

ENVIRONMENTAL ENERGY INSIGHTS

A S T R A T E G I C I N F O R M A T I O N S E R V I C E

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It is Official — EPA Can Regulate CO₂

Summary: The Supreme Court handed down two significant decisions in April that have far reaching implications for regulated industries under the Clean Air Act. In the first case, in a five to four decision, the Court held that the Environmental Protection Agency (EPA) acted arbitrarily and capriciously in denying a rulemaking petition in which several organizations asked EPA to regulate greenhouse gas (GHG) emissions from new motor vehicles under Section 202 of the Clean Air Act. Among the additional significant holdings, the Court also found that GHG emissions are air pollutants subject to regulation under the Clean Air Act. As discussed in this article, this case will have far reaching implications beyond motor vehicles.

Massachusetts v. EPA

The issues in *Massachusetts v. EPA* first arose in October 1999 when a group of organizations filed a rulemaking petition with Environmental Protection Agency (EPA) that called for EPA to use Section 202 of the Clean Air Act to establish greenhouse gas (GHG) emission standards for new motor vehicles. After receiving almost 50,000 comments, EPA denied the petition on September 8, 2003. The Agency justified its denial by reasoning that the Clean Air Act did not authorize EPA to issue mandatory regulations to address global climate change and that even if EPA had the authority to set GHG standards, it believed it was not appropriate for EPA to establish GHG emission standards for new motor vehicles at that time. The Supreme Court summarized EPA's reasoning by saying that "in essence, EPA concluded that climate change was so important that unless Congress spoke with exacting specificity, it could not have meant the agency to address it."

Petitioners, joined by Massachusetts and other states, challenged EPA's denial in the United States Court of Appeals for the D.C. Circuit. At issue in the case was the petitioners' standing to bring the case and EPA's decision not to regulate GHGs. Each of the three judges wrote a separate opinion, but two of the judges (Judges Randolph and Sentelle) agreed that EPA had properly exercised its discretion in denying the petition for rulemaking.

The Supreme Court heard oral arguments for the Court's first global warming case on November 29, 2006. Based on the oral arguments, many correctly thought, that the case would turn on the issue of standing and that Justice Kennedy would be key in determining who would win.

Justice Stevens wrote the five to four majority opinion (Justices Kennedy, Souter, Ginsburg, and Breyer joined). The majority opinion first noted that it is of "considerable relevance" that the Petitioner was a state and not a private individual. The Court also

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INSIGHTS

Environmental Energy Insights

Environmental Energy Insights is published by M. J. Bradley & Associates. *Insights* provides analysis of important regulatory and policy developments in the environmental and energy areas.

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stated that “Massachusetts cannot invade Rhode Island to force reductions in greenhouse gas emissions, it cannot negotiate an emission treaty with China or India, and in some circumstances the exercise of its police powers to reduce in-state motor-vehicle emissions might well be preempted.” Given this reasoning, the Court concluded that EPA is authorized to protect Massachusetts (among others) by prescribing standards applicable to air pollutants that may reasonably be anticipated to endanger public health or welfare. With respect to Massachusetts’ stake in protecting its quasi-sovereign interests, the Court noted that the Commonwealth is entitled to “special solitude in our standing analysis.”

Despite recognition of the special status of Massachusetts, the Court engaged in the typical three part standing analysis: (i) whether the litigant has demonstrated that it has suffered a concrete and particularized injury that is either actual or imminent, (ii) that the injury is fairly traceable to the defendant, and (iii) that it is likely that a favorable decision will redress that injury.

The court found that the petitioners satisfied each step. With respect to the injury, Justice Stevens included a significant discussion of the “well-documented rise in global temperatures” and explained that the “harms associated with climate change are serious and well recognized.” Looking at petitioners’ uncontested affidavits that global sea levels rose between ten and 20 centimeters over the 20th century as a result of global warming, the Court concluded that the severity of that injury will only increase over the course of the next century and the specific injury to Massachusetts due to this sea level rise has already occurred and will continue to occur. Further, the Court rejected EPA’s argument that its decision not to regulate GHGs emissions from new motor vehicles contributes so insignificantly to the Petitioner’s injuries and noted that “[a]gencies, like legislatures, do not generally resolve massive problems in one regulatory swoop.... They instead whittle away at them over time, refining their preferred approach as circumstances change and as they develop a more-nuanced understanding of

how best to proceed.” Moreover, the Court saw that reducing domestic automobile emissions is “hardly a tentative step.” Rather, the Court stated that a “reduction in domestic emissions would slow the pace of global emissions increases, no matter what happens elsewhere.”

The Court then turned to the merits of the case. The Clean Air Act defines “air pollutant” to include “any air pollution agent or combination of such agents, including any physical, chemical... substance or matter which is emitted into or otherwise enters the ambient air....” The Court concluded that this definition was “unambiguous.” Thus, the Court had “little trouble concluding” that Section 202 of the Clean Air Act authorizes EPA to regulate greenhouse gas emissions from new motor vehicles in the event that EPA forms the “judgment” that such emissions contribute to climate change.

Rejecting EPA’s reasoning that even if it had the authority to regulate GHGs, it would be unwise to do at this time, the Court held that EPA’s judgment must be based on the statutory text. The Court explained that “EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.” In other words, the Court found that EPA’s justifications including that the number of voluntary executive branch programs already provided an effective response to the threat of global warming, that regulating GHGs might impair the President’s ability to negotiate with “key developing nations” to reduce emissions, and that curtailing motor-vehicle emissions would reflect an inefficient and piecemeal approach were reasons effectively divorced from the statutory text. Accordingly, the Court declared that “EPA has offered no reasoned explanation for its refusing to decide whether greenhouse gases cause or contribute to climate change,” and, therefore, EPA’s action was “arbitrary, capricious,...or otherwise not in accordance with law.”

Four justices dissented. Chief Justice

Roberts, joined by Justices Scalia, Thomas, and Alito, focused on the Court's conclusion that Massachusetts had standing to bring its case. The Chief Justice explained that Massachusetts cannot establish standing because: (1) the rising sea levels the majority finds to be caused by global warming is not supported by the petitioner's affidavits, (2) the projected sea level rise is too remote to meet the standing test of imminence and certainty, (3) the causal connection between the injury and lack of new motor vehicle standards and Massachusetts' costal loss is too speculative, and (4) the ability to redress the injury through the promulgation of such standards is conjecture.

Justice Scalia filed a separate dissent focusing on the Court's interpretation of Section 202 of the Clean Air Act, which Chief Justice Roberts and Justices Thomas and Alito joined. Justice Scalia explained that nothing in the Clean Air Act *required* EPA to make a judgment on whether an air pollutant harms public health for every petition for rulemaking filed. Moreover, Scalia argued that the reasons put forth by EPA for why it declined to establish standards for GHG emissions from new motor vehicles were reasonable. Scalia also asserted that EPA's interpretation of "air pollutant" as not including GHGs was entitled to deference because while GHGs enter the ambient air, they are not agents of air pollution. Finally, Scalia noted that because GHGs reach the upper atmosphere rather than the air near the earth, EPA's interpretation of "air pollution" excluding GHGs was reasonable and should have been upheld.

Implications

Motor Vehicles

The case will now be remanded to EPA to make a decision consistent with the Court's opinion. The Court did not address whether on remand EPA must make an endangerment finding or whether policy concerns can inform EPA's action in the event that it makes such a finding. Thus, EPA could find no endangerment, but such a decision would make litigation a certainty. Further, the Court's opinion makes it difficult, if not impossible, for EPA to successfully assert that greenhouse gas emissions do not endanger the public health or welfare. If it does find endangerment, EPA could either find reasons based on the statute not to regulate GHGs or it must determine how to regulate GHGs from new motor vehicles. If EPA concludes the latter is required, EPA will have significant latitude in determining how best to do so.

The Court did not set a timetable for EPA action, and there are no deadlines in the Clean Air Act with which EPA must comply. As it usually takes several years for EPA to promulgate national ambient air quality standards, it is likely that EPA will not take any definitive action before President Bush leaves office in 2009.

