific regulatory context of the particular matter in question. As a result, the arbitrary and capricious standard serves as a broad umbrella under which a scant analysis may justify a cursory decision in some circumstances, while in other cases a highly developed factual record and detailed analysis is necessary to justify as reasonable a decision that undergoes a hard look by a reviewing body.[15] The need for reasonable decisions is by no means an abstract or academic point; as the U.S. Supreme Court recently affirmed in *Alaska Department of Environmental Conservation v. U.S. Environmental Protection*

13. *See* Tracking New Coal-Fired Power Plants: Coal's Resurgence in Electric Power Generation (National Energy Technology Laboratory 2004), *available at* http://www.netl.doe.gov/coalpower/oces/pubs/ncp.pdf (last visited Mar. 23, 2004) (listing 94 plants proposed through 2025, with a total anticipated cost of $72 billion; the plants would generate approximately 62,000 megawatts (MW) of electricity); Mark Clayton, *America's New Coal Rush*, Christian Sci. Monitor, Feb. 26, 2004, *available at* http://www.csmonitor.com/2004/0226/p01s04-sten.html.

14. *See* 5 U.S.C. §706; *see also infra* note 226.

15. *See generally, e.g.*, William H. Rodgers, Environmental Law §3.1 (2d ed. & Fall 2003 Supp.) and cases cited therein.

Agency,[16] unreasonable NSR permitting decisions are unlawful and cannot stand.

B. The Basic Statutory and Regulatory Framework

The CAA[17] establishes a comprehensive state-federal program for the prevention and control of air pollution, and the protection and enhancement of air resources.[18] The CAA scheme of "cooperative federalism"[19] has two fundamental elements. First is the set of national ambient air quality standards (NAAQS), promulgated by EPA as the basic measurement of whether outdoor air meets health- and welfare-based goals.[20] Second is the adoption by states, and approval by EPA, of state implementation plans (SIPs) for meeting the NAAQS and other air quality goals.[21] Since 1977 the CAA has specified that in addition to many other elements, all SIPs must contain programs requiring any "major" new stationary source of air pollution, and any "modification" of an existing source, to undergo preconstruction review and permitting. Generally, NSR applies to wholly new sources emitting 100 tons per year (tpy) of an air pollutant (or 250 tpy, in some instances).[22] By regulation, EPA has limited NSR at existing plants to only those modifications that are "major," i.e., where a nonroutine change at an existing plant increases emissions above a certain threshold, generally from 15 to 40 tpy.[23]

The CAA contains many provisions that, like NSR, reflect a fundamental legislative policy to apply a more stringent regulatory regime to "new" and/or "major," as opposed to "existing" and/or "small" emitters.[24] This statutory design creates an incentive for companies to avoid "new" or "major" status. Consequently, the drawing of regulatory definitions is a matter of substantial concern to many parties. In particular, what constitutes a major modification under NSR has always been controversial, especially in recent years regarding changes to existing emissions units at coal-fired power plants. In the late 1990s, EPA alleged that many companies modified existing units at those plants without obtaining NSR permits.[25] The Bush Administration is pursuing those lawsuits. The Administration has also concluded that the rules for determining NSR applicability to changes at existing units hampered energy-related investment in such units in the utility and refinery sectors, but did *not* affect investment in new plant capacity.[26] Accordingly, the Administration adopted two sets of NSR "reform" regulations intended to reduce the applicability of NSR to changes at *existing units*.[27] Those regulatory revisions have little bearing, however, on the construction of wholly new plants or the addition of *new emissions units* at existing plants—the subject of this Article.

Areas of the country that have failed to attain the NAAQS apply the nonattainment area NSR requirements (the NNSR program).[28] The NNSR program in those areas is intended to assist states in meeting the NAAQS. In areas that have attained the NAAQS, the PSD program of preconstruction review applies, to ensure that air quality does not degrade to the level of the NAAQS, and to serve broad air quality-related goals.[29] In addition to the NNSR and PSD programs, the CAA also requires SIPs to include a general, or "minor" NSR program that applies to construction or modification of any source without regard to size.[30]

The CAA sets two basic substantive requirements for both PSD and NNSR permits. First, the permit applicant must agree to use the best available technology to minimize emissions. This is termed lowest achievable emissions rate (LAER) under NNSR and best available control technology (BACT) under PSD.[31] Second, the applicant must demonstrate that the project will be consistent with applicable air quality planning goals. Under NNSR, the new or modified source must obtain "offsets"—emissions reductions from other sources of pollution in an amount equal to or greater than the emissions of the newly permitted source.[32] Under PSD, the applicant must ensure that the air quality impacts of the proposed source will not violate the NAAQS and that the available "increment" of increased air pollution allowed

16. 124 S. Ct. 983, 34 ELR 20012 (2004). The remedies available to address unreasoned NSR decisions are discussed in Section V.
17. The CAA is codified at 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618. For convenience citations to specific provisions are made by reference to the sections of the statute, i.e., ELR references.
18. *See, e.g.*, CAA §§101(a)(3), 101(b)(1), 169(5).
19. *See, e.g.*, Connecticut v. EPA, 696 F.2d 147, 151, 13 ELR 20135 (2d Cir. 1982).
20. *See* CAA §§108, 109. NAAQS have been established for sulfur dioxide (SO_2), particulate matter (PM), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead. *See* 40 C.F.R. §50.4B50.12.
21. *See* CAA §110.
22. *See, e.g.*, *id*. §169(1).
23. *See, e.g., id*. §111(a)(4); 40 C.F.R. §51.166(b)(23).
24. *Compare, e.g.,* CAA §112(d)(3) (emission standards for major new sources of toxic air pollutants based on the "best controlled similar source") *with id*. §112(d)(3)(A) (standard for existing major sources based on average of "best performing 12[%]" of sources) *and id*. §112(d)(5) (standards for smaller sources based on "generally available control technology").
25. *See, e.g.*, United States v. Ohio Edison Co., 276 F. Supp. 2d 829, 33 ELR 20253 (S.D. Ohio 2003).
26. In its May 2001 National Energy Policy Report, the National Energy Policy Development Group, headed by Vice President Richard Cheney, requested EPA to assess the impact of NSR in these sectors. *See* REPORT OF THE NATIONAL ENERGY POLICY DEVELOPMENT GROUP (2001), *available at* http://www.whitehouse.gov/energy/; U.S. EPA, NEW SOURCE REVIEW: REPORT TO THE PRESIDENT 2 (2002), *available at* http://www.epa.gov/air/nsr-review/bkgrnd/index.html. In its report, EPA concluded that "NSR does not appear to have a significant impact on investment in new utility or refinery plants." *Id*. at 5. EPA then explained how it believed NSR hindered investment in existing units. *See id*. at 8-21.
27. *See* 67 Fed. Reg. 80186 (Dec. 31, 2002) (relaxing baseline rules for determining when a change at an existing unit increases emissions); 68 Fed. Reg. 61248 (Oct. 27, 2003) (expanding exemption for "routine" changes at an existing unit). These rule changes were expressly based on the recommendations accompanying the June 13, 2002 REPORT TO THE PRESIDENT. *See* 67 Fed. Reg. at 80189; 68 Fed. Reg. at 61250. The 2003 rule changes have been stayed by the court pending judicial review. *See* New York v. EPA, No. 03-1380, Order (D.C. Cir. Dec. 24, 2003). The 2002 rule changes remain in place pending review. *See* New York v. EPA, No. 02-1387 (D.C. Cir. Dec. 31, 2002).
28. *See* CAA §172(c)(5).
29. *See id*. §165. Unlike NNSR, PSD is not limited to pollutants for which NAAQS have been established. Alabama Power Co. v. Costle, 636 F.2d 323, 362-63, 368, 10 ELR 20001 (D.C. Cir. 1979).
30. *See id*. §110(a)(2)(C) (SIPs must "include a program to provide for the . . . regulation of the modification and construction of any stationary source . . . as necessary to assure that [NAAQS] are achieved"). Since the requirements of this program are much less prescriptive than those applicable to "major" sources, its practical significance is limited to new and modified sources that are not major, thus, it is usually referred to as the "minor" NSR program.
31. *See id.* §§173(a)(2), 171(3) (LAER); *see id.* §§165(a)(4), 169(3) (BACT).
32. *See id*. §173(a)(1)(B).

in the area will not be exceeded.[33] Final permit terms are established following an extensive analysis by the state permitting agency and after an opportunity for public comment and a public hearing.[34] PSD and NNSR permitting is "pollutant-specific" in that most specific requirements of both programs apply with respect to emissions of particular pollutants. Consequently, a prospective new or modified source may be subject to both PSD and NNSR requirements for different pollutants, depending on the amount of each pollutant it will emit and the attainment status of the area for that pollutant.[35]

Despite the pollutant-specific focus of NSR on two main provisions, it is comprehensive and open-ended in considering the environmental impacts of any proposed new source. The scope of the required preconstruction environmental impacts analysis is akin to that undertaken under the National Environmental Policy Act (NEPA).[36] NSR differs from NEPA in that it imposes emissions limits and other substantive environmental requirements, whereas a NEPA analysis informs judgments made under some other federal statute that may or may not supply substantive requirements. In other words, the requirements for environmental analyses under NEPA are "purely procedural." As far as NEPA is concerned, the results of those analyses can be ignored in the substantive decision.[37] In stark contrast, NSR requires decisions about substantive permit requirements to be justified as reasonable taking into account the results of the NEPA-like environmental analyses.[38] In addition, although NSR sets out many specific conditions that are prerequisites to the granting of a permit, these do not constitute a finite "check list" that, if satisfied, entitles an applicant to receive a permit as a matter of right. As the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit has held, there is no such right.[39] Rather, the CAA and its legislative history are clear that permitting authorities have broad discretion to set conditions that are more stringent than specific minimum requirements, to require substantial changes in the design of a prospective plant, or to deny the application altogether.[40]

EPA must approve as part of the SIP all state permitting programs to implement NSR that meet or exceed minimum requirements established by EPA regulations.[41] In addition, the CAA includes a broad "savings clause," further ensuring states' ability to adopt and submit for EPA approval NSR programs that are more stringent than the required federal minima if they so desire.[42] Where a state lacks an approved NSR program, EPA is the permitting authority under a "federal implementation plan."[43] All states have approved NNSR programs. Several state (and local) jurisdictions remain under a federal PSD program; in most such jurisdictions, however, EPA has "delegated" authority to administer the PSD program to the state, which acts as EPA's agent in issuing federal permits.[44]

Within the overall statutory scheme of the CAA and, more particularly, the air quality planning provisions of the SIP system, NSR is one of many CAA programs that are, in theory, redundant. That is so because the basic SIP provisions have since 1970 required states to plan for attainment and maintenance of the NAAQS. However, subsequent enactment of NNSR, PSD, additional mobile source provisions of Title II, and other major programs reflect congressional understanding that general air quality planning alone is insufficient, and that overlapping measures are needed to actually achieve clean air. History demonstrates that neither the air quality planning requirements of 1970 nor subsequent, more prescriptive planning mandates, either alone or in conjunction with other provisions, have in fact been sufficient to meet air quality goals. While tremendous progress has been made, millions of people in large areas of the country still breathe unhealthy air.[45] Also, NAAQS and SIPs

33. *See id*. §165(a)(3), (a)(5). The PSD increments establish limits to the amount by which ambient concentrations of certain pollutants can increase above a baseline level. *See, e.g., id*. §163. A permit applicant must also demonstrate that there will be no adverse impact on visibility or other air quality-related values in national parks, wildernesses, and other "Class I" areas that enjoy additional protections. *See id*. §165(a)(5), 165(d).

34. *See, e.g., id*. §165(a)(2).

35. As a practical matter, plants that trigger NSR will always undergo PSD review for some pollutants, since all areas of the country are designated attainment for one or more pollutants. With the implementation of the revised eight-hour NAAQS for O_3, and the NAAQS for fine particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), the number of areas of the country designated as nonattainment for one or both of these pollutants will increase, and there is a corresponding increased likelihood that NNSR will apply as well to new sources.

36. 42 U.S.C. §§4321-4347, ELR STAT. NEPA §§2-209. Congress exempted NSR permitting and other CAA actions from the requirements of NEPA on the basis that the CAA provides a "functional equivalent" of the analysis that would otherwise be required under NEPA. *See* Energy Supply and Environmental Coordination Act (ESECA) §7(c)(1), 15 U.S.C. §793(c)(1) (no action taken under the CAA is subject to NEPA environmental analysis requirements); Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 385, 3 ELR 20642 (D.C. Cir. 1973) (functional equivalence doctrine); Alabama ex rel. Siegelman v. EPA, 911 F.2d 499, 505, 21 ELR 20107 (11th Cir. 1990) ("We see this express exemption [of CAA actions by ESECA] as Congress' way of making more obvious what would likely occur as a matter of judicial construction.").

37. *See, e.g*., Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 19 ELR 20743 (1989). The Court found that there was no substantive duty to mitigate environmental damage caused by the agency action, and thus no need for detailed analysis of mitigation measures, even if the result was that the resource in question were entirely destroyed. *Id*. at 350-51. The Court stated: "Other statutes may impose substantive environmental obligations on federal agencies, but NEPA merely prohibits uninformed—rather than unwise—agency action." *Id*. (citation omitted).

38. *See, e.g*., Alaska Dep't of Envtl. Conservation v. EPA, 124 S. Ct. 983, 1005, 34 ELR 20012 (2004); *see also infra* Sections I.C.3. and II.B. and C.

39. American Corn Growers Ass'n v. EPA, 291 F.3d 1, 32-33, 32 ELR 20658 (D.C. Cir. 2002).

40. *See id*.; *see also infra* note 58 and accompanying text.

41. *See* CAA §§110(a)(2)(C), 161, 172(c)(5), 173. The EPA regulations governing NNSR and PSD program approval are contained in 40 C.F.R. §51.165 and *id*. §51.166, respectively. Regulations for minor NSR program approval are in *id*. §§51.160-51.164.

42. *See* CAA §116.

43. *See* 40 C.F.R. §52.21 (federal PSD permitting regulations). The federal PSD program also applies on Indian lands, where state jurisdiction is lacking.

44. *See id*. §52.21(u) (delegation of PSD programs). Federal PSD permit decisions may be appealed to EPA's Environmental Appeals Board (EAB), which since 1992 has acted in place of the EPA Administrator in these matters. The role of the EAB is discussed *infra* in Sections II and V. EAB permit appeal decisions constitute a large and authoritative body of appellate decisions on a broad range of NSR issues and are referred to frequently in this Article.

45. Congress extended the original 1975 statutory deadlines for attainment of the NAAQS in the 1977 and 1990 CAA Amendments. Nonattainment area designations for eight-hour ozone and $PM_{2.5}$ NAAQS are scheduled for 2004, with attainment deadlines extending for several years thereafter. *See* 69 Fed. Reg. 23858 (Apr. 30, 2004) (final eight-hour ozone designations). In 2002, 146 million

have limited ability to anticipate, recognize, and address newly recognized problems in a timely way.[46] Finally, the prospect of comprehensive "cap-and-trade" legislation that would greatly reduce emissions from power plants and other categories does not obviate the need to address new sources of pollution. Even the most stringent "multipollutant" bills pending in the U.S. Congress still would not result in attainment of the NAAQS in all areas, let alone serve the other statutory purposes of NSR.[47] Thus, for the foreseeable future NSR continues to serve the critical environmental policy function of addressing planning uncertainties and failures by requiring that major new or modified sources minimize pollution and are consistent with air quality needs as the understanding of those needs evolves.

C. Key Provisions in Detail

The ultimate decision whether, and under what conditions, to grant an NSR permit represents the culmination of a process addressing many analytical factors. These factors can overlap considerably, as discussed below. Nevertheless, certain components of NNSR and PSD preconstruction review are particularly important, and these are addressed in greater detail in this subsection.

1. BACT/LAER

The control technology provisions of NSR require minimization of emissions from new sources of pollution. BACT and LAER are "technology-forcing," intended to stimulate the development of improved methods for reducing air pollution.[48] Emissions minimization in turn serves several broader statutory purposes that are precautionary in nature. These include maximizing opportunities for economic growth while meeting air quality goals,[49] serving as a backstop in light of the acknowledged inability of the NAAQS to protect against all adverse health and welfare effects of air pollution emitted by "numerous and diverse sources,"[50] and compensating for the repeated failure of SIPs to meet air quality goals through comprehensive planning.

BACT is defined as follows:

> The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking 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, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of "best available control technology" result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to [§]111 or [§]112 of this Act [42 U.S.C. §7411 or §7412]. Emissions from any source utilizing clean fuels, or any other means, to comply with this paragraph shall not be allowed to increase above levels that would have been required under this paragraph as it existed prior to enactment of the [CAA] Amendments of 1990.[51]

The definition of LAER is more rigorous than that of BACT, in keeping with the need for more stringent measures in areas that have not attained the NAAQS. LAER provides only the smallest of economic cost windows to avoid use of the most stringent emissions limit possible:

people nationwide lived in counties with pollution levels above the NAAQS. Out of the 230 nonattainment areas identified during the 1990 CAA Amendments designation process, 124 areas remain. *See* U.S. EPA, Latest Findings on National Air Quality—2002 Status and Trends 5 (2003), *available at* http://www.epa.gov/air/airtrends/.

46. For example, EPA promulgated a NAAQS for fine PM in 1997 following a multiyear rulemaking process which concluded that $PM_{2.5}$ are responsible for thousands of excess deaths per year in the United States. *See, e.g.*, 69 Fed. Reg. 4566, 4644-45, tbl. XI-1 (2004) (proposed Interstate Air Quality Rule) (EPA estimates that partial implementation of the $PM_{2.5}$ NAAQS by 2015 will reduce excess deaths by 13,000 annually). Sixty-five million people live in the 120 counties that violate the $PM_{2.5}$ NAAQS. *Id*. at 4572. EPA plans to finally issue $PM_{2.5}$ nonattainment designations by the end of 2004; SIPs addressing $PM_{2.5}$ are not due until three years later. *See, e.g., id*. at 4624; attainment of the $PM_{2.5}$ NAAQS is not expected in some areas until after 2015. *See, e.g., id*. at 4636-40. As discussed *infra*, one of the specific purposes of PSD is to address air quality problems that exist notwithstanding attainment of the NAAQS. *See* CAA §160(1).

47. NSR could still serve the same backstop function under prospective "multipollutant" legislation featuring a cap-and-trade system for SO_2, nitrogen oxide (NO_x), and possibly other pollutants, given that none of the pending bills would bring all areas of the country into attainment—let alone obviate the broader precautionary purposes of NNSR and PSD. Thus, the Bush Administration estimates that its "Clear Skies" proposal would result in attainment for most areas, but not all. *See* Testimony of Jeffrey Holmstead Assistant Administrator, U.S. EPA, Before the Energy and Air Quality Subcomm., Energy and Commerce Comm. U.S. House of Representatives (July 8, 2003), at 4-5, *available at* http://www.epa.gov/ocir/hearings/testimony/2003_0708_jh.pdf.

48. Regarding LAER, see, e.g., H.R. Rep. No. 294, 95th Cong. 215 (1977) ("the technology-forcing purpose . . . is best served by requiring maximum feasible pollution control from . . . new sources in dirty air areas").

49. *See, e.g.*, CAA §165(3) (one of the purposes of PSD is "to [e]nsure that economic growth will occur in a manner consistent with the preservation of existing clean air resources"). Minimizing the additional pollution from any one new source maximizes the opportunities for additional new sources and associated economic growth to occur in harmony with air quality goals in nonattainment areas, while lessening the need for additional reductions from existing sources.

50. The very existence of the PSD program, addressed exclusively to air quality concerns that remain despite attainment of the NAAQS, demonstrates that the NAAQS are not truly comprehensive in remedying air pollution emitted by "numerous and diverse sources," which is their stated purpose. *See* CAA §109(b). (The CAA addresses toxic air pollutants separately in §112.) This is not to suggest that current NAAQS are deficient, but rather to note the limits to their role within the overall CAA scheme. Congress understood this in enacting PSD, stating that its first purpose is "to protect public health and welfare from any actual or potential adverse effect which in the Administrator's judgment may reasonably be anticipate[d] to occur from air pollution . . . notwithstanding attainment and maintenance of all [NAAQS]"). *Id*. §165(1); *see* LaFleur v. Whitman, 300 F.3d 256, 270, 33 ELR 20006 (2d Cir. 2002) (rejecting argument that PSD claimant lacked injury-in-fact and thus standing since by definition ambient pollution would be below the level of the NAAQS); *see also* Hawaiian Elec. Co. v. EPA, 723 F.2d 1440, 1446-47, 14 ELR 20328 (9th Cir. 1984) ("Congress repeatedly emphasized that NAAQS alone were insufficient to protect public health and welfare") (citing H.R. Rep. No. 294, 95th Cong. 105-132) (1977). If further proof that the NAAQS are inadequate to serve as a complete surrogate for all air quality concerns arising due to emissions from numerous and diverse sources, the 1990 enactment of the multibillion-dollar acid rain program in Title IV of the CAA should suffice.

51. CAA §169(3). The EPA regulatory definition closely tracks the statute, see, e.g., 40 C.F.R. §51.166(b)(12), and state program rules generally do as well. *See, e.g.*, Utah Air Quality Rules 307-101-2.

> (3) The term "lowest achievable emission rate" means for any source, that rate of emissions which reflects—
>
> (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent.

In no event shall the application of this term permit a proposed new or modified source to emit any pollutant in excess of the amount allowable under applicable new source standards of performance.

