STATE IMPLEMENTATION PLANS FOR AIR QUALITY: A PRIMER

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Foreword

The production and use of energy causes most of America's air pollution. Providing incentives to modify the amount and patterns of consumers' energy usage and to convert the mix of fuels consumed to produce it can yield profound air quality improvements. These improvements are especially valuable in areas presently not achieving our nation's ambient air quality standards.

Air quality and energy officials within government have long recognized the links between energy production and use and air quality. Unfortunately, they have rarely institutionalized that relationship by explicitly integrating their program objectives and guidelines to reinforce the values they share. As a result, producers and consumers who make energy efficiency improvements or select renewable sources of supply that reduce overall air emissions typically receive no tangible reward for their contributions to improved air quality. At the same time, traditional approaches to controlling air emissions, adding scrubbers or other controls to powerplants and tailpipes, sometimes frustrate our efforts to improve energy use efficiency because they create new demands for it.

Historically, air quality officials have addressed themselves strictly to what leaves America's smokestacks and tailpipes. They have ignored the demands for energy that cause fuels to be burned in the first place. Energy officials, on the other hand, have promoted energy efficiency and renewable energy supply technologies because they are economical to consumers and reduce the nation's economic vulnerability to foreign suppliers. Energy officials have treated the associated air quality improvements as incidental. Today we must both do better; we must formally join forces with one another to maximize our respective impact.

This primer is a start. It gives state energy officials a basic understanding of state implementation plan requirements and suggest opportunities for officially incorporating energy efficiency improvements and renewable resource developments into them. This information should help state energy officials create tangible rewards for the air quality improvements energy consumers and producers make when they increase energy efficiency and develop renewable resources within their state.

Without these added rewards, overall energy efficiency and renewable energy investments could decline as utilities eliminate the programs they were previously ordered to operate and emerging electricity markets drive prices down. Energy officials will not be able to rely on their traditional economic justifications to support the same level of energy efficiency and renewable energy development they are promoting today. They will need to learn how to incorporate environmental values into all of their transactions to avoid being forced to do less.

As the person responsible for both promoting increased energy efficiency and renewable resource development in Montana and developing state implementation plans for its ambient air quality nonattainment areas, I am confronted with the challenges to and opportunities for synergism addressed in this primer daily. Within that context, I encourage both sets of my colleagues to read this primer and commit themselves to creating tangible rewards, recognizable with a broad range of private transactions, to support one another's work.

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I. Executive Summary

Under the federal Clean Air Act, states must submit State Implementation Plans (SIPs) that demonstrate how states will attain and maintain national air quality standards.

This paper presents a basic primer on SIPs with reference to ground-level ozone (smog) and identifies opportunities for formally incorporating energy efficiency and renewable resources in SIPs. It emphasizes the linkage between energy production and pollutant emissions, and especially the avoidance thereof, through energy efficiency improvements and renewable resources.

Discussion of the legal and regulatory framework for SIPs highlights recent developments, such as the revision of the national ozone standard and the proposed ozone transport rule, which have set in motion a new schedule for SIP submittals. Briefly, implications of electric industry restructuring, including the environmental consequences and implications for state energy and air quality agencies are also reviewed.

Next, the paper moves on to a general review of the SIP planning process, both what is involved in the process and the analytic framework that guides preparation of state plans for attaining and maintaining air quality. An overview of the current integrated schedule or timeline for SIP submittals is set forth.

The paper then reviews the strategies and schedules for regulatory implementation and the interface of these strategies with the SIP. It includes a review of the near-term (next two years) focus and issues.

Finally, the paper identifies generic opportunities for integrating energy efficiency and renewable resources in the SIP process, proposing that each of three conceptual approaches for demonstrating how any emissions excess will be reduced represents such an opportunity:
1) modification of the growth estimates or reference case projection of economic activity/emissions
2) design of additional programs or control measures to reduce emissions, and
3) design of market-based programs and economic incentives, using the marketplace to achieve a given level of emissions reduction (e. g. emissions budget or cap) at a lower cost

With respect to the first, the reference case projection of economic activity/emissions usually includes public policy assumptions with respect to energy efficiency and renewable resources. With respect to the second, an energy efficiency or renewable resources program or measure represents an emissions prevention strategy which not only helps achieve the air quality standard as surely as a program requiring additional source

controls, but also results in substantial cobenefits as a result of the avoidance of fuel combustion.

With respect to the third, the design and implementation of market-based programs (e. g. a cap and trade program for power plants) involves the establishment of an emission budget and source allowances. Again, implementation of efficiency and renewable resource measures, as well as implementation of control measures, reduces emissions and, therefore, should be fully eligible to receive allowances.

The opportunities for and potential air quality benefits of integrating energy efficiency and renewable resources in the SIP process are significant. These opportunities and benefits should spur states to work with EPA and develop such measures for inclusion in SIP submittals scheduled for 1999 and 2000.

II. Introduction

Under federal law, EPA establishes national ambient air quality standards for pollutants that cause adverse effects to public health and the environment. EPA has set national air quality standards for six principal criteria pollutants: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10}) and sulfur dioxide (SO_2). States are responsible for designing SIPs to meet air quality standards for the six criteria pollutants within their borders.

The production and use of energy, particularly the burning of fossil fuels, causes most of the nation's air pollution problem with respect to these criteria pollutants. Therefore, SIPs deal with the linkage between energy production and use and air quality.

This paper focuses on ozone SIPs since ground-level ozone, a prime ingredient of smog, is both a widespread national air quality problem affecting many states and a primary example of the energy-air quality linkage. Ozone is generally not emitted directly into the atmosphere but rather is formed by some gases, notably nitrogen oxides (NO_x) and volatile organic compounds (VOCs). In the presence of strong sunlight, these gases react with oxygen in the atmosphere to form high ozone concentrations that can remain over large regions for an extended period of time.

Areas downwind of urban settings are also subject to high ozone exposure because winds can carry NO_x and VOCs, as well as ozone itself, hundreds of miles from the source of pollution. Moreover, ozone precursors which are emitted in less urbanized and rural areas are carried to downwind areas to form ozone, thus often exacerbating ozone levels. Thus, cities or areas with "clean" air, those that meet or attain the national air quality standards for ozone, may be contributing to a downwind metropolitan area's ozone problem because of transport. The process of ozone and ozone precursors traveling to these downwind areas is referred to as ozone transport.

Simply stated, ground-level ozone or smog is formed when nitrogen dioxides (emitted from power plants, automobiles and other sources) and volatile organic compounds (emitted from automobiles, factories, and smaller sources like paints and coatings, as well as naturally occurring biogenic emissions) "bake" in the summer heat resulting in health problems at ground level. Ozone control strategies address both combustion sources (primarily NO_x) and non-combustion sources (primarily VOCs).

For more than a quarter century, states have been designing and implementing programs to attain the federal air quality standard for ground-level ozone. States are responsible for developing and implementing State Implementation Plans (SIPs) to achieve and maintain ozone air quality standards within their borders. Although much progress has been made to improve air quality, many areas have yet to attain the current ozone standard.

For example, the following areas are illustrative of the current nonattainment areas (approximately 35-40) with respect to the ozone standard:

- Atlanta, GA
- Baltimore, MD
- Boston-Lawrence-Worcester, MA-NH
- Cincinnati-Hamilton, OH-KY
- Chicago-Gary-Lake County, IL-IN
- Houston-Galveston-Brazoria, TX
- Louisville, KY-IN
- Los Angeles South Coast Air Basin, CA
- New York-N. New Jersey-Long Island, NY-NJ-CT
- Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD
- Sacramento Metro, CA
- Washington, DC-MD-VA

Reflecting recent scientific research, two recent major policy initiatives are reshaping the SIP process with respect to ground-level ozone, as defined by the Clean Air Act Amendments of 1990. First, in July, 1997 the EPA issued revised ozone standards. Second, in October 1997 EPA issued a draft proposed rule for reducing regional transport of ozone and ozone precursors.