Currently pending before EPA is California's request for a waiver of the Clean Air Act preemption of its standards

regulating GHGs from certain motor vehicles. If EPA were to grant this waiver, at least eleven other states would adopt the California standards. At this time, however, Congress is currently debating a discussion draft of legislation proposed by Representative Boucher (D-VA) that would prohibit EPA from granting a waiver to California for GHG emissions from motor vehicles.

Regulation of Sources Beyond Motor Vehicles

Although the case only addressed GHGs from motor vehicles, the decision is equally significant for other sources of GHGs. The Court makes clear that EPA has the authority to regulate air pollutants, which by definition, includes GHGs. Thus, the decision opens the door for federal regulation in other areas where EPA has authority to set standards for "air pollutants." For example, as an air pollutant, EPA could establish a new source performance standard (NSPS) for CO₂. Additionally, EPA could find that GHGs are criteria pollutants under Section 108 of the Clean Air Act, which would impose a system for regulating existing sources in areas deemed not to be in "attainment" of the GHGs National Ambient Air Quality Standards.

In response to the Court's decision, President Bush directed EPA and other agencies to develop regulations by the end of 2008 that "protect the environment with respect to greenhouse gas emissions from motor vehicles, nonroad vehicles, and nonroad engines, in a manner consistent with sound science, analysis of benefits and costs, public safety, and economic growth." President Bush also recently announced a shift in his foreign policy position on climate in which he aims to fill the gap when the Kyoto Protocol expires in 2012. Specifically, on May 31st, President Bush announced that he would launch a series of meetings this fall with nations that produce the most greenhouse gases, including India and China. President Bush also wants all of the participating countries to "establish midterm national targets, and programs that reflect their own mix of energy sources and future energy needs."

In testimony before the Senate Environment and Public Works Committee, EPA Administrator Johnson emphasized that the regulation of GHGs is complicated and any regulatory program will take time to develop. In contrast, Congress is poised to act on climate change and may shape EPA's actions before EPA develops its own strategy. As discussed more fully in previous *Insights* articles as well as in the article that begins on page 14 of this issue, there are several Congressional efforts to address climate change.

The Supreme Court decision, however, may bring stakeholders previously opposed to any GHG policy to the table because the decision has clarified that EPA can regulate GHGs without Congressional action. Consequently, some may try to shape Congressional action now rather than waiting for the next EPA Administration to develop an approach. For the same reason, there is likely to be efforts to try to define the breadth of EPA's authority to address climate change.

Litigation

Beyond the regulatory and legislative implications, the Court's ruling will impact a number of outstanding climate-related cases.

Stationary Sources

The Court's ruling only applies to new motor vehicles. That being said, the case is significant for stationary sources in that EPA can no longer assert that it lacks the authority to regulate GHGs from stationary sources.

In *Coke Oven Environmental Task Force v. EPA*, the petitioners (including ten states) challenged EPA's 2006 New Source Performance Standards for certain utility and industrial power plants. During the comment period, petitioners had requested that EPA promulgate standards for GHG emissions, and EPA declined on the basis that it did not have authority over GHGs. The case had been stayed pending the outcome of *Massachusetts v. EPA*, and is now proceeding.

Motor Vehicles

Under the Clean Air Act and the Energy Policy and Conservation Act (EPCA), only the federal government has the authority to regulate tailpipe emissions and fuel economy from new motor vehicles. This authority is also granted to California but only if EPA grants a waiver. If the waiver is granted, other states may adopt the California rules.

In 2004, California promulgated a regulation that requires motor vehicle manufacturers to begin reducing greenhouse gas emission rates for cars starting in 2009. In *Central Valley Chrysler-Jeep, Inc. v. Witherspoon* in the U.S. District Court for the Northern District of California, the automobile industry argued that EPCA preempted California's regulations. Prior to the Supreme Court's decision in *Massachusetts v. EPA*, EPA had refused to consider California's request for a waiver; however, at the end of April, EPA issued a notice for a 60-day public comment period. In the litigation, both sides are claiming that the Supreme Court decision supports their position. The district court is currently holding status conferences and will consider each side's arguments this summer.

In the meantime, thirteen other states have adopted California's standards and lawsuits have been filed in several of those states. The case that has proceeded the furthest is *Green Mountain Chrysler Plymouth Dodge Jeep v. Crombie* in the U.S. District Court in Vermont. Two days following the Supreme Court's decision, the state requested that the trial judge dismiss the case arguing that the Supreme Court had decided the matter. The automobile industry responded that the Supreme Court had not resolved the key preemption issue of whether Vermont's regulations amount to fuel economy standards rather than emissions limitations. The trial concluded in May, and the post-trial briefs were due to the court on June 8.

Public Nuisance

There are several pending cases that allege that GHGs are a public nuisance. For example, in *Connecticut v. American Electric Power*, eight states and the city of New York filed nuisance suits against the five largest GHG emitters in the U.S. In September 2005, the U.S. District Court for the Southern District of New York dismissed the case on the grounds that it presented a political question that should not be resolved by the courts. The plaintiffs, however, appealed that decision to the Second Circuit. Given the Supreme Court's decision, the Second Circuit may overturn the lower court's dismissal.

In *California v. General Motors Corp.*, the California Attorney General sued several automakers under the public nuisance doctrine for releasing CO₂ emissions each year that injure California's coastline, water supply, and treasury. Both sides in this case are arguing that the Supreme Court case strengthen their respective positions. ☞

Insights

Massachusetts v. EPA has significantly altered the future of climate change policies in the United States. The case forces EPA's hand to develop an approach for climate change. Nonetheless, while there is no longer a question of whether EPA has the authority to regulate GHGs, the more immediate impacts will likely be seen on the Congressional and litigation fronts.

Stakeholders previously opposed to any federal climate change program are now trying to shape the debate regarding the scope of a federal program before the end of the Bush administration in 2009. Likewise, we expect to see efforts in Congress to try to define the breadth of EPA's authority to address climate change.

It is unlikely that Congress will enact a federal climate change program this year, but the increasing attention on climate change following the Supreme Court's decision as well as the engagement of stakeholders previously opposed to any regulatory program make it a certainty that the Congressional debate regarding the details of any climate change program will continue to intensify.

Litigation concerning global climate change will continue to shape the debate regarding the scope of a federal program. If EPA and Congress are unable to develop a comprehensive federal climate change program, states and private litigants will use the courts and the Supreme Court decision to force EPA to address greenhouse gas emissions from all sources.

Supreme Court Unanimous in *United States v. Duke Energy Corp.*, but NSR Uncertainty Remains

Summary: On the same day as *Massachusetts v. EPA*, the Supreme Court unanimously reversed the Fourth Circuit New Source Review (NSR) Decision in *United States v. Duke Energy Corp.* The Supreme Court held that the Clean Air Act does not mandate that the term “modification” be interpreted the same for both the New Source Performance Standard (NSPS) program and the Prevention of Significant Deterioration (PSD) program. The Court settled the split between the Fourth Circuit and D.C. Circuit by concluding that EPA could adopt an hourly emission test for NSPS and an annual rate of emissions test for PSD, even though the two programs share the same definition of “modification.”

United States v. Duke Energy Corp. arose as part of EPA’s New Source Review (NSR) enforcement initiative in 2000 against electric utilities. Duke Energy had argued that its modifications did not require Prevention of Significant Deterioration (PSD) permits because they did not increase the hourly emissions rates, and the lower courts agreed. The district court held that a project could only result in a significant net emissions increase for PSD purposes if it first resulted in an increase in the *hourly* emissions rate. On appeal by the U.S., the Fourth Circuit upheld the trial court’s decision though on different legal grounds. The Fourth Circuit concluded that because the New Source Performance Standard (NSPS) and PSD programs shared the same statutory definition of “modification”, EPA lacked any discretion to apply a different emissions test to determine whether a modification occurred under those two programs.

