IssuesLetter

Climate Change and the Electricity Industry
Moving in the Right Direction?

The upcoming December 1997 international climate change conference in Kyoto, Japan has focused public attention on the issue of global warming and global climate change. Scientific understanding of climate change has advanced considerably over the past five years and, not unexpectedly, the science has grown more complex as deeper insight has been gained into the interactions between climate and meteorological patterns and human-caused air emissions.

Despite remaining scientific uncertainties, an unprecedented 2600 international climate scientists advising the United Nations Intergovernmental Panel on Climate Change (IPCC) reached consensus that "the balance of evidence suggests a discernible human influence on global climate," and stressed the "importance for timely decision-making."

President Clinton recently hosted a White House conference of U.S. business leaders on climate change issues and has taken other steps to draw the public's attention to the need for a national commitment to address the problem. According to the President, "the overwhelming balance of evidence and scientific opinion is that climate change is no longer a theory, but now is a fact that global warming is for real. ...we have to see this whole issue of climate change in terms of our deepest obligations to future generations."

What Are The Long-Term Risks?

The detailed IPCC reports (available at the IPCC website, reference below) analyze several scenarios that are likely to occur as the result of gases already emitted and assumed levels of future emissions. The IPCC's "best estimate" case forecasts a rise in average global temperature of 2-6 degrees F over the next century. (By contrast, during the last ice age the global average temperature was only 5 to 9 degrees F lower than it is today.) However, the predicted rise will not be uniform. Daytime temperatures may not rise as much as nighttime temperatures, and some areas of the globe will become colder, not warmer. The incidence of extremely hot days is expected to increase and, conversely, the incidence of extremely cold days to decrease. Changes in the hydrological cycles will cause more extreme weather events, with episodic heavy precipitation in some places and severe droughts in others. Melting polar ice caps will result in rising seas, affecting coastal communities throughout the world and drowning some island nations altogether. Weather cycles will cause great difficulties for agriculture and forestry as ecosystems struggle to adapt. Overall, an unprecedented instability and unpredict-ability in weather patterns will become the norm.

Reducing greenhouse gas emissions today will come at a cost; waiting will cost even more. Because greenhouse gases will continue to accumulate, their effects on climate will be exerted years after emissions have ceased. The longer society waits to address the

problem, the higher the cost of reduction and mitigation could become. In fact, the longer society waits, the greater the risk that the problems associated with climate change will not be solvable.

The Electric Industry and Climate Change

The generation of electricity in the U.S. remains a very large source of greenhouse gases. Although there are a number of greenhouse gases, some of which are more potent contributors to the greenhouse effect on a per molecule basis than carbon, carbon emissions comprise over half of the total gases. The production of electricity accounts for 36 percent of current total U.S. carbon emissions and is expected to rise to 38 percent by 2015 (EIA/Annual Energy Outlook 1997). The electric industry is second only to transportation in the production of greenhouse gases.

The voluntary commitments to reduce greenhouse gases to 1990 levels -- which the U.S. entered into at the Rio Earth Summit in 1992 -- have not worked. Emissions are rising, not falling. In the electricity sector, carbon emissions have continued to rise by more than one percent annually. The increased use of electricity, lower fossil fuel costs and lower than projected use of renewable resources have exerted a greater influence over the level of carbon emissions than the voluntary reduction activities undertaken by several electric utilities. Similar growth has occurred in other sectors of the economy, again with the fastest growth rate -- 1.4 percent -- occurring in the transportation sector.

Electric Utility Carbon Dioxide Emissions by Fuel

	million metric tons carbon		percent change
Fuel	1990	1995	1990-1995
Petroleum	26.6	14.0	-47.4
Natural Gas	41.2	47.0	14.2
Coal	409.0	432.8	5.8
Total	476.9	493.8	3.6

Who Pays For Climate Change?

The cost of climate change is not reflected in the costs of any energy source in the U.S., and because of this, electricity markets on their own will not be able to minimize the long run-costs and risks of climate change.

It is possible that international agreements coming out of the Kyoto Conference will create an emission reduction framework that could begin to internalize the costs greenhouse gases impose on society. Two major emission reduction proposals with long-term binding targets are expected at Kyoto. Both will internalize carbon reduction costs, but on different timetables and perhaps, in different regions of the globe. The recommended U.S. policy emphasizes flexibility in compliance and is expected to work over several decades to reduce overall emissions. It is more likely to encourage U.S. investment in cleaner energy sources in other parts of the world than to spur increased clean investments in the U.S. The European Union approach, on the other hand, would

impose specific reductions within the U.S. over the next decade, causing the associated reduction costs to become internal to U.S. electricity prices almost immediately.

