ELECRICITY RESTRUCTURING, RELIABILITY, AND THE ENVIRONMENT

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I. Introduction

Mr. Chairman and members of the Committee, thank you for the opportunity to testify on restructuring the electricity industry. My name is Alan Nogee. I am the Energy Program Director of the Union of Concerned Scientists (UCS), a nonprofit organization of 50,000 citizens and scientists working for practical environmental solutions. For more than two decades, UCS has combined rigorous analysis with committed advocacy to reduce the environmental impacts and risks of energy. Our energy program focuses on encouraging the development of clean and renewable energy resources, such as solar, wind, geothermal and biomass energy, and on improving energy efficiency.

We will testify today in favor of including mechanisms in any restructuring legislation that will increase energy efficiency and renewable energy resources, and limit emissions from existing power plants. These mechanisms are needed to protect the environment and maintain benefits historically provided by the electricity industry to the public at large. Specifically, we endorse a public benefits trust fund, renewable energy portfolio standard, emissions limits, net metering, and disclosure of fuel sources and emissions to customers. We are pleased to support S. 1369, the Clean Energy Act of 1999, which includes these mechanisms.

The electricity industry penetrates every sector of the economy and our lives. It keeps our food fresh. It lights up the darkness. It powers the manufacturing process. It runs life-giving medical systems and mind-enriching information systems. It helps warm us in the winter and cools us in the summer.

But as important as electricity is to the economy, it has an even bigger impact on the environment. Electricity accounts for less than three percent of US economic activity. It accounts for more than 26 percent of smog-producing nitrogen oxide emissions, one-third of toxic mercury emissions, more than 40 percent of climate-changing carbon dioxide emissions, and 64 percent of acid rain-causing sulfur-dioxide emissions.

Restructuring has the potential to increase or to decrease these emissions, and their impact on the environment and public health. At the very least, restructuring must not degrade the environment or reduce public benefits historically provided by the electricity industry.

But this is not enough. If we are going to make the effort to restructure this industry to reduce its three-percent impact on the economy, shouldn't it be at least as high a priority to reduce its 26 to 64 percent impact on the air we breathe?

In order to maintain or reduce the impact of electricity on the environment during restructuring, we need to accomplish three objectives: improve our energy efficiency, develop our renewable energy resources, and reduce emissions from existing power plants. Through restructuring, we can accomplish these goals *and* reduce electricity costs. Moreover, by accomplishing these goals, we can also maintain or increase other important public goods: reliable electric service, fuel diversity, price stability, national security, universal service, economic development, and the promotion of robust, fair competition.

Some of these public goods also have private aspects. Individual customers may increase the reliability of their service through purchasing backup power supplies or save money by choosing interruptible rates. They may assemble a diverse portfolio of energy supplies for themselves. Restructuring may facilitate such choices.

But all customers connected to the grid receive power at the same voltage and frequency, and share access to the same power reserves as their neighbors. Investments that enhance the reliability of the grid by adding generation, transmission, or distribution capacity benefit everyone on the grid. Investments that increase fuel diversity strengthen the ability of our economy to withstand supply interruptions or price shocks from any one fuel source. Investments in domestic fuel sources reduce our vulnerability to supply or price impacts caused or aggravated by international tensions. Investments in regional energy sources keep money circulating and creating jobs in regional economies, and create export opportunities. And of course, investments in clean air benefit everyone that breathes the air.

In the remainder of my testimony, I will review how increasing energy efficiency and renewables can help us maintain and increase these public goods, while reducing energy costs. I will then review the four mechanisms that have been adopted in a growing number of states to achieve these objectives: public benefit funds, renewable portfolio standards, emission limits, net metering, and information disclosure, and discuss why they also need to implemented at the federal level.

II. Energy efficiency

As part of debating nearly every program, Congress considers how to cut waste and improve efficiency. So why not also try to cut energy waste and improve energy efficiency?

Improving the efficiency of our electricity-using equipment can more than pay for itself in energy savings. It is therefore frequently the least expensive way to improve electricity system reliability. It can be a least cost way to reduce vulnerability to fuel supply and price disruptions and to prevent abuses of market power. It is the a least cost way to reduce emissions. It can make energy more affordable for all customers by reducing energy bills, and keep money in the local economy by reducing the need to import fuel.

Unfortunately, as the electricity industry has geared up for competition, it has geared down efforts to improve energy efficiency. Total utility spending on demand-side management (DSM) programs fell 45 percent between 1993 and 1998, and fell 57 percent from projected levels.