Justice Souter wrote the unanimous opinion for the Court, in which the Court rejected the Fourth Circuit’s reasoning. While the Court acknowledged that “we presume that the same term has the same meaning when it occurs here and there in a single statute”, the Court held that the Court of Appeals mischaracterized that presumption as “effectively irrebuttable” and that EPA has the discretion to adopt different interpretations for regulatory purposes. The Court further explained that “[a]bsent any iron rule to ignore the reasons for regulating PSD and NSPS “modification” differently, EPA’s construction need do no more than fall within the limits of what is reasonable, as set by the Act’s common definitions.”

The Court analyzed the PSD regulations and concluded that the Fourth Circuit’s reading that the PSD regulations must conform to the NSPS counterparts is “too far a stretch for the language used.” The Court explained that the definition of “major modification” does not specify any rate while other definitions specify the rate as annual, such as “tons per year”, rather than hourly. The Court also noted the requirement that actual emissions be calculated using the unit’s actual operating hours, requires that such emissions be measured in a manner that looks to the number of hours the unit is or probably will be actually running. The Court reasoned that “a measure of actual operations averaged over time, and the regulatory language simply cannot be squared with a regime under which ‘hourly rate of emissions’, is dispositive.” (citations omitted).

The Court also stated that the Fourth Circuit’s decision could only be viewed as an invalidation of the PSD regulations as written. This form of judicial review is limited to appeals filed in the D.C. Circuit within 60 days of EPA’s rulemaking. Since this issue, however, was not addressed by the lower courts, the Supreme Court did not consider its merits.

The Supreme Court’s decision in this case can certainly be viewed as a major blow to the pending NSR enforcement cases in that the issue of how to determine an emissions increase for purposes of NSR applicability has once and for all been settled in favor of the government. With respect to the implications of this case on other NSR cases in the lower courts, the Court did not address Duke’s liability in the case, but the decision does prevent industry from arguing that the statute mandates an hourly emissions rate test under the NSR program. NSR defendants, including Duke on remand, are likely to argue that an hourly rate test should apply to a particular project in order to remain consistent with EPA’s enforcement interpretation of the rules at the time the project occurred.

Additionally, the decision expressly allows Duke on remand to argue that EPA has inconsistently interpreted “modifications” under the PSD program and that EPA’s current enforcement interpretation may not be retroactively applied.

Significantly, the decision does not constrain EPA from promulgating a new NSR test that explicitly adopts an hourly emissions rate test. In fact, on April 25, 2007, EPA announced a supplemental notice of proposed rulemaking that aims to apply both the hourly and annual tests. In the proposed rule, EPA acknowledges that its prior justification of providing a consistent interpretation of “modification” in light of the Fourth Circuit decision is no longer relevant. Nonetheless, EPA states that its proposal of an hourly test is an “appropriate exercise of the Agency’s discretion.” To summarize briefly, under this revised proposed rule, a PSD violation would occur only if a plant fails the hourly emis-

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Revisiting Decoupling for Electric and Natural Gas Utilities

Summary: With the growing concern over energy security and climate change, there is also growing support for more efficient energy use and customer-sited renewable generation. Energy efficiency (EE) could substantially reduce demand now and in the future, while distributed generation (DG), in the form of renewables, could provide clean energy to the consumer while also providing power to the grid. Yet EE and DG, especially if deployed on the large scale that some organizations are advocating, result in customers demanding less power from utilities and, consequently, can erode profits. Therefore, as long as electric and gas utility profits are entwined with sales, it may be unreasonable to expect utilities to support EE and DG programs. In this article, we discuss the concept of “decoupling”. Decoupling is a programmatic phrase used to describe a rearrangement of rate structure to separate utility revenues from sales as a means to align utility financial interests with EE and DG goals. We also discuss decoupling programs in place or under consideration, and how decoupling can make sense when packaged with other incentives.

The Conflict: Profits vs. Energy Efficiency

Electricity and gas rates reflect a utility’s fixed costs (including capital costs and return on equity, if it is an investor-owned utility) and variable costs (electricity and gas purchases). Fixed costs represent the majority of costs a utility needs to recover from electricity sales and do not vary with the amount of electricity a customer consumes.

Fixed costs are typically charged per kilowatt-hour (kWh) instead of as a flat rate, however, for two reasons. First, the fixed cost is relatively high and regulators believe lower income (and presumably lower use) customers would be unjustifiably burdened by the high cost. Second, regulators want there to be a strong price signal between electricity bills and consumption, which they can achieve by incorporating part of the fixed charge in a volumetric charge. Therefore, the utility recovers both its fixed and variable costs on a kWh basis.

For the most part, investor-owned utilities are no different than any other company in that they seek to sell more product, in this case electricity, to more customers to grow the business and provide a healthy return for investors. Even publicly owned utilities and community choice aggregators have financial obligations that encourage them to sell more electricity. As noted above, under traditional ratemaking, a company’s revenue is tied to its sales. The Regulatory Assistance Project (RAP) estimates that a five percent decrease in sales could lead to a 25 percent decrease in net profit for an integrated utility and a 50 percent decrease in profits for a stand-alone distribution company. Thus, it is a natural response for utilities not to view energy efficiency (EE) and distributed generation (DG) positively because they have the potential to negatively impact a utility’s revenues.

The American Council for and Energy Efficient Economy (ACEEE) reviewed 11 studies on the potential for EE and found that the median achievable energy savings, which considers economic and technical feasibility as well as realistic adoption rates for energy efficient technologies and practices, was 24 percent for electric power and nine percent for natural gas. In strictly technical terms, i.e., without considering economic barriers or potential adoption rates, the median energy savings potential jumped to 33 percent for electric power and 41 percent for natural gas. These numbers equate to a substantial reduction in

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sions rate test and then fails the annual emissions test. Thus, if a plant’s hourly emissions did not increase, then it would not be subject to the annual emissions test and would be exempt from NSR requirements. If a plant’s hourly emissions increased, but its annual emissions did not increase, it also would not be subject to NSR. Comments on the supplemental notice of proposed rulemaking are due on July 9, 2007. ☞

Insights

Beyond the hourly versus annual emission test issue, the next important issue with respect to NSR is whether the routine repair, maintenance and replacement (RMR&R) exclusion should be determined in the context of what is routine within the industry or for an individual source. Courts are currently split. Upon remand, Duke will undoubtedly argue that the projects they undertook were the type of projects that are routinely undertaken within the industry and, therefore, qualify for the RMR&R exclusion.

Looking forward, the *Duke Energy* case does not impact EPA’s intent to proceed with NSR reform. Thus, while we expect any final NSR regulations to be challenged in court, the *Duke Energy Corp.* case does not significantly constrain EPA’s discretion to reform NSR. The uncertainty surrounding NSR is likely to continue for several more years as the rulemaking process and litigation challenges shape NSR.

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utility sales. How can the obvious disincentive for companies to support EE and DG programs be overcome? One option that is receiving increased attention is decoupling.

Decoupling Defined

Rates for electricity delivery are established in a rate case based on baseline or forecasted sales of the utility.¹ There are typically a few years between rate cases, though one year or less is certainly not uncommon, during which time sales may fluctuate. Depending on the cost structure of the utility, the utility may have an incentive to increase incremental sales beyond the baseline amount because higher sales lead to additional profits for the company (as long as marginal revenue from the sale exceeds marginal cost).

Decoupling, also referred to as revenue decoupling, attempts to separate a utility's revenue from product sales. A Lawrence Berkley Laboratory report, *The Theory and Practice of Decoupling* (1994), refers to decoupling as "automatic or semi-automatic annual ratemaking adjustments that ensure collection of an agreed upon level of revenues independent of actual sales." This approach essentially treats the delivery of natural gas or electricity as a service, rather than as a product. Decoupling is appropriate whether or not the market has been restructured because while actual generation is competitive in a deregulated market, transmission and distribution are still regulated. The objectives of decoupling are to remove the incentive utilities have to increase sales, while removing the disincentive they have to support EE and DG. Decoupling, however, is not designed to induce more activity on the part of the utility to promote EE and DG — incentives and other programs are designed to achieve these goals.