These developments reflect both an ongoing convergence of energy and air quality issues and a changing federal/state role with a new recognition of the importance of regional air quality phenomena and regional solutions. An example of the former is the issue of the clean air consequences of electric industry restructuring. The electric power industry is in the midst of a fundamental restructuring with important implications for the SIP process.

With full retail choice arriving in California and New England, and being phased-in in other states, competition among electric suppliers is increasing dramatically. The increased competition could have important electricity generation and air emissions consequences, as a result of shifts in the geographic pattern of electricity production or changes in generation fuel mix patterns, as discussed more fully below. For example, increased competition among electricity service providers could result in increased use of low-cost Midwest coal-fired generation facilities with attendant downwind emissions consequences.

An example of the new recognition of the importance of regional air quality phenomenon and regional solutions is the recent 37-state Ozone Transport Assessment Group (OTAG) process. Progress in attaining the ozone standard has been limited by the fact that ozone and the pollutants that form ozone can be carried significant distances by the wind. It became apparent that some states cannot demonstrate attainment with the national standard simply through the implementation of control measures within their nonattainment areas. In order for these states to demonstrate attainment, ozone and ozone precursor reductions at the boundaries of boundaries of the nonattainment areas will be necessary, together with reductions within the nonattainment areas. Therefore, it is necessary to develop control programs that reduce ozone-forming pollutants that are emitted many miles upwind of the area of violation.

Because no individual state or jurisdiction can be expected to either fully assess or subsequently resolve all the issues relevant to ozone transport, EPA and the Environmental Council of the States (ECOS) determined that it was appropriate to form a national workgroup to bring together all interested states and other stakeholders, including industry and environmental groups, to allow for a thoughtful assessment and the development of consensus solutions to the problem. The result was the formation of the formation of the 37-state Ozone Transport Assessment Group. The group was charged with assessing the significance of pollutant transport and recommending control strategies for reducing that transport (OTAG, Executive Report, August, 1997).

The issuance of revised ozone standards and the proposed rule for reducing ozone transport, as well as the restructuring of the electric power industry, make this a timely window of opportunity to examine the role of energy efficiency and renewable resources in the SIP process. Integration of these strategies would recognize the important role of pollutant prevention, as compared to source control strategies, in meeting the ozone air quality standard at a reduced cost. At the same time, such integration would provide cobenefits resulting from the avoidance of other pollutants associated with fossil fuel combustion, such as acid rain precursors, particulates, air toxics and carbon dioxide (CO_2).

The objective of this report is to present a primer on the SIP process with emphasis on the current focus of the ozone SIP and associated issues and to identify specific opportunities for incorporation of energy efficiency and renewable resources in the SIP process.

The report contains four major sections. The first section describes the legal and regulatory framework for SIPs. The second section provides a general overview of the ozone SIP planning process. The third section then reviews strategies for regulatory implementation and the interface of these strategies with the SIP. And the final section examines generic opportunities for integrating energy efficiency and renewable resources in the SIPs.

III. Legal and Regulatory Framework for SIPs

The Federal Clean Air Act

The federal Clean Air Act (CAA), as amended in 1990, provides the legal framework for the state regulation of air quality and emissions sources, including power plants, industrial sources, motor vehicles and others. The CAA directs EPA to identify and set national ambient air quality standards for pollutants that cause adverse effects to public health and the environment. As noted, EPA has set national air quality standards for six common air pollutants--ground level ozone (smog), carbon monoxide, lead, nitrogen dioxide, sulfur dioxide, and particulate matter.

The CAA sets forth the framework for states to develop and implement State Implementation Plans (SIPs). Each state is required to have a SIP which contains the control measures and strategies which will be used to attain and maintain the national air quality standards within their borders.

SIPs must address pollution control for both clean air areas (to maintain air quality consistent with national standards against growth in emissions) and for areas in violation of the air quality standards, to ensure that the ambient standards are attained in the future. The latter portions of the SIP are known as the nonattainment programs.

The SIP shows how a state will reduce emissions through applying CAA mandated controls. In addition, states can adopt more stringent standards or additional measures beyond what is required under the Clean Air Act, in order to reach attainment. These measures become part of the SIP and are federally enforceable.

As part of these plans, states divide their total area into air quality control regions. Attainment areas are designated at the county level. Sometimes only part of a county is designated, but the county is the building block for designating nonattainment and writing SIPs. If the air quality in a control region, based on monitoring, falls below any of the air quality standards, EPA designates that control region as a nonattainment area for that particular pollutant.

State and local authorities monitor air quality in each control region and develop and implement plans to improve and maintain air quality in each nonattainment area. These plans contain specific requirements for controlling pollution within each nonattainment area. The SIP includes all elements of a state's air quality management program: plans, commitments, enforceable rules, requirements for new emission sources, monitoring plans, modeling of demonstrations and background documentation, letters and attestations, administrative documentation, resources and authority to implement and enforce rules, permit fee requirements and interstate transport requirements.

The SIPs must be reviewed and approved by EPA, a joint effort of EPA regional and Washington, DC offices. If EPA should find a SIP inadequate, the federal government is

authorized to impose sanctions and, if necessary, prepare a Federal Implementation Plan (FIP), thus taking over enforcement of the CAA in the state.

With respect to the national ozone air quality standard, the 1990 CAA amendments required the states and EPA to review and, if necessary, revise the designation of areas as attainment or nonattainment under the standard. Areas designated as nonattainment were divided into, primarily, five classifications based on the severity of nonattainment. Each classification carries specific requirements, including attainment dates. In increasing severity of the air quality problem, these classifications are marginal, moderate, serious, severe and extreme.

Recognizing that actions by individual states alone would not be sufficient for the Northeast region as a whole to attain the air quality standard for ozone, the 1990 CAA amendments also established an Ozone Transport Commission (OTC). Within the Northeast Corridor, downwind states are affected by the NO_x and VOC emissions of upwind states due to the nature of ozone formation and prevailing wind patterns to address the transport of ozone and its precursor gases in this region. The OTC is comprised of government leaders and environmental officials from 12 northeast and mid-Atlantic states (CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, and VA) and the District of Columbia which together compose the Ozone Transport Region, as well as the U. S. EPA.

The OTC has adopted several memorandum of understanding (MOUs) which specify or regional (joint-state) actions to address the transport of ozone and its precursors in the region by controlling ozone precursor emissions within the region beyond that generally required by the CAA. These actions help ensure that SIPs in the Northeast are developed which lead to attainment and maintenance of the ambient ozone standard throughout the region. The decisions of the OTC, a nationally recognized entity, have influenced public policy in non-OTC states.

The standards which drive the SIPs can be revised. Indeed, EPA is required by the Clean Air Act to review the health and welfare-based standards at least once every five years to determine whether revisions to the standards are necessary to continue to protect public health and the environment.

Revised Ozone Standard

In July 1997, EPA issued a revised national air quality standard for ground-level ozone, effective September 1997, the first revision since 1979. The decision to revise the standard was based on the Agency's review of the available scientific evidence linking exposures to ambient ozone to adverse health and welfare effects at levels allowed by the current standard.
To protect against longer exposure periods, EPA is phasing out and replacing the previous primary one-hour ozone standard with a new 8-hour standard. EPA established the 8-

hour standard at 0.08 parts per million (ppm) and defines the new standard as a "concentration-based" form, specifically the 3-year average of the annual 4th-highest daily maximum 8-hour concentrations.