While utility DSM budgets were being slashed between 1993 and 1997, summer peak loads grew by 56,000 MW. In several regions last summer, we saw capacity reserve margins stretched very thin. Several regions are also expected to experience tight supplies this summer.

More than half of that 56,000 MW increase in demand might have been avoided if utilities had not cut their DSM programs. Utilities had projected that demand-side programs would reduce peak demand by 55,000 MW in 1998. But with budget cuts, these programs only achieved 25,000 MW in peak reduction that year, a shortfall of 30,000 MW compared to what had been planned. That was 30,000 MW less reserve capacity available to avoid brownouts, blackouts and price spikes.

In addition to the growing concern about reliability problems, there is increasing recognition that the current transmission system was not designed for a great increase in wholesale power transactions. By reducing peak loads on the transmission system, energy efficiency and load management free up more transmission capacity for economic power exchanges, allowing more robust competition among generators. By directing DSM investments to strategic areas on the grid, they can also relieve specific points of congestion, enabling more energy transactions. They can also help minimize potential abuses of market power, by providing demand-side responses to rising spot market prices and by reducing the ability of some generators to charge excessive prices because generation capacity may be needed in certain locations on the grid.

Energy efficiency and load management programs can provide these benefits, as well as avoiding emissions, while paying for themselves in energy savings. Yet the discussion of improving reliability and transmission efficiency is dominated by discussions of how to increase pipeline capacity, generation capacity, transmission capacity and distribution capacity, which are generally more expensive, take more time to implement, and raise siting and environmental concerns.

There is plenty of potential for increasing our energy efficiency. The national labs have estimated that increased efficiency could reduce electricity needs by 15 percent by 2010, saving consumers $23 billion. Utility demand-side management programs have a documented successful track record overcoming market barriers to deliver these public benefits.

The market barriers to energy efficiency will persist in more competitive electricity markets. Most customers will typically consider investing in energy efficiency improvements with a two to three year payback in energy savings. But many customers lack information about the availability and cost of advanced efficiency measures. They may also lack access to capital for investing in them or have competing investment priorities. Tenants who pay energy bills may not have the authority or incentive to invest in building improvements. And customers do not consider the added public benefits in their private cost-effectiveness tests. It is vital that restructuring legislation preserve these public benefits by restoring efficiency program spending at least to historic levels.

III. Renewable energy

Renewable energy sources can provide many of the same public benefits as energy efficiency investments. They also face most of the same market barriers.

Some distributed renewable energy technologies, such as photovoltaics and small wind machines, can be installed on the customer side of the meter, where they act very much like efficiency investments. They reduce demand on central generation, transmission and distribution systems. They have typical load shapes, which sometimes are highly correlated with peak demand. They can be targeted to specific areas of transmission or distribution congestion. Just like efficiency investments, they can therefore provide public benefits through enhancing reliability, increasing the economic exchange capacity of the existing transmission system, relieving congestion, providing a check on market power, providing local economic development opportunities, and reducing emissions.

Renewables, like efficiency improvements, conserve natural resources for future generations, and reduce the environmental impacts of mining, refining, transporting, burning, and disposing of wastes from fossil fuels, as well as reducing air emissions. They provide insurance against increased costs from stricter environmental regulations in the future.

Renewables also diversify our energy resource portfolio, reducing exposure to energy supply interruptions and price volatility which can effect the entire economy. They provide additional options for customers, which will increase customer satisfaction with retail choice, and provide additional competition with fossil and nuclear generators, which can help restrain fuel price increases.

They also provide new economic development opportunities, especially in rural areas that are rich in wind and biomass resources. At a recent dedication of a wind farm in Iowa, a farmer thanked one of the participants for creating new high tech jobs in the rural economy. Not only were the jobs important in themselves, said the farmer, but they increased the likelihood that some of their children would return to the community after going to college, instead of leaving the community for a job in the city. Renewable energy technologies also offer the potential for a very large export market, as many countries around the world are increasing their use of renewable resources.

Under traditional regulation and the Public Utility Regulatory Policies Act (PURPA), many companies provided a portfolio that included renewable energy resources. While PURPA implementation did lead to stranded costs in some states, it is important to also remember that:

- in many cases, utilities had proposed projects that were more expensive than the PURPA projects, and were avoided by them, even though the PURPA facilities today are more expensive than current market prices;
- by creating an independent power industry, PURPA helped create the conditions whereby we could consider full wholesale and retail competition;
- PURPA was largely responsible for helping renewables gain the manufacturing and operating experience that enabled great cost declines and performance improvements.