How Decoupling Works

Table 1 illustrates how decoupling works for an electric utility on a very basic level — the actual decoupling mechanism for ratemaking can occur in many different

¹ A rate case is a hearing, in front of an administrative law judge, where a utility provides evidence for a rate change. The final determination of a new rate is at the prerogative of the state public utility commission.

forms and is more complex than this example portrays. First, the utility establishes its fixed and variable costs and forecasts its sales for the year. The regulator approves a rate (in cents per kWh) after taking these costs and anticipated sales into consideration. In Year 1, the utility may sell electricity at, below, or above the forecast. If the sales are above or below the forecasted sales, the regulator will set a new rate in Year 2 that incorporates this discrepancy in revenues. For example, in Year 1, if sales were below forecasted sales, the new rate in Year 2 will be set to ensure that the utility recovers the lost revenue from the previous year (for simplicity, we assume that Year 2 sales will be the same as Year 1, i.e. 100 kWh). Thus, if the utility sold 95 kWh instead of 100 kWh in Year 1, it will have recovered \$0.30 less than it needed to cover costs. In

Year 2, the rates would be increased by \$0.003/kWh. If the utility sold the 100 kWh it expected to in Year 2, it would generate the \$0.30 it lost in Year 1. Likewise, the regulator will set lower rates in Year 2 if the utility generates more revenue in Year 1 than has been authorized in an effort to compensate customers for the "over-recovery" in Year 1.

This example uses an annual "true-up", but the rate adjustment period could be spread out over several years. In fact, RAP believes less frequent rate cases, with more frequent price adjustments, would lead to greater price stability. Rate cases every three to five years, with monthly adjustments (submitted by the

utility to the state public utility commission (PUC) without a formal rate case) would have a stabilizing effect. This approach would also avoid overly burdensome annual rate cases and allow companies to react quickly to changing demand.

Taking Sides on the Decoupling Issue

The concept and implementation of decoupling has been around for decades. In the 1980s, a few states adopted decoupling, but then in the 1990s, deregulation was instituted in many states and decoupling, if it existed, was put aside. Decoupling has been gaining traction lately as a way for gas utilities to protect their revenues as natural gas consumption per customer decreases. It also is increasingly viewed as a tool to help overcome the disincentive

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Table 1. Example of ratemaking under decoupling (Adapted from EPA, *Clean Energy-Environment Guide to Action*, 2006)

Base assumptions			
Fixed cost	\$6.00		
Variable cost	\$0.04 / kWh		
Sales forecast	100 kWh		
Total expected cost	\$10.00 (\$6.00 + (100 kWh X \$0.04/kWh))		
Authorized rate	\$0.100 / kWh (\$10.00/100 kWh)		
Year 1			
Sales scenarios	At forecast (100 kWh)	Below forecast (95 kWh)	Above forecast (105 kWh)
Actual revenues	\$10.00	\$9.50	\$10.50
Actual total cost	\$10.00	\$9.80 (\$6.00 + \$3.80)	\$10.20 (\$6.00 + \$4.20)
Difference	0	-\$0.30	\$0.30
Year 2			
Revenue requirement (using same base assumptions as Year 1)	\$10.00	\$10.30	\$9.70
Year 2 authorized rate	\$0.100/kWh	\$0.103/kWh	\$0.097/kWh

Supplemental Climate Legislation

Summary: If Congressional leaders do not find support for a mandatory greenhouse gas cap-and-trade system this year, they may, as a first step, turn to a package of supplemental bills that encourage the development and deployment of climate change technologies and establish a greenhouse gas emissions registry.

As the climate change debate in Washington, D.C. has shifted over the past six months, Senators and Representatives have proposed a variety of bills to address greenhouse gas emissions. The most frequently discussed component of these bills is a cap-and-trade system for the control of greenhouse gases. While the cap-and-trade proposals use the same mechanisms for limiting emissions (setting the cap) and promoting cost effective solutions (allowing trading), they differ in specifics. For example, some proposals limit emissions from the entire economy, while others limit emissions from particular sectors of the economy; some proposals include systems to limit pollutants in addition to greenhouse gases (such as nitrogen oxides, sulfur dioxide, and mercury), while others focus entirely on greenhouse gases; and some include stringent caps with short timelines, while others include less stringent near-term caps that become more stringent over decades.

Beyond the mandatory cap provisions, the bills include language to create supplemental standards or incentives to encourage the development of technologies to address climate change. For example, the economy-wide cap-and-trade bill proposed by Senator Bernie Sanders of Vermont includes provisions to create a Renewable Portfolio standard (RPS); an energy efficiency performance standard; emissions standards for vehicles and electric generating units; and standards for the geologic storage and biological sequestration of carbon dioxide. The bill also increases research and development (R&D) funding, requires greenhouse gas reporting for major stationary sources, and provides incentives for deploying clean energy technology in developing countries.

These supplementary measures do not require the reduction of greenhouse gas emissions in the economy. Rather, with the exception of the reporting requirements, they encourage the development and deployment of technologies to reduce greenhouse gas emissions. For example, an RPS creates a requirement for a certain amount of electricity to be generated using renewable sources (where the qualifying sources are defined in the standard). This requirement allows renewable technologies to compete with each other to meet the standard rather than with conventional technologies. In recent years, the market encouraged by state renewable standards has led investors to deploy a large amount of renewable power (especially wind power). The most striking example is in Texas where the adoption of an RPS in 1999

coupled with federal tax credits for wind development has resulted in Texas becoming the leader in U.S. wind power capacity. From 1999 to 2006, Texas installed wind power capacity has increased from 990 megawatts to 2,768 megawatts.

Encouraging the development of renewable technologies through an RPS allows industry to gain experience installing and operating the technologies. Research strongly suggests that this process of “learning-by-doing” lowers the cost of a given technology. While each of the supplementary measures uses a slightly different methodology and has a different technological focus, they all encourage learning-by-doing. Even a greenhouse gas reporting requirement, while not directed at lowering emissions, forces entities to learn techniques for cataloguing emissions, increasing information about the potential for emissions reductions, and lowering the cost of future reporting.

Beyond their inclusion within larger greenhouse gas cap-and-trade bills, Senators and Representatives have introduced many of the supplementary measures in stand-alone bills. If a mandatory cap-and-trade bill does not garner sufficient support to move through Congress this year, it is possible that a number of these supplementary bills or a bill that packages them into one bill will gain momentum and reach the President’s desk.

The table on pages 9 and 10 summarizes some of the more prominent bills that could be included in a package of supplemental bills during the 110th Congress. The table focuses on bills that have a potential to impact the electric power sector. An equally extensive table could be created for bills that encourage technological development in the transportation sector. ↻

Insights

There is a concern among supporters of mandatory greenhouse gas limits that Congress will pass a package of supplemental climate policies and opponents will use the opportunity to take more stringent climate legislation off the Congressional schedule.

Senators and Representatives have packaged some of these supplementary climate bills and introduced or plan to introduce them under one title. For example, S. 1321 introduced by Senator Jeff Bingaman has five titles and drafts of the Senate energy bill (S. 1419) include a wide range of supplemental provisions.

Senator Bingaman is expected to introduce an RPS when the Senate considers energy legislation. The RPS amendment sets a standard of 15 percent renewable electricity by 2020. Senator Pete Domenici is expected to introduce a competing amendment that would create a clean energy standard that includes advanced coal and nuclear technologies within the standard.