The revised ozone standard results in more areas (counties) and larger areas (multi-county) with monitoring data indicating nonattainment. For this reason, EPA believes expedited implementation of regional NO_x control strategies is critical to mitigate transport of ozone and ozone precursors (NO_x and VOCs) into areas in violation of the new standards, thus enabling these areas to demonstrate attainment. EPA believes the recently proposed regional NO_x reductions (see below) alone should be sufficient to allow most of the new nonattainment counties to comply with the new standard (preamble to proposed SIP call rule, "Notice of Proposed Rulemaking (NPR)," published in Federal Register, Nov. 7, 1997).

The current 1-hour standard (0.12 ppm) will not be revoked in a given nonattainment area, but will continue to apply to an area for an interim period until EPA makes a determination the area has air quality meeting the 1-hour standard (or, in other words, has achieved three consecutive years of air quality data meeting the 1-hour standard). The purpose of retaining the pre-existing 1-hour standard is to ensure a smooth, legal and practical transition to the new standard.

Proposed Rule for Reducing Regional Transport

In the mid-1990s, many states, primarily in the Northeast and the Midwest, had found it difficult to demonstrate attainment of the ozone air quality standard due, in large measure, to the widespread transport of ozone and its precursors from upwind states. In response, EPA issued a memorandum (March 2, 1995) laying the foundation for the Ozone Transport Assessment Group (OTAG) process and establishing an extended time frame for SIP submittals to reflect the transport assessment.

The OTAG process, a collaborative process conducted by representatives from 37 affected states (all states east of the Mississippi, DC, and the two tiers of states west of the Mississippi-- ND, SD, NB, KS, OK, TX, MN, IA, MO, AK and LA,), EPA, and interested members of the public, including environmental groups and industry, was established to evaluate the ozone transport problem and develop solutions. Through the OTAG process, the states concluded in a Summer 1997 final report that widespread regional NO_x reductions are needed in order to enable areas to attain and maintain the ozone standard.

Section 126 Petitions

In August 1997, eight northeastern states (CT,ME,MA,NH,NY,PA,RI, and VT), citing Section 126 of the CAA, filed petitions with EPA to reduce the transport of ground-level ozone pollution. The petitions ask EPA to make a finding that utilities and other sources of NO_x emissions in upwind states exacerbate ozone problems in the petitioning states. If

EPA agrees and makes the requested finding, EPA would establish federal emissions controls on the targeted power plants.

In April 1998, EPA issued an Advanced Notice of Proposed Rulemaking (ANPR) for the Section 126 petitions. The ANPR harmonizes the time frame for action on the 126 petitions with EPA's anticipated schedule for action on the NO_x SIP call (see below). The agreement basically serves as a backstop for the SIP process, as outlined above, with respect to emissions reductions from the dirtiest electric power plants.

SIP Call

In October, 1997, pursuant to Section 110 of the CAA, EPA issued a proposed rule for reducing regional transport of ground-level ozone (smog), referred to as the ozone transport or SIP call rule. The SIP call rule calls in the SIPs of specified states for revisions needed to reduce long-range ozone transport precursors, notably NO_x emissions. The rulemaking makes a finding that each of 22 states contributes to nonattainment in, or interferes with maintenance by, a downwind state. Therefore, the rulemaking assigns NO_x emissions budgets that each of 22 identified states must meet through SIP measures. The NO_x emissions budget or cap for each identified state was based, in large measure, upon technical information developed in the OTAG process.

Under this proposed rule, states will be required to adopt and submit SIPs within one year after publication of the notice of final rulemaking (expected to be final in September 1998). SIPs must contain control measures that will mitigate the ozone transport problem by meeting the assigned statewide emission budget. EPA has encouraged states to achieve the necessary NO_x emission reductions primarily from large stationary sources and to consider electric power plant controls under a cap and trade program as a cost-effective strategy.

EPA also recognizes that providers of energy efficiency can contribute to a cost-effective program. EPA is working with states to develop guidance on how states can integrate energy efficiency in SIPs.

In April 1998, EPA published a supplemental note of proposed rulemaking (SNPR). The agency included in the SNPR a proposed model cap-and-trade rule. It will allow, though not require, states to establish a regional cap and trade program. This would allow facilities that reduce emissions early or in greater amounts than required to sell their "right to pollute" or allowances to other facilities that need more time to implement controls. Thus, the trading program will reduce the overall cost of attaining the standards. Under the specified state budgets, allowances would be allocated among power plants.

Regional Haze

While the phenomena of regional haze and ozone creation are distinct, the phenomenon share power generation facilities as an important common pollutant source. In parts of the western half of the nation, regional haze affecting national parks may be a more serious problem than ozone nonattainment. Recognizing the linkage, EPA established a CAA Federal Advisory Subcommittee on Ozone, Particulate Matter and Regional Haze Implementation Programs to focus on how best to develop more cost-effective, flexible strategies for implementing these requirements. In fact, the regional haze SIP will likely be able to take into account air quality improvements due to implementation of other programs, such as the national ambient air quality standards, including ozone.

In July 1997, EPA issued a draft regional haze rule which proposed a framework for states to develop a long term strategy for reducing regional haze and improving visibility in 156 national parks and wilderness areas. States would develop emission control plans to achieve "reasonable progress." The strategy would include best available retrofit technology to existing sources (power plants and other stationary sources) placed into operation between 1962-77.

EPA issuance of the final regional haze rulemaking is pending.

Electric Industry Restructuring: SIP Implications

Restructuring of the electric industry is designed to promote competition among electricity providers, resulting in lower electricity rates to consumers, higher quality services and a stronger national economy.

Now in the midst of an historic transition, the electric power industry will experience major changes in structure over the next five years (refer to Electric Industry Restructuring primer). These changes will continue to affect electric generating facility dispatch decisions which, in turn, will have environmental consequences and, also, implications for the SIP process.

With the transformation of the electric power industry from a heavily regulated industry of integrated utilities to an industry characterized by deregulation of generation and customer service functions, several important changes are occurring. First, competitive markets, rather than state public utility commission regulation, increasingly are dictating decisions of where and how to generate electricity and which customers will be supplied by various suppliers.

Second, state restructuring plans in California, the Northeast and elsewhere are requiring the divestiture of utility generation facilities through auctions. Major independent power producers and large utility holding companies seeking to become nationwide suppliers of electricity have been the winning bidders. The consolidation of the electric power generation industry is likely to continue and result in a limited number of large national

companies, either generation utilities or independent power producers, dominating the industry and selling in many states.

Finally, it should also be noted that the restructuring of the industry will likely result in a significant decrease in the real price of electricity. In a recent 1998 update of energy projections, the Energy Information Administration projects a significant decline (14 percent) in the average price of electricity by 2010 and further declines thereafter. Even greater reductions are anticipated in high cost regions, reflecting, in part, fuel switching and increased interstate transmission of electricity.

Environmental Consequences

Increased competition in the electricity markets, however, can have unintended environmental consequences as a result of shifts in the geographic pattern of electricity production or changes in generation fuel mix patterns. In the mid-nineties, the potential environmental effects of electric industry restructuring emerged as a significant public policy issue in conjunction with federal action to encourage competition in the electric industry at the wholesale level.

Specifically, increased competition results in opportunities for lower-cost producers to market power to higher cost regions. Many lower cost producers include coal-based utilities in the Midwest--notably in the Ohio River Valley.

However, the Clean Air Act, as amended, provided for power plants planned prior to 1977 and located in attainment areas to be generally exempt from increasingly rigorous "new source" performance standards. The exemption extends to many coal plants in the Midwest which came into service as late as 1985 and can emit sulfur dioxide (SO2) and nitrogen oxides (NOx) far in excess of the rate of new plants.