As utilities have geared up for restructuring, they have geared down generation and purchases of renewable energy. Renewable energy generation fell from 66 billion kWh in 1993 to 49 billion kWh in 1998, as utilities bought out contracts and plants shut down or reduced output. It is critical that any restructuring legislation support the continued diversification of our energy supply by increasing our use of renewable energy resources.

Some have called for future support of renewable energy through "green marketing," selling portfolios with a higher renewable energy content (and lower emissions) to customers who are willing to pay more for them. We strongly support green marketing as a means to increase the use of renewable energy and reduce the environmental impacts of energy use.

Green marketing is not a substitute for sound public policy, however. There are many barriers to customers switching to green power, not the least of which is inertia. More than fifteen years after deregulation of long-distance telephone service, half of telephone customers still had not switched suppliers, even though they could get much lower prices by doing so.

With green electricity, the benefits of any individual customer's choice accrue to everyone, not the individual customer. Green customers gets the same undifferentiated electrons and breathe the same air as their neighbors choosing to buy power from cheap, dirty coal plants, creating a strong incentive for people to be "free riders" rather than pay higher costs for renewables. People recognize this public benefits aspect of green power. While they consistently say they are willing to pay more for electricity that is cleaner and includes more renewables, they overwhelmingly prefer that everyone pay for these benefits over relying on volunteers. A deliberative poll by Texas utilities found that 79 percent of participants favored everyone paying a small amount to support renewables, versus 17 percent favoring relying only on green marketing.

The concern for renewable energy also applies to research and development of new technologies that provide public benefits, including renewables and energy efficiency technologies. Competition is likely to spur considerable research and development and many new innovations of products and services that provide direct benefits to customers and competitive advantage to companies that provide them. Research and development expenditures are much less likely to be directed toward developing technologies, products and services that benefit everyone, but which everyone does not have to pay for.

As utilities have geared up for competition, they have geared down their spending on R&D. Investor-owned utilities reduced R&D spending by about one-quarter, from $650 million to $500 million, in only three years, between 1993 and 1995.

IV. Reducing Emissions

As noted above, electricity generation accounts for air emissions far out of proportion to its role in the economy. These emissions create serious impacts on public health, including triggering asthma attacks, hospital admissions, and premature deaths. They damage ecosystems and now threaten the stability of our climate by contributing to global warming,

While these many power plant emissions are regulated, there is a significant potential for emissions that are regulated today and some that may be regulated in the future to increase as a result of restructuring. A major problem is that the Clean Air Act of 1970, and subsequent amendments, does not require all plants to meet the same emission standards. Older power plants, which are responsible for a great majority of all emissions, were grandfathered from meeting standards as strict as applied to new plants built since the Act.

Because they do not have to install the same level of pollution controls as newer plants, older plants have an economic advantage compared to newer, cleaner plants. As we move to create a national electricity market, leaving an economic advantage to older, dirtier power plants intact distorts the market and creates a serious risk of increasing the use of and emissions from these older plants. It also creates an economic disincentive to developing newer cleaner technologies, whether using fossil fuels, renewables, or energy efficiency.

Some analysts have told us not to worry too much about increasing emissions from increasing competition, because transmission constraints would limit trafficking in dirty power, and because many new combined-cycle natural gas plants have been proposed and may be increasingly competitive. However, relieving transmission constraints has become a major issue of concern, in order to increase system reliability and promote economic power transactions. And given the historical inability to accurately forecast fossil fuel prices, we should be loathe to base environmental protection on the basis of such forecasts. It is too early to tell how many of the proposed natural gas plants will actually be built, and whether those that are built will run sufficiently often to satisfy the financial expectations of their owners and investors. Companies have also paid significant premiums for older fossil fuel plants, implying an interest in continuing to operate those plants for an extended period of time.

There is a significant potential benefit to enacting multi-pollutant emission reductions during restructuring. Piecemeal environmental regulation invites companies to install a series of single-pollutant controls as the least-cost option to each successive new requirement. Such a strategy may be more expensive over the long run, however, than installing multi-pollutant controls or increasing energy efficiency or renewables. Adopting multi-pollutant limits would enable companies to plan more economically efficient strategies for controlling pollution, and avoid stranding the cost of new pollution control additions.