BACT and LAER plainly require the review of available pollution control methods to be comprehensive, but neither the statute nor regulations specify in detail how this is to be accomplished. Instead, this task has been left to guidance documents and case-by-case development, which have focused primarily on BACT. EPA policy recommends that states follow a "top-down" method of analysis, in which the control technology alternatives that are technically available are identified and arrayed in descending order of stringency. Under this approach, the option providing "maximum degree of reduction" is established as BACT unless consideration of "energy, environmental, and economic impacts and other costs" justifies rejection of that alternative, in which case the next-most-stringent alternative is considered, and so on. The cost of various available control options is stated in terms of cost effectiveness, usually expressed as the dollars per ton of reduction of emissions of the targeted pollution. Decisions on BACT typically are driven by these cost concerns. The primary EPA guidance document regarding the top-down methodology and other technical aspects of NSR is the 1990 New Source Review Workshop Manual (Workshop Manual).[52]

Regardless of whether the available control options are considered in descending order of stringency or otherwise, the same core criteria apply: the application must consider all available alternatives, and the permitting authority must either select the most stringent option or demonstrate why it should not be adopted.[53] A necessary first step in the analysis is to determine what alternatives are technically available to the applicant. The case law reflects that technical availability is a broad and flexible concept that includes, for example, "technology transfer" from one source category to another.[54]

Historically, NSR permitting has focused primarily on determining the most stringent "end of stack" controls. As a consequence, most guidance documents and cases reflect a similar focus, with less attention to fuel and materials choices and production process design, and still less consideration of the more fundamental issues of conservation and renewable energy. Nevertheless, the statutory and regulatory language, legislative history, case law, and applicable policies all support the need for NSR permitting to address the full range of emissions minimization methods.[55]

First, it is clear from the terms of the CAA itself that BACT is not a static emissions limitation, but rather a dynamic process that is intended to use all of the methods outlined in the broad statutory definition in achieving the legislative goal of minimizing pollution by considering all environmental effects. Thus, it is not sufficient to show that use of a "clean fuel" or improved "production processes" would be sufficient in itself to meet a fixed emission limit target previously achieved using add-on controls alone. Rather, the company should address in its application the combination of processes, fuels, and add-on controls, as well as other "available methods," that would result in "the maximum degree of reduction" of emissions of the targeted pollutant. The case law supports this conclusion.[56]

The legislative history of the 1977 CAA Amendments adopting PSD is also in accord with a broad and dynamic construction of BACT. The U.S. Senate added the term "innovative fuel combustion techniques" to "leave no doubt" that BACT included the full range of production methods, including coal gasification.[57] In addition, Congress took an expansive view of permitting agencies' authority to consider "energy, environmental, and economic impacts" in determining BACT. The Senate Report indicates that the concerns of the community regarding the overall impact of the source on air quality may be considered in evaluating the statutory BACT factors:

> [W]hen an analysis of energy, economics, or environmental considerations indicates that the impact of a ma-

52. The Workshop Manual (EPA/OAQPS 1990) is available on EPA's website at http://www.epa.gov/ttn/NNSR/gen/wkshpman.pdf. The Workshop Manual is not a binding regulation, but has been relied upon as Agency guidance by the EAB, see, e.g., In re EcoElectrica, Ltd. Partnership, PSD Appeal Nos. 96-8, -13, 7 E.A.D. 56, ELR Admin. Mat. 40632 (EAB Apr. 8, 1997), and reviewing courts. *See, e.g.*, Alaska v. EPA, 298 F.3d 814, 822, 32 ELR 20793 (9th Cir. 2002) (discussing the Workshop Manual's outline of the top-down methodology); *see also* Alaska Dep't of Envtl. Conservation v. EPA, 124 S. Ct. 983, 995, 34 ELR 20012 (2004) (same); Citizens for Clean Air v. EPA, 959 F.2d 839, 845, 22 ELR 20669 (9th Cir. 1992) (same).

53. *See* Memorandum from John Calcagni, Director, U.S. EPA, Air Quality Management Division, to EPA Regional Air Directors (June 13, 1989), at 4, *available at* http://www.epa.gov/Region7/programs/artd/air/nsr/nsrmemos/topdawn.pdf (discussing "core criteria" of any BACT analysis).

54. *See* Workshop Manual, *supra* note 52, at B.11; *see also, e.g.*, Spokane Reg'l Waste to Energy Facility, PSD Appeal No. 88-12, 2 EAD 809, 816, 22 ELR 20671 (Adm'r 1989) ("[t]echnology transfer from one source category to another is appropriate for BACT purposes").

55. Thus, in describing the process of identifying potentially applicable control alternatives, the Workshop Manual categorizes control options as inherently lower emitting processes/practices, add-on controls and combinations of inherently lower polluting processes/practices and add-on controls. *See* Workshop Manual, *supra* note 52, at B.10.

56. *See, e.g.*, Sur Contra la Contaminacion v. EPA, 202 F.3d 443, 30 ELR 20358 (1st Cir. 2000). In that case, as the court explained, the company

> proposed a novel combination of three proven control technologies: circulating fluidized bed boilers with limestone injection; low sulfur coal; and a dry scrubber. The company claims that this combination will lead to "one of the world's cleanest coal-fired power plants." Though this combination has not been used before, the EPA believes that this control technique is "technically feasible" and "will result in a real decrease in impacts." It, therefore, accepted the combined technologies as the BACT.

Id. at 447.

57. *See* 123 Cong. Rec. 18472, CA77 Leg. Hist. 17 (LEXIS) (June 10, 1977) (Senate floor adoption of Up Amendment No. 387).

> jor facility could alter the character of that community, then the State could, after considering those impacts, reject the application or condition [of] it within the desires of the State or local community. Flexibility and State judgment are the foundations of this policy.[58]

Likewise, as to LAER, it is obvious—if only implicit—that determining "the most stringent emissions rate" may require use of a combination of techniques from several of the categories of emissions reduction methods enumerated above. As to both BACT and LAER, the need to minimize emissions is tempered by what is "achievable" in terms of cost. This is essentially an affordability criterion.

In sum, BACT and LAER plainly require the review of available pollution control methods to be comprehensive, although neither the statute nor regulations specify how this is to be accomplished. EPA guidance, particularly the 1990 Workshop Manual, does establish a clear preference for a roughly hierarchical, "top-down" approach to the task, but that guidance is somewhat dated. It focuses on end-of-stack controls, providing little or no attention to important categories of emission reduction strategies—beginning with the threshold decision whether to build any new source at all. As a result, states and permit applicants often fail to consider the full range of alternatives, precluding even the possibility of adopting an alternative that might result in dramatically less pollution. The absence of guidance, however, does not relieve companies and permitting authorities of their legal obligation to conduct a complete review. A useful way of filling gaps in the analytical framework is to place the various available methods for reducing emissions within four functional categories and array the categories in a more detailed hierarchy:

> At the top of the hierarchy is *conservation*, i.e., the avoidance of energy or materials use through more efficient use of existing resources. Conservation is logically the first candidate for analysis since it can obviate the need for any new source, and hence, the need for further analysis.[59]
>
> Next in the hierarchy (in cases involving power plants) are wind, solar, and other *renewable energy resources*. These involve construction of some new source of energy that will not result in direct emissions of air pollution (but will have other environmental impacts).
>
> The third tier consists of *efficiency* in energy production or materials processing; *combustion and process design*, to prevent pollution formation; and *lower polluting fuels and materials*. At this stage in the hierarchy, it is assumed that some major new source of air pollution may be needed, and the focus is on minimizing the emissions that are formed by operation of that new source.
>
> Last are *add-on control devices*, to reduce emissions after they have been formed but before they are released to the atmosphere.[60]

The essential advantages of a hierarchical approach to emissions reduction methods are that it includes all principle methods of emissions reduction, and focuses attention first on the least-polluting methods. To be clear, the analytical hierarchy suggested here does not require adoption of new regulations or policies to enable its implementation. Rather, this is an analytical tool that permit applicants and permitting agencies can use to help ensure that they consider the full range of ultimate control options (and associated emission limits) as required by law.

2. Environmental Impact Analysis

Requirements for air quality impacts assessment and environmental impact analysis together constitute the second main component of NSR. As will be seen, this component is not entirely distinct from the control technology requirement; they should be considered together in reaching final permit decisions.[61] Historically, assessing air quality impacts has been by far the more important aspect of the second main component of NSR. Permit applicants and states have focused almost entirely on the need to obtain emissions offsets in nonattainment areas to protect the NAAQS, and conduct modeling of ambient concentrations of pollutants in PSD areas to protect the PSD increments. This may be minimally adequate for most NSR purposes, but it is irrelevant to the problem of climate change. This is so for the simple reason that there are no NAAQS or increments for CO_2 or any other greenhouse gas, nor do any of the existing air quality standards function as surrogates for greenhouse gases.[62] Rather, when issues arise that pertain to climate change or other concerns not addressed by the core NAAQS and increments provisions, the broader—but often neglected—environmental impact analysis provisions of NSR should come to the forefront.

The need to consider environmental impact outside of the core concerns of NAAQS and increments is addressed first by the "purposes" section of the PSD program. The legislative goals of protecting against adverse impacts that may "reasonably be anticipated" despite attainment of the NAAQS, and "careful evaluation of all the consequences"[63]

58. S. Rep. No. 127, 95th Cong. 31 (1977) *reprinted in* 3 Senate Comm. on Environment and Public Works, 95th Cong., A Legislative History of the Clean Air Act Amendments of 1977, at 1405 (1978).

59. To the extent reliance on conservation does not eliminate altogether the need for a planned new emissions source, but reduces the size of the new plant, it results in a corresponding reduction in air quality concerns.

60. *See* Manfred Klein, *The Need for Output-Based Standards for Gas Turbines*, Cogeneration and On-Site Power Production (Sept./Oct. 2002) *available at* http://www.jxj.com/magsandj/cospp/2002_05/output_based_standards.html.

61. This discussion reflects that NSR statutory provisions are overlapping: at some junctures, control technology considerations merge into air quality analyses, since both address the overall statutory purposes to protect air quality and the environment generally. Thus, states have broad discretion in shaping the precise contours of the preconstruction analysis so long as they fulfill the legislative purposes. At the same time, it would be improper to limit the scope of these analyses by asserting that no matter can be considered unless it fits neatly in a specific statutory or regulatory pigeonhole.

62. In contrast, assessments of air quality impacts of SO_2 and NO_x for purposes of meeting NAAQS and increment requirements for a new source, and corresponding limits on those pollutants, serve as a rough surrogate for certain other environmental impact concerns. For example, SO_2 and NO_x emissions are the main precursors of visibility impairment and vegetation damage. Requiring add-on controls limiting these pollutants to protect the NAAQS or increments would reduce harm to visibility and vegetation, but would not reduce CO_2 emissions or mitigate climate change.

63. *See* CAA §160(1), (5).

call for a NEPA-like approach that is open-ended, precautionary, and flexible.[64] The scope of the required consideration is restated in the terms governing the mandatory preconstruction analysis that informs permit decisions. The language expressly extends beyond the statute's core air quality impact concerns—indeed, beyond air quality altogether—to environmental impacts generally. Specifically, the statute provides that EPA regulations

> shall require an analysis of the ambient air quality, climate and meteorology, terrain, soils and vegetation, and visibility at the site of the proposed major emitting facility and in the area potentially affected by the emissions from such facility for each pollutant regulated under this Act which will be emitted from, or which results from the construction or operation of, such facility, the size and nature of the proposed facility, the degree of continuous emission reduction which could be achieved by such facility, and such other factors as may be relevant in determining the effect of emissions from a proposed facility.[65]

Provision for broad consideration of environmental impacts appears again in the PSD subsection addressing public participation in the permit action, which states that the scope of written comments and public hearings regarding a proposed new source extends to "the air quality impact of such source, alternatives thereto, control technology requirements, and other appropriate considerations."[66]

As noted, environmental impact issues come into play in the BACT analysis as well. This occurs via the "environmental impacts" prong of BACT, which informs the control technology decision. Specifically, the prospect of adverse environmental impacts from a proposed source can lead to more stringent or otherwise preferable emission limits than would otherwise have resulted.[67]

One aspect of the assessment of "environmental impacts" in a BACT analysis is particularly relevant to the issue of CO_2 emissions. This is the requirement, in assessing which of the available control alternative is "best" for a targeted pollutant, to take into account the effect of the various alternatives on emissions of other pollutants. Importantly, this requirement extends to pollutants that are not "subject to regulation" under PSD and thus not the focus of their own pollutant-specific BACT determinations.[68] This principle was first articulated in a 1986 Environmental Appeals Board (EAB) PSD permit appeal decision, *In re North County Resource Recovery Associates*,[69] in which citizens sought to have emissions of unregulated toxic pollutants taken into account. The Administrator addressed:

> Region IX's assertion that EPA lacks the authority to "consider" pollutants not regulated by the [CAA] when making a PSD determination. This assertion is correct only if it is read narrowly to mean EPA lacks the authority to impose limitations or other restrictions directly on the emission of unregulated pollutants. EPA clearly has no such authority over emissions of unregulated pollutants. Region IX's assertion is overly broad, however, if it is meant as a limitation on EPA's authority to evaluate, for example, the environmental impact of unregulated pollutants in the course of making a BACT determination for the regulated pollutants. EPA's authority in that respect is clear. . . . Hence, if application of a control system results directly in the release (or removal) of pollutants that are not currently regulated under the Act, the net environmental impact of such emissions is eligible for consideration in making the BACT determination. The analysis may take the form of comparing the incremental environmental impact of alternative emission control systems with the control system proposed as BACT; however, as in any BACT determination, the exact form of the analysis and the level of detail required will depend upon the facts of the individual case. Depending upon what weight is assigned to the environmental impact of a particular control system, the control system proposed as BACT may have to be modified or be rejected in favor of another system. In other words, EPA may ultimately choose more stringent emission limitations for a regulated pollutant than it would otherwise have chosen if setting such limitations would have the incidental benefit of restricting a hazardous but, as yet, unregulated pollutant.[70]

The interpretation of BACT in *North County* as requiring consideration of unregulated pollutants in setting emission limits and other permit terms has been followed consistently by the EAB in subsequent PSD cases, for good reason.[71] It is

64. An example of innovative use of these tools is that of proposed power plants whose emissions would have adversely impacted air quality-related values in a national park. In order to avoid findings of adverse impacts that would have prevented construction of the facilities, the parties agreed that the source would obtain nonstatutory emissions offsets to prevent a net adverse impact. In re Multitrade Ltd. Partnership, 3 E.A.D. 773, ELR Admin. Mat. 40839 (EAB Apr. 29, 1992); In re Old Dominion Elec. Coop., 3 E.A.D. 779, 1992 EPA App. LEXIS 37, at *13 (EAB Jan. 29, 1992).

65. CAA §165(e)(3)(B).

66. *Id*. §165(a)(2).

67. This might occur, for example in order to avoid violating PSD air quality increments. *Sur Contra la Contaminacion* involved a situation where the company agreed to a "novel" combination of fuel, process, and add-on controls to avoid violating air quality limits. *See* Sur Contra la Contaminacion v. EPA, 202 F.3d 443, 448, 30 ELR 20358 (1st Cir. 2000).

    Conversely, EPA has consistently rejected claims that the *absence* of adverse impacts could justify a *less* stringent BACT determination. Such claims have been rejected as inconsistent with the statutory purposes of both minimizing emissions from the new source—the primary purpose of BACT (and LAER)—and assuring consistency with air quality planning goals. *See, e.g*., In re Columbia Gulf Transmission Co., 2 E.A.D. 824, 1989 EPA App. LEXIS 26, at **5-10 (Adm'r 1989) (the fact that use of more stringent NO_x controls would not discernibly reduce ambient concentrations of O_3 was not a rational basis for adopting less stringent emissions controls). In that case, the EPA Administrator also ruled that the environmental impacts prong of BACT might provide a basis for adoption of a less stringent BACT limit in limited circumstances, namely in order to address "adverse collateral impacts" that might result from use of the more stringent technology, citing the example of exceptional water demands from a control device. *See id*., 1989 EPA App. LEXIS 26, at *8.

68. CAA §165(a)(4) provides that BACT applies to each pollutant "subject to regulation" under the Act. However, CAA §112(b)(6), part of the 1990 Amendments to the Act, exempted from PSD toxic pollutants regulated under §112. These statutory provisions are bundled into a term EPA has adopted—"regulated NSR pollutant"—to define the set of pollutants that must be undergo a BACT analysis. *See, e.g.*, 40 C.F.R. §51.166(j)(2), (3); *id*. §51.166(b)(49).

69. 2 E.A.D. 229, 230, 1986 EPA App. LEXIS 14 (Adm'r 1986).

70. 1986 EPA App. LEXIS 14, at **2-3.

71. Since *North County*, EPA has reiterated that the BACT analysis encompasses "unregulated" pollutants, including those now exempted from direct PSD permitting by CAA §112(b)(6) following enactment of the 1990 CAA Amendments. *See, e.g.*, In re Genesee Power Station, 4 E.A.D. 832, ELR Admin. Mat. 40969 (EAB Oct. 22, 1993) (definition of BACT provides for "consideration of the environmental consequences of choosing one control technology over another"); In re Steel Dynamics, Inc., 9 E.A.D. 165, 189, ELR

solidly grounded in the statutory language and fully consistent with the broad and open-ended inquiry into environmental impacts that Congress intended. In particular, the finding that consideration of a "hazardous, but, as yet, unregulated pollutant" may lead to different BACT outcomes has obvious implications for the issue of CO_2 limitations.[72]

3. Consideration of "Alternatives" to a Proposed New Source

The CAA provisions calling for consideration of "alternatives" to a proposed new source in NSR speak to the required breadth and depth of control technology and environmental impacts analyses, the allocation of burdens in presenting relevant issues, and the degree of discretion afforded to permitting authorities.

In the PSD program, the requirement to consider alternatives is in the section of the statute regarding public (and EPA) participation in the preconstruction analysis of a proposed new source. The relevant language refers to the ability of "interested persons" to "submit written or oral presentations on the air quality impact of such source, alternatives thereto, control technology requirements, and other appropriate considerations."[73] By expressly providing citizens with the right to call upon the permitting authority to consider "alternatives" to the proposed source, Congress clearly intended that the permitting authority could conclude that a source different from the one proposed by the applicant—or no new source at all—should be permitted.[74] Congress did not provide direction on precisely how states should manage the process of considering alternatives in PSD. Basic principles of administrative law are quite sufficient for this purpose, however.

In PSD permitting there is a range within the spectrum of alternatives where the permit applicant and the state have the initial obligation to present and assess alternatives that are specified by law. Thus, by its plain terms the BACT definition expressly requires consideration of certain emissions reduction methods, e.g., "production processes" and "clean fuels."[75] Allocating the initial obligation to consider statutorily mandated factors to the applicant and the state also is consistent with overarching principles of administrative law.[76] Considering this language together with the prong of BACT requiring analysis of "environmental impacts" and the PSD "alternatives" language, the statutory scheme also implies, although much less clearly, that to some extent the permit applicant and permitting authority have the initial obligation to present and consider alternatives that obviously are of central relevance.

These provisions also carry the negative implication that beyond some point on the continuum of possibilities, the applicant and the state have no up-front obligation to consider additional alternatives, i.e., the failure to consider such alternatives on their own initiative would not constitute facial evidence of unreasoned decisionmaking. Rather, the better view is that beyond this point in the spectrum, it is the burden of the commenter to place additional alternatives on the table. If the commenter does present an alternative that merits consideration the burden shifts to the state to consider and respond to the new alternative, because it constitutes a significant comment, to which reasoned response is always required. This allocation is likewise consistent with administrative law principles.[77] The body of administrative law is also clear that there is an extreme end of the spectrum, where alternatives proposed by commenters are simply nongermane and engender no obligation by the state to respond.[78] The precise location of these cutpoints is less certain, and leaves a fair amount of discretion for permitting authorities.

Consideration of alternatives is a stronger requirement in nonattainment areas, consistent with the premise that air quality considerations are heightened in such areas. The NNSR provision explicitly places on states the burden of justifying construction of a new source based on a broad environmental impacts analysis that expressly includes production processes and location. Specifically, it provides that an NNSR permit may be issued only if

> an analysis of alternative sites, sizes, production processes, and environmental control techniques for such proposed source demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification.[79]

EPA has never issued regulations on this provision, and has done very little to provide nonbinding guidance.[80] Only a few cases address the provision.[81] The paucity of administrative or judicial construction, however, does not relieve states of their obligation to implement the language in a

ADMIN. MAT. 41238 (EAB Apr. 23, 2000) (citing *North County* as characterizing "statutory and regulatory definitions of BACT as requiring consideration of environmental impacts").

72. *See infra* Section IV.A.1. The quoted passage from *North County* also refers obliquely to the question of allocation of burdens in NSR permitting. Subsequent decisions of the EAB make it clear that the fact that an issue is "eligible for consideration" in a BACT analysis does not determine which party is obligated in the first instance to address that issue. Allocation of burdens in considering alternatives is discussed in detail *infra* in Section II.B.

73. CAA §165(a)(2).

74. *See supra* notes 39 and 58 and accompanying text; *see also infra* Section II, discussing in detail the ability of permitting authorities to "redefine the source" as presented in a permit application.

75. CAA §169(3).

76. In general, an agency plainly has an obligation to fulfill on its own initiative specific analytical requirements that are spelled out by statute, such as the "no action" alternative under NEPA at 40 C.F.R. §1502.14(d). *See also, e.g.*, Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519, 551, 8 ELR 20288 (1978).

77. *See, e.g.*, *Vermont Yankee*, 435 U.S. at 553 (under the APA, only public comments significant enough to pass a threshold requirement of specificity and materiality require consideration or response by the agency). Congress codified this "significance" test for actions subject to the rulemaking provisions of the CAA. *See* CAA §307(d)(6)(B).

78. *See, e.g.*, *Vermont Yankee*, 435 U.S. at 551 (the NEPA obligation to consider alternatives does not extend to "every alternative device and thought conceivable by the mind of man").

79. CAA §173(a)(5).

80. *See, e.g.*, Gary S. Guzy, General Counsel, U.S. EPA, Memorandum, EPA Statutory and Regulatory Authorities Under Which Environmental Justice Issues May Be Addressed in Permitting 11 (Dec. 1, 2000), *available at* http://www.epa.gov/compliance/resources/policies/ej/ (CAA 173(a)(5) authorizes consideration of siting issues in the environmental justice context).

81. *See* City of Seabrook v. EPA, 659 F.2d 1349, 1359-63, 11 ELR 21058 (5th Cir. 1981); In re Shintech, Inc., 814 So. 2d 20, 25 (La. App. 1 Cir. 2002); In re Campo Landfill Project, 6 E.A.D. 505, ELR ADMIN. MAT. 40526, 1996 EPA App. LEXIS 25, at **36-47 (June 19, 1996); In the Matter of Borden Chemicals, Inc., Geismar, La. (CAA Title V Petition Response) (Adm'r Dec. 22, 2000), at 34-44, *available at* http://www.epa.gov/region7/programs/artd/air/title5/petitiondb/petitiondb1999.htm.

manner that is sufficiently robust to fulfill the legislative purposes. A comparison of the NNSR alternatives analysis language with corresponding provisions under NEPA and PSD is illustrative.

As noted previously, under NEPA agencies are free to ignore the results of an environmental impact statement (EIS) no matter how meritorious the alternatives presented or how bleak the environmental consequences of the proposed action.[82] Under PSD, where alternatives are placed in consideration by either the applicant/permitting authority or by commenters, the state must provide a reasoned explanation for rejecting the alternatives. It follows that the consideration of reasonable alternatives underlying that explanation should be at least as broad and deep as under NEPA. Consequently, the extensive case law on what constitutes an acceptable weighing of alternatives under NEPA should serve as a baseline in assessing the adequacy of alternatives analysis under PSD.

With respect to NNSR, the state has an explicit burden to justify any decision to build the major new source of air pollution as providing net benefits that "significantly outweigh" the "environmental and social costs" of that decision. Consequently, there is less discretion to reject an environmentally preferable alternative than there would be under PSD, where the state need only justify its decision as reasonable, not as preferable, from the environmental perspective. The NNSR language also means that in many cases the state's decision must be informed by an analysis more detailed than one that would suffice under NEPA. For example, as to mitigation of the adverse environmental impacts that would flow from a decision to build the new source, a merely cursory analysis or summary disposition appears inadequate for NNSR purposes.[83] Moreover, since a separate NNSR provision already requires greater than one-for-one emissions offsets for the pollutants that are the direct subject of the NNSR review, principles of statutory construction dictate that the purposes of the alternatives analysis cannot be satisfied by mere reference to those offsets, since that would render the alternatives analysis superfluous. Rather, it is other environmental impacts that need to be considered—including the impacts of CO_2 and toxic mercury emissions from a new coal-fired power plant.