The restructuring of the electric industry appears to be resulting in significantly increased operation of these facilities in order to minimize production costs. Without the application of stringent requirements on these older facilities, the resulting increased emissions and associated ozone transport from these plants will only add to difficulties the Northeast and other nonattainment areas already face in attaining federal air quality standards in a timely manner.

The recent EPA Ozone Transport or SIP call rule, in combination with the Section 126 backstop consent agreement, appears to have the potential to resolve this long-standing issue by establishing NOx emission budgets or caps for each of the affected states and requiring substantial reductions in emissions for specified power plants.

Seven northeastern environmental commissioners (CT,ME,MA,NH,NY,RI and VT), however, have expressed concerns. In releasing a recent Northeast States for Coordinated Air Use Management (NESCAUM) study of the early results of restructuring, the commissioners concluded that the findings "...affirm our belief that comparable

environmental standards must be applied to all electricity generators to ensure that increased competition does not have the unintended effect of increasing air pollution.(NESCAUM, Air Pollution Impacts of Increased Deregulation in the Electric Power Industry: An Initial Analysis, January, 1998) " The commissioners further stated that the findings support the need for inclusion of environmental safeguards in any federal restructuring legislation.

State Agency Implications

What are the implications of electric industry restructuring for the traditional roles of state energy and environmental agencies: public utility commissions, air quality offices and energy offices? Clearly, the general focus of state electric industry regulation is shifting from the traditional regulatory mode to that of assuring open and competitive markets.

With deregulation of the electricity generation function, competitive markets rather than state public utility commission (PUC) cost-of-service regulation will increasingly dictate decisions on where, how and when to generate electricity. Of course, such decisions will continue to be made within the constraints of environmental regulation, but that regulation is also changing and shifting to market-oriented cap and trade programs. As a consequence, air quality regulation, including the SIP process, will shift increasingly from a traditional command and control orientation to a market orientation.

The emerging emissions trading programs are a case in point. Four types of trading schemes for criteria pollutants are emerging: allowance trading (characterized by cap and trade), open market trading of discrete emission reductions (DERs), emission reduction credit (ERC) trading and emission offsets. The individual OTC states are now in the process of adopting NO_x budget implementing rules which will implement an OTR-wide NO_x budget cap and trade program, similar to the national SO_2 allowance trading program. Memoranda of understanding (MOUs) among OTC states are not needed for interstate trading since the regulation for each trading program provide for a regional trading system. With respect to the other three types of trading, however, MOUs among states are required for interstate trading.

Open market trading, while still awaiting final guidance from EPA, has begun in various forms in Massachusetts, Connecticut, New Jersey and New Hampshire. Michigan, Texas and Illinois have developed various open market trading programs that are awaiting EPA approval. An MOU for interstate open market trading exists between Connecticut and New Jersey. MOUs for interstate ERC trading are in place between Massachusetts and New Jersey, Massachusetts and Maine, Connecticut and New Jersey and New York and Pennsylvania. An MOU has been finalized between New York and Pennsylvania for emission offset trading.

The role of state public utility commissions with respect to electric facility generation decisions will be greatly diminished. However, the PUCs will assume a major new role as "traffic cops" for fair and open electric industry competition. For example, PUCs will no

longer micromanage utility demand-side management program (DSM) decisions related to expenditure levels for utility-sponsored energy efficiency programs. In some states, administrators responsible for system benefit charge funds (i. e. funding for public benefit programs for energy efficiency and renewables, low-income energy assistance, etc. supported by a wires charge on all electricity delivered) under state electric industry restructuring programs will be responsible for implementing energy efficiency programs.

State air quality offices will remain the focal point for environmental regulation of utilities. However, the nature of air quality regulation will change with an increased emphasis on market-oriented regulation of electric generating companies with multistate operations.

The role of state energy offices will continue to vary significantly from state to state. However, these offices will continue to serve as the focal point for energy efficiency and renewable resources in most states. These offices have had substantial experience over the past two decades in the design and verification of a wide range of energy efficiency and renewable energy programs and measures.

IV. General Review of the SIP Planning Process

SIPs, as noted, are state plans submitted to EPA which provide for implementation, maintenance and enforcement of national air quality standards. The SIP is a living document which can be revised by the state as necessary to address the specific air pollution situation in the state.

SIPs are legally enforceable documents that state governments develop to identify the sources of air pollution and to determine the reductions which are necessary to achieve federal air quality standards. Based on these determinations, measures are developed to achieve the necessary standards. In brief, SIPs are a collection of planning documents and regulations a state will use to clean up air pollution.

The SIP Process

The preparation of a SIP involves an extensive multi-year planning process, interaction with a wide range of stakeholders, conduct of extensive air quality and emissions modeling in order to demonstrate attainment of the standards, as well as preparation of extensive documentation that the full range of SIP requirements, as specified by the law and implementing EPA regulations and guidance memoranda, have been fully met. The state must involve the public, through hearings and opportunities to comment, in the development of SIPs.

The final SIP product is often a multi-volume document that presents detailed data on emissions trends, attainment demonstration modeling results, the estimated emissions impacts of all required regulations, documentation of the status of all required implementing state regulations and enforcement mechanisms, as well as verification that all SIP requirements have been fulfilled.

Simply stated, the SIP must demonstrate, by modeling, that the nonattainment region's air quality will achieve the criteria pollutant air quality standards by the required date. The regional ambient air quality modeling requires a projection of economic activity and associated emissions as a point of departure and basic input.

The planning process analytic framework begins with a reference case projection of economic activity and emissions, based upon implementation of CAA required actions for the particular area. The CAA mandatory actions vary according to the category of nonattainment areas with the most stringent actions or control measures required for the areas with the most severe criteria pollutant nonattainment problem. This reference case projection provides the foundation for an air quality model assessment of whether the mandatory measures are sufficient to achieve the criteria pollutant standard in that area. If the reference case emissions projection falls short of that required to demonstrate clean air, excess emissions exist and a state must develop local measures to reduce emissions. Generally, the CAA specifies that eligible control measures must result in reductions which are real, permanent, quantifiable and enforceable.

With respect to electric power plant sources, the projection of emissions results from the interaction of a projection of electricity demand/activity (kilowatt hours) and assumptions about installation of power plant source control technologies. The projection of the impact of the SIP control strategy results from the application of assumed additional controls to the power plants.

Generally speaking, the SIP control plan must demonstrate how any emissions excess will be reduced through one or more of three basic conceptual approaches:
1) modification of the growth estimates or reference case projection of economic activity/emissions
2) design of additional programs or control measures to reduce emissions, and
3) design of market-based programs and economic incentives to use the marketplace to achieve a given level of reduction (e. g. emissions budget) at a lower cost

This point can be further illustrated by example with reference to the recently proposed ozone transport or SIP call rule (October, 1997). In the proposed rule, EPA explicitly addressed two important issues: growth estimates and promoting end-use efficiency. With respect to the former, EPA stated it is important that consistent emissions growth estimates be used for the state's budget demonstration and for EPA's calculation of the required statewide emissions budget. However, EPA also stated that if a state wishes to substitute its own growth estimate or control information in its budget analyses and can provide adequate justification for the alternative numbers, EPA will evaluate the state's submission and may recalculate the required statewide estimate to reflect the state numbers. EPA further noted that because the revised estimates will be included in EPA's budget calculation, lower growth rates could not be considered part of a state's NO_x control strategy to attain that budget unless the change in growth is the result of clearly identified control strategies that can be shown to provide real, permanent and quantifiable changes in growth (underlining added).

With respect to energy efficiency, EPA stated that providers of energy efficiency can contribute to a cost-effective program. Specifically, EPA believes that achievement of energy efficiency improvements in homes, buildings, and industry can be a cost-effective component of a comprehensive state strategy. These energy efficiency improvements would substantially reduce control measures required to meet NO_x objectives. EPA is continuing to work with states to develop guidance on how SIPs and associated processes can allow for the incorporation of cost-effective, end-use energy efficiency.