Is There A Role For State Utility Regulators?

In recent years, the responsibility for electricity generation decisions in the U.S. has moved away from state public utility regulators toward the private market. Although the transition to a competitive electricity market is by no means complete, market forces have effectively replaced state regulators as the primary arbiter of which power plants will be built and which will operate. The move to competitive electricity generation may have caused some utility regulators to believe they have no role to play with regard to the global impacts of electricity generation, but this should not be the case. In the middle of major electric industry restructuring, there are a few modest, inexpensive steps state policy makers can take that will guide the electric industry in the right direction, that is away from high-carbon content fossil fuels and inefficient production and use and toward low- or no-carbon content fuels and highly efficient production and end use.

There are two complementary policy approaches for state regulators to consider to meet the risks and challenges posed by climate change. These policies are the same as those already introduced to retain the public benefits many fear will be lost in the move to competitive electricity markets. They become even more important as basic building blocks in meeting the challenge of climate change. They call for

- Encouraging the informed exercise of customer choice and insuring the broadestarray of competitors in the retail market
- Continuing a minimum investment in demand-side energy efficiency, renewable resources and related research and development

Informed Customer Choice

Developing opportunities for consumer choice in the retail purchase of electricity is one of most important actions state regulators can take to reduce greenhouse gases. Retail purchase decisions will be exercised in response to price, but price is not all customers care about. Recent consumer research (see RAP August 1997 Issuesletter) has corroborated what many other polls of electricity customers have shown for a long time (see, REPP, October 1996, Energy and the Environment: The Public View, B. Farhar); customers care about where their electric power comes from. Many want increased use of renewable resources and are willing to pay somewhat higher prices to make this happen. State regulators can provide customers the opportunity to exercise their preferences for cleaner sources of electricity by requiring electricity suppliers to disclose the fuel sources and air emissions of the products they sell. Disclosing carbon emissions will give customers the opportunity to choose resources that have little impact on climate.

State regulators are quickly picking up on the idea of standardized information disclosure for retail electricity customers. Most of the states adopting restructuring plans after NARUC's November 1996 Resolution in favor of information disclosure have included disclosure as a key part of creating meaningful customer choice. For example, the Pennsylvania PUC in its July 1997 Interim Requirements for Customer Information

required the labeling of fuel source. The New Jersey Board of Public Utilities included it in its April 1997 restructuring order. Five of the six New England states (Connecticut excepted) have issued orders supporting the disclosure of fuel source information to retail customers. The disclosure of fuel sources and possibly air emissions using an agreed-upon regional format is currently under discussion in all six New England states. Disclosure has been required or permitted in recent legislation adopted in Nevada, Maine and Montana.

Continued Policy Support

In many states, the support for energy conservation investment and renewable resource development simply requires the reframing of existing policies to fit the realities of a competitive market. For example, supply-side efficiency is expected to improve in competitive electricity markets as better price signals and intense price competition cause customers to improve their own load management. This efficiency may not penetrate to all customer classes until advanced, time-of-use meters become cheap enough for lower-use customers to install. Even then, energy conservation programs and renewable resource development are not likely to fare as well as supply-side efficiency.

The Right Direction	Solutions to climate change require a move towards • Fuels with low or no carbon content • Generators which are highly efficient • Highly efficient end use Markets can play a major role in reducing greenhouse gases, but there are hurdles for markets as well. • Support for renewable resources development and energy efficiency is declining and may be lost during • the industry transition. • Informed customer choice takes time to develop. • Because full energy costs are not reflected in market prices, choice cannot be relied upon to make the most efficient resource selections. • Other market barriers -- up-front costs and high discount rates -- may require ongoing public policy intervention on behalf of energy conservation and renewable resource development.

Expenditures for energy conservation, renewable resources and associated R&D are under intense pressure as utility suppliers scramble to hold onto market share in a market focused on short-term prices. Utility spending for DSM has declined nationally from $2.5 billion in 1994 to an estimated $1.5 billion for 1998, a decline of 45 percent. There is reason to be concerned that without some intervention the existing infrastructure and program benefits could be lost before there is any real opportunity to see what a competitive market might produce on its own.