To recap, the NSR permitting process is open-ended and is intended to raise basic issues about the environmental consequences of a new source of air pollution. The case law and administrative history, however, are almost entirely concerned with "end-of-stack" or "add-on" control technologies. Similarly, most air quality analyses focus on compliance with the NAAQS and increments. Agencies are substantially less experienced with more fundamental questions about the nature, siting, and—at the threshold—the very existence of the prospective new source of pollution. Nevertheless, the law is clear that permitting authorities are required to assess the full range of environmental impacts of a proposed source (including impacts on global climate), consider alternatives to the source as proposed, and justify the permit decision based on these analyses. In this sense, NSR is "NEPA with teeth."

82. *See supra* note 37 and accompanying text.

83. *Cf.* Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350-52, 19 ELR 20743 (1989) (no need to formulate and adopt a complete mitigation plan under NEPA, since that statute is purely procedural and state agencies—not the federal agency that must comply with NEPA—would be responsible for carrying out any plan to mitigate the adverse effect).

II. "Redefining the Source"

Before examining the particular categories of issues that arise in considering applications to build new power plants, it is useful to synthesize the history of a general, preliminary question: the obligation of permitting authorities to consider alternatives to a prospective new source as presented in a permit application. Despite the clarity of the statutory language requiring consideration of alternatives, some permitting authorities have limited the scope of NSR proceedings to the specific configuration of fuel and production process presented by the applicant. These states appear not to understand their own initial obligation to address statutorily mandated factors, since they treat comments urging consideration of alternatives that would "redefine the source" as nongermane.[84] It is possible that those views are derived from a misreading of case law on PSD permit appeals decisions by the EAB. As discussed below, careful review of this case law reinforces what the statute itself and its legislative purposes already provide, namely that permitting authorities cannot lawfully accept the design or location of a proposed source as a fait accompli. Rather, the proposal is subject to public debate, and permitting authorities must justify on the record of the permit proceeding any decision to reject reasonable alternatives to the proposed source.

A. The EAB Precedents

EPA first addressed the issue of possible limits to the consideration of alternatives in NSR in a 1988 case, *In re Pennsauken County, New Jersey Resource Recovery Facility*,[85] in which a petitioner objected to the construction of a municipal waste combustor that would also produce electricity for sale to the power grid. The petitioner urged that the municipal waste instead be burned in an existing nearby power plant, co-firing the waste with coal. The Administrator ruled that BACT permit conditions "are imposed on the source as the applicant has defined it," and although imposition of BACT conditions "may, among other things, have a

84. *See, e.g.*, Letter from Scott Hassett, Secretary, Wisconsin Department of Natural Resources, to Carl A. Sinderbrand (June 10, 2003) (on file with author). In that correspondence, the state of Wisconsin disclaimed authority to consider IGCC as an alternative to a proposed new pulverized coal boiler, on the ground that these are "different process technologies." *Cf.* CAA §169(3) (BACT requires consideration of available "processes"). The state also asserted that it need not consider IGCC since EPA has not specifically required this in its own guidance, and Wisconsin law prohibits the state from adopting standards more stringent than corresponding federal standards. As to the latter assertion, as discussed in this section, EPA has in fact called upon states to consider alternatives to a proposed source where the failure to do so would constitute an abuse of discretion. Even if Wisconsin were correct that EPA had not spoken (and ignoring that the CAA itself expressly requires consideration of alternative processes), it would not follow that a state law restricting permit terms to those no more stringent than required by EPA would prohibit consideration of IGCC or other alternatives. Rather, the state would be required to follow a BACT process (such as the top-down process Wisconsin adopted consistent with EPA policy) and reach its own conclusions as to what constitutes BACT. In other words, since BACT is essentially a procedural rubric requiring a case-by-case determination, there simply are no "federal standards" that would establish a maximum level of stringency for the state's determination or constrain its consideration of alternatives.

85. *See* 2 E.A.D. 667, 1988 EPA App. LEXIS 27 (Adm'r 1988).

profound effect on the viability of the proposed facility as conceived by the applicant, the conditions themselves are not intended to redefine the source." Thus, the petitioner's objections were "not within the scope of this proceeding."[86]

It seems inappropriate for NSR purposes to consider the goal of the permit applicant—a municipality—to be construction of a waste combustor. A municipality has no proper intrinsic purpose to undertake a particular method of waste disposal. Rather, its governmental function is to dispose of waste in an appropriate way at minimum cost. *Pennsauken* seemed to assume that the municipality's proper purpose was inherently incompatible with the petitioner's suggestion that the task be accomplished by co-firing waste in a preexisting power plant. Yet, at the same time, *Pennsauken* acknowledged that the applicant had no right to construct its desired project, pointing out that the stringency of required end-of-stack controls might threaten the viability of the project altogether.[87] Logically, the ability to deny the permit application subsumes the ability to set conditions short of outright denial, and as noted previously, the CAA legislative history confirms this ability,[88] as does the statutory requirement to consider "alternatives" to a proposed source.[89]

The next year, *In re Hibbing Taconite Co*.[90] involved a permit for modification of a gas-burning boiler to switch to petroleum coke. EPA ruled that the permitting agency had failed to justify its cursory rejection of continued use of gas on economic grounds, since the mere fact of the plant's prior history showed gas to be a viable alternative. The Administrator found that requiring the company to continue burning gas would not "redefine the source" and distinguished *Pennsauken* on the ground that the plant was presently burning gas. This distinction is unpersuasive, however, since the relevant issue in *Pennsauken* was not the economic cost or technical feasibility of the petitioner's suggested alternative of co-firing municipal waste in an existing power plant, but whether the proposal to build a waste combustor in the first place was subject to challenge.

Considering just *Pennsauken* and *Hibbing Taconite*, one might conclude that EPA believes there is a line beyond which alternatives to a proposed source constitute "redefining" the source, and that as such they are beyond the scope of a PSD proceeding. More recent EAB decisions contravene that reading, however, and instead make it clear that even if alternatives brought forward by commenters constitute "redefining" the source, they are within the scope of the PSD proceeding. Newer cases also specify that the permitting authority may ultimately require the alternative to be adopted.[91] The more recent EAB decisions also acknowledge that if the permitting authority rejects a proffered alternative, that rejection constitutes an exercise of discretion that is reviewable to determine whether such discretion was exercised reasonably, and not abused. This formulation was summarized in a 2003 case, *In re Kendall New Century Development*[92]:

> We have previously noted that the Agency's PSD regulations governing permit conditions do not require that a permitting authority consider "redefining the source" as a means of reducing emissions. . . . However, "although it is not EPA's policy to require a source to employ a different design, redefinition of the source is not always prohibited. This is a matter for the permitting authority's discretion." Knauf Fiber Glass, 8 E.A.D. at 136. In order to obtain review of a permit issuer's decision not to conduct a broader BACT analysis that would include redefinition of the source, a petitioner must show a good reason in the circumstances of the case for curtailing the permit issuer's discretion or that the permit issuer abused this discretion.[93]

As *Kendall* reflects, the standard articulated by the EAB in addressing alternatives to the proposed source presumes as an initial matter that the permitting agency must have authority to consider redefining the source in response to criticisms articulated by commenters who propose alternatives.[94] It would be illogical, and contrary to the CAA statutory language and legislative purposes, to conclude otherwise. If states could simply disclaim authority to consider alternatives, by the same thinking they could reject even traditional add-on control devices that exceed some predetermined "disproportionate cost" threshold without providing a case-specific rationale for that decision. The Court has found that to be arbitrary and thus unlawful.[95] For the same basic reason, it also would be improper to accede to any a priori limitations on a permitting authority's responsibility to consider reasonable alternatives to the proposed new or modified source. As the EAB pointed out in *Kendall*, the state cannot abuse its discretion in such matters, and complete failure to consider statutorily mandated factors such as "alternatives" to a proposed source generally or "production processes" in particular plainly constitutes such an abuse.[96]

86. 2 E.A.D. at 667, 1988 EPA App. LEXIS 27, at **13-14.

87. *Id*.

88. *See supra* note 58 and accompanying text.

89. *See supra* Section I.C.3.

90. 2 E.A.D. at 838, 1988 EPA App. LEXIS 24, at **11-12.

91. In re Hillman Power Co., Ltd. Liab. Corp., PSD Appeal Nos. 02-04 et al., ELR Admin. Mat. 41255, 2002 EPA App. LEXIS 15, at **46-47 (EAB July 31, 2002) (petitioner asked permitting agency to condition permit so as to prevent applicant's desired requested process modification; agency "clearly has discretion under EPA guidance to consider and even require such a restriction").

92. PSD Appeal No. 03-01, ELR Admin. Mat. 41261, 2003 EPA App. LEXIS 3 (EAB Apr. 29, 2003).

93. 2003 EPA App. LEXIS 3, at *30 n.14 (citations omitted).

94. Thus, for example, in In re Hawaiian Commercial & Sugar Co., PSD Appeal No. 92-1, 4 E.A.D. 95, ELR Admin. Mat. 40025, 1992 EPA App. LEXIS 42 (EAB July 20, 1992), the EAB addressed a claim that a proposed coal-fired power plant should use gas and a different combustion process. The EAB pointed out that the state permitting agency asserted it lacked authority to exercise its discretion in a way that would impose different fuels, processes, or control devices, *see id*., 1992 EPA App. LEXIS 42, at **11-14. The EAB then noted that "the definition of BACT includes consideration of both clean fuels and use of air pollution control devices," implying that the state agency's authority to issue PSD permits would be deemed inadequate if the EAB had not ultimately concluded that the petitioner had failed, in any event, to demonstrate that the permit was deficient under the facts of the case. *See id*. Likewise, in *Kendall*, the EAB responded to a similar state assertion that it lacked authority to require that the permit applicant build a smaller number of larger gas turbines than proposed, or require that they be constructed in combined-cycle rather than simple-cycle mode. In a quoted passage the EAB again implied it was necessary that the state agency have authority to exercise the discretion to require such a "redefining" of the proposed source. *See* 2003 EPA App. LEXIS 3, at *30 & n.14.

95. *See* Alaska Dep't of Envtl. Conservation v. EPA, 124 S. Ct. 983, 1007-09, 34 ELR 20012 (2004).

96. *See infra* note 121 and accompanying text. If such a limitation on state authority were allowed, it would have no obvious bright-line boundary, and could lead to a form of gaming whereby the applicant

Regarding the degree of flexibility accorded to permitting agencies in considering proposed alternatives, the EAB's use of the term "abuse of discretion" merits explanation. Nothing in the EAB's precedents suggests an attempt to depart from the governing "arbitrary and capricious" standard for assessing the validity of agency action, of which "abuse of discretion" is a component.[97] Although the EAB, in reviewing administrative decisions based on a record prepared by the permitting agency, has many similarities to a court engaged in judicial review, the EAB is itself an administrative entity. Its authority is delegated by the EPA Administrator, and its decisions constitute final agency action.[98] For the purpose of efficiently ordering its *internal* affairs, EPA has chosen to place great reliance on the initial permitting decisions reached by regional offices and delegated state agencies.[99] This is reflected in the EAB's generally narrow standard for granting EAB review.[100] Thus, absent "clear error," the initial permitting decision is adopted as the core of the Agency action. At that point the entire Agency action, consisting of the initial permit decision as well as the EAB's decision to deny administrative review under its internal, administrative "clear error" standard, is subject to external, judicial review under the APA's usual "arbitrary and capricious" standard.[101] Consequently, a reviewing court would refuse to uphold the rejection of a proffered alternative to the proposed new source if such rejection, considering the administrative record as a whole, constituted an abuse of discretion or otherwise was "arbitrary and capricious."[102]

In examining the issue of what would constitute reasonable, as opposed to arbitrary, state consideration of alternatives, EAB precedents again are illuminating. These decisions provide that the depth of a permitting agency's consideration of alternatives to the proposed source—and the degree of discretion the agency has to accept or reject those alternatives—is a function of the persuasive value of those alternatives. That value in turn is determined by the strength of the factual record presented in support of the proffered alternatives and corresponding legal and policy arguments.[103] Not surprisingly, the EAB's decisions reflect that more obvious and proven alternatives merit greater consideration by the permitting agency than those that are novel and unproven; as to the latter type, there is a correspondingly larger burden on the commenter to marshal facts and arguments in support of its preferred approach.[104] Every aspect of this an-

proposes to construct a source that is defined in a way that makes it not amenable to cost-effective control technology, e.g., choosing a combination of plant site and design configuration that leaves no room for a control device, or proposing to dispose of municipal solid waste by burning it in an open trench. Notably, reviewing courts have rejected such artificial narrowing of the range of alternatives to a proposed project in the analogous NEPA context. *See, e.g.*, Colorado Envtl. Coalition v. Dombeck, 185 F.3d 1162, 1175, 29 ELR 21406 (10th Cir. 1999) (agencies are precluded from "defining the objectives of their actions in terms so unreasonably narrow they can be accomplished by only one alternative (i.e., the applicant's proposed project)"); *see also, e.g.*, Citizens Against Burlington v. Busey, 938 F.2d 190, 196, 21 ELR 21142 (D.C. Cir. 1991) (consideration of alternatives is bounded by a reasonable determination of the objectives of the action in question; "an agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative . . . would accomplish the goals").

97. *See* 5 U.S.C. §706(2)(A). The "discretion" afforded to an agency in addressing alternatives within an informal adjudication does not refer to "agency action [that] is committed to agency discretion by law" within the meaning of the APA because there is no meaningful legal standard against which agency action could be judged or because the decision is inherently discretionary. *See id*. §701(a)(2). Matters committed to agency discretion and presumptively insulated from judicial review are those such as prosecutorial discretion, e.g., Heckler v. Chaney, 470 U.S. 821, 830-31, 15 ELR 20335 (1985) (decision whether to prosecute generally committed to agency discretion and thus immune from judicial review). The discretion at issue in an informal adjudication such as an NSR permit proceeding must be exercised in a "reasoned and justified" manner; failure to do so in determining BACT constitutes "abuse of discretion" under the "arbitrary and capricious" standard of review and renders the permit decision unlawful. *See, e.g.*, Alaska v. EPA, 298 F.3d 814, 823, 32 ELR 20793 (9th Cir. 2002) (lack of reasoned justification for BACT decision constitutes unlawful "abuse of discretion" under arbitrary and capricious standard), *aff'd sub nom. Alaska Dep't of Envtl. Conservation*, 124 S. Ct. at 983.

98. *See* 40 C.F.R. §1.25(e)(2) (EAB performs functions as delegated by the EPA Administrator); *id*. §124.19(a) (EAB jurisdiction over PSD permit appeals).

99. *See, e.g.*, In re Knauf, 1999 EPA App. LEXIS 2, at **14-15 ("[I]n applying this standard for granting review, the [EAB] has been guided by the following language in the preamble to section 124.19: the 'power of review should be only sparingly exercised' and 'most permit conditions should be finally determined at the [permitting authority] level.' 45 Fed. Reg. 33290, 33412 (May 19, 1980)").

100. *See* 40 C.F.R. §124.19(a)(1). Note, however, that in addition to this narrow internal standard, under 40 C.F.R. §124.19(a)(2) the EAB also may grant review where there is an "exercise of discretion or an important policy consideration which the [EAB] should, in its discretion, review").

101. Citizens for Clean Air v. EPA, 959 F.2d 839, 845-46, 22 ELR 20669 (9th Cir. 1992). NSR permitting under federal law is a form of licensing not subject to decision "on the record" after a formal, trial-like hearing. Thus, in APA terminology, it is an "informal adjudication." *See* 5 U.S.C. §§501(4)-(9), 554.

102. *See* 959 F.2d at 845-46; *see also Alaska Dep't of Envtl. Conservation*, 124 S. Ct. at 1006-07 (judicial review of BACT determination under arbitrary and capricious standard); Sur Contra la Contaminacion v. EPA, 202 F.3d 443, 447-48, 30 ELR 20358 (1st Cir. 2000) (same).

103. *See, e.g.*, In re Hawaiian Commercial & Sugar Co., PSD Appeal No. 92-1, 4 E.A.D. 95, ELR Admin. Mat. 40025, 1992 EPA App. LEXIS 42 (EAB July 20, 1992). The EAB cited the Workshop Manual at B.13 as providing that permitting agencies have discretion in selecting production technology, and found that petitioner "has provided no good reason" to conclude that the agency "abused this discretion" in that case. *Id*. at **11-14. *See also* In re Knauf Fiber Glass, GmbH, 30 ELR 41218, 1999 EPA App. LEXIS 2, at **37-52 (EAB Mar. 14, 2000) (petitioner claimed that agency had failed to consider more efficient production process; permit decision remanded for consideration of that option). Notably, the form of analysis used in these decisions is the usual one in review of alternative courses of action presented in administrative decisions.

104. *See, e.g.*, *Citizens for Clean Air*, 959 F.2d at 846-47 (petitioners seeking to require recycling as condition of construction of municipal incinerator had particularly heavy burden of demonstrating that their preferred alternative constituted BACT because at the time considering the air quality benefits of recycling required the agency to "embark upon an exploration of uncharted territory" (quoting Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519, 553, 8 ELR 20288 (1978)).

For another example, on the issue of technology transfer from one source category to another, *compare* In re Mecklenburg Cogeneration Ltd. Partnership, 3 E.A.D. 492, 494 n.3, 1990 EPA App. LEXIS 42, at *4 n.3 (Adm'r 1990):

> [A] permit issuer does not commit clear error if it carefully considers the potentially transferrable technologies in the context of a particular project . . . but its level of consideration or documentation nonetheless falls short of matching the level that would be expected, for example, if the permit issuer were rejecting a top technology with a proven track record in the same source category. A rule of reason proportionate to the technology's track record necessarily governs how much detail and documentation must go into consideration of a particular technology.

with In re Pennsauken County, N.J. Resource Recovery Facility, 2 E.A.D. 667, 1988 EPA App. LEXIS 27, at *10 (Adm'r 1988) (permit determination remanded where rejected technology was in use domestically in the same type of facility but the BACT determination

alytical framework is fully consistent with the mainstream of black-letter administrative law.

B. Environmental Justice and the Allocation of Burdens in Considering Alternatives Under PSD

Despite the EAB's clear acknowledgement of the need to consider alternatives to a proposed new source, the EAB's jurisprudence with respect to alternatives that the EAB characterizes as seeking to "redefine the source" reflects a seeming discomfort with addressing issues that it views as better handled by state agencies. This may be due at least in part to the understandable desire to maintain comity with the states, and a sense that states are better equipped to make basic economic growth decisions.[105] The EAB displays no such reluctance, however, to engage fundamentally similar issues that arise under the rubric of environmental justice. Examination of this perceived anomaly reveals that in actuality the EAB has applied a uniform standard of review to both types of cases. The apparent disparity simply reflects distinctions between the procedural contexts of these classes—specifically, whether the matter at issue is within the class of issues which the permitting authority has a mandatory duty to consider on its own initiative, or whether the commenter has the burden of presenting it for consideration.

Environmental justice claims arising under NSR assert that a new source of pollution will result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, and the party's desired remedy typically is to build the source elsewhere or, in some instances, not at all. As such, it is quite clear that environmental justice claims do seek to "redefine the source" as that term has been used by the EAB. Nevertheless, the EAB has not characterized environmental justice claims in that manner. For example, in *In re EcoElectrica, Ltd. Partnership*,[106] the petitioner raised an environmental justice claim expressing concern with the air quality impacts of locating a proposed power plant in lower income towns in Puerto Rico; the petitioner separately claimed that energy efficiency projects could obviate need for the plant altogether. The EAB was solicitous of the environmental justice claim and, while ultimately rejecting it on the merits, expressed no concern regarding the ability of the EPA permitting office to address the claim.[107] Conversely, the EAB stated that the petitioner's claim that conservation could substitute for the new power plant constituted an attempt to "redefine the source" and was more appropriately addressed to commonwealth officials.[108]

The environmental justice claim in *In re EcoElectrica*, if successful, plainly would have "redefined the source" by resulting in it not being built at all, or being sited in a location different from that proposed by the applicant. The difference in the EAB's characterization of the environmental justice claim and the energy efficiency claim and its treatment of them is readily reconciled, however, by viewing the claims within the normal administrative law framework for review of agency action. The permitting agency was obligated to address environmental justice by the issuance of Executive Order No. 12898, which expressly directed EPA to incorporate environmental justice concerns into Agency decisions.[109] By its terms, that Executive Order is only procedural in nature, and adds no substantive legal obligations.[110] Accordingly, since environmental justice claims (like many other claims that a permitting authority should consider alternatives to a proposed source) seek to "redefine the source," it follows that characterizing any claim as one that would "redefine the source" does not render it ineligible for consideration in the permitting exercise.

Rather, what is significant about environmental justice in illuminating the larger issue of considering alternatives in NSR permitting is that by adopting the policy of "identifying and addressing" potential disparate impacts on minority and low-income communities,[111] the permitting authority—here, EPA—altered the regulatory context. It did so by placing environmental justice within the class of issues arising in NSR permitting that are a *mandatory* component of the preconstruction review. As a result, if the permitting agency failed to adequately address the issue in the permitting exercise, and if a commenter pointed out that failure and its significance, the permit would be found deficient and remanded to correct the deficiency. As noted, in *In re EcoElectrica* the EAB held that the permitting agency had adequately addressed the environmental justice issue in crafting the permit, and so ultimately rejected the claim on its merits.

In contrast, there was no equivalent policy directing EPA to consider the claim in *In re EcoElectrica* for efficiency-based alternatives to the proposed plant. Thus, the mere fact that the permitting agency had not considered those alternatives in preparing the permit did not render the permit legally deficient, because the agency had no mandatory duty to address those alternatives on its own initiative. Rather, under the specific regulatory context, it was the commenter's obligation to raise the issue and present a persuasive case as to why failure to consider its preferred alternatives would be a reasonable exercise of discretion. Consequently, in *In re EcoElectrica* the EAB needed to do no more than note the absence of effective advocacy by petitioner of the energy conservation alternative, and in particular the complete failure to demonstrate how the claim related to the requirements of BACT or other PSD provisions.[112] As a result, the EAB found that the permitting agency acted reasonably under the record of the case in cursorily rejecting the claim.[113]

lacked the "detail and analysis" necessary to show that the rejected technology was technically or economically unachievable by the proposed source).

105. *See infra* note 108 and accompanying text. This concern over the respective roles of EPA and the states would not arise, of course, as to state-issued permits.

106. *See* 7 E.A.D. 56, ELR Admin. Mat. 40632, 1997 EPA App. LEXIS 5, at **27-28 and **36-43 (Apr. 8, 1997).

107. *See* 7 E.A.D. at 56, 1997 EPA App. LEXIS 5, at **27-31.

108. *See* 7 E.A.D. at 56, 1997 EPA App. LEXIS 5, at **39-42.