The SIP Timeline

This section presents an overview of the current ozone SIP schedule/timeline (through 2012), including both the requirements for ozone transport and the revised standards. It reviews the near-term focus and issues with an emphasis on the next two years.

The current ozone SIP process schedule reflects an integration of the implementation of three major ongoing regulatory/legal processes: the new ozone air quality standards, the proposed ozone transport or SIP call rule and the Sect. 126 agreement.

Generally, Figure 1 presents the current integrated ozone SIP process timeline and milestones. Milestones associated with each regulatory process are differentiated by typeface: ozone standard (Roman), regional transport rule (*italics*) and Section 126 petitions (Monotype Corsiva).

In addition, the existing ozone SIP requirements for demonstrating attainment with the existing one-hour ozone standard will continue to apply. In EPA implementation guidance for the new ozone standard, states were required to submit attainment demonstrations in April, 1998. For severe and higher classified nonattainment areas, a SIP commitment to submit a plan on or before the end of 2000 which contains a) target calculations for post-1999 rate of progress (ROP) milestones up to the attainment date and b) adopted regulations to achieve the post-1999 ROP requirements up to the attainment date for the one-hour standard was required.

Figure 1 Ozone SIP Implementation Timeline: An Overview

Date	Milestone
1997	EPA issued revised ozone standard *EPA issued proposed Ozone Transport or SIP-call rule* EPA and states reach Section 126 agreement
1998	EPA issues final regulatory guidance *EPA issues supplemental rule (April) and final regional transport rule (September)*
1999	*States submit implementation plan to address transported air problem* EPA takes final action on Section 126 petitions
2000	EPA designates nonattainment areas under revised standard States submit early SIPs for transitional areas pursuant to revised standard
2003	States submit implementation plan for meeting revised standard
2004	*States achieve reductions from regional transport (implement controls 2002-04)*
2007	States assess effectiveness of regional reductions
2012	States have up to 10 years (from date of designation) to meet the new standards, plus two possible one-year extensions

V. Strategies for Regulatory Implementation and Interface with SIPs

This section discusses the strategies and schedules for each of the three implementing regulatory processes. It concludes with a review of the near-term (next two years) focus and issues.

New Ozone Air Quality Standards

EPA has stressed a commitment to follow a common-sense flexible implementation strategy for meeting the new ozone air quality standards. This strategy emphasizes maintaining progress already being made and respecting agreements already made, rewarding states and businesses that take early action to reduce air pollution levels and responding to the fact that pollution travels hundreds of miles and across state boundaries.

The strategy for implementing the new standards builds upon the recently issued proposed regional transport/SIP call rule. This rule requires states in the OTAG region that are significantly contributing to nonattainment or interfering with the maintenance of attainment of downwind states to submit SIPs to reduce their interstate pollution. EPA will issue the final rule in September 1998. (See below for discussion of the regional transport rule timeline.) Reducing ozone transport (interstate pollution) will help all areas in the eastern U. S. attain the pre-existing 1-hour standard and the new 8-hour standard.

EPA will create a special "transitional" classification for eligible nonattainment areas that participate in the regional emissions control strategy or SIP call and/or opt to submit early plans addressing the new 8-hour standard. For these areas, states can use the EPA regional modeling for the new 8-hour standard attainment demonstration, thus avoiding the burdensome and often expensive modeling requirements otherwise needed for an attainment demonstration. The transitional classification would be available for any area attaining the 1-hour standard but not attaining the 8-hour standard (and for any area to which the 1-hour standard no longer applies as of the time EPA promulgates designations for the 8-hour standard). EPA will also revise its rules for new source review and conformity so that states will comply with only minor revisions to existing programs in transitional areas.

The revised ozone standards will replace the previous standards; however, these previous (1-hour) standards and the associated regulatory requirements will continue to apply to areas not attaining them for an interim period to ensure an effective transition.

The general schedule for implementing the new ozone standard can be summarized, as follows:

- EPA will issue final regulatory guidance with respect to implementation by the end of 1998.

- As provided for under the Clean Air Act, EPA will work with the various governors regarding designation of nonattainment areas for ozone by the year 2000 (using the most recently available 3 years worth of air quality data at that time).

- Areas will have up to three years (or until 2003) to develop and submit State implementation plans (SIPs) to provide for attainment of the new standard.

- For transitional areas, States may opt to submit early SIPs in 2000, thus avoiding otherwise burdensome regulatory review requirements

- The Clean Air Act allows up to 10 years from the date of designation for areas to attain the revised standards with the possibility of two one-year extensions.

Figure 2 presents the general timeline for implementation of the new ozone standards.

Figure 3 presents a similar timeline for the implementation of ozone standards for those areas designated as transitional areas.

Regional Transport Rule

The EPA strategy for implementing the proposed regional transport rule has been linked with the implementation of the new ozone standards.

In the SNPR, EPA set forth a model market-based "cap-and-trade" program that the EPA proposes to implement jointly with participating states. The program is designed to achieve and maintain a NO_x emissions budget for certain combustion sources consistent with the NO_x SIP-call.

States can voluntarily choose to participate in the trading program by adopting the model rule. Adoption of the model rule is a fully approvable control strategy for achieving emissions reductions required under the proposed SIP-call. The trading program builds upon the Ozone Transport Commission's NO_x Budget Program and recommendations from OTAG, as well as subsequent public workshops in November and December, 1977. The trading program employs a cap on total emissions to ensure achievement of the required reductions, while the market-based system provides flexibility and cost effectiveness.

Facilities in states choosing to adopt the proposed cap-and-trade program, and which reduce NO_x emissions in greater amounts than required, would be able to sell their excess NO_x emission allowances those facilities in the program that cannot reduce emissions as quickly or cost-effectively. In administration of the trading program, the EPA would be responsible for managing the emissions data and market functions, as well as reconciling monitored emissions with emission allowances at the end of each ozone season. States choosing to join the trading program would be responsible for promulgating the

Figure 2 Timeline for Implementation of Revised Ozone Standard

Year	Milestone
1997	Revised ozone standard issued (July 18, 1997), effective Sept. 16, 1997.
1998	EPA issues final regulatory guidance
2000	EPA designates nonattainment areas.
2003	State submit implementation plans for meeting the 8-hour standard. For areas which haven't met the current 1-hour standard, ongoing efforts are sufficient through the current attainment dates.
2012	States have up to 10 years (from the date of designation) to meet the standards, plus two possible 1-year extensions.

Figure 3 Timeline for Implementation of Revised Ozone Standards for Transitional Areas

Date	Milestone
1997	Revised ozone standards issued (July 18, 1997), effective Sept. 16, 1997
2000	States submit early SIPs for transitional areas
2004	States achieve reductions from regional transport
2007	States assess effectiveness of regional reductions
2012	States have up to 10 years (from the date of designation) to meet the standards, plus two possible 1-year extensions

supporting state regulations, submitting allocations of NO_x emissions allowances to EPA, and enforcing the program's requirements.

The EPA will perform streamlined approval for ozone transport SIPs that adopt the model rule for the NO_x Budget Trading Program proposed in the SNPR. EPA is also proposing additional approvability criteria and an optional alternative offset pool approach for meeting NO_x budgets to account for growth of new sources in the future.

The general schedule for implementation of the regional transport rule can be summarized, as follows:

- States were unable to meet the CAA statutory November 15, 1994 deadline for SIP attainment demonstration, primarily because states were not able to address or control transport from upwind states.

