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TAX CREDITS FOR ELECTRICITY PRODUCTION FROM RENEWABLE SOURCES

HEARING

BEFORE THE

SUBCOMMITTEE ON SELECT REVENUE MEASURES

OF THE

COMMITTEE ON WAYS AND MEANS
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

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TAX CREDITS FOR ELECTRICITY PRODUCTION FROM RENEWABLE SOURCES

TUESDAY, MAY 24, 2005

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON WAYS AND MEANS,
SUBCOMMITTEE ON SELECT REVENUE MEASURES,
Washington, DC.

The Subcommittee met, pursuant to notice, at 2:03 p.m., in room 1100, Longworth House Office Building, Hon. Dave Camp (Chairman of the Subcommittee), presiding.

[The advisory announcing the hearing follows:]

ADVISORY

FROM THE COMMITTEE ON WAYS AND MEANS

SUBCOMMITTEE ON SELECT REVENUE MEASURES

FOR IMMEDIATE RELEASE
May 16, 2005
No. SRM–2

CONTACT: (202) 226–5911

Camp Announces Hearing on Tax Credits for Electricity Production from Renewable Sources

Congressman Dave Camp (R–MI), Chairman, Subcommittee on Select Revenue Measures of the Committee on Ways and Means, today announced that the Subcommittee will hold a hearing on Federal tax credits for electricity production from renewable sources. **The hearing will take place on Tuesday, May 24, 2005, in the main Committee hearing room, 1100 Longworth House Office Building, beginning at 2:00 p.m.**

In view of the limited time available to hear witnesses, oral testimony at this hearing will be from invited witnesses only. However, any individual or organization not scheduled for an oral appearance may submit a written statement for consideration by the Subcommittee and for inclusion in the printed record of the hearing.

BACKGROUND:

In 1992, Congress passed the Energy Policy Act of 1992 (P.L. 102–486) which established an inflation-adjusted tax credit (Section 45 of the Internal Revenue Code) of 1.5 cents per kWh for electricity produced from certain renewable sources, specifically qualified wind and closed-loop biomass plants. This provision has been extended and modified several times. Most recently in the American Jobs Creation Act of 2004 (P.L. 108–357), the credit was expanded to include electricity produced from open-loop biomass, geothermal, solar, small irrigation and municipal solid waste. The credit will not, without extension of current law, be available for output from qualified facilities placed in service after 2005.

In announcing the hearing, Chairman Camp stated, "This hearing will provide us with the opportunity to examine Section 45 of the Internal Revenue Code and the impact tax credits have had on the production of energy from renewable sources."

FOCUS OF THE HEARING:

The hearing will focus on the history of the renewable production tax credit and its effects on the retail electricity market. The Subcommittee will assess the economic efficiency of current tax policy for renewable energy production and its efficacy in promoting economically viable new energy technology.

DETAILS FOR SUBMISSION OF WRITTEN COMMENTS:

Please Note: Any person(s) and/or organization(s) wishing to submit for the hearing record must follow the appropriate link on the hearing page of the Committee website and complete the informational forms. From the Committee homepage, *http://waysandmeans.house.gov*, select "*109th Congress*" from the menu entitled, "*Hearing Archives*" (*http://waysandmeans.house.gov/Hearings.asp?congress=17*). Select the hearing for which you would like to submit, and click on the link entitled, "*Click here to provide a submission for the record.*" Once you have followed the on-

line instructions, completing all informational forms and clicking "submit" on the final page, an email will be sent to the address which you supply confirming your interest in providing a submission for the record. You ***MUST REPLY*** to the email and ***ATTACH*** your submission as a Word or WordPerfect document, in compliance with the formatting requirements listed below, by close of business Thursday, June 23, 2005. **Finally**, please note that due to the change in House mail policy, the U.S. Capitol Police will refuse sealed-package deliveries to all House Office Buildings. For questions, or if you encounter technical problems, please call (202) 225–1721.

FORMATTING REQUIREMENTS:

The Committee relies on electronic submissions for printing the official hearing record. As always, submissions will be included in the record according to the discretion of the Committee. The Committee will not alter the content of your submission, but we reserve the right to format it according to our guidelines. Any submission provided to the Committee by a witness, any supplementary materials submitted for the printed record, and any written comments in response to a request for written comments must conform to the guidelines listed below. Any submission or supplementary item not in compliance with these guidelines will not be printed, but will be maintained in the Committee files for review and use by the Committee.

1. All submissions and supplementary materials must be provided in Word or WordPerfect format and MUST NOT exceed a total of 10 pages, including attachments. Witnesses and submitters are advised that the Committee relies on electronic submissions for printing the official hearing record.

2. Copies of whole documents submitted as exhibit material will not be accepted for printing. Instead, exhibit material should be referenced and quoted or paraphrased. All exhibit material not meeting these specifications will be maintained in the Committee files for review and use by the Committee.