109. *See* 7 E.A.D. at 56, 1997 EPA App. LEXIS 5, at **27-28 (citing Exec. Order No. 12898, 3 C.F.R. §859 (1995), ELR Admin. Mat. 45075 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

110. *See, e.g.*, Sur Contra la Contaminacion v. EPA, 202 F.3d 443, 449, 30 ELR 20358 (1st Cir. 2000) (Executive Order No. 12898 was "'intended only to improve the internal management of the executive branch'; by its own words, the order 'shall not be construed to create any right to judicial review'" (quoting Exec. Order No. 12898, *supra* note 109, §6-609)).

111. Exec. Order No. 12898, *supra* note 109, §1-101.

112. 7 E.A.D. at 56, 1997 EPA App. LEXIS 5, at **36-37 & n.23.

113. 7 E.A.D. at 56, 1997 EPA App. LEXIS 5, at **39-41.

This same review format is evident in *In re Knauf*[114] as well. There, the commenters' environmental justice claim had been summarily rejected by the permitting agency. In petitioning EAB, the commenters needed only to point out the agency's essential failure to address a mandatory issue and its potential impact on the outcome of the permit proceeding. The petitioners did so, and the EAB found that the agency's failure to explain its basis for rejection of the environmental justice issue (as contrasted to the detailed explanation provided in *In re EcoElectrica*) rendered the permit deficient. Accordingly, the EAB remanded the matter for further consideration, placing the obligation on *the agency* to document its findings on environmental justice and provide an opportunity for public comment on them.[115]

As had occurred in *In re EcoElectrica*, commenters in *In re Knauf* also raised claims that on appeal the EAB characterized as an attempt to redefine the source. Specifically, they sought to require that the permitting agency consider a fundamentally different production process.[116] In *In re Knauf*, however, the petitioners carried their burden of explaining how the different production technology merited consideration as BACT. Consequently, the Board ordered that the permit be remanded to determine whether the alternative process was "available," and if so, to consider it as a BACT option, because enabling the permit applicant to artificially limit the range of fundamental project designs to its preferred process technology would undermine the statutory purpose.[117]

In sum, *In re EcoElectrica* and *In re Knauf* illustrate that whether a proffered alternative to a proposed new source is characterized as a request to "redefine" it is merely a way of framing an issue as possibly arising toward the discretionary end of the administrative decisionmaking spectrum. Such characterization does not alter in any fundamental way the permitting authority's ultimate responsibility to consider the BACT alternatives presented and explain the basis for its decision. The general obligation for reasoned decisionmaking is uniform, as is the obligation to provide a reasoned justification for rejection of any BACT options that are more stringent than the applicant's preferred approach. What can vary is the allocation of the burden to present alternatives at issue in the first instance and the degree of discretion afforded to the permitting authority in addressing the alternatives once they have been brought forward for consideration. Hence, deeming an alternative as one that would "redefine the source" merely signals that, in the PSD context, such an alternative is usually—but not always—treated as being beyond the range of mandatory permitting issues that the applicant and the permitting authority have the obligation to address in the first instance. Where consideration of the alternative is not mandatory, commenters have the burden of presenting the case that the alternative should be adopted. EPA or states can, however, broaden the range of mandatory issues to include particular classes of alternatives, including those that would "redefine the source." As noted, EPA and some states have done so with respect to environmental justice.[118] Some states also have done so as to other matters,[119] such as by establishing an approach to power plant choices that ranks them in ascending order of adverse environmental impacts.[120]

Standing alone, failure to consider a mandatory issue generally would render the permit decision legally deficient.[121] It is important to emphasize, however, that even in the event of a complete failure to consider a mandatory issue or other clear defect in a permit, the aggrieved party is still responsible for pointing out the error and explaining how it renders the permit deficient.[122] Such allocation of burdens is inherent under the arbitrary and capricious standard of review, which presumes the validity of agency action and which places upon a challenger the ultimate responsibility for overcoming this presumption.[123]

In the context of nonattainment areas and NNSR, the allocation of burdens in considering alternatives to the proposed source differs from that under PSD. As noted, NNSR: (1) places an affirmative obligation on the permitting authority to consider "alternate sites, sizes, production processes, and environmental control techniques for such proposed source"; and (2) enables the state to issue the permit only if its analysis "demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification."[124] Using the terms of the analytical framework discussed above, consideration of alternatives is a mandatory permitting element that must be included in the permit application and addressed in the permit decision. Unlike the situation under PSD, consideration of alternatives is never a discretionary issue that commenters have the obli-

114. 1999 EPA App. LEXIS 2, at *127.

115. *Id*. at *128.

116. The claim involved a proprietary process for fiberglass manufacturing. *See id*. at **37-41.

117. *Id*. at *47.

118. *See, e.g*., Exec. Order No. 12898, *supra* note 109; New York Dep't. of Envtl. Conservation, Commissioner's Policy, Environmental Justice and Permitting (2003), *available at* http://www.dec.state.ny.us/website/ej/ejpolicy.html. As previously noted, failure to follow policies adopted by executive order are not judicially reviewable as such. *See supra* note 110. Such disregard of an agency's own decisionmaking criteria would, however, appear to constitute evidence of arbitrary action subject to judicial review on that basis. *But see* Air Transp. Ass'n of Am. v. FAA, 169 F.3d 1, 8-9 (D.C. Cir. 1999).

119. *See infra* note 134 (summarizing Wisconsin resource planning statute).

120. For the reasons discussed, whether a proposed alternative constitutes an attempt to "redefine the source" is not necessarily determinative of either the initial allocation of burden to present that alternative in the permit proceeding or the degree of discretion ultimately afforded to the permitting authority in considering that alternative. Consequently, the term is of limited utility and is potentially misleading. Thus, it would seem prudent for the EAB to discontinue use of the term altogether, or take care to characterize the issues before it in terms of the allocation of the initial burden to address alternatives to a proposed source and related matters.

121. *See, e.g*., Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43, 13 ELR 20672 (1983) (normally, an agency action would be arbitrary and capricious if the agency, inter alia, "entirely failed to consider an important aspect of the problem"); Sierra Club v. Leavitt, 2004 U.S. App. LEXIS 8832 (11th Cir. 2004) (same).

122. *E.g*., Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519, 553, 8 ELR 20288 (1978).

123. *See, e.g*., Alaska Dep't of Envtl. Conservation v. EPA, 124 S. Ct. 983, 1004-05, 34 ELR 20012 (2004); Citizens of Overton Park v. Volpe, 401 U.S. 402, 415, 1 ELR 20110 (1971); *see also*, *e.g.*, City of Seabrook v. EPA, 659 F.2d 1349, 1360, 11 ELR 21058 (5th Cir. 1981) ("[W]hen petitioners claim that an agency conclusion was arbitrary because there was no evidence to support it, they must at least identify the factual determination the agency was required to make and their basis for disputing it, bringing the countervailing evidence, if any, to the attention of the court.").

124. CAA §173(a)(5); *see supra* note 79 and accompanying text.

gation to raise in the first instance, at least as to obvious, reasonable alternatives.

Consequently, the failure to adequately consider alternatives in NNSR permitting should itself be sufficient to render the permit deficient.[125] Where, however, the absence of an alternatives analysis is challenged in judicial review of a permit decision as a failure to undertake a mandatory permitting requirement under NNSR, an aggrieved party still is not relieved of the obligations inherent in any attempt to overturn agency action under the arbitrary and capricious standard of review. Such a party must still explain how this failure bears upon the adequacy of the final permit decision, just as it must "make the case" under PSD.

Even where consideration of alternatives is mandatory, as it always is under nonattainment area NNSR, and sometimes is under PSD, the question remains what constitutes adequate consideration. As noted, EPA has issued no regulations or guidance.[126] What remains is broad discretion for permitting authorities to provide content to this requirement. In these circumstances, some states may be inclined to take a minimalist view of their NNSR obligation, and it could follow that reviewing courts might have little basis upon which to conclude that the state's minimalist treatment was inadequate. As discussed in the next subsection, however, a permitting authority's consideration of alternatives does not occur in a vacuum despite the absence of EPA or state guidance. Instead, it is informed by the statutory language and purposes, as well as by any prior environmental analyses performed for other purposes. Nevertheless, as a practical matter, even in nonattainment areas, those wanting a robust consideration of alternatives to a proposed source would be wise to provide detailed comments supporting their preferred alternatives.[127]

C. The Role of Previously Conducted Environmental Analyses in Considering Alternatives Under NSR

Whether addressing alternatives in the first instance in a permit application or draft permit, or responding to comments that present alternatives, an obvious source of guidance to inform the adequacy of a state's consideration is a previously conducted environmental impacts analysis. Thus, permitting authorities often rely on environmental analyses conducted under state law, such as state equivalents to NEPA, or power plant siting statutes and other resource planning tools.[128] The Energy Policy Act of 1992 required states to at least consider adopting integrated resource planning that considers a range of alternatives in addressing electricity generation.[129] These can be an acceptable means of framing the consideration of alternatives for NSR purposes; a prior environmental impact assessment *can* appropriately inform the preconstruction review.[130]

Reliance on prior analyses of alternatives is adequate in practice, however, only to the extent that: (1) the prior analysis actually addresses all of the issues that would be germane to the permit decision; and (2) the permitting authority exercises independent judgment in the permit decision, and does not automatically accept prior determinations made for other purposes.[131] Thus, if the prior environmental analysis is narrower in scope than is needed for NSR purposes, or failed to incorporate air quality-related data that were not available until submission of the NSR permit application, the prior analysis should be supplemented as necessary. Likewise, if a prior analysis was not informed by all the factors that are relevant to an NSR decision, the permitting authority may not disclaim the ability to reach conclusions different from any that accompanied such prior analysis.[132]

In sum, permitting authorities cannot properly take an "easy way out" when faced with potentially controversial alternatives to a proposed new source by claiming a lack of

125. *See, e.g.*, Oregon Envtl. Council v. Oregon Dep't of Envtl. Quality, 1992 U.S. Dist. LEXIS 14842 (D. Or. 1992) (in citizen suit under CAA §304 collaterally challenging prior state permit decision, permitting authority violated SIP by issuing permits that failed to include NNSR alternatives analysis).

126. *See supra* note 80 and accompanying text. In at least one instance, however, an EPA regional office has construed the NNSR alternatives analysis as providing that the applicant "should provide a thorough alternatives analysis that details alternative locations for the equipment and alternate processes that might have less severe impacts on environmental and public health and safety." *See* Communities for a Better Env't v. Cenco Ref. Co., 180 F. Supp. 2d 1062, 1071 (C.D. Cal. 2001); *see also* In re Campo Landfill Project, 6 E.A.D. 505, ELR Admin. Mat. 40526, 1996 EPA App. LEXIS 25, at **36-47 (June 19, 1996) (EIS conducted under NEPA was sufficient for purposes of NNSR alternatives analysis under facts of the case).

127. *City of Seabrook* is instructive in this regard. The case arose under the CAA as amended in 1977, under which only certain nonattainment areas were required, pursuant to CAA §172(b)(11)(A), 42 U.S.C. §7502(b)(11)(A) (1977), to undertake the analysis now mandated in all nonattainment areas pursuant to §173(a)(5) of the CAA as amended in 1990. Petitioners had alleged that the Texas NNSR program was deficient because it merely required permit applicants to state whether an alternatives analysis had been conducted, and contained no specific analytical requirements whatsoever. 659 F.2d at 1361. The court noted both the absence of any EPA guidance or interpretation regarding the content of an alternatives analysis, and that petitioners had made only conclusory allegations of state program deficiency rather than asserting any particular shortcomings. *Id*. at 1359-60, 1363. The court, in a somewhat tortured analysis, reluctantly concluded ("[w]e hesitate to accept the EPA's argument in full," *id*. at 1362) that EPA's approval of the state's bare-bones approach to the analysis requirement was not arbitrary or capricious. *Id*. at 1363.

128. For example, in Wisconsin, the Public Service Commission generally must consider whether a proposed utility plant would satisfy the reasonable needs of the public for an adequate supply of electricity under Wis. Stat. §196.491(3)(d)2, and whether the design and location of the plant is in the public interest considering alternative sources of supply or engineering or economic factors pursuant to *id*. §196.491(3)(d)3. These analyses are incorporated into the PSD permitting decision.

129. *See* 16 U.S.C. §2621(d)(7).

130. *See, e.g.*, [San Francisco] Bay Area Air Quality Management District Rule 2-2-401 addressing the California Environmental Quality Act (CEQA): "[A]pplications for authorities to construct facilities subject to Rule 2 shall include . . . CEQA-related information which satisfies the requirements of Regulation 2-1-426." Regulation 2-1-426 in turn requires the lead agency under CEQA to prepare an [environmental impact report (EIR)]. PSD delegation agreements between EPA and state permitting agencies provide that "where the delegate agency does not have continuing responsibility for managing land use, it shall consult with the appropriate State and local agency primarily responsible for managing land use prior to making any determination under this section." 40 C.F.R. §52.21(u)(2). *See also supra* note 126 and *infra* Section III.A. (discussing role of prior environmental analyses).

131. For example, in In re Sutter Power Plant, 8 E.A.D. 680, ELR Admin. Mat. 41216 (EAB Dec. 2, 1999), the EAB rejected a claim that the PSD permit decision failed to consider alternate sites for the proposed source, pointing out that a prior siting analysis under NEPA and California law had considered potential alternatives, and that petitioner had failed to demonstrate that the prior analysis was inadequate or that the permit decision was unreasonable under the record of the case.

132. *See supra* note 94 and accompanying text.

authority to even consider alternatives. Rather, states can be called upon to confront basic issues such as the need for and fundamental design of power plants, to take a public position on those issues, and to be prepared to defend the merits of their positions. In PSD areas, it usually is the obligation of commenters to marshal the facts and arguments supporting their preferred alternatives and present them to the permitting agency. Permitting authorities can, however, by policy, regulation, or statute make consideration of certain alternatives a mandatory part of the preconstruction review. In nonattainment areas, it is always necessary for the permit application to include alternatives to the proposed source, and for the state to consider these alternatives. In both PSD and NNSR permitting, citizens should be prepared to present their preferred alternatives and arguments in support of them. All of this is fully consistent with specific statutory provisions and the underlying legislative intent of the CAA, relevant case law, and basic tenets of administrative law.

III. Considering Alternatives: The Factors That Should Be Addressed in Reviewing Applications for New Power Plants

The foregoing discussion of NSR provisions demonstrates that the framers of the CAA did not intend that PSD and NNSR permit applicants should be entitled to dictate the design parameters under which the prospective major new or modified source of air pollution would be constructed and operated. Likewise, it is clear that permitting authorities are not compelled to grant a permit application that meets a predefined set of specific technical requirements regarding control technology hardware and impacts on ambient concentrations of regulated air pollutants, where broader environmental impact concerns remain. Nevertheless, as a practical matter, in most industries there may be little reason to question a company's basic decision to build. That decision is a result of highly complex market forces. Permitting authorities will likely remain reluctant to question the threshold question of the need for or function of most industrial plants. Likewise, citizens will find it difficult to challenge most such decisions given their highly discretionary nature.[133]

Power plants, however, are different. Because the function of any single plant typically is to add to a common pool of electricity supply, the threshold question of need should never be ignored in deciding whether to issue a permit. Thus, despite a significant degree of economic deregulation in recent years, and the growth of "merchant" plants that sell electric power in the wholesale market, electricity generating plants primarily serve as and are regulated as public utilities. Coal-fired plants in particular merit extra scrutiny because of their tremendous size, longevity, capital and operating costs, demands on fuel suppliers and transmission lines, and adverse environmental impacts. All these public policy concerns are best addressed by reading the CAA as providing no vested right to build a coal-fired plant in any form, and as requiring that every decision to do so only be made after careful consideration of each important aspect of the consequences of that decision. As discussed below, this reading is also the best one under the law.

As explained above, BACT can be a combination of all the available methods for minimizing emissions. These methods are most appropriately addressed in a hierarchical fashion, as it is the clearest method of considering the full range of means to limit air pollution. Some states have expressly adopted such a hierarchical approach to energy planning, under which conservation is considered first and burning of coal last, with other options in-between.[134] Where such policies exist, they should be reflected in an NSR permit application. Where these policies are lacking, interested parties should bring the full range of options to the table in particular permit proceedings, as alternatives to the proposed source.

The following subsections outline, in hierarchical order, the range of emissions issues that should arise in assessing alternatives to a proposed source. The example of a coal-fired power plant is used, although most of the concepts are applicable to other types of power plants and other source categories. Note that although for the reasons explained previously, a hierarchical approach to these emissions reduction methods can facilitate the analysis, it is not a substitute for sound judgment. Nor should a hierarchical approach obscure the need to consider cross-cutting issues. Perhaps most prominent among these are environmental justice and siting issues.[135]

A. Energy Efficiency and Renewable Energy Resources: The Threshold Decision to Build Any New Power Plants Using Fossil Fuels

The threshold question in considering any prospective new or modified electricity generating plant fired by fossil fuels is why the plant should be constructed at all: obviously, it is preferable from the air quality standpoint to rely on renewable energy and more efficient use of existing resources than it is to construct any new fossil-fuel plant. In cases involving traditionally regulated public utilities, a public service commission generally requires a needs analysis. Many states have adopted some form of integrated resource planning that calls for consideration of alternatives to a proposed new power plant, including demand-side management and other

133. As *In re Knauf* illustrates, however, it does not follow as to industrial sources generally that states should take a hands-off approach to questions of production processes, materials and fuels, and efficiency where alternatives would still accommodate production of the intended amount of the desired end product.

134. For example, Wisconsin has adopted an express hierarchy of energy source priorities in WIS. STAT. §1.12 (2002), as follows:

> (4) PRIORITIES. In meeting energy demands, the policy of the state is that, to the extent cost-effective and technically feasible, options be considered based on the following priorities, in the order listed:
>
> (a) Energy conservation and efficiency.
> (b) Noncombustible renewable energy resources.
> (c) Combustible renewable energy resources.
> (d) Nonrenewable combustible energy resources, in the order listed:
> 1. Natural gas.
> 2. Oil or coal with a sulphur content of less than 1%.
> 3. All other carbon-based fuels.

135. Although environmental justice and siting typically are associated with issues closer to the top of the hierarchy, they can involve a mix of emissions reduction methods. For example, the permitting authority might reasonably conclude that it would be preferable to forego construction of a new factory powered by a hydroelectric project that would displace farmers in a minority or low-income community and instead build the factory in another location where power is supplied by a gas-fired turbine even though the latter results in higher emissions. *See also infra* note 202.

energy efficiency measures, and renewable energy.[136] Where such a needs analysis is truly comprehensive, no more may be required for purposes of NSR. Where a needs analysis is lacking, however, e.g., due to utility regulatory reform, or where it fails to take into account the full range of environmental impacts that could be relevant in the NSR context, the matter should be considered still open for consideration in PSD and NNSR permitting.

Perhaps the most likely shortcoming of a preexisting needs analysis is the failure to consider adequately (or at all) serving the projected perceived demand for additional generating capacity through the more efficient use of existing generating resources. Similarly, the applicant may have given little or no consideration to reliance on wind or solar energy or other renewable resources rather than use of fossil fuels. As discussed previously, in the PSD context the permit applicant generally is not required at the outset to address the alternatives of efficiency or renewable fuels in the absence of a state or federal policy declaring otherwise. Rather, the burden is typically on commenters to bring these matters to the attention of the permitting agency. In the NNSR context, where the burden of demonstrating that the benefits of the source as proposed outweigh its costs is on the permitting authority, the efficiency and renewable energy options should be addressed in the permit application and the state's draft permit decision.[137]

Characterizing the threshold decision to build a coal-fired power plant as a mandatory element, at least for NNSR purposes, is appropriate. Reliance on efficiency and renewable energy is a sufficiently obvious and available alternative that it should not be necessary for a commenter to have the burden of raising the issue in the first instance.[138] At the same time, the environmental and other consequences of a decision to construct a power plant are far-reaching. For this reason also, the threshold decision to build deserves careful scrutiny. Arguably, that decision is today of such central relevance—particularly in the context of a coal-fired plant—as to merit treatment as a mandatory element for PSD permitting as well even where the state has not adopted an energy planning policy that would make it so on that basis alone.[139]

Independent of the question of who has the initial obligation to address energy efficiency and renewable energy is the question of what kind of analysis is sufficient. Since these methods of emissions reduction are widely available and highly effective, that militates in favor of a detailed analysis. Also, consistent with general principles of administrative law and with NSR case law, the level of sophistication of the needs analysis that is necessary to enable reasoned decisionmaking for NSR purposes should vary according to the type and degree of environmental consequences at stake. These consequences, and hence the need for detailed analysis, reach their apogee in the context of a new coal-fired facility.[140] Once the state has conducted a sufficient analysis of efficiency and renewable energy alternatives, the question becomes what is adequate to constitute a justifiable state decision as to those options. An alternatives analysis conducted under state resource planning laws, for example, may be adequate in scope and detail, but as under NEPA carry no obligation for a siting decision to be justified in light of that analysis. As explained previously, in PSD the permitting authority must justify its decision as reasonable based upon its analysis, and in light of statutory environmental protection criteria. In NNSR, the permitting authority must justify its decision as preferable despite its environmental costs.

B. Fuels and Production Processes

As discussed previously, NSR permit proceedings must seriously address reasonable alternatives to an applicant's preferred mix of production designs and processes, fuel types, and fuel sources. Most explicitly, in the PSD context the definition of BACT expressly requires a "taking into account" of such alternatives as "production processes," "clean fuels," and "innovative fuel combustion techniques."[141] Likewise, the "most stringent emission limitation which is achieved in practice" for a source category cannot be ascertained for LAER purposes without considering these factors, since they can affect the final emissions rate.

This conclusion is especially compelling with respect to coal-fired power plants for two additional reasons. First, as was the case with energy efficiency and renewable energy, these alternatives merit consideration because of the magnitude of the air quality and other adverse environmental consequences of coal-fired plants. Second, these alternatives should be considered because adopting them can substantially reduce emissions, and hence, other adverse environmental impacts from these plants.

As explained, assertions that considering alternative fuels and production processes would, despite the clear statutory language, impermissibly "redefine the source" for PSD purposes are also contrary to EAB case law.[142] Similarly, it might be claimed that considering these factors is impermissible under NNSR because LAER is the lowest emissions rate for "such class or category of source," and use of different fuels, processes, etc., would constitute a different "class or category." Such an argument is also without merit.[143] It

136. For a discussion of these laws, see John Dernbach et al., *Moving the Climate Change Debate From Models to Proposed Legislation: Lessons From State Experience*, 30 ELR 10933, 10960-61 (Nov. 2000).

137. *See supra* Section II.B.

138. Since a demonstration that the proposed source is the best alternative rests with the state in the NNSR context, and since efficiency and renewable energy are obvious alternatives, an NNSR permit that fails to address these alternatives would appear deficient on its face.

139. In addition, where potential commenters on a particular project have advised the state of a general concern that efficiency or renewable energy should be considered, such that is likely they will in fact present these alternatives in the permit proceeding when it occurs, it would benefit all concerned—not least the permit applicant—if the permitting authority proceeded to address these options in the draft permit. If the state fails to address conservation under these circumstances, and if comments are in fact submitted that are sufficient to demonstrate the significance of the issue and the absence of an analysis addressing it, the state may have no choice but to revise the draft permit, resulting in unnecessary delay.