V. Mechanisms to Maintain and Increase Public Benefits through Restructuring

In restructuring the electricity industries within their states, many state legislators and regulators have adopted a number of measures to increase energy efficiency and renewables, reduce emissions, and preserve public benefits. These mechanisms should be included in federal legislation as well.

A. Public Benefits Funds

Seventeen states have adopted public benefit funds in the process of restructuring their electricity industries. Two other states have recently adopted public benefits outside of restructuring. These funds generally have been aimed at maintaining a prior level of spending on energy efficiency, renewable energy, research and development, and sometimes on low-income services. In some cases, they restored funding to levels existing before utilities began cutting costs in anticipation of restructuring, and in some cases increased spending to even higher levels for one or more of these public purposes, reflecting a need to increase public benefits where previous utility spending was sub-optimal. They are fundamentally not new charges, however, but merely a new mechanism for preserving some of the same public benefits delivered by regulated utilities that had previously

been bundled into utility rates. They generally aim to be competitively neutral and non-bypassable, to ensure that everyone contributes towards programs that provide benefits to all.

Both the Administration's restructuring bill and Sen. Jeffords Clean Energy Act of 1999 include a provision for a federal matching system benefit trust, with the Administration proposing funding the trust through a 1 mill per kWh charge, and the Jeffords bill proposing a 2 mill per kWh charge. In both cases, the federal funds would be used to match state programs up to the specified amount.

We support the Jeffords 2 mill per kWh proposal. It would cost the typical customer only about $1 per month, but provide an opportunity to reduce bills by much larger amounts through participation in energy efficiency programs.

Both proposals would allow states to administer the funds themselves, and to allocate the funds according to their own public benefit priorities. They would likely create incentives for new states to enact public benefit funds and would reduce large differences in the levels of spending among states. They would not cost the federal Treasury anything, but they would help protect a national interest in increasing reliability, fuel diversity, energy security, R&D, economic development, environmental improvement, and universal access to electricity services.

Public benefit funds are supported by the public and by state utility regulators. A recent poll by the Sustainable Energy Coalition found that, by 59% to 37%, citizens supported a public benefit trust at levels two to three times higher than the level proposed by the Administration. Only last month, the National Association of Regulator Utility Commissioners (NARUC) affirmed earlier support for public benefits funding. In a resolution passed on March 8, 2000, NARUC stated:

> Preservation of public benefits should be part of federal restructuring legislation. NARUC has identified many options to preserve public benefits. However, NARUC believes the best approach for Congress to follow during the transition to a competitive market is to establish a Federal/State trust, funded by a non-bypassable, competitively neutral customer charge. The fund could be administered by an independent entity. A State would qualify for the Federal match by designating its own program and funding mechanism for its match.

B. The Renewable Energy Portfolio Standard

Seven states have enacted a Renewable Energy Portfolio Standard (RPS) as part of electricity restructuring. Three other states have minimum renewable electricity standards adopted outside of restructuring. Both the Administration's bill and the Jeffords bill include RPS provisions, with the Administration proposing a target of 7.5% of sales from non-hydro renewables by 2010, and Sen. Jeffords proposing 10% by 2010 and 20% by 2020. We endorse the Jeffords proposal.

The RPS is a renewable energy content standard, akin to building codes, or efficiency standards for buildings, appliances or vehicles. It would ensure a small but steadily growing proportion of electricity sales be provided by renewable energy. It is designed to integrate renewables into the marketplace in the most cost-effective fashion.

All federal RPS proposals would use tradable renewable energy credits for compliance. Renewable credit trading is analogous to the sulfur allowance trading system established in the Clean Air Act. Like emissions trading, it is designed to be administratively simple and to increase flexibility and decrease the cost of compliance with the standard. Electricity suppliers can generate renewable electricity themselves, purchase renewable electricity and credits from generators, or buy credits in a secondary trading market.

The RPS is the surest mechanism for securing the public benefits of renewables and for reducing their cost to enable them to become more competitive. It is a market mechanism, setting a uniform standard and allowing companies to determine the best way to meet it. The market picks the winning and losing technologies and projects, not administrators. The RPS will reduce renewable energy costs by:

- Providing a revenue stream that will enable manufacturers and developers to obtain reasonable cost financing and make investments in expanding capacity to meet an expanding renewable energy market.
- Allowing economies of scale in manufacturing, installation, operation and maintenance of renewable energy facilities.
- Promoting vigorous competition among renewable energy developers and technologies to meet the standard at the lowest cost.
- Inducing development of renewables in the regions of the country where they are the most cost-effective, while avoiding expensive long-distance transmission, by allowing national renewable energy credit trading.
- Reducing transaction costs, by enabling suppliers to buy credits and avoid having to negotiate many small contracts with individual renewable energy projects.