**Selection of Supplementary Bills to Encourage Climate Technologies Introduced in the 110th Congress
(As of June 7, 2007)**

Bill Type	Title (Number) Most Recent Action	Sponsor Cosponsor(s)	Date Introduced	Summary
Greenhouse Gas Registry	National Greenhouse Gas Registry Act of 2007 (S. 1387) Referred to the Senate Committee on Environment and Public Works (5/14/2007)	Klobuchar Snowe	5/14/2007	Establishes the first national greenhouse gas registry — a comprehensive and uniform system to track greenhouse emissions by major industries. It amends the Emergency Planning and Community Right-to-Know Act (EPCRA) to include greenhouse gases and subjects emissions statistics to third party verification.
Renewable Portfolio Standard	Renewable Portfolio Standard (H.R. 969) Referred to the House Committee on Energy and Commerce (2/8/2007)	Udall, T. 96 Cosponsors	2/8/2007	Establishes a federal RPS starting at 1% in 2010 and ramping up to 20% by 2020 for certain retail electric utilities.
Coal-fired Power Plant Performance Standard	Clean Coal Act of 2007 (S.1227) Referred to the Senate Committee on Environment and Public Works (4/26/2007)	Kerry	4/26/2007	Mandates that all new coal plants, including recently proposed plants, use technologies that significantly reduce emissions of air pollutants and greenhouse gases. It calls for a performance standard of less than 285 pounds of carbon dioxide per megawatt-hour.
Carbon Dioxide Capture and Storage Research and Development	National Carbon Dioxide Storage Capacity Assessment Act of 2007 (S. 731) Hearings held in the Senate Committee on Energy and Natural Resources (4/16/2007)	Salazar 12 Cosponsors	3/1/2007	Calls for the development of a methodology for, and completion of, a national assessment of geological storage capacity for carbon dioxide.
	Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act of 2007 (S. 962) Hearings held in the Senate Committee on Energy and Natural Resources (4/16/2007)	Bingaman 14 Cosponsors	3/22/2007	Amends the Energy Policy Act of 2005 to reauthorize and improve the carbon capture and storage research, development, and demonstration program of the Department of Energy.
	Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act of 2007 (H.R. 1933) Referred to the House Subcommittee on Energy and Environment (5/8/2007)	Udall, M. Gordon Marshall Salazar Schiff	4/18/2007	Reauthorizes and improves the carbon capture and storage research, development, and demonstration (RD&D) program in DOE.
	National Carbon Dioxide Storage Capacity Assessment Act of 2007 (H.R. 1267) Referred to the House Subcommittee on Energy and Mineral Resources (3/5/2007)	Gordon 12 Cosponsors	3/1/2007	Authorizes the U.S. Geological Service (USGS), in cooperation with the Department of Energy and the Environmental Protection Agency, to conduct a comprehensive inventory of the Nation's ability to store carbon in appropriate geologic features and other natural basins. It also requires the USGS to develop an official methodology the assessment.

**Selection of Supplementary Bills to Encourage Climate Technologies Introduced in the 110th Congress
(As of June 7, 2007)**

Bill Type	Title (Number) Most Recent Action	Sponsor Cosponsor(s)	Date Introduced	Summary
Energy Efficiency	Energy Efficiency Promotion Act (S.1115) Hearings held in the Senate Committee on Energy and Natural Resources (4/23/2007)	Bingaman 12 Cosponsors	4/16/2007	Promotes more efficient lighting, establishes energy efficiency standards for appliances, promotes high efficiency vehicles, and sets energy efficiency goals.
	Energy Research Act of 2007 (S. 696) Referred to the Senate Committee on Energy and Natural Resource (2/27/2007)	Baucus	2/27/2007	Establishes an Advanced Research Projects Administration-Energy (ARPA-E) to initiate high risk, innovative energy research to improve the energy security of the United States.
Energy Research and Development	To Provide for the Establishment of the Advanced Research Projects Agency – Energy (H.R. 364) Marked-up and ordered to be reported by the House Committee on Science and Technology (5/10/2007)	Bart 22 Cosponsors	1/10/2007	Establishes an Advanced Research Projects Agency-Energy (ARPA-E) within the Department of Energy to reduce the amount of energy the United States imports from foreign sources by 20% over the next 10 years.
	CREST (Creating Renewable Energy through Science and Technology) Act (S.1020) Referred to the Senate Committee on Energy and Natural Resources (3/28/2007)	Hutchison Allard Bond Comyn Murkowski Stevens	3/28/2007	Establishes and authorizes funding for a Council on Renewable Energies (CORE). The Council will advise Congress on national renewable energy strategy, research and development, including offshore wind production, solar power, geothermal, alternative biofuels and wave energy. It will also facilitate collaboration across federal agencies and departments on executing national renewable energy objectives.
	Energy Policy Reform and Revitalization Act (H.R. 2337) Committee hearing held by the House Committee on Natural Resources, referred to House Committee on Science and Technology (5/16/2007)	Rahall Baca Bordallo Christensen Grijalva Hinchey Inslee Napolitano	5/16/2007	Introduces greater accountability in the management of federal energy resources, promotes the development of innovative sources of energy, and grapples with the challenges of carbon sequestration and climate change impacts.
	Global Change Research and Data Management Act of 2007 (H.R.906) Referred to the House Subcommittee on Energy and Environment (2/13/2007)	Udall, M. Giffords Gilchrest Gordon Inglis Inslee Jones Lantos	2/7/2007	Promotes and coordinate global climate change research.
	Energy Technology Transfer Act (H.R.85) Passed by House and referred to the Senate Committee on Energy and Natural Resources, hearing held (5/22/2007)	Biggett Miller	1/4/2007	Amends the Energy Policy Act of 2005 to revise the guidelines for a geographically dispersed network of Advanced Energy Technology Transfer Centers by authorizing a DOE program to award grants to cooperative extension services, states, local governments, institutions of higher education, and non-profit institutions with expertise in energy research or extension to conduct activities to transfer knowledge and information about energy efficiency technologies and methods to a wide range of energy end-users.

(Continued from page 7)

for utilities to promote EE and DG. Currently, only California has a decoupling mechanism that applies to natural gas as well as electric utilities, which it reinstated after the 2001 energy crisis. Other states have approved decoupling (in most instances for gas utilities), and many more are investigating whether decoupling makes sense in their state. On the other hand, some state PUCs have rejected decoupling. For example, in 2006, the Connecticut Department of Public Utility Control (DPUC) decided not to allow distribution companies to decouple revenues from sales, reasoning that “recent experience has shown that the electric [distribution companies] are performing well and that incentives available to the companies and their customers provide good incentives to promote conservation and load management.” (DPUC, *DPUC Investigation into Decoupling Energy Distribution Company Earnings From Sales*, Docket 05-05-09 (2006)). This decision may be

short-lived, however, with the Governor of Connecticut this month signing an energy bill requiring the DPUC to decouple electric and gas utility revenues from sales. Table 2 lists states that have approved or are considering decoupling for electric and gas utilities.

Organizations are also weighing in on both sides of the decoupling debate. In 2004, the American Gas Association and Natural Resources Defense Council wrote a joint statement to the National Association of Regulated Utility Commissioners (NARUC) voicing their support for decoupling. NARUC, in 2005, issued its own statement urging state commissioners to consider decoupling mechanisms in their ratemaking. The consumer advocacy group Electricity Consumers Resource Council (ELCON), however, has spoken out against decoupling claiming it “disrupts and distorts the core utility functions and is not a particularly effective way of promoting energy efficiency or anything of benefit to customers.” (ELCON, *Revenue Decoupling* (2007)).

Interestingly, there are significantly more examples of decoupling for natural gas utilities compared to electric power utilities. The reason for this distinction is that gas companies are faced with declining sales due to more energy efficient gas-powered appliances. Electricity consumption per household, on the other hand, has been increasing due to higher use of electronics that demand more electricity and the proliferation of new housing in southern parts of the country where air conditioner use is higher. (Energy Information Administration, *U.S. Household Electricity Report* (July 2005)). Thus, decoupling revenues from sales tends to benefit gas utilities much more than it benefits electric utilities. In some states, such as Vermont, however, EE programs have been able to control the growth rates of electricity consumption at very low levels, opening a door for electric utilities in these states to benefit from decoupling. Vermont is one of only three states, including California and Idaho, to have decoupling for an electric utility, though several utilities in other states have filed proposals for decoupling to the state PUC.