140. The consequences, and thus the level of detail, should be less extensive for other types of projects. Thus, for example, a smaller gas-fired turbine project used in combined-cycle, cogeneration mode presents fewer environmental concerns and at the same time by definition also favorably addresses several other components of the control technology hierarchy, i.e., fuel, production process, and efficiency.

141. CAA §169(3).

142. *See supra* Section II.

143. EPA guidance calls for consideration of a combination of control techniques under LAER. *See, e.g.*, Memorandum, Transfer of Technology in Determining Lowest Achievable Emission Rate (LAER), from John Calcagni, Director, Air Quality Management

would contravene the statutory scheme to define the source category so narrowly for LAER purposes, since that would be impermissible under BACT, and LAER is the more rigorous of the two control technology provisions. Moreover, in light of the need to consider the transfer of available technology in NSR even between what all agree would be two different source categories,[144] it is obvious that this argument would result in an artificial narrowing of the source category for LAER purposes.

Alternative fuels and production processes also should be treated as mandatory elements of the preconstruction review that the company must include in its permit application and the permitting authority must address in its draft permit decision. They are central, not peripheral, concerns because they can substantially affect emissions rates and have in fact been widely considered in past permit proceedings. It follows that a permit decision failing to address these factors should be considered deficient on its face. Certainly, such a deficiency would be found if commenters were to place these alternatives at issue in particular permit proceedings.[145]

1. The Choice of Fuels

With respect to fuels in particular, as noted previously the CAA explicitly requires that "clean fuels" be considered in determining BACT. It follows that permit applications to construct new or expanded coal-fired facilities should address the alternative of instead constructing plants burning natural gas, since gas is an inherently lower polluting fuel. Likewise, a BACT or LAER analysis should include cleaner forms of the fuel in question, such as coals with lower sulfur content than the applicant would prefer. This aspect of considering alternative fuels in turn raises the issue of choice of fuel source, and related siting issues. In particular, an applicant may intend to construct a "mine-mouth" power plant to eliminate transportation costs, or a state may desire to use coals mined within the state, to provide jobs and promote economic growth. These certainly are legitimate reasons to prefer a particular choice of fuels in a permit application,[146] but they cannot legitimately prevent consideration of different fuel choices.

2. The Choice of Production Processes

As discussed above, in considering emissions from new sources the choice of production process using a given material to be processed or fuel to be combusted can have a profound effect on final emissions rates and other relevant factors in the permitting decision.[147] It is likewise clear as a legal matter that considering available production processes is a proper component of BACT and LAER determinations, and indeed, is best viewed as a mandatory element in all cases. As with the other factors affecting emissions and environmental impacts from major new sources, the depth of consideration and degree of discretion afforded permitting authorities in assessing alternative production processes should vary somewhat depending on the context of the source category under consideration and the particular circumstances of the specific proposed new source. Production processes are no different from the other factors affecting control technology decisions in this respect; some merit greater scrutiny than others as a function of their technical availability, cost, and other relevant factors.

In cases involving power plants, once a well-considered decision has tentatively been made to construct some type of coal-fired plant, there is little doubt about the need for a full and detailed analysis of the choices of production processes. This is so because, as will be seen, the choice of currently available production processes is especially important in determining the final emissions rate for NAAQS pollutants and toxic pollutants—mercury in particular—and also because this choice is critical with respect to CO_2 emissions. Accordingly, applications for permission to construct new or expanded coal-fired facilities using conventional pulverized coal boilers should also carefully consider inherently less-polluting production processes. These choices include circulating fluidized bed (CFB) boilers.[148] Another option with even lower inherent emissions is the IGCC. The CAA legislative history is clear that BACT was intended to encompass consideration of both CFB and IGCC technology.[149]

In the IGCC process, coal (or petcoke or other solid or liquid fuel) is gasified and processed to remove acidic and particulate components. The resulting "syngas" then feeds a combustion turbine whose exhaust heat produces steam for a second-generation cycle (as is done in a natural gas-fired combined-cycle system).[150] Because pollutants are re-

Division, U.S. EPA, to David Kee, Director Air and Radiation Division, EPA Region V, Aug. 29, 1988, *available at* http://www.epa.gov/ttnNNSR01/naa1/n26_5.html [hereinafter Memorandum of Aug. 29, 1988]. In this guidance document addressing coating lines in the motor vehicle industry, EPA points out that the composition of process materials, the production method, i.e., method of application of the materials in the production process, and add-on controls all must be considered, such that LAER is the lowest net emissions rate achievable considering "the composition of the coating, then for the transfer efficiency, and finally for the exhaust gas stream." *Id*.

144. 44 Fed. Reg. 3276, 3280 (Jan. 16, 1979) (notice of proposed rulemaking interpreting LAER as requiring technology transfer between source categories); Memorandum of Aug. 29, 1988, *supra* note 143 (affirming that interpretation set out in Jan. 16, 1979 proposal remains in place).

145. Thus, as is the case with respect to conservation alternatives, it would be counterproductive for the permitting authority to decline to consider these issues from the beginning in any situation where potentially aggrieved parties (including vendors of competing fuels and processes) have made the state aware of their intention to raise the matter in an upcoming permit proceeding. *See supra* note 139.

146. *See, e.g.*, CAA §169(3) (BACT definition includes consideration of "economic impacts and other costs").

147. Although considering the factors that affect a final emissions rate in a hierarchical fashion is, for the reasons discussed in this Article, a very useful tool in NSR, it should not be used in a counterproductive manner. As to emissions from fossil-fueled power plants, the choice of fuels generally should precede that of production processes, since fuels generally are more determinative of a final emissions rate. For example, as to SO_2 and PM emissions, emissions from even the "dirtiest" gas-fired plant generally will be lower than those from the "cleanest" coal-fired plant of similar output regardless of the specific production process used. In other industries, there may be no clear-cut logical order of consideration of fuels and materials as opposed to production processes. Where such is the case, a matrix format may be needed in order to fully consider the range of choices.

148. *See, e.g.*, In re AES Puerto Rico, Ltd. Partnership, 8 E.A.D. 324, 29 ELR 41132 (EAB May 27, 1999) (CFB boilers using limestone injection have inherently low emissions of SO_2; these emissions can be lowered further by using low-sulfur coal and an add-on control device (dry scrubber)).

149. *See supra* note 57.

150. *See, e.g.*, William G. Rosenberg et al., Financing IGCC—3Party Covenant 20-23 (Energy Technology Innova-

moved from a highly concentrated stream prior to combustion, IGCC is the lowest emitting among all coal production processes as to NAAQS pollutants. For the same reason, IGCC used in conjunction with available control technologies also provides vastly superior performance and dramatically lower cost in removing mercury and other toxic metals as compared to pulverized coal boilers.[151] The IGCC technology is also substantially more thermally efficient—by 10% or more, according to the U.S. Department of Energy (DOE)—than other available technologies. This thermal advantage reduces total emissions of all pollutants, including CO_2, by a corresponding amount.[152] In addition, IGCC can be configured to produce liquid fuels and hydrogen in addition to or in place of electricity as an end product, which provides a range of environmental benefits, including those resulting from use in fuel cells for vehicles and other "hydrogen economy" applications.[153] Finally, IGCC is unique among available technologies in its ability to economically capture the CO_2 emissions from coal combustion, making the CO_2 available for storage rather than being vented to the atmosphere as a greenhouse gas.[154]

Gasification technology has been used extensively in the chemical industry for many years, and is now coming into use for power production as well. Worldwide electrical output of IGCC totals about 5,800 megawatts (MW), with approximately 5,000 MW of additional capacity in the planning stage.[155] Existing IGCC commercial applications include two full-scale electric-generating plants in the United States.[156] Given this record of technical availability and actual usage, there is no doubt that IGCC should be considered an "available" technology that must be considered in determining BACT and LAER. Indeed, several states have treated IGCC as an available technology for NSR purposes.[157]

IGCC also has been required as BACT or LAER for some full-scale commercial operations.[158] Even these few instances are sufficient to demonstrate that IGCC can be "achievable" from a cost standpoint. Still, the use of IGCC has been limited. In part this is due to an initial and—for the reasons explained in this Article—improper refusal by some states to even consider production processes other than the one proposed by the permit applicant. Where IGCC has been considered but rejected, that outcome has been based primarily on cost grounds.[159] Assessments conducted to date, however, apparently have not taken into account the full range of benefits associated with IGCC technology. Likewise, the full amount of costs associated with emissions from conventional coal-fired plants, including emissions of CO_2 and mercury, have not been addressed. A complete assessment of costs and benefits and the other factors that should be considered in NSR may well lead to different outcomes, as discussed in Section IV.

C. Production Efficiency as a Component of BACT and LAER

As discussed in Section I.C., debates regarding BACT have centered on end-of-stack controls, and thus on an emissions rate expressed as "control efficiency," or percentage of reduction in emissions compared to uncontrolled, or less effectively controlled emissions. Concerns regarding total emissions typically have been addressed only by an air quality analysis focusing on whether, on a short-term (24-hours or less) or long-term (annual) basis, the modeled impacts of plant emissions are within the maximum concentrations allowed by the NAAQS and PSD increments. In practice, emission limits for power plants have traditionally been measured by reference to the amount of pollution emitted per unit of fuel input.[160]

Nevertheless, it is clear that BACT and LAER must take production efficiency into account in order to fully address

tion Project, Belfer Center for Science and International Affairs, Harvard Univ., Feb. 2004), *available at* http://bcsia.ksg.harvard.edu/publication.cfm?ctype'paper&item_id'436 (last visited Mar. 23, 2004).

151. In an IGCC plant, unlike a pulverized coal plant, available technology can reliably remove 90-95% or more of mercury (and other metals) from the syngas prior to combustion, where gas volume treated is much less than the post-combustion flow. This dramatically improves the reliability of control technology compared to pulverized coal plants, at one-tenth the cost. *See, e.g.*, Jay Ratafia-Brown et al., Major Environmental Aspects of Gasification-Based Power Generation Technologies—Final Report ES-5 (DOE/NETL Dec. 2002), *available at* http://www.netl.doe.gov/coalpower/gasification/pubs/reports.html.

152. *See id*. at ES-2, 7. Vendors estimate greater thermal advantages. *See, e.g.*, *Testimony of Edward Lowe, General Electric Power Systems, Hearings Before the Subcomm. on Clean Air, Wetlands and Climate Change, U.S. Senate Comm. on Environment and Public Works* (Jan. 29, 2002), at 3, *available at* http://www.epw.senate.gov/107th/Lowe_01-29-02.pdf ("High IGCC efficiencies yield CO_2 greenhouse gas emissions that are 12% lower than those of state-of-the-art coal steam-boiler plants. These emissions are approximately 30% lower than those of average coal plants.").

153. *See, e.g.*, John N. O'Brien et al., An Analysis of the Institutional Challenges to Commercialization and Deployment of IGCC Technology in the U.S. Electric Industry: Recommended Policy, Regulatory, Executive, and Legislative Initiatives—Final Report 18-19 (DOE/NETL Mar. 2004), *available at* http://www.netl.doe.gov/coalpower/gasification/pubs/reports.html. Many byproducts from the IGCC process are salable and may also result in net income to the plant, in contrast to pulverized coal plants that incur significant solid waste disposal costs. *See, e.g., id*. at 3.

154. *See, e.g*, Ratafia-Brown et al., *supra* note 151, at ES-7-8.

155. *See, e.g.*, O'Brien et al., *supra* note 153, at 9.

156. These are Global Energy's Wabash River Generating Station and Tampa Electric's Polk Power Station. Both are currently operated as base-load plants, although they received significant subsidies as demonstration plants. *See id*. at 6-7.

157. These states include Illinois, Montana, New Mexico, and Wisconsin.

158. *See, e.g.*, Wisconsin Department of Natural Resources Permit No. 03-RV-166 (Jan. 14, 2004) issued for WE Energies' Elm Road Generating Station, *at* http://www.dnr.state.wi.us/org/aw/air/permits/APM_toc.htm. IGCC permits have also been issued for the Wabash River plant, the Kentucky Pioneer facility in Trapp County, Kentucky, and a Global Energy, Inc., facility in Lima, Ohio. *See* Ratafia-Brown et al., *supra* note 151, at 3-20.

159. One promising mechanism for addressing IGCC costs is presented in Rosenberg et al., *supra* note 150. The 3Party Covenant is an innovative approach that would recognize IGCC's environmental benefits by providing financial incentives to equity investors in new utility plants using coal gasification technology through federal loan guarantees and preferential treatment by state utility commissions. This approach would require federal and, in some instances, state legislation. Another opportunity for reducing IGCC costs is presented by the high number of distressed natural gas combined-cycle facilities. Due to a large increase in gas prices and supply concerns, many such plants built in the last few years are unprofitable and are for sale or have been repossessed by lenders. These stranded turbines could be coupled with newly constructed gasifiers to create IGCC plants at a cost substantially lower than that of a wholly new IGCC facility. *See*, *e.g.*, Gregson Vaux et al., Potential for NGCC Plant Conversion to a Coal-Based IGCC Plant—A Preliminary Study (DOE/NETL 2004), *available at* http://www.netl.doe.gov/coalpower/gasification/pubs/reports.html.

160. *See, e.g.*, 40 C.F.R. §60.43a (SO_2 emissions limit in new source performance standards (NSPS) under CAA §111 for utility boilers expressed as parts per million British thermal unit heat input).

the methods for minimizing emissions from, and air quality and other environmental effects of, new sources of pollution. Doing so involves measuring the effect of the efficiency of a production process on the total amount of emissions from the source. This is accomplished by assessing the amount of pollution emitted as a function of a unit of output.

With respect to sources combusting fossil fuels, "output-based" emissions limitations address thermodynamic efficiency, i.e., the amount of useful work that can be obtained from a given fuel input.[161] For a simple example of the concept of output-based emissions standards, consider two alternatives for a proposed new power plant intended to produce a specified amount of electricity. The first plant emits X tons of pollution per unit of fuel combusted. The second plant also emits X tons of pollution per unit of fuel combusted, but because it is more efficient uses 10% less fuel to produce the same amount of electricity. The second plant's total emissions are the same as the first plant's measured on a fuel input basis, but 10% lower when measured on a power output basis. This translates directly into improved cost-effectiveness for the more efficient process.[162]

As this example demonstrates, total releases to the environment from a source of air pollution indisputably are affected by the efficiency of the production process used. Just as logic demands that production efficiency be incorporated into the calculus for determining how emissions from a new source can be minimized, it is likewise clear that production efficiency is a legitimate component of BACT and LAER from the statutory terms themselves.[163] More specifically, efficiency is a subset of the larger category of "production processes" and "fuel combustion techniques" under BACT, and affects the "most stringent emission limitation" for LAER purposes. This is no mere legalistic point; some production processes are more efficient than others and thus have significantly lower emissions. Disregarding efficiency would, as a practical matter, ignore important aspects of the present state of knowledge regarding available technologies for minimizing emissions and their associated costs.[164]

At least one decision of the EAB has acknowledged that production efficiency is an appropriate component of BACT and should be addressed in fundamentally the same manner as other aspects of the control technology determination.[165] Some states have made significant progress in this direction.[166] EPA has taken only tentative steps, however, toward specifically considering production efficiency in

161. For a discussion of output-based emission limits, see generally Klein, *supra* note 60.

162. The standard NSR calculus for assessing the cost-effectiveness of control options is expressed in annualized dollars per ton of pollution removed. *See* Workshop Manual, *supra* note 52, at B.36-37. Thus, a 10% reduction in total emissions using the more efficient process technology should result in a corresponding 10% improvement in cost-effectiveness for that process when considered on an output basis.

163. Under the closely related NSPS program in CAA §111, EPA issued output-based standards for NO_x emissions from utility and industrial boilers in 1998, measured as pounds of NO_x per megawatt hour of electricity output. *See* 63 Fed. Reg. 49442 (Sept. 16, 1998) (codified at 40 C.F.R. §60.44a, 60.44b). These standards withstood an industry claim that EPA lacked authority to issue output-based standards that considered production efficiency. Lignite Energy Council v. EPA, 198 F.3d 930, 932 n.1, 30 ELR 20279 (D.C. Cir. 1999). In that rulemaking, EPA departed from past practice and rather than setting emission limits based on specific boiler types and fuels, adopted a single so-called fuel neutral emission rate for all boiler types and fuels. In effect, the standards were based on emission limits readily achievable at coal-fired boilers using selective catalytic reduction (SCR) add-on control technology, but these standards required no add-on controls for gas-fired units. EPA acknowledged that this was intended to provide an incentive to use natural gas in new units. *See* 63 Fed. Reg. at 49445-46.

In fact, as commenters pointed out, SCR had been widely demonstrated on gas-fired units, and the resulting emissions are far lower than the limit set by the EPA standards. *See id*. Thus, it is questionable whether the approach used by EPA was sufficiently rigorous to satisfy the NSPS statutory requirement for use of "best demonstrated technology." The court rejected industry's claim that the single standard promulgated by EPA was arbitrary for not taking into account the alleged difficulty of using SCR for all types of coal and types of boilers using coal. 198 F.3d at 933. Environmental groups did not, however, challenge the standards as arbitrarily *failing* to require SCR on gas-fired units, and the court did not address that point. In any event, EPA's justification for a single standard—that it "will expand the control options available by allowing the use of clean fuels as a method for reducing $NO_{[x]}$ emissions,"—63 Fed. Reg. at 49446—plainly would be inadequate for NSR purposes. As explained, under BACT and LAER, *all* means of reducing emissions must be considered in determining the most stringent emissions rate achievable.

Moreover, the definition of BACT expressly prohibits using "clean fuels" to substitute for other means of reducing emissions where doing so would result in an emissions rate higher than that required prior to adoption of the "clean fuels" language in 1990. *See* CAA §169(3). In other words, NSR does not allow the trade off between efficiency and add-on controls or other means of reducing emissions that EPA adopted in the NSPS boiler standards to meet a fixed emission limit. Instead, under the NSR hierarchy of control options, construction of a new source using clean fuels is a clearly preferable option whose rejection must be justified by the permitting authority. But a decision to use clean fuels such as natural gas is not the endpoint of the analysis, and the state must proceed to consider additional means, such as production efficiency and add-on controls.

164. EPA has proposed to adopt output-based standards for emissions of mercury from new (and existing) utility units under CAA §§111 or 112 that acknowledge the importance of production efficiency in determining total emissions. *See* 69 Fed. Reg. 4652, 4667, 4694 (2004). As with the 1998 Subpart Da rulemaking, EPA pointed out that setting the proposed emission limits on an output basis created an incentive for companies to operate plants more efficiently. *See id*. at 4667. In a uniform emission standard under §§111 or 112, the company has two basic ways of retaining the benefits of operating at efficiencies greater than those presumed by the standard rather than passing them on to the environment in the form of lower total emissions. It may do so by relaxing the effectiveness of add-on controls that otherwise would be needed to meet the final emission limit. Alternatively, if the regulation allows trading between plants, emissions below the standard at one plant due to enhanced efficiency can be credited against emissions higher than the standard at another plant. As explained above, BACT and LAER generally require that lower emissions due to enhanced efficiency be incorporated into the final emissions rate and accrue to the benefit of the environment.

165. *See* In re Kendall New Century Dev., PSD Appeal No. 03-01, 2003 EPA App. LEXIS 3 (EAB Apr. 29, 2003) (addressing consideration of gas turbines operated in combined-cycle mode).

166. For example, Connecticut's NSR regulations explicitly provide that the state shall "[n]ot preclude the establishment of an output based emission limitation as BACT provided such application of BACT improves the overall thermal efficiency of the subject source or modification." Conn. Agencies Regs. §22a-174-3a(j)(6)(D). The professional association of state and local air pollution program administrators (STAPPA/ALAPCO) emphasized states' ability to incorporate thermal efficiency in BACT in commenting on a draft EPA guidance document addressing combined heat and power (CHP) facilities (also known as cogeneration). Such facilities employ waste heat from a combustion boiler or turbine for industrial use rather than venting it to the atmosphere. STAPPA/ALAPCO commented: "[W]e believe that it is appropriate for state and local permitting authorities to give consideration—in the form of an output based analysis—to CHP technology in the BACT determination process." *See* Letter from STAPPA/ALAPCO, to Pamela J. Smith, U.S. EPA (Dec. 12, 2001), *available at* http://www.4cleanair.org/members/committee/permits/CHPcomments-1101.pdf.

any systematic manner in NSR. This approach is generally referred to as "output-based BACT."[167]

Some have advocated that, for BACT purposes, production efficiency should be allowed to substitute for add-on controls or other factors affecting total emissions.[168] Doing so clearly would be contrary to the requirements of BACT, which call for consideration of *all* the factors affecting emissions in order to determine the lowest possible emissions. Rather, a more efficient production process, like a process that produces lower emissions per unit of fuel combusted or materials processed, is simply a type of "inherently lower polluting" process.[169] As such, the statute requires that efficiency be considered in conjunction with, not as a substitute for, other "available methods" for minimizing emissions in order to determine the lowest emissions rate for BACT and LAER purposes.[170]

Consideration of efficiency can in some instances add complexity to a permitting decision because of the possible need to consider trade offs between efficiency and other factors. This might occur, for example, where one production process is more thermally efficient, but higher emitting per unit of fuel input than another available technology. NSR is equipped to handle this potential complexity, however. In any event, such concerns are essentially absent at the point when a well-considered decision has tentatively been reached to construct some form of coal-fired power plant. This is so because advanced combustion technologies such as IGCC are both more efficient and lower emitting than traditional pulverized coal combustion techniques. In short, there is no good reason to fail to fully consider these options.

IV. The Case for Construction of a Truly Clean Coal-Fired Power Plant That Uses IGCC Technology to Minimize Emissions of All Pollutants and Offsets CO_2 Emissions

This section presents the case for weighing an application to construct a coal-fired power plant in light of the CO_2 emissions from such a plant. The discussion here assumes that through a hierarchical approach or otherwise, the environmentally preferable alternatives of conservation, renewable energy, and cleaner fuels tentatively have been rejected on appropriate grounds,[171] and that the focus of the NSR permitting exercise has shifted to the conditions under which a coal-fired plant will be built.[172] The analysis proceeds to outline the reasons why the plant should be constructed using IGCC technology to minimize emissions of both regulated pollutants and CO_2, and requiring that CO_2 emissions from the plant be offset by reductions elsewhere. The analysis also refutes likely counterarguments.

The reasons why IGCC technology must be carefully considered in an NSR proceeding for purposes of regulated pollutants have already been addressed and will only be summarized here. Rather, this section will focus on why CO_2 emissions should be taken into account at all in NSR permitting, why such consideration presents a strong case for use of IGCC technology, and why CO_2 offsets should be required as a permit condition.

A. Why CO_2 Emissions Should Be Considered in NNSR and PSD Permitting

Before considering *how* CO_2 emissions should be addressed under NSR, it is necessary first to assess *whether* CO_2 emissions merit consideration at all, and if so, *to what extent*. This assessment consists of policy, legal, and factual components.