- In March, 1995, EPA issued a Memorandum laying the foundation for the Ozone Assessment Group (OTAG) process and establishing new time frames for SIP submittals.

- In October, 1997, EPA issued a draft regional transport or SIP-call rule which established NO_x budgets for 22 affected states based, in large measure, on the findings of the OTAG process.

- EPA issued a supplemental notice (SNPR) in April, 1998

- EPA intends to issue a final ozone transport rule in September, 1998.

- SIP-call submittals to demonstrate attainment with the NO_x budgets will be due one year after the final rule (1999).

- States will be required to implement all regional control measures in the 2002-04 timeframe.

Figure 4 presents the timeline for implementation of the regional transport or SIP-call rule.

Sect. 126 ANPR

In April 1998, EPA issued an advanced notice of proposed rulemaking (ANPR) for the Section 126 petitions. The ANPR sets forth EPA's schedule for proposing and finalizing action on the Section 126 petitions, including a public hearing in October, 1998.

The section 126 petitions and the Agency's proposed NO_x SIP-call are both designed to reduce NO_x emissions that travel across the eastern United States and contribute to regional ozone problems. The section 126 petitions request that EPA establish emission

Figure 4 Timeline for Implementation of Regional Transport Rule

Year	Milestone
May 1995--June 1997	37 states form Ozone Transport Assessment Group (OTAG) to analyze regional ozone transport
June 1997	OTAG recommends that EPA take actions to reduce regional ozone transport
October 1997	EPA acts on OTAG recommendations and proposes regional reductions and rulemaking through Section 110 of the Clean Air Act
April 1998	EPA publishes supplemental notice of proposed rulemaking
September 1998	EPA issues final rule on regional reductions after public comment
September 1999	States submit plans to EPA in response to EPA's ozone transport SIP-call
September 2002	States implement controls to achieve their NO_x budgets
September 2007	States demonstrate compliance with their NO_x budgets

limitations and compliance schedules for groups of stationary sources that may also be subject to controls by states in response to the SIP-call. The schedule will allow the states to respond to the SIP call before EPA makes any final filing under section 126.

The schedule set forth in the ANPR harmonizes the time frame for action on the 126 petitions with the EPA's anticipated schedule for action on the NO_x SIP-call. Specifically, EPA will publish a notice of proposed rulemaking for section 126 petitions by September 30, 1998. The ANPR requires EPA to take action on the petitions by April 30, 1999, except that under certain circumstances, EPA action may occur as late as May, 2000.

Figure 5 presents the timeline for EPA review of the Section 126 petitions.

Regional Haze

The regional haze rulemaking, scheduled for Summer, 1998, may require a 1999 SIP revision, including a monitoring plan. EPA intends to coordinate the SIPs under this rulemaking with other SIP submittals, notably the ozone SIP submittals.

According to the proposed rule, SIPs for the haze emission reduction strategy would be due in 2003, with SIP reviews required every three years thereafter to demonstrate reasonable progress. Such a timeline is generally consistent with ozone SIP submittals required under both the new ozone standards and the regional transport SIP-call rule.

Near-Term Focus and Issues

Figure 6 highlights EPA's regulatory focus over the next two years in implementing each of the regulatory processes in a linked manner. Milestones associated with each regulatory process are again differentiated by typeface: ozone standard (Roman), regional transport rule (*italics*) and Section 126 petitions (Monotype Corsiva).

With respect to the revised ozone standards, EPA has indicated that all regulatory guidance concerning implementation will be completed by the end of 1998. The President's Memorandum to EPA on Implementation of Revised Air Quality Standards for Ozone and Particulate Matter (July, 16, 1997) sets forth the basic framework within which EPA will implement the new standards.

In December, 1997, reflecting the Presidential directive, EPA issued interim implementation guidance on key issues regarding ongoing programs being implemented by states to attain the preexisting 1-hour standard. At this time EPA also identified areas (counties) that now meet the 1-hour standard.

Throughout 1998, EPA intends to issue additional guidance with respect to implementation of the new standards. This guidance will focus on specifications for transitional areas, designation and classification of nonattainment areas with respect to

Figure 5 Timeline for EPA Action on Section 126 Petitions

Date	Milestone
August 1997	Citing Section 126 of CAA, petitioning states (CT,ME,MA,NH, NY, RI, PA and VT) filed petitions requesting that EPA examine transport of ozone pollution from upwind sources
November 1997	EPA proposed NO_x SIP call under Section 110 of CAA
February 1998	EPA and petitioning states filed a consent decree to take action on the Section 126 petitions
April 1998	EPA published an advance notice of proposed rulemaking
September 1998	EPA will publish a notice of proposed rulemaking
October 1998	Public hearing on proposed rulemaking
April 1999	EPA will take final action on Section 126 petitions. The EPA could determine that the 126 petitions are technically meritorious in that they accurately identify sources whose NO_x emissions exacerbate ozone problems in the petitioning states, and determine an appropriate remedy, but postpone making a final finding that would impose control requirements.
November 1999	If EPA so chooses, the final rule (April 1999) may provide that the Section 126 petitions be automatically granted if EPA does not propose to approve SIPs submitted in response to the NO_x SIP call by the states whose sources are targeted by the petitions.
May 2000	If EPA so chooses, the final rule may further provide that the petitions will be automatically granted if EPA does not take final action approving SIPs submitted in response to the NO_x SIP call by the states whose sources are targeted by the petitions.

Figure 6 Ozone SIP Implementation Timeline: Near-Term Focus

Date	Milestone
Ongoing	All guidance on implementation of revised ozone standards completed by the end of 1998
September 1998	*Final regional transport rule*
April 1999	*EPA final action on Section 126 petitions*
September 1999	*State SIP revisions (SIP calls) submitted to EPA in response to rulemaking*
2000	States submit early SIPs for transitional areas
Ongoing	*EPA and northeastern states coordinate linkage with OTC NO_x Budget Model Rule implementation*

the revised standards and related changes to new source review and conformity regulations, as well as regulatory review streamlining and flexibility.

With respect to the regional transport, EPA issued a supplemental notice in April, 1998. The SNPR includes a proposed model cap and trade rule, air quality analyses of the proposed statewide emission budgets, emissions reporting and state reporting requirements, a discussion of the interaction with the CAA Title IV NO_x rule and proposed rule language.

In recent months, EPA has worked in coordination with states and interested parties to develop the proposal for the model cap and trade program. The proposal calls for a cap and trade system with market features that are easily understood to facilitate maximum participation, minimum transaction costs, and maximum cost savings.

States that elect to participate in the cap and trade program would either adopt the model rule by reference or state regulations that are generally consistent with the model rule.

The final regional transport or SIP call rulemaking is scheduled for September, 1998.

Pursuant to the final regional transport rule, states must submit SIPs to EPA by September 1999 and, pursuant to the revised ozone standard, states may opt to submit early SIPs for transitional areas in 2000. The next section of this paper identifies opportunities for integrating energy efficiency and renewable resources in these plans.

Finally, throughout the coming year EPA will continue to work closely with northeastern states with respect to linking implementation of the SIP process with implementation of the OTC NO_x Budget Model Rule. This rule, in many respects, served as a forerunner for the proposed model NO_x cap and trade program. The proposed program, thus, should benefit from the lessons learned in the OTC program to date.

In 1994, the OTC states signed an MOU for the coordinated implementation of an Ozone Transport Region-wide NO_x Budget cap and trade program. The program provides for a phased reduction in NO_x emissions from stationary sources in the OTC region and by state, beginning in 1999. The program establishes a Phase II reduction in 1999 and, pending a mid-course 1998 review, a further Phase III reduction in 2003. (Note: The CAA required 1995 RACT reductions were considered as Phase I.) Each participating OTC state allocated allowances to affected sources and has or is now adopting a final NO_x budget implementing rule.