Ken Costello, of the National Regulatory Research Institute (NRRI), compiled a list of arguments for and against decoupling, presented in Table 3, that have been offered over the years, along with his opinion as to which are strong arguments and which are weak ones. (Costello, K., *Revenue Decoupling for Natural Gas Utilities* (2006)). The take-away message from this table is that there are strong arguments from both sides of the issue. In his final assessment of the issue, however, Costello believes PUCs should consider a decoupling mechanism if the PUCs are encouraging natural gas utilities to implement EE programs. He also believes, along with other experts on this topic, that decoupling is gain-

State	Utility	
	Electric	Gas
Arizona	Commission considering decoupling	
California	All 3 IOUs (Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric, Southern California Edison)	All 4 major gas IOUs (PG&E, San Diego Gas and Electric, Southern California Gas, Southwest Gas)
Colorado	Commission considering decoupling	
Delaware	PEPCO (filed)	
District of Columbia	PEPCO (filed)	
Idaho	Idaho Power	
Illinois	Pending decoupling legislation	
Indiana		Vectren
Maryland	PEPCO (filed), Delmarva (filed), BGE (expected)	BGE, Washington Gas
Minnesota	Pending decoupling legislation	
Missouri		Atmos
New Hampshire	PUC is investigating decoupling for electric utilities	
New Jersey		New Jersey Natural Gas, South Jersey Gas
New Mexico	PNM (filing anticipated)	PNM Gas (filed)
New York	PUC ordered all utilities to include decoupling proposals in rate cases	
North Carolina		Piedmont Natural Gas (which also owns NCNG and EasternNC)
Ohio		Vectren
Oregon		NW Natural Gas, Cascade Natural Gas
Utah		Questar
Vermont	Green Mountain Power	
Washington		Avista, Cascade

ing in popularity among companies and PUCs as states try to meet more and more aggressive EE and DG goals.

Whether or not an entity supports decoupling, decoupling is not a panacea for the problem, but it is one component of a strategy to increase the implementation of EE and DG.

Alternatives and Complementary Programs to Decoupling

Several mechanisms exist to promote EE and DG. Decoupling can help in efforts to promote EE and DG, but it is not, by itself, an effective tool to reach this goal. Decoupling can, however, be an important component in any comprehensive package of policies and regulations for EE and DG. The first two options below could be used instead of decoupling, whereas the second two could be used along with decoupling.

Straight-fixed Variable Rate Design (SFV) removes the incentive for utilities to sell more product by charging customers a price that better reflects the true cost of the service to the utility. The fixed costs (return on equity, depreciation, etc.) of a utility are partially recovered through volumetric pricing, but with SFV, fixed costs would be charged evenly among all customers. Opponents to this approach usually cite two reasons why this method is not desirable. The first reason goes back to the motivation for volumetric pricing. A flat rate would negatively impact low-use customers (and presumably in many cases lower income customers) disproportionately, as their expenses would increase while high-use customers would see a decrease in their utility bill. The second reason is that there would be less of a price signal to consumers as they used more or less electricity since the variable costs of the product itself (gas or electricity) would be a small portion of the overall cost of the service.

Table 3. NRRI's Strong and Weak Arguments For and Against Decoupling (Costello, K. *Revenue Decoupling for Natural Gas Utilities*, 2006)

"Strong" Arguments	
Support	Opposition
Necessary, if not sufficient, for a utility's financial interest in promoting effectively energy efficiency	Need to demonstrate special conditions for true-up recovery of revenues
Strong utility profit motive under standard ratemaking for promoting sales (assuming energy-efficiency promotion is an explicit commission or state policy)	Inappropriate to single out revenues for true-up adjustments
Sales largely exogenous to a utility's control	Less likelihood of addressing rate-design problem
Historical decline in gas use per residential customer generally not taken into account in setting new base rates	More certainty of utility benefits than customer benefits
High sales volatility from year-to-year causing possible significant deviations from targeted sales and earnings	Upward pressure on short-term prices, as a utility's average cost for delivery is likely to increase
Short-run delivery costs largely fixed	Possible legal/policy precedent issues
Strong opposition to allocating all fixed costs to the customer charge	Overly broad in addressing the problem at hand
Potential for energy efficiency to benefit customers	Incremental options should be considered
Reduced risks to the utility	
Less contentious than a lost revenue adjustment (LRA) mechanism	
"Weak" Arguments	
Support	Opposition
Reduced risk to customers	Uncertainty over a future decline in use per customer
Definite benefits to customers	Lower utility service quality
A higher customer charge reducing significantly the incentive for customer-initiated energy efficiency	More price volatility
More energy efficiency causing a decline in the market price of gas	Reduced incentive for customer-initiated energy efficiency
Absolutely necessary for aggressive utility energy-efficiency initiatives	Unequivocally increased customer risk
Ease in design	Feasibility of alternative programs
Necessary for a utility to earn its authorized rate of return	Preference for lost revenue adjustment (LRA) mechanism

Lost margin recovery (or lost revenue adjustment (LRA) mechanism) is one way to compensate utilities for the reduction in sales that are a direct result of demand side management programs. Under LRA, a utility reports the amount of revenue it has lost due to EE programs and is reimbursed accordingly. One criticism of this approach is that the company calculates lost revenue based on projected sales, not actual EE savings. Furthermore, this alternative is often perceived as less desirable than decoupling because while LRA may encourage utilities to promote EE programs, it would not remove the motivation to increase sales in general.

Performance incentives come in many forms, but the underlying purpose is to reward utilities in one way or another for achieving certain EE or DG goals. One example is permitting utilities to earn a higher rate of return if some of their investments include demand-side management efforts. Another example is to reward a company based on the amount of EE achieved. Performance incentives, therefore, are more in-line with business practices of recovering expenses (whether the expenses are in the form of EE programs or capital investments) while earning a return on investment.

Third party energy efficiency services circumvent the internal conflict of interest at a utility to simultaneously promote EE and increase sales by not requiring utilities to promote EE. Proponents suggest a third party should promote EE, alleviating any responsibility of the utility for EE gains. Efficiency Vermont is a third party EE service operated by a nonprofit organization and supported by funds generated from surcharges on customer electric bills. With the creation of Efficiency Vermont, state utilities (with the exception of Burlington Electric Department) are no longer required to provide EE services to customers. According to ACEEE, Vermont ranks first in the nation for EE spending as a percentage of utility revenues.

As different states have proven, there is more than one way to promote EE and DG. Decoupling utility revenues from sales could be one component of an overall strategy to implement long-term and large-scale EE and DG. California has successfully demonstrated that decoupling in conjunction with a well-designed energy strategy that considers a utility's financial needs can be effective. In addition to decoupling, California utilities receive funds for EE programs from "public goods" charges applied to customer bills. The state also views EE as the first resource that must be procured, when economically feasible, if new generation is required. Following this mandate, the California Public Utility Commission approved \$2 billion in "energy efficiency resource" procurement from 2006-2008 for four investor-owned utilities. *✍*

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In order to achieve the levels of energy efficiency and distributed generation that are economically and/or technically feasible, utilities will likely need rate-making alternatives to the methods currently employed in many states.

While programs such as third party energy efficiency services and state-supported distributed energy funds are an effective means to increase energy efficiency and distributed generation, ultimately public utility commissions (PUC) will need to remove the disincentive utilities have to support these programs by disassociating utility revenues from sales. An increasing number of companies, PUCs, and environmental groups are weighing in on decoupling as the preferred mechanism to remove this disincentive, though there are legitimate concerns if decoupling is implemented without financial incentives.

Packaging decoupling with long-term financial incentives may better align energy efficiency and distributed generation goals with utilities' goal of meeting shareholder expectations.

As California has shown, a comprehensive energy plan that promotes energy efficiency through various regulations and incentives, and with the inclusion of decoupling, can take advantage of the substantial opportunities in energy savings.