1. The CAA Requires That NSR Permit Decisions Consider Environmental Impacts of "Unregulated" Pollutants Such as CO_2; EPA's Determination That CO_2 Is Not an "Air Pollutant" Does Not Affect This Obligation

In addition to direct regulation of NAAQS pollutants and certain others, NSR also encompasses pollutants not directly regulated by the CAA, so-called unregulated pollutants. As discussed in Section I.C., this form of what might be termed "indirect regulation" arises from several components of NNSR and PSD, including the environmental impacts prong of BACT, the requirement for a broad-ranging environmental impacts analysis to inform the PSD permit decision, and the requirements in NNSR and PSD for consideration of alternatives to a proposed source.

These provisions on their face apply to environmental concerns arising from emissions of CO_2 to the same extent as any other consequence of a decision to permit a new power plant. Nonetheless, it might be argued that EPA somehow exempted CO_2 from consideration in NSR permitting by virtue of its August 2003 declaration, in response to a petition for rulemaking, that CO_2 is not an "air pollutant" within the meaning of the CAA.[173] The petition ad-

167. *See generally* Susan Freedman & Suzanne Watson, Output-Based Emissions Standards: Advancing Innovative Energy Technologies (Northeast-Midwest Inst. 2003), *available at* http://www.nemw.org/energy_output.htm.

168. *See, e.g., id*. at 7-14. Freedman and Watson appear to advocate the substitution of efficiency for add-on controls in referring to the Connecticut regulation noted above (*see* note 166, *supra*) as providing a "credit" for thermal efficiency in determining BACT. *See id*. at 11.

169. *See, e.g*., In re General Motors, Inc., PSD Appeal No. 01-30, ELR Admin. Mat. 41249 (EAB Mar. 6, 2002).

170. Thus, the Connecticut BACT regulation, properly viewed, merely serves to emphasize what the statute already requires: consideration of thermal efficiency among the other factors that affect overall emissions in determining BACT.

171. One possible ground supporting a tentative decision to proceed with construction of a coal-fired power plant proposed today even though it is more polluting than other alternatives would apply if the plant uses IGCC technology. Although IGCC plainly is "available" in NSR terms, it is an immature technology that has been applied in relatively few instances. Under these circumstances, the next several IGCC plants are likely to result in significant lowering of cost and improvement in technology as IGCC moves toward becoming the industry standard for new coal-fired plants. Given the forecasts for substantial growth in coal-fired capacity in the developing world, the need to limit those emissions in order to meet climate change goals, and the ability of IGCC to limit CO_2 emissions, it may be appropriate to take on additional pollution from a small fleet of these plants in the United States now in order to foster the use of this superior technology in developing countries. Quite apart from the substantial climate change benefits that widespread use of IGCC for new power plants in China and other developing countries, IGCC would also greatly reduce emissions of SO_2, NO_x and PM. Control of those pollutants is inherent in the IGCC process, while add-on controls to limit emissions of those pollutants from pulverized coal plants is often lacking in the developing world. Fostering use of IGCC would also serve many sustainable development principles, including developed country leadership. *See infra* Section IV.B.3.

172. The analysis in this section likewise assumes that siting issues, including those arising from environmental justice, concerns over impacts on Class I areas, and other areas of special concern possibly affecting the location of the source have been adequately addressed.

173. 68 Fed. Reg. 52922 (Sept. 9, 2003). The petition denial is now under judicial review. Massachusetts v. EPA, No. 03-1361 (D.C. Cir. 2003).

dressed a particular question: whether CO_2 should be directly regulated under a specific provision of the CAA regarding emissions from mobile sources. EPA's response spoke more broadly, however. It concluded that despite the apparently clear statutory language, EPA lacked authority to directly regulate CO_2 through mobile source regulations or a NAAQS, in light of what it characterized as the "enormous" consequences of a comprehensive regulatory regime.[174] As a necessary corollary of its ultimate conclusion, EPA reasoned further that CO_2 could not be an "air pollutant" under the Act in the absence of authority to directly regulate it.[175]

EPA's decision not to directly regulate CO_2 at the present time does not affect the ability of NSR permitting to appropriately consider CO_2 emissions, since neither the policy, legal, nor factual underpinnings of that decision implicate restrictions on CO_2 emissions adopted through NSR permitting.

As to policy, EPA's decision was expressly driven by the huge political and economic consequences of adopting a NAAQS for CO_2 or another comprehensive, mandatory program. The petitioners surely would agree on that point; their obvious purpose was to force the adoption of wide-reaching, mandatory regulations. In contrast, just as the adoption of voluntary CO_2 reductions by individual companies and mandatory CO_2 reduction programs by some states do not carry the enormous consequences of a NAAQS or other comprehensive program, neither do restrictions on CO_2 emissions adopted by states in individual NSR permits. The Bush Administration has spoken favorably of both voluntary and regulatory state efforts to limit CO_2.[176]

The legal concerns expressed in the petition denial are also irrelevant to NSR. This is so because consideration of CO_2 in NNSR and PSD permitting derives not from CO_2's formal status as an "air pollutant" under the CAA but rather from its function as a cause of adverse environmental impacts resulting from construction and operation of a new source. Just as a new source may adversely affect water quality or present solid waste concerns, CO_2 comes under consideration as cause of adverse environmental impact for reasons independent of its status under the CAA. EPA's declaration that CO_2 is not an "air pollutant" simply reasoned backwards from the conclusion that Congress did not intend to adopt a comprehensive regulatory regime such as a NAAQS.[177]

Regarding factual issues, nothing in the petition response detracted from the scientific consensus reflected in many U.S. government documents holding that anthropogenic emissions of CO_2 are a significant cause of climate change and as such present the clear prospect of massive, adverse environmental impacts.[178] In addition, EPA's petition response did not address NSR at all, let alone purport to carve out some kind of "CO_2 exemption" from the comprehensive environmental impact requirements of NNSR and PSD permitting. Moreover, even prior to the response, CO_2 was neither a NAAQS pollutant nor a pollutant otherwise "subject to regulation" for PSD purposes. Then, as now, CO_2 emissions do not require their own BACT or LAER determinations and are not otherwise *directly* regulated under the CAA.

Conversely, even if EPA had granted the petition, it likely would take years to actually implement mobile source, NAAQS, or other comprehensive CAA regulatory programs limiting CO_2. Until that future time, there still would have been no requirement to obtain an NSR permit for CO_2 emissions as such. Instead, the present basis for consideration of CO_2 emissions in NSR—precisely that it is *not* a regulated pollutant—would have remained in place.

It might also be argued that limiting CO_2 emissions via NSR is counterproductive, since, if doing so raises the cost of a project, it may not proceed at all. Companies would instead continue to rely on older, dirtier power plants rather than replacing them with new plants that, even if no steps are taken to address CO_2 emissions, will be far cleaner as to emissions of other pollutants.[179] This is unlikely to occur in practice. Companies already have strong incentives to continue using old coal-fired units. They have always been free to make changes at existing units (such as component upgrades to improve thermal efficiency) without triggering NNSR or PSD, so long as emissions do not increase.[180] In addition, the Bush Administration's NSR "reform" regulations now would allow upgrades representing 20% of the replacement cost of an existing unit to avoid NNSR and PSD even if emissions do increase.[181] The Administration concluded that even if it had not relaxed the EPA regulations, companies likely would modernize existing units at coal-fired utility plants without increasing emissions and triggering NSR rather than shutting them down and building new

174. 68 Fed. Reg. at 52928.

175. "Because EPA lacks CAA regulatory authority to address global climate change, the term 'air pollution' as used in the regulatory provisions cannot be interpreted to encompass global climate change." *Id*.

176. *See infra* note 217.

177. *See* 68 Fed. Reg. at 52928 ("We thus conclude that the CAA does not authorize regulation to address concerns about global climate change. . . . It follows from this conclusion, that GHGs, as such, are not air pollutants under the CAA's regulatory provisions.").

178. The petition response did not refer to the *Climate Action Report* 2002, *supra* note 8. The response did cite the 2001 National Research Council (NRC) report Climate Change Science: An Analysis of Some Key Questions, 2001 (National Academy Press 2001) that had been commissioned by President George W. Bush. *See* 68 Fed. Reg. at 52930. The response emphasized the remaining uncertainties in the state of the science noted in the NRC's report. *See id*. The response did not include the NRC's basic conclusion, which was incorporated into the lead sentence of the relevant portion (Chapter 6) of *Climate Action Report* 2002: "In its June 2001 report, the Committee on the Science of Climate Change, which was convened by the [NRC] of the National Academy of Sciences, concluded that '[h]uman-induced warming and associated sea level rises are expected to continue through the 21st century.'"

179. *See, e.g*., Dernbach et al., *supra* note 136, at 10960-61.

180. *See* CAA §111(a)(4) (defining "modification" to require both a physical or operational change *and* an increase in emissions. Thus, investments to improve efficiency from existing coal-fired facilities do not, standing alone, increase emissions and thus do not trigger NSR. *See* Letter from Francis X. Lyons, Regional Administrator, U.S. EPA, to Henry Nickel, U.S. EPA (May 23, 2000) (Applicability Determination Regarding the Proposed Replacement and Reconfiguration of the High Pressure Section of Two Steam Turbines at Detroit Edison's Monroe Power Plant), *available at* http://www.epa.gov/Region7/programs/artd/air/nsr/nsrmemos/detedisn.pdf.

181. EPA's NSR reform regulations facilitate such investments by broadening the scope of the exemption for "routine" activities. Thus, even extensive upgrades that result in actual emissions increases, e.g., by resulting in increased utilization that outweighs the reduction in emissions per unit of output resulting from newer or more efficient components, do not trigger NNSR or PSD so long as the project does not exceed 20% of the unit's replacement cost. *See* 68 Fed. Reg. at 61250-51. As noted, this rule change is presently stayed by the D.C. Circuit. *See supra* note 27.

182. *See* 68 Fed. Reg. at 61264-65 (even if the regulations had not changed, "the units would likely remain viable electric generating units for years without triggering BACT requirements").

units.[182] Only when an existing unit is so old that modernization is simply uneconomical or when demand is sufficient to support additional units, will a company proceed to make a major, long-term commitment of capital in new facilities. Yet, forecasters predict that both retirements and demand for additional units will occur in large numbers in coming years.[183] Thus, limiting CO_2 through NSR should not prolong the life of existing dirty units. Using NSR to take account of the cost of CO_2 emissions, however, might shift plans for construction of new units to less polluting alternatives.[184]

2. Emissions of CO_2 Result in Significant, Adverse Environmental Impacts That Merit Careful Consideration in NSR Permitting

That consideration of emissions of CO_2 as an unregulated pollutant is within the scope of NSR permitting is clear. Less certain is the appropriate level of consideration of the CO_2 issue. This Article has at several junctures referred to general principles of administrative law, historically adhered to in implementation of the NSR program. Under those principles, the uniform requirement for reasoned decisionmaking provides differing levels of administrative agency discretion in deciding an issue (as well as the level of appellate scrutiny of that decision), depending on the specific regulatory context in which the issue arises.[185] Applying these principles and their past usage in NNSR and PSD to the issue of CO_2 emissions from coal-fired power plants leads to the conclusion that this issue is a highly significant one that should limit agency discretion. This is so because of the severe adverse environmental impacts resulting from CO_2 emissions, the absence of other regulatory mechanisms to address those concerns, and the ability of NSR to effectively mitigate those impacts through appropriate permit conditions.

a. CO_2 Emissions Are Extremely Harmful

As noted at the outset, the United States shares the general consensus of scientific opinion that CO_2 emissions constitute a clear and present danger to human health and welfare and the environment, both in the United States and throughout the world. This factual determination has been stated and restated in recent years with ever-increasing clarity, certainty, and authority. It is summarized, and adopted as the official position of the U.S. government, in *Climate Action Report 2002*.[186]

In light of the authoritativeness of the factual conclusions of *Climate Action Report 2002*, there should be little need to debate the basic point of the threat posed by climate change and CO_2 as a significant cause of it in an NSR permit proceeding. What might appear subject to reasonable dispute is the degree to which emissions from a specific new coal-fired power plant contribute to the problem and are deserving of consideration. A typical 800 MW unit at a coal-fired

183. *See supra* note 3.

184. It might also be argued that NSR is simply irrelevant, because companies building new units will do so within the same general timeframe as retirement of existing units, thereby avoiding NNSR and PSD because there will be no net increase in emissions, particularly under the expanded baseline periods and other relaxed applicability features of the "reform" rules. *See* 67 Fed. Reg. 80186 (Dec. 31, 2002). This may be the case in those instances where new units represent a turning over of, rather than an addition to the existing stock. But there will be many additions, according to forecasts and the record of NNSR and PSD permit applications for additional units in recent years.

In addition, regulation, like water, seeks its own level. Thus, cutbacks in the scope of minimum federal NNSR and PSD permitting regulations will shift additional focus to two areas. One will be state NNSR and PSD programs, which may or may not adopt program revisions that reduce applicability, since SIP programs are allowed to be more stringent than minimum federal requirements. *See, e.g.*, 40 C.F.R. §51.166(b). The other area will include aspects of NSR unaffected by NNSR reform. These include "minor" NSR programs, which will take on added significance if projects previously requiring NNSR or PSD permits no longer do so. *See supra* note 26 and accompanying text. States will need to respond by bolstering those programs in light of the heavier weight they will bear in assuring that modified sources are consistent with air quality planning needs. Also taking on greater significance will be provisions of the PSD program other than the major source permitting program in CAA §165. The PSD program is not limited to §165 and EPA is authorized to use other tools in order to achieve the statutory purposes of that program. Alabama Power Co. v. Costle, 636 F.2d 323, 362-63, 368, 10 ELR 20001 (D.C. Cir. 1979). Thus, to the extent that major source permitting programs no longer fulfill the plenary obligation in CAA §161 to adopt programs to prevent significant deterioration of air quality—such as the deterioration associated with CO_2 emissions—it will be incumbent upon EPA and the states to adopt other measures that do so.

185. *See supra* Section I.A.

186. The broad conclusions set out in *Climate Action Report 2002* reflect the resolution of an issue addressed by the 1970 Amendments to the CAA, which listed effects on climate as a "welfare" effect of air pollution. Pub. L. No. 91-604, §15(a)(1) (1970). The 1970 legislative history shows congressional concern that manmade emissions could affect the global climate, but also uncertainty whether the warming effect of CO_2 or the cooling effect of particulates would predominate.

Sen. J. Caleb Boggs (R-Del.), ranking minority member on the Senate subcommittee with jurisdiction over the bill, incorporated into the record during the Sept. 21, 1970, floor debate President Richard Nixon's Message on the Environment of Feb. 10, 1970 and the summary portion of Environmental Quality—The First Annual Report of the Council on Environmental Quality (Aug. 1970) [hereinafter CEQ Report]. *See* 116 Cong. Rec. 32907 (1970). The president's message addressed the climate issue, pointing out that power plants and other stationary sources "can cause unforeseen atmospheric and meteorological problems." *Id*. at 32909. The later *CEQ Report* is more detailed. It begins by discussing the various air pollution issues addressed by the bill, tracking the format of the bill, and demonstrates the nature of the concerns that led to the inclusion of climate in the 1970 Amendments. Thus, the report addresses "[w]hat air pollution does," first "to human health," then "to vegetation and materials," "to visibility," and "to climate." *Id*. at 32913-14. (*Cf*. CAA §302(h) defining "effects on welfare" to include "vegetation, man-made materials . . . visibility, and climate.") The summary statement on climate is simple and to the point: "Air pollution alters climate and may produce global changes in temperature." Chapter V of this report deals with that subject. *Id*. at 32914. CEQ's summary recommendations call for "cooperative arrangements with other nations in limiting total amounts of air pollution," because of transboundary effects, and because "the addition of particulates and [CO_2] in the atmosphere could have dramatic and long-term effects on world climate." *Id*. at 32917.

Chapter V of the *CEQ Report* discusses in detail the impacts of emissions on atmosphere and climate, based on research available at that time. It expresses concern over the warming effect of CO_2, and with the cooling effect of particulates. See CEQ Report, *supra*, at 95-98. Specifically, it notes that mankind "can increase the [CO_2] content of the atmosphere by burning fossil fuels" and that "when [CO_2] concentrations increase, heat loss through radiation from the surface is reduced—the 'greenhouse' effect." *Id*. at 95. The report then points out that increased CO_2 levels could increase the earth's average temperature sufficiently that, "if not counteracted by other effects, could in a period of a few decades lead to the start of substantial melting of ice caps and flooding of coastal regions." *Id*. at 97. Three decades later, uncertainty over the net effects of various emissions has been resolved, and *Climate Action Report 2002* reflects the conclusion that CO_2 and other greenhouse gases are causing net global warming and associated climate change.

plant operating at base-loaded capacity emits approximately five million tpy of CO_2.[187] Emissions of this magnitude are undeniably small compared to total U.S. emissions or worldwide emissions, and it might be argued that they have only a de minimis impact on climate change and thus should be ignored. That would be false logic, however, as has been recognized with respect to various air pollution problems, including ozone pollution, acid rain, and visibility impairment. Those are all cumulative, regional-scale air quality problems that are difficult to attribute to any particular source or group of sources. Regulatory responses to those problems nevertheless recognize that individual large emitters of the relevant precursor pollutants—power plants in particular—are significant contributors to these problems and should bear some part of the burden for ameliorating them.[188] The nature of the climate change problem is essentially the same: no single source of CO_2 emissions or group of sources is a discernible cause of climate change. Rather, cumulative emissions from many sources cause the problem. It does not follow that an individual source of emissions—particularly a major new one from the largest category of CO_2 emitters—should be relieved of responsibility. That would be a recipe for total inaction that has been rejected in considering other air pollution problems and should be as to CO_2 as well. Rather, sizable sources such as coal-fired power plants must be viewed in terms of their contribution to the cumulative problem of climate change and the need—at least in the absence of a comprehensive regulatory program of CO_2 control—to mitigate that contribution.

b. There Is an Absence of Other Regulatory Mechanisms to Address CO_2 Emissions

Although the magnitude of the environmental impacts of CO_2 emissions is large, a permitting authority might reasonably reject a call for limitations on CO_2 emissions as an unregulated pollutant in NSR permitting if a comprehensive regulatory program already addressed those emissions. In those circumstances, there may be little or nothing to gain from additional consideration of CO_2 emissions in NSR. Cases such as *In re Genesee Power Station*[189] are illuminating in this regard. There, the petitioner claimed that in determining BACT the state should have given greater consideration to how choices of control technologies for limiting emissions of regulated pollutants would affect emissions of various toxic pollutants. The EAB found that in the circumstances of that case, more thorough consideration of the unregulated pollutants by the state would have added little, because the state had already directly regulated those pollutants through a state control technology requirement for limiting toxic emissions. The situation could not be more different with respect to CO_2 emissions. There is no direct federal regulation of CO_2 emissions through other programs, and limitations grounded in state law are generally absent also.[190] Thus, there is very substantial value added by seriously considering the emissions of unregulated CO_2 emissions when determining BACT and LAER for regulated pollutants, and in otherwise assessing the environmental impacts of a new coal-fired power plant.

c. NSR Can Effectively Mitigate the Adverse Environmental Impacts of CO_2 Emissions

Appropriate new source permit conditions can effectively mitigate the adverse environmental effects of CO_2 emissions from coal-fired power plants. This can be accomplished by requiring use of IGCC as the production process, and requiring CO_2 offsets. Absent the use of technology to capture and store CO_2, the only currently available means of reducing CO_2 emissions from such a plant is improving the efficiency of the production process. As explained, the thermal efficiency of IGCC is superior to that of other production technologies, and its use will reduce CO_2 emissions correspondingly. Nevertheless, even assuming a 20% advantage in thermal efficiency for IGCC, its use would only partially mitigate the climate change impacts of a new source, as very substantial CO_2 emissions would still occur (until such time as an IGCC facility were retrofitted with carbon capture-and-storage technology). By offsetting those emissions through a permit requirement for CO_2 reductions elsewhere, however, permitting authorities could further or even fully address the climate change impacts of the new source.

B. How CO_2 Emissions Should Be Considered in NSR Permitting

1. Use of IGCC Technology as a Production Process

With respect to IGCC, before considering CO_2 as a factor in the NSR permit decision, it is appropriate to summarize other reasons favoring use of this technology. As noted in Section III.B.2., IGCC is an environmentally superior technology for minimizing emissions of both NAAQS pollutants and mercury and other heavy metals, but it has been viewed as somewhat more expensive than other production processes. Those analyses of environmental and economic costs and benefits, however, typically have been incomplete, even as to NAAQS pollutants and toxic emissions. Specifically, they often fail to measure the cost-effectiveness of available options for control of regulated pollutants taking production efficiency into account. Correcting this oversight would, given the greater thermal efficiency of

187. For example, Detroit Edison's Monroe Unit 3 emitted 5,188,506 tons of CO_2 in 2001, according to monitoring data submitted under the EPA acid rain program. Taken together, the four 800 MW units at Monroe emitted 17,561,424 tons of CO_2 in 2001. *See* U.S. EPA, Emissions Scorecard 2001, Emissions and Heat Input Data tbls. B-1, B-2 (2002), *available at* http://www.epa.gov/airmarkets/emissions/score01/index.html.

188. *See, e.g.*, CAA Title IV, adopting a program requiring emissions reductions from individual coal-fired utilities to address their contributions to acid rain. *See also* CAA §169B (directing EPA to establish a "regional haze" regulatory program, including emission limits on individual coal-fired utilities, to address contributions to large-scale visibility impairment); 63 Fed. Reg. 57356, 57358-59, 57375-76 (1998) (recognizing "collective contribution" approach to ozone is necessary to address regional-scale effects and focusing on emission limits for utilities as largest emitters).

189. *See* PSD Appeal Nos. 93-1 et al., ELR Admin. Mat. 40969, 1993 EPA App. LEXIS 23, at **39-41 (Oct. 22, 1993).

190. Even where regulatory programs addressing CO_2 exist at the state level, they are not comprehensive and thus do not obviate the need to consider CO_2 emissions from new coal-fired power plants. For example, requirements for partial mitigation of CO_2 emissions under Oregon and Washington law, discussed *infra* in Section IV.B.2., do not directly address the issue of BACT or the climate change environmental impacts of the decision regarding what production process to use for a new plant.

IGCC compared to other production processes, lead to a corresponding improvement in the cost-effectiveness of IGCC as part of the mainstream BACT and LAER analysis for *regulated* pollutants even before taking CO_2 into account.[191] Likewise, considering IGCC technology for control of mercury and other heavy metals as "unregulated" pollutants for NSR purposes would improve the relative cost-effectiveness of IGCC due its much lower control costs, higher removal efficiencies, and greater thermal efficiencies for metals as compared to pulverized coal boilers.[192] Permitting authorities should also be mindful that even if IGCC is calculated to be more expensive than another production process, it still constitutes BACT or LAER unless costs or other relevant factors show it is not "achievable."