Some people have asked why hydropower is not eligible to earn renewable energy credits in most RPS proposals. The primary reason for not including hydro is that it is a mature resource and technology. In most cases, it is already highly competitive. It will not benefit appreciably from the cost-reduction mechanisms outlined above, and an RPS that included hydro would produce negligible, if any, increases in hydro generation. Because it is a much larger resource than other renewables, however, giving hydro tradable renewable energy credits would greatly increase the cost of an RPS without increasing the benefits.

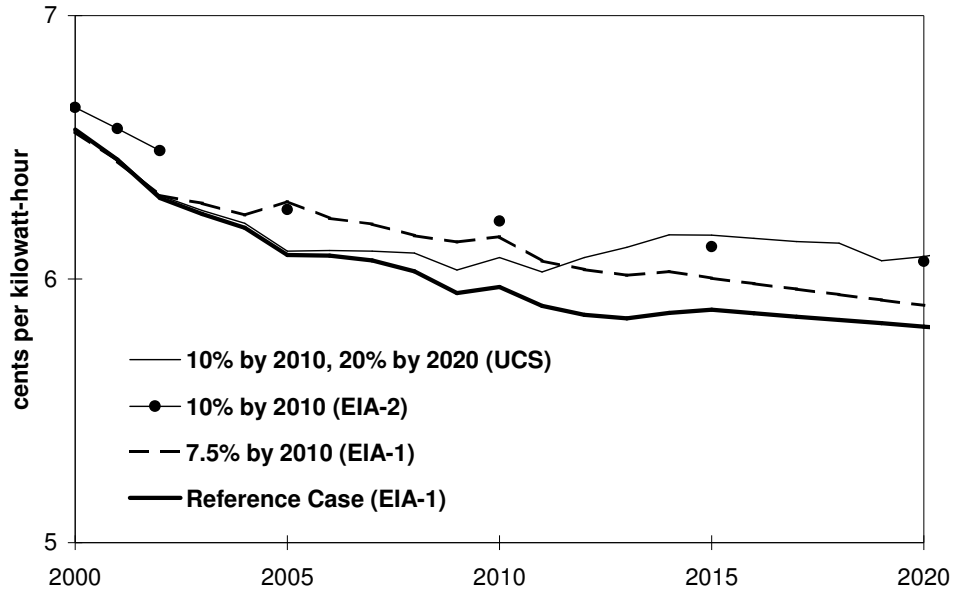
We have done extensive modeling of the costs and benefits of RPS proposals, published in our report, *A Powerful Opportunity: Making Renewable Electricity the Standard*. Our analysis of the Jeffords proposal found that electricity bills for a typical (500 kWh per month, non-electric heating) residential customer would be 56 cents per month (1.5%) more in 2010 and $1.33 per month (3.7%) more in 2020 than without an RPS. Electricity prices would still be lower than they were in 1998, by 8% in 2010 and 2020.

Analyses by the Department of Energy and by the Energy Information Administration concluded that the cost of an RPS would be somewhat higher than we did in the near term, though electricity prices would still decline from current levels. Our analysis used technology costs from the most recent technical assessment conducted collaboratively by the Electric Power Research Institute and

the Department of Energy. EIA assumed higher costs for renewable technologies. And neither EIA or DOE modeled the effects of renewable energy credit trading as extensively as we did.