System Benefits Charges. This is the primary vehicle that has emerged in states to support continued investment in energy conservation, renewable resources and R&D. California, Rhode Island and Maine have adopted system benefits charges as part of state

restructuring legislation. Massachusetts, New York, Vermont and Wisconsin utility commissions have included it in their restructuring orders.

Renewable Resource Portfolio Requirements. Direct support for renewable resource development through the requirement of a resource portfolio has been adopted in restructuring legislation in Nevada and Maine and in commission orders in Vermont and Arizona.

National System Benefits Trust. Investment in energy efficiency and renewables, along with programs that assure electricity is affordable for all customers have been termed "stranded benefits." (These are benefits that are at risk of being left behind during the transition to competition.) To create an incentive for states to fund stranded benefit programs, Richard Cowart, Chairman of the Vermont Public Service Board has proposed a national system benefits trust. The national trust (similar to the existing energy savings trust in the UK) would levy a small fee on transmission services, and the funds would be available to the states on a matching dollar for dollar basis for expenditures on system benefits -- universal service, energy efficiency, renewable resources and R&D. The allocation of funds as well as program design for energy efficiency and renewables would be decided upon and implemented at the state level. The concept is drawing the support of a growing number of state utility commissioners.

PBR and Distributed Utility. Local transmission and distribution systems will remain state-regulated monopolies for the foreseeable future. State regulators can implement Performance Based Regulations (PBRs) that reward cost-effective T&D investments and discourage inefficient investment. Distribution revenues, for example, that vary with volume of sales may encourage inefficient consumption, but these revenues can be decoupled from sales and still be recovered in rates on a usage basis. PBRs can also be used to encourage targeted energy efficiency and /or renewable installations by a distributed utility to relieve distribution congestion. The distributed utility can encourage the use of smaller, on-site generation but, like any generation, air emissions from these sources need to be evaluated in terms of their overall contribution to air quality and greenhouse gas production.

Net Metering. Net metering policies can encourage the installation of renewable resources on a customer's own premises. Net metering pays the customer the current retail rate for renewable power flowing into the grid, net of the customer's own use. To the extent the retail rate exceeds the current market price for power, the renewable producer receives a subsidy. Eighteen states across the country have net metering policies.

Siting. Many utility regulators participate in decisions regarding the siting of power plants. Siting policies can play an important part in controlling the emission of greenhouse gases. Oregon has taken a major step in the past year by adopting legislation that added a carbon emissions criteria to power plant siting. A new plant, on net, must emit less than the amount of carbon produced by today's most fuel-efficient, gas-fired facilities. This means any new facility must engage in carbon mitigation activities, such

as the purchase of carbon offsets from existing power plants, other industries or even other countries.

The Nuclear Wildcard

According to the Energy Information Agency (EIA), 38 gigawatts of nuclear capacity -- representing one third of the U.S. nuclear generation -- are expected to be retired between 1995 and 2015, assuming most plants operate until the end of their operating license. To both compensate for the loss of this capacity and meet rising demand, the EIA projects a need for 294 gigawatts of new fossil-fueled capacity. This increased generation will raise carbon emissions 172 million metric tons, or 34 percent, from 1995 levels. If more nuclear plants close early -- no plant has yet to run its full licensed life and several have retired early -- the additional new fossil-fired capacity will be even larger. Policy makers might want to consider the creation of a non-fossil fuel obligation that requires retired nuclear plants to be replaced, at least in part, with non-carbon emitting resources. A commitment to the development of non-fossil replacement for retired nuclear capacity would significantly accelerate the use of renewable energy technologies and improve energy efficiency.

Conclusion

State utility regulators continue to play a very important role in moving the country toward the technologies and practices which will most effectively reduce the emission of greenhouse gases. Without the intervention of state policy makers, many public benefits, together with the infrastructure that has been carefully constructed to develop, deliver and pay for them, may slip through the cracks of restructuring The modest preservation of these benefits through a system benefits charge and a national trust, plus the adoption of information disclosure to encourage the thoughtful exercise of consumer choice are prudent but very important pieces of a "no regrets" policy for climate change.

For more information:

Nagusky, Beth. 1997. *Global Climate Change: A Background Paper on the Science, the Politics And Their Implications for Electric Utilities.* Prepared for the Regulatory Assistance Project.

Ohio PUC has climate change web site has comprehensive coverage of global warming science and policies and links to many other sites: http://www.puc.ohio.gov/.

United Nations International Panel on Climate Change website: http://www.ipcc.ch

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