For reasons previously discussed, conducting a preconstruction assessment that takes into account the full range of environmental impacts of, and alternatives to, a proposed new source is required by the CAA, and must give detailed consideration to CO_2 emissions. Such an analysis also would tend to support a conclusion that IGCC should be adopted for new and modified coal-fired facilities, for two additional reasons.

First, any newly constructed coal-fired plant will be in operation for many, many years, and this longevity should be taken into account. Recent litigation involving electric utilities accused of illegally modifying existing plants without complying with NSR has highlighted the lengthening life-span of coal-fired plants. These units are now known to have a life-span of at least 50 to 60 years, and quite possibly longer.[193] Moreover, EPA recently adopted revisions to the NSR regulations that are intended to facilitate continued use of existing coal-fired units, thereby placing greater responsibility on states to fully assess those impacts at the time of initial construction since a second chance is unlikely.[194]

Second, there is a high likelihood that mandatory CO_2 regulation will be adopted early in the life-span of any coal-fired plant constructed during the next several years. As noted, the official U.S. position is that man-made CO_2 emissions are a cause of climate change. The Bush Administration rejects the Kyoto Protocol and opposes legislation that would adopt a national program of domestic regulation of CO_2. Instead it calls at present for a voluntary reduction in greenhouse gas "intensity," while carrying out a research program intended to develop more detailed information on climate change causes and effects. At the same time, however, the president maintains his intention both to comply with the UNFCCC and to reduce total greenhouse gas emissions: "I want to reiterate today . . . that we're committed to reducing greenhouse gases in the United States."[195] In addition, the United States has embarked on a significant and expensive program for developing carbon capture and storage technology. It also has established a greenhouse gas registry in the DOE, for the purpose of tracking voluntary reductions and thereby enabling these reductions to be credited under a future program of mandatory regulation.[196] The Administration's program also calls for revisiting the issue of mandatory CO_2 regulation by 2012.[197] Even strategists within Republican party circles suggest that the Administration will not continue for long a policy that on one hand acknowledges that CO_2 causes climate change and develops technologies and regulatory tracking mechanisms to provide for CO_2 reductions, and on the other denies the need for mandatory regulation.[198] In short, the prospect of CO_2 regulation presents a question of when, and not whether, comprehensive reductions will be mandated. The best answer, in the context of the long life-span of newly constructed coal-fired units, is "soon." Indeed some utilities are beginning to acknowledge the inevitability of CO_2 regulation by factoring its cost and financial risks into their corporate planning and reporting.[199]

Given the likelihood of future CO_2 regulation, it would be unreasonable for NSR permitting authorities to simply ignore CO_2 emissions now. Whether or not states are made directly responsible for managing CO_2 emissions under a future regulatory regime, they will certainly retain substantial

191. *See supra* note 162 and accompanying text; *see also, e.g*, O'Brien et al., *supra* note 153, at 40 (discussing potential methods of determining economic value of lower SO_2 and NO_x emissions from IGCC plants).

192. A study for the DOE estimates that the cost saving of 90% mercury control associated with IGCC compared to a pulverized coal boiler would be $10 million per year. *See id*. at 41-42.

EPA's 2004 proposed mercury emissions standards do not require companies to adopt a particular fuel or production process for new units, but rather would set emission limits based on the type of fuel combusted. Thus, different standards are proposed for units using bituminous coal, lignite, etc., and IGCC is treated as a separate class for this purpose. *See, e.g*., 69 Fed. Reg. at 4662-63, 4694. The proposed emission limits are based upon characteristics of the various coal types and available, highly variable, data regarding control experience. With respect to IGCC, however, the proposal does not presume any particular coal type but does assume a much higher 90% control efficiency than is assumed to be achievable with the other classes. *See id*. at 4665-66, 4691-93. Thus, a site-specific analysis under NSR may show that substantially lower mercury emission limits than those required by the proposed standards could be realized with an IGCC unit, depending on the type of coal that actually would be used. Likewise, in setting output-based standards, the proposal assumes 35% thermal efficiency for all new units. *See id*. at 4668, 4679. Even the existing IGCC units in the United States and elsewhere, however, all operate at 37.5-41.5% efficiency, and the DOE estimates that efficiencies up to 50% are achievable for new units. *See* Ratafia-Brown et al., *supra* note 151, at 1-26-27. In a site-specific analysis under NSR, these higher thermal efficiencies would translate into lower comparative costs for IGCC with respect to all pollutants, not just mercury.

193. *See, e.g*., United States v. Ohio Edison Co., 276 F. Supp. 2d 829, 838-40, 33 ELR 20253 (S.D. Ohio 2003) (discussing industry assumptions that coal-fired utility units had long been assumed to have a useful life of 30 years, but with "life extension" projects to periodically replace major components now have a useful life-span that is 50-60 years or longer, and perhaps indefinite).

194. *See supra* note 173 and accompanying text. Given this regulatory change facilitating piecemeal replacement of existing units, it seems unlikely that a new unit being built today and undergoing NNSR or PSD permitting would be regulated again in the future under NSR as a "modification." Thus, the time of initial construction of a new plant or unit may provide the only opportunity for permitting authorities to fully consider the environmental impacts of a particular source.

195. Joint Press Conference With President George W. Bush and President Jose Maria Aznar of Spain (June 12, 2001), *available at* http://www.whitehouse.gov/news/releases/2001/06/20010612-6.html.

196. For a discussion of these elements of the Bush Administration policy, see, e.g., William Pedersen, *Inside the Bush Greenhouse*, Wkly. Standard, Oct. 27, 2003.

197. *See, e.g.,* 69 Fed. Reg. 21514, 21515 (Apr. 21, 2004) (discussing Administration's Global Climate Change Initiative).

198. *See id*.

199. *See, e.g*., *Two Ohio Power Companies Agree to Report Economic Risks of Future Carbon Controls*, Daily Env't Rep. (BNA), Feb. 20, 1994; Pacificorp Integrated Resource Plan 2003, at 120-24, *available at* http://www.pacificorp.com/File/File25682.pdf (large western utility assumes, in scenario risk planning, a $8/ton carbon charge beginning in fiscal year 2009 for emissions above calendar year 2000 levels).

regulatory authority over power plants. States and ratepayers likewise will inevitably bear the environmental and economic consequences flowing from permitting decisions today when steps are taken tomorrow to reduce CO_2 emissions. In light of these foreseeable events, it is incumbent upon permitting authorities to undertake a full analysis of the regulatory and financial risks to which the state may be exposed by virtue of a decision to approve a coal-fired plant that does not minimize CO_2 emissions.

A comprehensive assessment of the cost of CO_2 emissions is necessary under BACT to understand the true costs of control technology alternatives for *regulated* pollutants alone, even before taking account of the environmental benefits of reduced CO_2 emissions as such. That analysis favors IGCC since it is the most cost-effective technology for both limiting CO_2 emissions from coal-fired units now and for retrofitting CO_2 capture-and-storage technology in the future. Thus, quantitative assessments conclude that if CO_2 is regulated in the future, that factor alone renders IGCC the cheapest of available production processes for new coal-fired units.[200] The prospect of those future, additional regulatory costs needs to be considered in order to determine the full cost of the options for minimizing emissions of *currently* regulated pollutants. In addition, a comprehensive assessment also is needed in order to take account of the status of CO_2 as an "unregulated pollutant" emitted by coal-fired power plants. It is in this respect that the environmental benefits of CO_2 reductions are taken into account in the permit decision.

Permitting authorities could apply standard methodologies for assessing the cost-effectiveness of control technology alternatives in considering emissions of CO_2, both as it affects the full cost of control options for regulated pollutants and in taking account of its status as an "unregulated pollutant." For example, in determining the costs and benefits of IGCC as part of their review of that technology for purposes of BACT for regulated pollutants, a state could determine the number of tons of CO_2 removed by virtue of IGCC's superior thermal efficiency compared to a baseline of CO_2 emissions from a pulverized coal boiler. Such an analysis should also take into account the likely future cost of controlling that same amount of CO_2 from the pulverized coal boiler, since that cost flows directly from the production process technology decision.[201] In considering future CO_2 regulation and its impact on the relative merits of IGCC and other combustion process technologies, the analysis should also take into account the cost of future retrofits to accommodate carbon capture and storage using IGCC versus pulverized coal or other technologies.[202] The combination of the likelihood of the need to make future CO_2 reductions and lower costs in doing so with IGCC militates in favor of using IGCC technology today.

Analytically distinct from consideration of CO_2 as it affects both the cost of controlling regulated pollutants and as an "unregulated pollutant" in a BACT analysis is the need to address CO_2 under the environmental impacts component of NSR. Although this form of assessment is, like the others, grounded in dollars-and-cents quantification, it should also take account of concerns that either are not amenable to quantification or entail a larger degree of uncertainty. As discussed previously, the statutory purposes of PSD, and the provisions requiring consideration of alternatives under both NNSR and PSD all call for a permitting decision that takes into account the uncertainty of the environmental risks posed by construction of a new source and the overriding legislative goal of environmental protection. These factors point toward a precautionary decision that errs on the side of protection.

Finally, in assessing CO_2 emissions, permitting authorities should insist that the permit applicant make a full disclosure of its own project and corporate financial risks with respect to future climate change regulations.[203] Doing so is a necessary component of the state's analysis of its own potential liabilities, since the permit decision could lead to adverse consequences for the state both as an environmental regulator and as a regulator of electric utilities. Full disclosure is likewise necessary for citizens to protect their own interests as ratepayers, investors, and taxpayers.[204] In short, climate change regulatory uncertainty might reasonably dissuade a utility company from investing in any new coal-fired power plant, and dissuade a state from approving that investment. But once a tentative decision to proceed with new coal capacity is reached, it seems apparent that the best way to minimize that risk is to use IGCC production technology, since doing so reduces CO_2 emissions now and holds the prospect of additional future reductions through carbon capture and storage.

2. CO_2 Offsets as a Permit Condition

A new coal-fired power plant that employs IGCC to minimize CO_2 emissions will still add millions of tons annually to an already harmful level of emissions at a time when there is no comprehensive plan to the climate change problem. This combination of acknowledged environmental harm and indefinite regulatory gap may be unprecedented in the modern era of environmental protection, and obliges states to seriously consider CO_2 offsets to prevent the largest new sources from making the climate change problem even worse. These offsets could be required as a condition of a NSR permit until comprehensive CO_2 regulations account

200. *See, e.g.*, Jeremy David & Howard Herzog, The Cost of Carbon Capture (Mass. Inst. of Tech. 2003), *available at* http://www.sequestration.mit.edu/pdf/David_and_Herzog.pdf. In their report, which was prepared for DOE, David and Herzog conclude that "IGCC plants will become more economical than PC plants if carbon sequestration becomes necessary." *Id*. at 2.

201. A future CO_2 regulatory regime might also establish a baseline for coal-fired plants that has the effect of providing extra credits for plants with thermal efficiency higher than in the baseline, which could result in future financial benefits to IGCC plants constructed today.

202. Consideration of future carbon capture and storage also raises siting concerns for a coal-fired plant, as appropriate geologic formations may be situated closer to some otherwise-suitable plant locations than others.

203. *See, e.g.*, Daily Env't Rep. (BNA), Nov. 25, 2003, at A-6 (discussing call by state financial officials and union pension funds for the U.S. Securities and Exchange Commission to fully enforce, with respect to risks posed by climate change, rules requiring corporate disclosure of trends and uncertainties that could affect a company's operations); *see also supra* note 190.

204. The recent, hugely costly bailout in the state of California of utilities that made improvident decisions in the wake of price deregulation and in complying with the Regional Clean Air Incentives Market (RECLAIM) NO_x reductions trading program shows that states, companies, and ratepayers could be left holding the bag if a new coal-fired plants fail to adequately plan for future CO_2 regulations. *See* Curtis Moore, *RECLAIM: Southern California's Failed Experiment With Air Pollution Trading*, 34 ELR 10261 (Mar. 2004).

for the plant's CO_2 emissions in a manner consistent with meeting climate change goals.

Although offsetting emissions reductions are only mandated for emissions of NAAQS pollutants from new sources locating in nonattainment areas, permitting agencies have in the past called for nonstatutory offsets to address other environmental impacts of new sources.[205] The legal authority to establish such permit conditions is a necessary corollary to the state's ability to deny a permit application altogether on any reasonable ground related to the comprehensive environmental concerns of NSR. Moreover, there are many reasons to support a state conclusion that some or all of the CO_2 emissions from a new coal-fired unit actually should be offset.

First, offsets under NSR are well suited to fill a regulatory gap of this nature by requiring that new sources be constructed on a "pay-as-you-go" basis in the absence of an air quality program that effectively addresses the environmental problem at issue. Indeed, offsets were originally required under NSR for this very reason.[206] The current issue of climate change and the absence of a program of CO_2 regulation present a remarkably similar problem and calls for a similar solution.[207]

Second, offsets work in tandem with the NSR emissions minimization tool by providing an economic incentive for use of IGCC to reduce the amount of offsets needed. Doing so will in turn stimulate the further development of both IGCC technology and associated carbon capture and storage technology by providing a market for both. Requiring offsets also provides a stimulus to other CO_2 reduction efforts, including improved production efficiency at existing utility units, by providing a market value to CO_2 reductions resulting from those actions.

Third, CO_2 offsets are not an untried regulatory tool; there are numerous available means of obtaining such offsets outside of a comprehensive program of CO_2 regulation, including market mechanisms.[208] Oregon provides an example of a permitting structure that integrates available CO_2 emissions reduction mechanisms into planning for new power plants. The state's approach establishes a nominal output-based CO_2 emission limit, and then allows sources to achieve that limit, in part, through use of offsets.[209] Oregon has designated a broad, flexible range of qualifying mechanisms that are quantifiable and verifiable, including reliance on CO_2 markets through payment of a per-ton cash fee to a third party to actually obtain CO_2 reductions.[210] The state of Washington has enacted a similar program, under which 20% of CO_2 emissions from new or modified plants must be offset over a period of 30 years through direct CO_2 reduction projects, purchase of credits, or third-party mitigation.[211] New Zealand has also required CO_2 offsets for a new coal-fired power plant in at least one instance in the absence of a regulatory system that comprehensively limits CO_2.[212] The examples of these jurisdictions demonstrate that new and modified utility plants are an appropriate first target for CO_2 limitations, and provide confidence that a broad array of mechanisms are available to enable companies to obtain those limitations in conjunction with new source permitting.

3. Action to Minimize and Offset CO_2 Emissions From New Sources Addresses Climate Change and Sustainable Development Obligations Under International Law

In addition to all of the above reasons grounded in domestic law and policy concerns that call for permit conditions minimizing and offsetting CO_2 emissions from new coal-fired power plants, doing so also would help fulfill U.S. obligations under international law.

The United States is bound by the UNFCCC, which was adopted at the Earth Summit in Rio de Janeiro in 1992, ratified by the Senate that same year, and entered into force in 1994.[213] As noted, the UNFCCC established an ultimate objective of stabilizing atmospheric concentrations of greenhouse gases at levels that would prevent dangerous human interference with the climate system within a time frame sufficient to allow ecosystems to adapt to climate change and to enable economic development to proceed in a sustainable manner.[214] President George W. Bush has reaf-

205. *See supra* note 58.

206. In 1976, Congress had deadlocked over CAA Amendments to address the fact that many states had failed to achieve the original 1975 deadline for attainment of the NAAQS. In those circumstances, EPA interpreted the rudimentary provision for review of new sources for consistency with air quality planning needs as requiring both LAER and offsets to prevent the problem from worsening pending adoption of revised air quality planning deadlines and other measures. *See* 41 Fed. Reg. 55524 (1976) (codifying 40 C.F.R pt. 51, app. S). As explained *supra* in Section I.B., Congress has retained the offset requirement in recognition of the limitations of comprehensive air quality planning approaches.

207. Likewise, employing IGCC as the clearly preferable control technology option is directly analogous to EPA's 1976 interpretation holding that in the absence of an effective air quality planning device, emissions from new sources should be minimized through use of LAER, thereby reducing the size of the offset requirement. *See id*.

208. For example, the Chicago Climate Exchange has established a rules-based market for buying and selling greenhouse gas emission reduction credits. *See* http://www.chicagoclimateexchange.com/.

209. *See* Or. Rev. Stat. §469.503, discussed in Dernbach et al., *supra* note 136, at 10961-62. For gas-fired plants, the state establishes a thermal efficiency base-case that serves as the CO_2 limit for newer sources to meet directly, by being at least as efficient, or through offsets, or by a combination of the two. For coal-fired plants, the CO_2 limit is set by rule on a plant-specific basis. *See id*.

210. *See id*.

211. *See* 2004 Wash. Laws Ch. 224 (enacted Mar. 31, 2004). Notably, the Washington law provides a partial credit for plants operating in a cogeneration mode. *See id*. §2(5). It further provides that third-party mitigation is at a rate of $1.60 per ton, although the state can by rulemaking adjust that price according to market prices and other factors. *See id*. §2(5)(a), (b).

212. *See* David Grinlinton, *The Taranaki Power Station—Atmospheric Discharges and the Resource Management Act*, 1 Resource Mgmt. Bull. (Butterworths) 105-07 (1995). New Zealand's decision to require offsets in that case was made pursuant to that country's Resource Management Act (RMA), a comprehensive environmental permitting statute that expressly incorporates principles of sustainable development. *See id*. At the time of permitting of the Taranaki plant, New Zealand did not have any comprehensive program of CO_2 limitations. (It has since ratified the Kyoto Protocol and is in the process of adopting domestic implementing legislation for limiting CO_2 emissions). Like the CAA, the RMA contains no provisions directly addressing CO_2. Like the NNSR and PSD provisions of the CAA, however, the RMA does call for consideration of alternatives and avoidance, remedy or mitigation of adverse effects of permitted emissions sources. *See id*. (discussing RMA §§5(2)(c) and 17(1)). In the Taranaki matter, the New Zealand permitting authority required the permit holder to establish a carbon sink sufficient to store the equivalent amount of carbon emitted from the plant over the term of the permit. *See id*.

213. For a general description of UNFCCC provisions, obligations, and implementation measures, see U.N. Climate Change Secretariat, A Guide to the Climate Change Convention Process (2002), *available at* http://unfccc.int/resource/process/guideprocess-p.pdf.

214 *See id*.

firmed the U.S. commitment to the general obligations of the UNFCCC.[215] The president has, of course, rejected the Kyoto Protocol setting out a specific program of reduction in CO_2 and other greenhouse gases. Rather, the Administration is relying heavily on use of innovative technology to meet UNFCCC objectives,[216] and encourages individual U.S. states to adopt their own innovative measures to reduce emissions.[217]

Another result of the 1992 Earth Summit was the adoption by the United States and other participating countries of the Rio Declaration on Environment and Development establishing "sustainable development" as the guiding concept for meeting environmental and developmental needs of present and future generations.[218] The Rio Declaration consists of 27 principles setting out the goals and principles of sustainable development. The Rio Declaration can appropriately be divided into normative and strategic principles. Substantively, the key normative principles are to eradicate poverty and achieve a higher quality of life for all people through sustainable patterns of resource production and consumption.[219] Procedurally, the key normative principle is to integrate environmental concerns and economic development in decisionmaking.[220] These are coupled with strategic principles, chief among them being "polluter pays," the precautionary approach, developed country leadership, and intergenerational and intragenerational equity.[221] The Earth Summit also produced Agenda 21, a detailed plan of action for implementing the sustainable development principles set out in the Rio Declaration.[222]

Little demonstrable progress was made toward either sustainability goals generally or toward the stabilization of greenhouse gases as required by the UNFCCC in the 10 years following Rio. The 2002 World Summit on Sustainable Development in Johannesburg, South Africa, was intended to reinvigorate world efforts toward sustainable development. The U.S. position at Johannesburg emphasized the need for good domestic governance, summarized in the declaration of Secretary of State Colin Powell that "sustainable development must begin at home."[223] Although Powell's remarks were aimed primarily at developing countries, his words also serve as a reminder of the obligations of developed countries, and of the United States in particular as the world's largest emitter of greenhouse gases and consumer of natural resources. In any event, the Bush Administration has explicitly linked U.S. efforts to meet climate change obligations under the UNFCCC to its broader obligations to pursue policies that will foster sustainable development.[224] One significant step that can be taken on the path to sustainable development is insisting that any new coal-fired power plants be a part of the solution to climate change rather than part of the problem.

V. Appendix: Available Remedies When Reasoned Decisionmaking Is Lacking in NSR

The bedrock administrative-law principle of reasoned decisionmaking is intended to guide permitting authorities in making appropriate NSR permit decisions in the first instance. Secondarily, since permitting authorities may not always meet this reasonableness standard, reference to it acknowledges the reality that administrative and judicial review may be necessary in order to assure that the environmental protection goals of NSR are realized. Thus, it is useful to summarize the range of remedies that are available to address NNSR and PSD permit decisions that are legally deficient.

Under the CAA statutory scheme, NSR programs exist as both state law and as federal law. That is, programs submitted to EPA retain their state law character. Upon EPA approval, however, they become federal law as well, and all such programs are incorporated by reference into the *Code of Federal Regulations*.[225]

Several different administrative and judicial remedies are available when a state NSR permitting decision is legally deficient. The availability of a particular remedy depends upon whether the permitting authority is the state or federal government and the posture of the case. Where the state is the permitting authority, administrative appeals and judicial review are available under the particular state's system for review of agency action. State administrative appeals may be de novo or based on the record of the permit proceeding, but state judicial review is usually on the record under a state analog of the federal "arbitrary and capricious" standard.[226]

215. "I reaffirm America's commitment to the [UNFCCC] and it's [sic] central goal, to stabilize atmospheric greenhouse gas concentrations at a level that will prevent dangerous human interference with the climate." Remarks of President George W. Bush, President Announces Clear Skies & Global Climate Change Initiatives (Feb. 14, 2002), *available at* http://www.whitehouse.gov/news/releases/2002/02/20020214-5.html.

216. *See, e.g.*, Under Secretary of State Paula Dobriansky, Remarks at the American Enterprise Institute (Nov. 19, 2003), *available at* http://www.state.gov/g/rls/rm/2003/26530.htm ("it is our intention to implement policies that will foster these technology-based solutions"). One example is the "FutureGen" project, a pilot plant intended to produce electricity and hydrogen from coal with zero emissions using IGCC and carbon sequestration technology. *See* http://www.fe.doe.gov/programs/powersystems/futuregen/.

217. *See* Statement to the Second Meeting of the Plenary, by Dr. Harlan Watson, Head of U.S. Delegation and Senior Climate Negotiator and Special Representative, at the Ninth Conference of the Parties to the UNFCCC, Milan, Italy (Dec. 4, 2003), *available at* http://www.state.gov/g/oes/rls/rm/2003/26894.htm (discussing regulatory and voluntary state efforts to limit GHG emissions by acting as "laboratories where new and creative ideas and methods can be applied and shared with others and inform federal policy").

218. U.N. Conference on Environment and Development (UNCED), Rio Declaration on Environment and Development, U.N. Doc. A/CONF.151/5/Rev. 1, *reprinted in* 31 I.L.M. 874 (1992).

219. *Id*. princs. 5, 8.

220. *Id*. princ. 4.