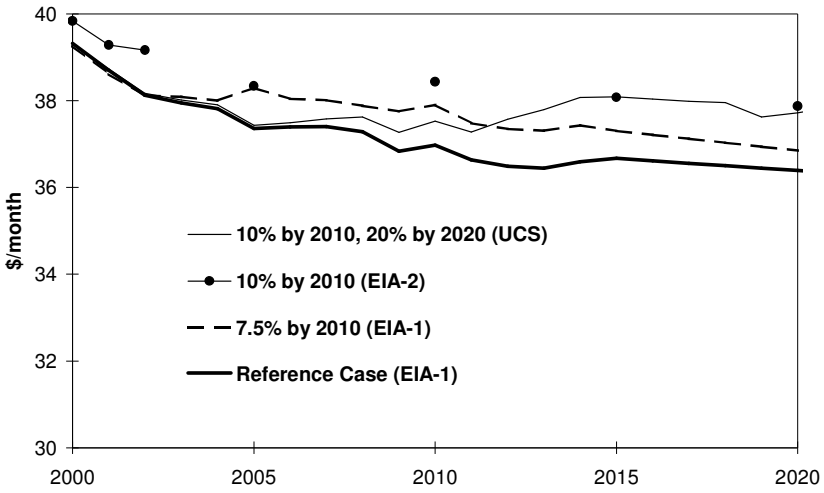
As the following graphs show, however, all the studies showed broadly comparable results. In each case, prices and bills would decline, with the RPS consuming part of the savings that would otherwise be realized. In the EIA study of a 10% RPS by 2010, residential customers would pay up to about $1.47 per month (4%) more in 2010 than they would without the RPS.

Figure 1. U.S. Average Electricity Prices under Proposed National Renewables Portfolio Standards[1]



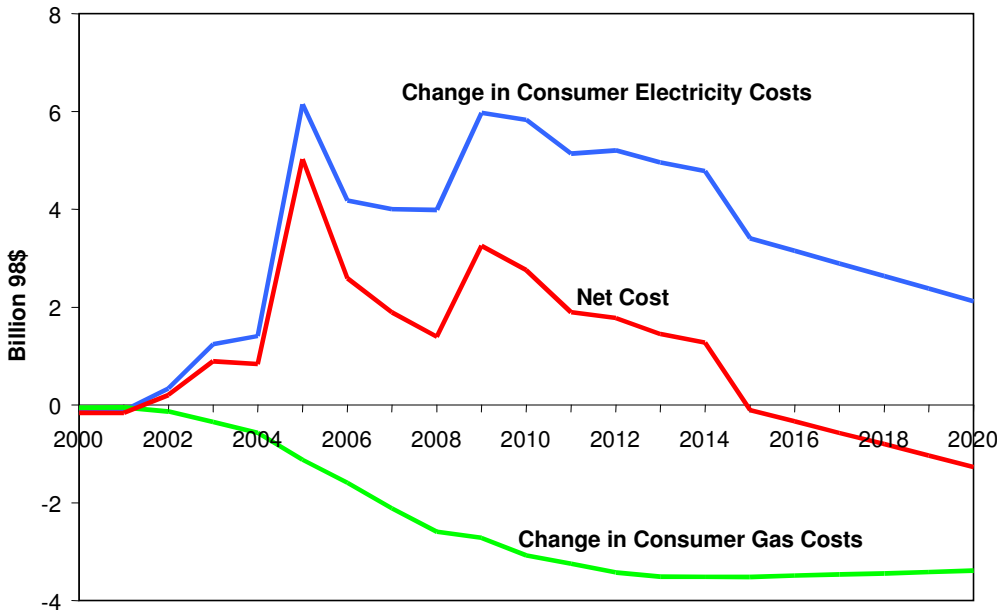
[1]EIA-1 is based on Energy Information Administration, *Annual Energy Outlook—2000*, December 1999. The results of the 7.5% by 2010 RPS reflect EIA's no cost cap, no sunset case. The results are indicative of what could be expected under the RPS in HR 2569. EIA-2 is from Energy Information Administration, *Analysis of S. 687, the Electric System Public Benefits Protection Act of 1997*, SR/OAIF/98-01, February 1998. Senator Jeffords requested that EIA model an RPS of 10% by 2010. UCS analysis is from Steven L. Clemmer, Alan Nogee and Michael Brower, *A Powerful Opportunity: Making Renewable Electricity the Standard*, Union of Concerned Scientists, January 1999. <http://www.ucsusa.org/energy>. Monthly electric bills for a typical non-electric heating household are based on an average use of 500 kilowatt-hours per month.

Figure 2. Average Monthly Electric Bill for a Typical Non-Electric Heating Household under Proposed National Renewables Portfolio Standards



The above graphs look only at the RPS impact on electricity. All the studies also found, however, that the RPS would restrain natural gas price increases, not only for electricity generation but throughout the economy. Even though natural gas use would increase considerably in all scenarios, the added competition from renewables in the RPS cases would keep gas prices from increasing as quickly. In the case of a 7.5% RPS by 2010 (with no cost cap or sunset, similar to the RPS in HR 2569), the EIA found that natural gas savings offset roughly half the cost of the RPS from 2006-2014, and actually produced net savings in the years after 2016.