Diesel Retrofit Strategies: Third in a Series

Summary: This article is the third in a series about diesel retrofits. In the first two articles (the March/April 2007 and January/February 2007 *Environmental Energy Insights*) we discussed why diesel retrofits are receiving so much attention, the technologies that can be used, and diesel retrofit strategies. This month we discuss diesel retrofit leadership — by highlighting the most active programs around the country.

To date, the locus of diesel retrofit activity in the U.S. has been in California, the Northeast, and Texas. Many voluntary retrofits, particularly in California and Texas, have been funded with government grants. Others have been funded with money set aside for Supplemental Environmental Programs (SEPs) as part of regulatory enforcement activities.

In the last five years, state and local governments have also started implementing mandates for retrofit of specific types of diesel vehicles. This trend began in California but has gained significant momentum in New York and other Northeastern states. Often these mandates are indirect — they are implemented through government contracting for construction and other services.

The lessons learned from the programs and mechanisms described in more detail below are especially important as states develop their implementation plans for the fine particle national ambient air quality standards established by EPA in 1997. After a number of delays, EPA designated areas as in “attainment” or “nonattainment” with the standards in April 2005. States with areas designated as nonattainment have until April 2008 to submit an implementation plan to EPA that describes actions the state will take to bring the area into attainment by 2010. Alternately, states may propose an attainment date extension up to five years. Among the measures EPA suggests states consider including in their implementation plan are:

- onroad diesel engine retrofits for school buses, trucks, and transit buses; and
- nonroad diesel engine, rebuild, replacement, or retrofit with catalyzed particle filter.

It is likely that in the coming months, a number of states will be considering diesel retrofit programs as they work to develop plans to reduce fine particle emissions in nonattainment areas.

Voluntary Retrofit Programs

The first major voluntary commitment to retrofitting diesel vehicles in the U.S. was made by Metropolitan Transit Authority New York City Transit (NYCT). In April 2000, after conducting a six-month trial on 25 buses, NYCT committed to retrofitting diesel particulate filters (DPF) on its entire fleet of 4,000 diesel transit buses.¹ Installations began in 2001, and to date NYCT has retrofitted over 3,600 buses. Funds dedicated from the MTA capital plan funded all of the retrofits.

Following NYCT’s example, other transit agencies have since started to voluntarily retrofit their buses — most notably the Massachusetts Bay Transportation Authority (MBTA) in Boston, which completed the retrofit of its 600+ bus diesel fleet with DPFs in 2004. These retrofits were also funded with local capital funds.

Most other voluntary retrofits have been at least partially funded by government grants. The two largest grant programs currently operating are California’s Carl Moyer Memorial Air Quality Standards Program (Carl Moyer) and the Texas Emissions Reduction Program (TERP). Both Carl Moyer and TERP award projects based on a minimum level of cost-effectiveness, and both are primarily designed to reduce nitrogen oxide (NO_x) emissions, with a secondary focus on particulate matter (PM).

Carl Moyer has provided over \$160 million in grant funding for various emissions reduction projects throughout California since its inception in 1998. Approximately 45 percent of these funds have gone to projects to reduce emissions from onroad diesel vehicles and approximately 30 percent has been dedicated to projects to reduce emissions from nonroad diesel equipment, including marine vessels, construction equipment, forklifts, and locomotives. The program is expected to award an additional \$140 million annually through 2015.

In its early years, annual appropriations in the state budget funded Carl Moyer. Beginning in fiscal year 2005, it was funded with a portion of the fees from the state’s Smog Check program for light-duty vehicles as well as by fees added to the sale of tires. Local air districts are permitted to raise additional funds by adding \$2 to the fees charged by the Department of Motor Vehicles. Future annual expected funding for the Carl Moyer program totals \$61 million from Smog Check fees, \$25 million from tire fees and \$55 million raised by local districts.

Since 2001, TERP has provided over \$180 million in grants for diesel emissions reduction projects in the 41 Texas counties designated as nonattainment areas. Onroad projects have included vehicle replacements, repowering, retrofits, purchase of cleaner fuels, and infrastructure development. Nonroad projects have included re-

¹ NYCT also operates about 500 compressed natural gas (CNG) buses.

placement and retrofit of locomotives, and repowering and retrofit of marine engines. TERP has also funded the replacement or repowering of over 250 pieces of construction equipment, including forklifts, cranes, tractors, loaders, excavators, bulldozers and air compressors.

Currently, TERP is funded by surcharges on the sale or lease of new and used onroad and nonroad diesel vehicles, as well as by fees charged for commercial motor vehicle inspections and by a portion of fees for certificates of vehicle titles. Funding for this program is expected to total approximately \$150 million per year through 2010.

Other states and EPA are also developing voluntary programs. California, Massachusetts, and North Carolina have programs that target a large percentage of school buses in the state. The federal Congestion Mitigation and Air Quality (CMAQ) program will partially fund the proposed school bus retrofit programs in Massachusetts and North Carolina. CMAQ requires a 20 percent local funding match by the state.

The Heinz Endowments has provided \$500,000 in seed money for a school bus retrofit program in Pittsburgh, Pennsylvania. An advantage to the Heinz-funded program is that it is structured as a rebate with a set level of reimbursement for installation of a DPF rather than as a grant program based on a Request for Proposals. This approach reduces the work required to apply for the money and allows the individual bus owners to choose their retrofit vendor.

In recent years, EPA has made demonstration grants under its National Clean Diesel Campaign and has launched a Clean School Bus Initiative. EPA provided grants to more than 300 projects, including efforts to retrofit approximately 10,000 school buses and 1,000 other diesel vehicles and equipment. EPA grants are made through seven regional collaboratives. Seven million dollars in funding is available this year specifically for school bus retrofits.

Over the last four years, the Puget Sound Clean Air Agency has sponsored and funded over 3,000 voluntary retrofits of transit and school buses, refuse haulers, public works vehicles, construction equipment, and port material-handling equipment. The agency currently has an annual appropriation of \$5 million to retrofit school buses statewide.

The New Jersey legislature adopted a diesel retrofit program in June 2005 and in November 2005 the voters approved, by a substantial margin, reapportioning to the diesel retrofit program 17 percent of the four percent of the state's corporation business tax previously dedicated to the remediation of leaking underground fuel storage tanks. This reapportioning is expected to generate \$14 million per year for retrofits.

In 1996, the citizens of the New York approved the Clean Water/Clean Air Bond Act. Under this program, New

York issued \$1.75 billion in general obligation bonds, which the state used to fund a range of environmental programs. The state spent approximately \$230 million on air quality projects, including retrofits and fuel conversions of onroad diesel vehicles.

Supplemental Environmental Projects

A number of retrofit programs have been funded as SEPs as a result of environmental enforcement actions at the national, regional, and state levels. Two examples are the national Clean Buses for Kids² program, which targets school buses, and the Northeast Utility Truck Retrofit Project.

The retrofit process is ongoing under the Clean Buses for Kids program, but currently is closed to new applications. The Northeast Utility Truck Retrofit Project is in the early planning stages. It will target diesel utility trucks throughout New England, New Jersey, and New York.

M.J. Bradley & Associates (MJB&A) and Northeast States for Coordinated Air Use Management (NESCAUM), in collaboration with the Northeast Diesel Collaborative, have designed the Utility Truck Retrofit Project. The program will retrofit a minimum of 400 trucks with diesel oxidation catalysts (DOCs) or high performance DOCs, and approximately 100 trucks with DPFs. The program has \$1.5 million in funds available and is modeled on the CMAQ program — it will require participating utilities to provide a cost-share match of 20 percent of the equipment cost. MJB&A is currently gathering information on utility fleets in the project area. After analyzing fleet data, we will produce a catalog of DOC and DPFs available for retrofit on specific types of trucks.