221. *See id*. princs. 16, 15, 7, 20-22. For a model of integrated resource management relying on sustainability principles that helpfully divides relevant goals and tasks into normative, strategic, and operational levels, see David Grinlinton, *Contemporary Environmental Law in New Zealand*, *in* Environmental Law for a Sustainable Society 30-31 (Klaus Bosselmann & David Grinlinton eds., 2002).

222. *See* UNCED, Agenda 21, P8.7, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. I), U.N. Sales No. E.93.I.8 (1992).

223. Secretary of State Colin L. Powell, Making Sustainable Development Work: Governance, Finance, and Public-Private Cooperation, Remarks at State Department Conference, Meridian International Center, Washington, D.C. (July 12, 2002), *available at* http://www.state.gov/secretary/rm/2002/11822.htm.

224. *See* Paula Dobriansky, Remarks at the American Enterprise Institute, *supra* note 216 ("Significantly, we also believe that climate change, should not be pursued in isolation, but should be handled as an integral part of a broad strategic paradigm of sustainable development.").

225. *See, e.g.*, 40 C.F.R. §52.884 (approval of Kansas PSD program); *id.* §870 (identification of contents of Kansas SIP).

226. *See, e.g.*, T.R.A.S.H., Ltd. v. Commonwealth, 132 Pa. Commw. 652, 574 A.2d 721 (Pa. Commw. 1990) (in determining BACT, state

EPA retains oversight authority under approved SIPs, and both EPA and citizens can bring suit in federal district court—to enforce the terms of NNSR and PSD permits, and to insure that state permitting decisions meet substantive and procedural NSR requirements.[227]

Where EPA is the permitting authority, including under "delegated" programs where the state actually issues permits, permit decisions may be appealed to EPA's EAB.[228] The EAB reviews permitting actions based on the administrative record, and its decisions constitute final agency action subject to judicial review in the appropriate U.S. court of appeals.[229] Such judicial review likewise is on the record, pursuant to the "arbitrary and capricious" standard of judicial review under the APA.[230]

A federal remedy for review of state NSR permit decisions is also available through the operating permit provisions of Title V of the CAA. Under Title V, all "major" sources, including all sources subject to NNSR or PSD permitting, are required to have a state-issued operating permit[231] that incorporates the full range of requirements applicable to that source under the CAA.[232] Thus, Title V permits must include the terms of underlying NSR permits issued by a state.[233] In addition to reflecting substantive state decisions regarding the terms and conditions included in PSD and NNSR permits, Title V permits embody the threshold decision whether NSR applies at all. All of these state decisions are subject to challenge through provisions of Title V requiring that EPA object to, or "veto," any permit that does not comply with CAA requirements.[234] If EPA declines to object on its own initiative, citizens can petition EPA to object to an allegedly deficient permit, and EPA denial of a petition to object is final agency action, subject to judicial review in a federal court of appeals.[235] As a requirement for approval of Title V programs, the CAA also requires that states provide citizens who participated in the permit proceeding an opportunity to challenge deficient operating permits in state court.[236] The provisions requiring both an opportunity for a petition to veto the operating permit with ultimate review in federal court, and state court review of the permit appear on their face to allow citizens "two bites at the apple" in challenging permit decisions. The one case on point, however, found otherwise, which suggests that potential litigants should choose their forum carefully.[237]

agency did not abuse its discretion, or commit errors of law, and had substantial evidence to support its findings of fact); Panhandle Eastern Pipe Line Co. v. Illinois Envtl. Protection Control Bd., 314 Ill. App. 3d 296; 734 N.E.2d 18 (Ill. Ct. App. 2000) (citing 415 ILCS 5/39(a) (West 1998)) (Illinois law implementing PSD program authorizes state permitting agency to impose conditions as may be necessary to accomplish the purposes of the Act; among the reasons a permit may be denied are that the Act or regulations will be violated or not met if the permit is granted or the applicant failed to provide a specific type of information deemed necessary by the agency); In re Shintech, Inc., 814 So. 2d 20, 25 (La. App. 1st Cir. 2002) (judicial review of combined construction and operating permit considers whether state agency followed a "rule of reasonableness" and made a rational connection between the facts found and the order issued).

227. *See* CAA §§113, 167 (EPA enforcement authority); *id*. §304 (citizen suit authority). Citizen enforcement authority to challenge the adequacy of state permit decisions is available in federal court under the citizen suit provisions of CAA §304. *See, e.g*., League to Save Lake Tahoe v. Trounday, 598 F.2d 1164, 9 ELR 20598 (9th Cir. 1979); *see also* Communities for a Better Env't v. CENCO Ref. Co., 180 F. Supp. 2d 1062, 1076-84 (C.D. Cal. 2001) (construing *Trounday* and summarizing other cases addressing challenges to state NSR permitting decisions under §304).

228. *See* 40 C.F.R. §§52.21(q), §124.19; *see also* 45 Fed. Reg. 33290, 33413 (May 19, 1980) ("For the purposes of part 124, a delegate . . . stands in the shoes of the Regional Administrator. Like the Regional Administrator, the delegate must follow the procedural requirements of Part 124. . . . A permit issued by a delegate is still an 'EPA-issued permit' . . . .").

229. *See* 40 C.F.R. §124.19(f)(1) (final decisions of the EAB are final agency action for purposes of judicial review); CAA §307(b)(1) (U.S. courts of appeals have exclusive jurisdiction to review any final action under the CAA).

230. Citizens for Clean Air v. EPA, 959 F.2d 839, 845-46, 22 ELR 20669 (9th Cir. 1992).

231. The Title V program structure is similar to that of SIP programs under the CAA in that each state must submit for EPA approval a program meeting the requirements of EPA regulations. These regulations are set forth at 40 C.F.R. pt. 70. Where there is no state program, and on Indian lands, EPA issues operating permits pursuant to regulations at 40 C.F.R. pt. 71. At present, all states have approved Title V programs.

232. *See* CAA §§502(a) (requirement to obtain operating permit), 504(a) (requirement that permits include all "applicable requirements," including requirements of SIPs).

233. *See* 40 C.F.R. §70.2 (definition of "applicable requirement" includes NSR permits).

234. *See, e.g*., LaFleur v. Whitman, 300 F.3d 256, 33 ELR 20006 (2d Cir. 2002) (petition for review of Title V permit challenging underlying state decision that PSD did not apply to a project); *see also* United States v. AM General Corp., 34 F.3d 472, 475, 24 ELR 21497 (7th Cir. 1994) (Title V veto available to challenge terms of deficient NNSR permits); Sierra Club v. Leavitt, 2004 U.S. App. LEXIS 8832 (11th Cir. 2004) (Title V veto available to challenge decision whether to issue NNSR permit); In the Matter of Borden Chemicals, Inc., Geismar, La. (Adm'r Dec. 22, 2000) (Administrator's review of citizen petition challenging NNSR permit decision incorporated into Title V permit).

235. The mechanics of the Title V veto process are as follows: After a state has issued a draft permit for public comment and has prepared a near-final "proposed" permit decision, that proposed permit must be submitted to EPA for review. CAA §505(a)(1)(B). EPA has 60 days to object to the permit as "not in compliance with the applicable requirements of this Act, including the requirements of an applicable implementation plan." *Id*. §505(b)(1). If EPA vetoes the permit, the state must reissue it in accordance with the EPA objection. *Id*. §505(b)(3). If EPA does not act, citizens who have participated in the permit proceeding have 45 days to petition EPA to veto the permit under the "not in compliance" standard noted above, and EPA must by statute respond to the petition within 60 days. *Id*. §505(b)(2). EPA's responses to veto petitions must be made by the Administrator and cannot be delegated. A searchable compilation of these responses is available on the Internet at http://www.epa.gov/region7/programs/artd/air/title5/titlevhp.htm. Judicial review of petition denial (but *not* the grant of a petition) is provided in CAA §505(b)(3). *See, e.g.*, New York Pub. Interest Research Group v. Whitman, 321 F.3d 316, 332-34, 33 ELR 20154 (2d Cir. 2003) (vacating, under arbitrary and capricious standard, EPA denial of petition to object; having made discretionary determination that permit was not in compliance with CAA, EPA had nondiscretionary duty to grant petition to object).

236. CAA §502(b)(6). EPA has limited the broad reach of the statutory by interpreting its implementing regulation at 40 C.F.R. §70.4(b)(3)(x), as limiting the necessary standing to those who would have standing under Article III of the U.S. Constitution in a federal case. 59 Fed. Reg. 31183, 31184 (June 17, 1994). The requirement that standing be as broad as provided under Article III has been upheld against a state challenge that this requirement unconstitutionally limits state sovereignty. Virginia v. Browner, 80 F.3d 869, 878-80, 26 ELR 21245 (4th Cir. 1996).

237. In *LaFleur*, citizens unsuccessfully challenged a Title V permit in state court, alleging a deficiency in the underlying decision not to require a PSD permit, based in turn on an allegedly incorrect interpretation of EPA's regulations governing PSD applicability. The U.S. Court of Appeals for the Second Circuit held that the petitioners were collaterally estopped from also obtaining judicial review of EPA's denial of their petition to veto the operating permit, since there was identity of issues. 300 F.3d at 273 (citing Montana v. United States, 440 U.S. 147 (1979)). The court characterized this outcome as "troubling," since it appeared to infringe on the express congressional grant of jurisdiction to the courts of appeals to review EPA denial of a veto petition. *See id*. at 275. It found comfort, however, in its further explanation that *EPA* would not have been bound by the prior

The practical effectiveness of a Title V remedy to address deficient NSR permit decisions may depend upon whether the state has "consolidated" its construction and operating permit programs in order to issue both permits contemporaneously, which results in the window for EPA objection opening before construction begins. Many states have done so, but others have not, relying on federal regulations that allow deferral of operating permits for new sources until years after construction has been completed and operation has begun.[238] Timeliness is critical in any challenge to NSR permit decisions, since as a practical matter, reviewing courts will be mindful of the equity that attaches to a facially valid permit. Thus, as with other mechanisms for addressing deficient NNSR and PSD permits, it seems imprudent to rely only upon a Title V objection opportunity that would not occur until long after the NSR permit has been issued.[239]

Permitting authorities unquestionably have a substantial degree of discretion in implementing NSR programs under any of the schemes for judicial review of their decisions outlined above. It is just as certain that their discretion is not unlimited. As the Court held in *Alaska Department of Environmental Conservation*, permitting agencies must conform to administrative-law norms in carrying out these programs. That is, their permitting decisions must be supported by the record developed for the permitting decision, must adhere to applicable procedures, and must otherwise reflect reasoned decisionmaking.[240] Although the specific context of *Alaska Department of Environmental Conservation* involved an EPA enforcement action and a deficient state BACT decision, the principle of reasoned decisionmaking extends to all NSR permits and all remedial mechanisms. Thus, both state and federal permit decisions that fail to meet this "arbitrary and capricious" standard are subject to being overturned on judicial review. Likewise, the standard of judicial review is essentially the same regardless of the specific forum or mechanism for review of the permitting decision: EPA and citizen enforcement actions in federal district court, citizen permit challenges in state court, direct appellate review of EAB actions regarding delegated state PSD decisions, and appellate review of EPA veto petition denials under Title V regarding state NSR decisions.[241] EPA has consistently articulated this standard on numerous occasions over 20 years, emphasizing the breadth of state discretion, the certainty that an effective remedy will lie if the state abuses its discretion, and the uniformity of the ultimate standard of review regardless of the particular oversight mechanism employed. In *Alaska Department of Environmental Conservation*, the Court expressly endorsed all three of these elements.[242] Although the Court was addressing a case

state court judgment if it had agreed with the citizens that the state permit decision was legally deficient. *See id*.

The court's collateral estoppel analysis in *LaFleur* is open to question. It appears to give insufficient consideration not only to the express congressional grant of recourse by citizens to both state and federal courts, but also to the primacy of EPA under the CAA to authoritatively interpret that statute and its own regulations pursuant to the teachings of Chevron, U.S.A., Inc. v. Natural Resources Defense Council, 467 U.S. 823, 14 ELR 20507 (1984) (statutory interpretations), and Udall v. Tallman, 380 U.S. 1 (1965) (regulatory interpretations). Thus, although the state and federal courts addressed essentially similar subject matter, as a legal matter the "issues" were profoundly different. The Second Circuit's decision failed to grasp the fundamentally different character of a statutory or regulatory interpretation by a *federal* agency charged with implementation of the federal law in question, and a decision reached beforehand by a court reviewing the interpretation of a *state* agency that is entitled to no deference under federal law. Since, under *Chevron* and *Tallman,* a court is required to defer to any reasonable agency interpretation once it has been rendered—even including an interpretation that reverses a prior agency view—there is no true inconsistency between a prior state (or for that matter, federal) court judgment and a contrary, subsequent EPA interpretation. Accordingly, the purpose of the collateral estoppel doctrine of avoiding inconsistent judgments on identical issues is not served by applying the doctrine in this context. Moreover, the court's comfort in its ruling that EPA itself would not be estopped from reaching a different outcome than the state court did is inadequate, since that option does not fulfill the citizen's statutory right to force EPA to issue its own interpretation of the provision at issue and defend that interpretation as reasonable, as CAA §505(b)(2) provides.

In Alaska Dep't of Envtl. Conservation v. EPA, 124 S. Ct. 983, 34 ELR 20012 (2004), the Court likewise recently pointed to *Montana* in responding to a contention of the dissenters that upholding the ability to obtain judicial review of state NSR permit decisions in federal court would diminish the importance of state action. The Court noted that EPA has never "asserted authority to override a state-court judgment." *See* 124 S. Ct. at 1003 n.14. The *Alaska Dep't of Envtl. Conservation* Court's dicta made no mention of *LaFleur* or the Title V oversight mechanism.

238. CAA §502(a) generally prohibits covered sources from operating without a Title V permit. However, the Framers provided that existing sources should not be penalized by state delays in issuing permits. Thus, §503(d) contains an "application shield" against the §502(a) prohibition for sources filing timely permit applications, but excludes from the shield "sources required to have a permit before construction or modification under the applicable requirements of this Act." EPA regulations nevertheless extend the application shield to new sources by allowing states to defer operating permit application deadlines until 12 months *after* a new source begins operation. 40 C.F.R. §70.5(a)(1)(ii). In those states, the opportunity for EPA objection in CAA §505 may not occur for years after construction has been completed.

239. In *Alaska Dep't of Envtl. Conservation*, the Court warned that courts would not look kindly upon untimely enforcement challenges to state permit decisions: "EPA, we are confident, could not indulge in the inequitable conduct [Alaska] and the dissent hypothesize while the federal courts sit to review EPA's actions." 124 S. Ct. at 1006 (citations omitted). Private parties surely would be wise to heed this warning as well. It is far from clear, however, that a Title V objection to a state BACT or LAER determination occurring after construction should be deemed inequitable, since any delay in the objection opportunity would be due to the state's own decision to defer issuance of the Title V permit until long after the NSR permit. *See supra* note 238.

240. *See id*. at 999-1006.

241. *See, e.g., id*. at 1004-05 (in either direct appellate review of EPA compliance order or EPA civil action in district court, "the production and persuasion burdens remain with EPA and the underlying question a reviewing court resolves remains the same: Whether the state agency's BACT determination was reasonable, in light of the statutory guides and the state administrative record."); Alabama Power Co. v. Costle, 636 F.2d 323, 409, 10 ELR 20001 (D.C. Cir. 1979) ("the permitting authority, which in most cases will be a state, may exercise reasonable discretion" in determining BACT); Northern Plains Research Council v. EPA, 645 F.2d 1349, 1358-62 (9th Cir. 1981) (affirming EPA BACT decision because permitting authority "exercised reasoned discretion"); Sur Contra la Contaminacion v. EPA, 202 F.3d 443, 448, 30 ELR 20358 (1st Cir. 2000) (upholding as reasonable under "arbitrary and capricious" standard of review EPA's air quality analysis and BACT determination); Citizens for Clean Air v. EPA, 959 F.2d 839, 845-46, 22 ELR 20669 (9th Cir. 1992) (upholding BACT decision of EPA as permitting authority, with State agency as delegatee, under arbitrary and capricious standard); Plumbers & Steamfitters, Local 52 v. Alabama Dep't of Envtl. Mgmt., 647 So. 2d 793 (Ala. Civ. App. 1994) (upholding state BACT decision under arbitrary and capricious standard against citizen suit challenge in state court); In re NJPDES Permit No. NJ 0055247, 522 A.2d 1002, 1007-08 (N.J. Super. Ct. App. Div. 1987) (upholding state LAER decision as reasonable under arbitrary and capricious standard against citizen suit challenge in state court); *LaFleur*, 300 F.3d at 256 (upholding, under arbitrary and capricious standard, EPA denial of Title V petition to object that was based on claim state had wrongly determined that a new source of pollution did not require a PSD permit).

242. In upholding the ability of EPA to challenge state permit decisions, the Court cited, in addition to the CAA statutory terms and legisla-

where EPA was challenging the NSR permit decision, nothing in its opinion suggests that these factors would differ where a private party brings the case. Thus, the Court's holding emphasizing the need for reasoned decisionmaking, although it specifically addressed the immateriality of forum in *EPA* permit challenges, should apply to all parties: "The underlying question a reviewing court resolves remains the same: Whether the state agency's BACT determination was reasonable, in light of the statutory guides and the state administrative record."[243]

A final point to consider in assessing potential remedies for deficient NSR decisions by either a state or EPA is the substantial, although not always visible, role played by the permit applicant. As a practical matter, in weighing applications for NSR permits, permitting authorities rely heavily on the applicant's submission, often supplemented formally and informally through discussions between the company—and its lawyers and expert technical consultants—and the state. Similarly, in considering citizen challenges to NSR decisions, government agencies must contend with the political and economic power that companies can—and do—bring to bear. The legislative history of the CAA reflects that one of Congress' principal motivations in enacting the PSD program was to prevent states from competing for the valuable economic benefits—jobs, tax revenues, etc.—that major investments in new factories can bring to an area by lowering environmental standards.[244]

The informal history of NSR contains many instances and many forms of company influence. In some instances, this occurs when career staff at state permitting agencies recommend tough conditions in PSD and NNSR permits. This can be followed by intense lobbying from the company, and then by a political decision to issue a final permit decision that substantially waters down the initial permit terms. On occasion, these activities find their way into the public record and become a key part of a challenge to the adequacy of a permit decision, e.g., because the state, in seeking to placate a powerful company, failed to adequately justify its change in position.[245] Another unfortunate dynamic can be observed when the applicant attempts to "pre-wire" a PSD or NNSR permit with the state, seeking informal assurances that the prospective source will be permitted as proposed. Citizens who believe they have been shortchanged by such dealings are unlikely to prevail in attempting to discover evidence clearly documenting these practices. By the same token, reviewing courts are unlikely to be persuaded by assertions that ex parte understandings drove permit decisions in the absence of a "smoking gun." Accordingly, citizens should focus their efforts on building a full record before the permitting authority, and by insisting that the decision be grounded in that record.

VI. Conclusion

Consideration of alternatives under NSR requires a hard look at the environmental consequences of the available choices for fulfilling energy needs. This tool should be employed to scrutinize the threshold decision to build any new power plant and at each key step in the decisionmaking process, in order to minimize emissions and mitigate adverse environmental impacts. As to coal-fired plants in particular, four factors now have converged that should invigorate state efforts under NSR to address the dangers posed by emissions of CO_2. First, the U.S. government shares in the global consensus that the problem of climate change is grave and necessitates prompt action to avoid the real possibility of environmental disaster. Second, there is no comprehensive regulatory program in place to address this problem, leaving a yawning regulatory gap. Third, because their emissions are so large over such a long period of time, new coal-fired power plants present a compelling opportunity to begin filling this gap now. Finally, the availability of IGCC technology and offset mechanisms provide cost-effective means to address climate change by limiting CO_2 emissions from those plants. The Court recently reminded us in *Alaska Department of Environmental Conservation* that NSR permit decisions must be reasonable under the circumstances presented. Taking the above factors into account as they consider all the consequences of constructing new coal-fired plants, states are likely to conclude that these modest steps should be taken to limit CO_2 emissions.

tive history, EPA memoranda from 1983, 1988, and 1993 emphasizing the need for, and the limitations of, oversight of state permit decisions. *See* 124 S. Ct. at 999-1001. The Court also referenced an EPA rulemaking that made these same points in the context of the use of Title V veto petitions to address alleged underlying NSR permit deficiencies. *See id*. at 1001 (quoting 63 Fed. Reg. 13795, 13797 (1998)).

243. 124 S. Ct. at 1005. *Alaska Dep't of Envtl. Conservation* swept away the state's argument, previously adopted by a district court in United States v. Solar Turbines, Inc., 732 F. Supp. 535 (M.D. Pa. 1989), that a BACT determination was not subject to challenge because it did not reflect an "objective" standard. "[T]he fact that the relevant statutory guides—'maximum' pollution reduction, considerations of energy, environmental, and economic impacts—may not yield a 'single, objectively "correct" BACT determination' . . . surely does not signify that there can be no unreasonable determinations." 124 S. Ct. at 1002. *See also* Alaska v. EPA, 298 F.3d 814, 821, 32 ELR 20793 (9th Cir. 2002).

244. As the Ninth Circuit pointed out in *Alaska Dep't of Envtl. Conservation*, "Congress recognized that the states experienced internal industry 'pressure . . . to relax their standards with the threat of industrial relocation in other, more permissive States.' S. Rep. No. 95-127, at 136-37 (1997), *reprinted in* 1977 U.S.C.C.A.N. 1077, 1215. Overarching federal leadership provided 'protection for States exercising their right to maintain clean air.' *Id*." 298 F.3d at 820. The Court likewise took seriously the congressional concerns about "economic-environmental blackmail" that could arise in the absence of enforcement mechanisms to "restrain the interjurisdictional pressures." *See Alaska Dep't of Envtl. Conservation*, 124 S. Ct. at 1000-01 (citations omitted).

245. *Alaska Dep't of Envtl. Conservation* may have been just such a case. After the state's initial draft permit required use of the most stringent controls as BACT, company comments were followed by an agency decision overruling "its staff's clear view" and the state instead "endorsed the alternative proffered by [the company]." *See id*. at 995. The state's overruling of its staff was not accompanied, however, by any reasoned analysis that would justify the change in position. As the Ninth Circuit found, the state's "apparent motivation . . . is uncomfortably reminiscent of one of the very reasons Congress granted EPA enforcement authority—to protect states from industry pressure to issue ill-advised permits. See S. Rep. No. 95-127, at 136." 298 F.3d at 823. And as the Court put it, the state's basis "reduces to a readiness '[t]o support Cominco's . . . Project, and its contributions to the region.'" 124 S. Ct. at 1003. The dissenters in the Court, seemingly without irony, reasoned in part that a federal remedy to address arbitrary state BACT decisions is unwarranted because it undermines the "expertise and commitment to the law" of state agency staffs. *Id.* at 1017. The majority sided instead with those state amici who understand that the availability of a federal remedy is critical to states' ability to withstand industry pressure to override the sound exercise of their own discretion. *See id*. at 1000-01.