With respect to the linkage with the OTC rule, EPA intends to work with the OTC states to coordinate Phase III (post 2003) implementation with implementation of the emissions reductions required by the ozone transport or SIP call rule. In coming months, EPA and the states will focus on issues related to dovetailing the OTC trading program with the SIP model trading rule and program.

VI. Opportunities for Integrating Energy Efficiency and Renewable Resources in SIPs

With the SIP near-term focus on the implementation of the new ozone standards and the rule for reducing regional transport of ground-level ozone (smog), there is a unique window of opportunity for examining the appropriate role for and integrating energy efficiency and renewable resources in the SIP process.

Goals and Objectives

The primary goal for integrating energy efficiency and renewables in the SIP process is to reduce emissions and the economic cost of compliance for a given air quality objective, such as the ozone air quality standard. Of course, in so doing, energy efficiency and renewable resources not only achieve the significant NO_x cobenefits of source control strategies, but also achieve cobenefits associated with elimination of other pollutants that are a byproduct of fuel combustion.

In a "Working Paper on Energy Efficiency and Renewables Set-Aside (dated Dec. 16, 1997," EPA stated:

> *Energy efficiency and renewable resources are potentially important means for achieving cost-effective emission reductions. There is a large potential for greater energy efficiency improvements to reduce energy demand. There is also a large potential for distributed resources that reduce demand at the consumer level, including both generating resources such a rooftop photovoltaics, and renewables that reduce electricity demand, such as solar hot water heaters. Finally, renewable resource electric generation facilities, including wind, solar and biomass technologies have demonstrated potential for supplying an increasing proportion of electric generation needs. Realizing these potentials will dramatically reduce system costs.*
>
> *Greater penetration of energy efficiency and renewable resources in the marketplace can save companies and individuals money and promote economic growth, thus reducing the economic cost of compliance with environmental regulations.*

Reductions in NO_x emissions as a result of energy efficiency and renewable resources have multiple impacts on public health and the environment. In addition to helping attain the ozone standard, decreases in NO_x emissions are helpful to reducing acid deposition, particulate matter, air toxics, greenhouse gases, nitrates in drinking water, stratospheric ozone depletion, excessive nitrogen loadings in to aquatic and terrestrial ecosystems, and ambient concentrations of nitrogen dioxide.

Equally important, however, implementation of energy efficiency and distributed renewable resources reduce the demand for electricity generation and, therefore, combustion of fossil fuels. Unlike pollution control strategies which address NO_x

emissions from the combustion of fossil fuels, these prevention or avoidance strategies also eliminate a range of additional non-NO_x pollutants or byproducts of fuel combustion. For example, such strategies reduce directly non-NO_x acid rain precursors, air toxics and greenhouse gases, among others.

In view of the multiple benefits--cost reduction, non-ozone NO_x cobenefits and other combustion prevention cobenefits--a high priority for integrating energy efficiency and renewable resources in the SIP process is appropriate.

Potential for Energy Efficiency and Renewable Resources

Recent studies demonstrate the substantial potential for energy efficiency improvements and renewable resources. As the transition in the electric power industry unfolds, the incentives for technological innovation in the generation, transmission and use of energy can only be expected to further increase this potential.

Appendix I presents a chart which summarizes the energy efficiency and renewable resource potential identified in recent studies by the Energy Information Administration (EIA), the U. S. DOE research lab consortium (5 labs), a consortium of leading energy efficiency environmental groups (Alliance to Save Energy, American Council for an Energy Efficient Economy, Natural Resources Defense Fund, Tellus Institute and the Union of Concerned Scientists) and the U. S. EPA.

Generally speaking, these studies conclude that implementing energy efficient technologies could reduce the demand for electricity in 2010 by at least 10-15 percent. Moreover, it should be noted that in general these studies fail to account for or value the range of environmental and other cobenefits associated with the prevention of energy production and use.

Appendix II presents a chart which summarizes the potential for expanded use of renewable resources in electricity generation, as identified in the aforementioned studies. Generally speaking, these studies conclude that implementing renewable resource electricity generation technologies could increase the renewable resource share of electricity generation in 2010 by up to 9 percent.

Key Issues

Several key generic issues arise in the design of specific approaches for integrating energy efficiency in the SIP process. Most important are issues concerning rewarding energy efficiency improvements in a manner that avoids double counting, examining whether the amount of such resources should be limited, determining eligibility of applicants and projects and assuring accurate measurement and verification of energy/emissions reductions.

With respect to the first, energy efficiency should be rewarded by integrating such improvements in the SIP process in a manner that avoids possible double counting. For example, if such resources have been accounted for in the growth estimates or reference projection, then such resources should not also be rewarded as a supply-side or SIP control measure.

With respect to whether energy efficiency resources should be limited in some manner, several threshold questions arise. First, is there any reason why the principal of equivalent treatment should not apply to the energy services/demand side and supply side. Second, provided that monitoring and verification requirements are met, why should efficiency resources which provide significant additional clean air and environmental benefits be limited in a manner beyond that which applies to control measures? Third, to the extent that anyway reductions may be allowed on the supply side, why should such reductions not be allowed for prevention measures. Fourth, if a determination should be made to limit efficiency resources, what criteria, if any, should be used to determine the appropriate size?

With respect to eligibility of applicants and projects, several questions also arise. Should any specific types of applicants or projects be given a priority and, if so, what kind? Are there administrative reasons for restricting eligibility?

Finally, with respect to verification requirements and procedures, several points merit attention. First, many State agencies, notably state energy offices, have had substantial experience over the past two decades in designing documentation and verification requirements of energy efficiency improvements. Second, current reference case electricity demand projections could underestimate demand growth for two important reasons: first, the effect on electricity demand growth of an anticipated decline in electricity prices resulting from industry restructuring and, second, the effect of the substantial curtailment in utility demand-side management (DSM) programs.

Generic Opportunities

The SIP process, in requiring submittal of plans that demonstrate attainment with air quality standards, can be complex. Understanding the SIP process, as previously outlined, is a prerequisite for identifying generic approaches for the integration of energy efficiency and renewable resources in the process.

As noted, the SIP control plan must demonstrate how any excess emissions will be reduced through one or more of three basic conceptual approaches:
1) modification of the growth estimates or reference case projection of economic activity/emissions
2) design of additional programs or control measures to reduce emissions, and
3) design of market-based programs and economic incentives to use the marketplace to achieve a given level of reduction (e. g. emissions budget) at a lower cost

Accordingly, there are three generic approaches for incorporating energy efficiency and renewable resources in the SIP process: one associated with the growth estimates, a second associated with the control strategy plan and a third associated with the development of market-based programs, such as EPA's proposed SIP call model NO_x cap and trade rule.

With respect to the first, the baseline electricity demand projections are generally based upon a current public policy scenario assumption and/or past trends in electricity intensity. For example, the current public policy scenario generally includes current state building codes and federal appliance efficiency standards. The scenario also may include an explicit assumption concerning utility DSM programs. Therefore, documented and verifiable energy efficiency improvements that exceed the current standards or baseline assumptions (or revisions to the current standards, such as an updated state building code) could be allowed as an adjustment to a state's growth estimates.

With respect to the second, an energy efficiency program or measure represents an emissions prevention strategy or approach which helps achieve the air quality standard just as surely as a program that requires additional source controls. There would appear to be no conceptual reason why a control plan should not include prevention strategies, as well as control strategies. Indeed, EPA, as noted above, has confirmed this conclusion and encouraged states to develop energy efficiency strategies that avoid fuel combustion and, hence, emissions in the first instance. However, at the present time, it appears this approach would have to be done with the approval of EPA on a case-by-case basis.