Figure 3. Consumer Natural Gas Savings Offset Higher Consumer Electricity Costs of RPS (Based on EIA's 7.5% by 2010 no cost cap, no sunset case)



Additionally, these analyses considered only the effects of the RPS alone. When combined with public benefits funding, customers should be able to achieve larger bill reductions through savings from energy efficiency programs than they would see in increased electricity bills from the RPS.

In exchange, the RPS would yield important environmental and economic development benefits. According to the EIA, a 10% RPS could reduce nitrogen oxide emissions by almost half a million tons, or 8% compared to the reference case. The DOE analysis found that biomass and wind development from the RPS could mean over $1 billion per year in new income for farmers and tens of thousands of new jobs.

Survey after survey has shown that Americans want cleaner and renewable energy sources, and that they are willing to pay more for them. A recent survey for the Sustainable Energy Coalition found that 79% of voters support an RPS of 10%, vs. only 17% who oppose it.

C. Emission reductions

Four states (Texas, Massachusetts, Connecticut and New Jersey) have adopted some emissions limits as part of restructuring. The Connecticut and New Jersey proposals do not go into effect, however, until larger neighboring states enact similar standards.

The reluctance of states to enact new emission limits generally, and to tie them to similar moves by their neighbors, highlights the widespread belief that federal standards are needed to implement fair and effective emission caps.

We support S. 1369's proposed multi-pollutant standards. They will allow efficient planning by companies to meet the standards at the lowest cost. With the exception of mercury, which has local impacts, the bill would establish trading mechanisms to meet the standards at the least cost. The SO_x and NO_x standards would help level the playing field among all generators. The mercury standard would reduce emissions at the coal plants which are the largest remaining source of this pollutant. The carbon dioxide standard would reduce emissions to 1990 levels—the target set in the 1992 Rio Climate Treaty that the U.S. has ratified.

D. Net metering and information disclosure

At least two other policies are critical components of restructuring legislation that would maintain or enhance public benefits, net metering, and disclosure of fuel sources and emissions to electricity customers. We support these provisions of S. 1369.

Net metering makes it easier and more affordable for customers to generate their own power from renewable energy sources or other distributed generation technologies. A number of states have enacted or affirmed net metering policies in the process of restructuring, making a total of 30 states that now have some form of net metering policy.

Net metering allows customers to interconnect and feed surplus power back into the grid during periods when generation exceeds the customers own use. It is particularly important for intermittent renewable sources, such as solar and small wind machines, which generate electricity only when

the resource is available. Net metering eliminates the administrative expense of installing, reading, and billing for an additional meter to measure generation separately from consumption. During surplus generation periods, the single meter spins backwards, so that the customer is billed only for the net amount of electricity consumed during a billing period.

By facilitating small scale generation by customers, net metering will help reduce loads on central generation, transmission and distribution, enhancing reliability as well as fuel diversity and other public benefits.

Providing customers with accurate information about the fuel sources and emissions of the generation mix that serves them is essential for customers to make informed decisions about electricity choices. Fifteen states have enacted some form of environmental information disclosure. Two have done so outside of moving to retail choice, in order to help customers understand the sources of their electricity. Implementing disclosure at the federal level will help ensure consistency of information provided to customers in an increasingly national market, and will greatly facilitate the development of a reliable tracking mechanism to ensure accurate, verifiable information about electricity sources. It is currently very difficult for states to verify the attributes of generation originating outside of the power pools they belong to.

VI. Conclusion

A number of states have provided strong leadership in enacting mechanisms to protect the environment and provide for other public benefits in the course of restructuring their electricity industries. However, as Richard Cowart, former Chairman of the Vermont Public Service Board and Executive Director of the National Council on Competition and the Electric Industry, testified to the House Energy & Power Subcommittee:

> The benefits of pool-wide reliability, of reducing air emissions, of diversifying our fuel supplies, of enhancing out energy security, and of supporting American-made technologies and energy are national benefits that need national support. State-by-state programs will also come under increasing pressure to "race to the bottom." We must not rely on a handful of states or on volunteers to provide these national benefits.

We respectfully urge you to act favorably on S. 1369, or to add its provisions to any other restructuring bill considered by the Committee. Thank you very much.

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