Mandatory Retrofit Programs

In addition to the voluntary programs, several states have started to mandate the retrofit or replacement of diesel engines in specific types of fleets. California was the first to take this approach, adopting a fleet rule in 2000 for transit buses that mandated the use of cleaner engines, cleaner fuels, and the retrofitting of older vehicles. The rule is focused on both NO_x and PM emissions. It mandates incremental progress over a ten-year period through more stringent standards for new engines, as well as retrofit requirements.

In 2003, the California Air Resources Board extended the same concept to other fleets by adopting a mandatory retrofit program, to be implemented between 2004 and 2010, for all diesel-fueled solid waste collection vehicles over 14,000 pounds gross vehicle weight. This program provides implementation flexibility because it does not require the use of a specific retrofit device. Instead, it requires the use of the Best Available Control Technology (BACT) that can reduce PM emissions to the greatest ex-

² See <http://www.cleanbusesforkids.com/index.html>

tent possible. Under the rules, repowering with a natural gas or cleaner diesel engine is considered to be BACT, as is retrofitting with a California Air Resources Board (CARB)-verified tail pipe retrofit technology.

In 2004, CARB adopted mandatory retrofit requirements for portable diesel engines used in California in agricultural pumps, airport ground-support equipment, oil drilling rigs, portable generators, and other nonroad equipment. The rule requires stepped-up reductions in PM emissions from these engines, with a 95 percent reduction to be achieved by 2020. These are the first mandatory retrofit requirements California has adopted for any type of nonroad diesel engines, although CARB is evaluating a similar program for nonroad construction equipment.³

Broad mandatory retrofit requirements are harder to impose on privately-owned nonroad equipment than on privately-owned onroad vehicles. Unlike onroad vehicles that use public roadways, nonroad equipment is usually not required to be registered with the state. One of the reasons that California, unlike other states, was able to impose mandatory retrofit requirements for portable engines is that owners of these engines have been required for a number of years to register them with the state. The proposed construction equipment rule will also require that the owners file initial and annual reports for their affected equipment.

The Clean Air Act significantly restricts states other than California from imposing mandatory retrofit requirements on nonroad diesels. While the Clean Air Act allows all states significant freedom to set their own “standards” for existing onroad vehicles (for example by mandating retrofits), the same is not true for nonroad equipment. California can create its own requirements for some types of existing nonroad vehicles, but other states can only adopt the rules that California has already imposed.

In 2005, New Jersey became the first state other than California to mandate the retrofit of certain types of diesel vehicles. State law now requires BACT retrofits for all commercial buses, garbage trucks that are publicly owned or used on a publicly funded contract, and other publicly owned onroad diesel equipment.

In addition, New Jersey requires that school buses have closed crankcase ventilation installed and may require the installation of DOCs on all school buses. New Jersey Department of Environmental Protection is currently conducting a study to determine the in-cabin impacts of requiring exhaust retrofits on diesel school buses. If the study determines that retrofitting will improve in-cabin air quality, retrofits will be required.

³. CARB has released draft regulations that target diesel offroad equipment on a fleet-wide average basis, with a requirement that individual fleets prove that they have implemented BACT if they cannot meet the fleet-wide average emission rate.

Under New Jersey’s retrofitting program, the state reimburses fleet owners for the cost of the mandatory retrofits. Interestingly, the mandatory program includes both direct mandates (for school buses and commercial buses) and indirect mandates imposed through government contracting (for garbage trucks). Indirect mandates — first successfully demonstrated through Boston’s “Big Dig” construction project — are becoming more and more popular, especially for diesel construction equipment.

Government Contracting

While the nonroad equipment used in government contracting generally makes up only a small percentage of all nonroad equipment used in a locality, indirect retrofit mandates are appealing for several reasons:

- the Clean Air Act allows states and local areas to implement such policies,
- they are usually relatively easy to implement, and
- they may help to build an experience base and a commercial market for retrofit products and services that can later be extended to non-government controlled fleets.

As noted, Boston’s “Big Dig” — a fifteen-year project to bury a 7.5-mile section of I-93 running through central Boston — pioneered the indirect approach. Beginning in 1998, the Massachusetts Turnpike Authority mandated the retrofit of some of the construction equipment used on the project. In collaboration with other government agencies and private organizations, the Massachusetts Turnpike Authority first developed a pilot program to retrofit eight pieces of equipment belonging to three different contractors. By the time the project was complete, over 200 pieces of equipment had been retrofit by Big Dig contractors; the cost of the retrofits was covered in their construction bid prices.


In 2003, New York City became the first local jurisdiction to legislate indirect diesel retrofit mandates. The New York City Council adopted Local Law 77, which requires retrofits of all diesel-powered construction equipment that is greater than 50 horsepower and that is used on publicly funded construction projects in New York City. The requirements were phased in between June 2004 and December 2005, depending on the location and size of the project.

Local Law 77 requires the use of “best available technology” to reduce PM emissions to the greatest extent possible. Under the implementing regulations developed by the New York City Department of Environmental Protection, contractors must install an EPA- or CARB-verified diesel particulate filter on each affected piece of equipment unless they can demonstrate that these devices are not technically feasible. If so, the contractors can install a diesel oxidation catalyst or use emulsified diesel fuel.

In April 2005, similar to New Jersey's program described above, the New York City Council enacted legislation that extended the retrofit mandate to private school buses, city-licensed sight-seeing buses, garbage trucks used for all city contracts, and all city-owned or -operated diesel vehicles.

Other state and local agencies have implemented similar requirements on a project-by-project basis. These include the Illinois Department of Transportation's rebuilding of the Dan Ryan Expressway through Chicago, the Port of Seattle's construction of a new runway at Seattle's Sea-Tac airport, and the Connecticut Department of Transportation's major road and bridge project along seven miles of I-95 through southern Connecticut.

To date most of these indirect government mandates have applied to construction equipment and refuse collection trucks. California, however, is evaluating strategies to reduce emissions from the trucks used to move goods in and out of publicly-owned port facilities. California is considering the imposition of mandatory early retirement and retrofit requirements on trucks that service the ports, which would be enforced through licensing or other access restrictions.

Even some private companies have begun to mandate diesel retrofits on construction equipment. For example, when the Dana-Farber Cancer Institute wanted to build a new 275,000 square foot clinical research and treatment facility in the heart of the Longwood Medical Area in Boston, they partnered with the regional EPA office and the prime contractor to write Diesel Emission Reduction requirements into all subcontracts. The specifications include a strict no-idling policy, encourage the use of electric-powered equipment where feasible, and require minimum pollutant reductions for volatile organic compounds (VOCs), carbon monoxide (CO), and particulate matter (PM). Through this program the subcontractors were encouraged to use a combination of retrofit technologies and cleaner fuels to meet these contract specifications. To date, eight pieces of equipment have been retrofit with diesel oxidation catalysts. An additional nine pieces, which will not be required on site until June 2008, are currently in the process of being retrofit. By the end of the project, it is expected that 25 to 30 pieces of construction equipment will have emissions reduction technology installed. 

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To be effective, voluntary retrofit programs need to provide funding to subsidize the cost of the retrofits, especially when targeting privately-owned vehicles. The programs in California, Texas, and New Jersey — which provide a dedicated funding stream rather than relying on annual appropriations — are a good model for other states and localities to follow.

Diesel retrofits are a good use of SEP funds. The many diesel vehicle sectors and the significant unmet retrofit needs can provide flexibility in developing a SEP program, as well as significant and cost-effective emissions reductions.

School buses and construction equipment will likely continue to be the priority sectors for encouraging retrofits. School buses will be the targets for voluntary, funded retrofits while construction equipment will increasingly be subject to mandatory retrofit requirements in government and private sector contracting.

Given the current regulatory system as well as implementation and financial constraints, many states and localities are reluctant to mandate diesel retrofits. While EPA has encouraged states to consider diesel retrofits as a component of their State Implementation Plans (SIPs) for fine particle emissions, most states will likely continue to use voluntary programs and may expand their use of indirect mandates by requiring retrofits on vehicles and equipment used to provide government services. The exception is California, which is likely to expand its mandatory retrofit requirements into additional onroad and nonroad diesel sectors.