Precedent for inclusion of energy efficiency strategies can be found in recent innovative SIP program measures that address mobile source emissions. For example, automobile scrappage programs clearly are no less a prevention or avoidance strategy than energy efficiency improvements. Furthermore, EPA has recently approved guidance for incorporating voluntary mobile source emission reduction programs in SIPs. Examples of these programs include transportation control measures, trip reduction programs, growth management strategies, ozone action programs and targeted public outreach.

Documented and verifiable energy efficiency improvements through state energy office programs or through energy service companies should be allowable either as a growth adjustment, a control strategy plan element or as an integral part of a market-based program. The National Association of State Energy Officials (NASEO) has identified illustrative state programs now in place (refer to Energy Efficiency primer). In addition, as previously stated, programs are being developed by administrators of state system benefit charge funds associated with state electric industry restructuring programs. In addition, the President has proposed $2.7 billion in federal tax credits for a range of energy efficiency measures as an element of climate change action program. These and any state certified tax credits for energy efficiency should also be allowable.

Similarly, documented and verifiable renewable resource programs should be allowable as a growth adjustment, a control strategy plan element or as an integral part of a market-

based program. Again, the expanded use of renewable resources to generate electricity represents a key strategy for reducing not only anticipated NO_x emissions, but other pollutants as well.

As an integral part of electric industry restructuring programs, some states are adopting a renewable resource portfolio standard. Such a standard requires that an electric distribution company demonstrate that a given percentage of electricity sold by the company was obtained from renewable resource generation facilities. Such a standard is also included in the Clinton Administration recently proposed federal restructuring legislation.

In addition, many states are requiring environmental disclosure in conjunction with electric industry restructuring programs. Environmental disclosure, similar in concept to consumer protection labeling of food products, will require electric distribution companies to inform customers of the fuel mix and emissions characteristics of electricity supplied to customers. Such a program will provide an important incentive for expanded "green marketing" of electricity from renewable resources.

These programs, as well as federal tax credits for renewable resources, also included in the President's proposed climate change action program, should be allowable measures for inclusion in the SIP.

Each of these categories of energy efficiency and renewable resource programs would appear to meet the real, permanent and quantifiable criteria noted by EPA. Moreover, it should be stressed again that these programs contributing to emissions reductions through the avoidance of fuel combustion have very large and significant ancillary cobenefits.

While the development of each of these generic approaches involves certain implementation questions, the potential benefits of the integration of energy efficiency and renewable resources in the SIP process should spur states, working with EPA, to develop such measures for inclusion in the SIP submittals scheduled for 1999 and 2000.

Appendix I Potential of Energy Efficient Technologies: Summary of Recent Studies

Name of Study	*Annual Energy Outlook, 1998*	*Scenarios of U. S. Carbon Reductions*	*Energy Innovations*	*Proposed Ozone Transport Rulemaking Regulatory Analysis**
Organization	Energy Information Administration, U. S. DOE	Interlaboratory Working Group (5 labs), U. S. DOE	Alliance to Save Energy, ACEEE, NRDC, Tellus and Union of Concerned Scientists	Office of Air and Radiation, U. S. EPA
Date	December, 1997	September, 1997	June, 1997	September, 1997
Reference Scenario Description	Current policy and regulations (assumes no new efficiency standards, but continued technology improvements)	Modification of AEO97 to reflect the workings of a fully competitive market	*Present Path*-- continuation of current U. S. energy trends .	Extension of NERC electric demand forecast (specifics not included)
Energy Efficiency Scenario Description	*Advanced Technology*-- permits choices based on cost, but over time the costs for the most efficient technologies decline from their reference case values *High Technology*-- assumes that the most energy-efficient technologies will be chosen, regardless of cost *Note: These scenarios apply to the residential and commercial sectors only*	*High Efficiency*-- defined as the potential for cost-effective energy efficient technologies to penetrate the market given an invigorated effort to promote energy efficiency through public and private-sector R&D and market transformation activities *High Efficiency/Low Carbon*-- defined as optimistic but feasible potential based on a greater commitment to reduce carbon emissions resulting from actions	*Innovation Path*-- marked by a set of programs and policies that would guide the economy toward lower cost, less polluting and more sustainable ways of producing and using energy	*Climate Change Action Plan*

		that might include the creation of a market value for carbon of $25 and $50 per tonne.		
Energy Efficiency Scenario Bkwh Reduction from Reference Scenario	*Note: The following figures are in quadrillion Btus* Residential: 0.82--2010 *TA* 0.31--2010 *HT* 0.38--2020 *AT* 1.12--2020 *HT* Commercial: 0.15--2010 *AT* 0.48--2010 *HT* 0.27--2020 AT 0.72--2020 HT	330--2010 *HE* 630--2010 *High Efficiency/Low HE/LC*	660--2010	158.0--2000 197.5--2010 and 2020
Energy Efficiency Scenario Percent Reduction from Reference Scenario	Residential: 6.7% *AT*; 17.8% *HT*--2010 9.1% *AT*; 16.2% *HT*--2020 Commercial: 3.7% *AT*; 11.7% *HT*--2010 6.1% *AT*; 16.2% *HT*--2020	8.5%--*High Efficiency* 16.3%--*High Efficiency/Low Carbon*	17%	4.8%--2000 5.1%--2010 4.6%--2020 *Note: These figures based upon the application of bkwh reduction to EIA Annual Outlook, 1998* reference case projection
Miscellaneous				*and predecessor document, Analyzing Electric Power under the CAA (July, 1996)

Appendix II Potential of Renewable Resource Electricity Generation Technologies: Summary of Recent Studies

Name of Study	*Annual Energy Outlook, 1998*	*Scenarios of U. S. Carbon Reductions*	*Energy Innovations*	*Proposed Ozone Transport Rulemaking Regulatory Analysis**
Organization	Energy Information Administration, U. S. DOE	Interlaboratory Working Group (5 labs), U. S. DOE	Alliance to Save Energy, ACEEE, NRDC, Tellus and Union of Concerned Scientists	Office of Air and Radiation, U. S. EPA
Date	December, 1997	September, 1997	June, 1997	September, 1997
Reference Scenario Description	Current policy and regulations	Modification of AEO97 to reflect the workings of a fully competitive market	*Present Path*-- continuation of current U. S. energy trends .	Extension of NERC electric demand forecast (specifics not included) *Note: NERC and EIA data for planned renewable electric additions through 2000; based on economics thereafter*
Renewable Resource Scenario Description	*High Renewables*-- assumes lower capital and operating costs and higher efficiencies, based on U. S. DOE Office of Energy Efficiency and Renewable Energy August, 1997 technology characteristics	*Implementation of Renewable Electricity Technologies*-- High Efficiency/low carbon scenario (wind, hydro, biomass cofiring) supplemented by various additional analyses (landfill gas, PV, geothermal and solar thermal)	*Innovation Path*-- marked by a set of programs and policies that would guide the economy toward lower cost, less polluting and more sustainable ways of producing and using energy	*Climate Change Action Plan*-- *Note: No specific assumption for Climate Change Action Plan Renewable Energy Commercialization Program available*

Renewable Resource Scenario Bkwh Increase from Reference Scenario	46--2010 158--2020	182-380--2010 *Note: 119-204 included in High Efficiency/Low Carbon scenario; 73-176 incremental to that scenario*	approx. 350--2010	NA
Renewable Resource Scenario As a Percent of Reference Scenario Electricity Generation	1.1%--2010 3.5%--2020	4.8-9.9%--2010 *Note: 3.1-5.3% included in High Efficiency/Low Carbon scenario; 1.7-4.6% incremental to that scenario*	9.2%--2010	NA
Miscellaneous				*and predecessor document, Analyzing Electric Power under the CAA (July, 1996)