3. All submissions must include a list of all clients, persons, and/or organizations on whose behalf the witness appears. A supplemental sheet must accompany each submission listing the name, company, address, telephone and fax numbers of each witness.

Note: All Committee advisories and news releases are available on the World Wide Web at *http://waysandmeans.house.gov*.

The Committee seeks to make its facilities accessible to persons with disabilities. If you are in need of special accommodations, please call 202–225–1721 or 202–226–3411 TTD/TTY in advance of the event (four business days notice is requested). Questions with regard to special accommodation needs in general (including availability of Committee materials in alternative formats) may be directed to the Committee as noted above.

Chairman CAMP. The hearing will come to order. I ask our guests to please find seats. The Subcommittee on Select Revenue Measures hearing will begin, and the purpose of today's hearing is to examine the Production Tax Credit, commonly known as the PTC, or the section 45 credit, based on the section of the Internal Revenue Code in which it is found.

Congress enacted the PTC in 1992 to provide an incentive for producing electricity from certain renewable sources. The PTC originally provided 1.5 cents per kilowatt hour of electricity produced from certain renewable sources, specifically qualified wind and closed-loop biomass plants. Over the years, Congress has expanded the variety of renewable energy sources eligible for the PTC. Currently, several new renewables, such as solar, geothermal, and open-loop biomass, have been included in the credit.

Other potential sources of power have sought inclusion or higher credit amounts. In fact, the trend appears to be that energy sources previously covered by other tax incentives, such as investment credits, are now seeking to be included in the PTC. Congress needs

to periodically assess the current economics of renewables production and the efficacy of the PTC in promoting both the use of renewables and the development of new technologies. Today's hearing will be part of the Subcommittee's examination of these issues.

The Subcommittee will first hear from Dr. Howard Gruenspecht, representing the Department of Energy's Energy Information Administration. He will discuss the competitiveness of renewables eligible for the PTC and perspectives on how the structure of the credit may affect adoption of these new technologies.

The Subcommittee will then hear from representatives of the renewables industries currently covered by section 45.

The goal of this hearing is to determine what the PTC has accomplished or might accomplish. We need to understand the economics of renewable energy sources and the prospects for expanding their market share. With the PTC scheduled to expire at the end of this year, I look forward to hearing our witnesses discuss just how effective this tax incentive is in promoting renewable power.

I yield to the ranking Member of the Subcommittee, Congressman McNulty, for an opening statement.

Mr. MCNULTY. Thank you, Mr. Chairman. I am happy to be here with you, Mr. Gruenspecht, and the others who will testify later.

Mr. Chairman, if I could ask consent to place in the record an opening statement by a Member of the full Committee who is not a Member of the Social Security, Earl Pomeroy. I would appreciate that.

Chairman CAMP. Without objection.

Mr. MCNULTY. I would like to ask for permission for all Members to submit statements for the record.

Chairman CAMP. Without objection.

Mr. MCNULTY. Thank you, Mr. Chairman. I look forward to today's hearing on the effectiveness of Tax Code section 45 in the production of electricity from renewable sources.

It is timely that the Select Revenue Measures Subcommittee consider this issue given that the tax credit for renewable resources expires at the end of 2005. It is my hope that the Subcommittee will find time to consider other critically important tax provisions which expire at the end of this year, for example, individual Alternative Minimum Tax Relief and the Welfare to Work and Work Opportunity tax credit.

The production of electricity through renewable energy sources, such as biomass, solar, wind, and geothermal, continues to involve cutting-edge industries with creative technologies. It is important that our tax system support efficient energy production systems and long-range energy conservation measures. Renewable energy sources provide an opportunity for investing in new technologies and a better energy future for our children.

Mr. Chairman, I commend you for holding this hearing. I thank all of the witnesses for your valuable insights and I look forward to working with all of you on these issues in the future. Thank you.

Chairman CAMP. Thank you very much.

Now, Dr. Gruenspecht, you have 5 minutes to summarize your statement. We have received your written testimony, but you may begin at any time. Thank you for being here.

STATEMENT OF HOWARD GRUENSPECHT, DEPUTY ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, U.S. DEPARTMENT OF ENERGY

Dr. GRUENSPECHT. Thank you, Chairman Camp and Members of the Subcommittee. I appreciate the opportunity to appear before you today to discuss the economics of renewable energy electricity generating technologies that are eligible for the section 45 Production Tax Credit.

The Energy Information Administration is a statistical and analytical agency within the U.S. Department of Energy. We don't take positions on policy issues, but we do produce data, analyses, and forecasts that are meant to assist policy makers in their deliberations. Because we have an element of statutory independence, EIA's views should not be construed as representing those of the Department of Energy or the Administration.

The information I am providing today is based on our outlook for domestic energy consumption, supply, and prices through 2025. These projections are meant to represent likely futures, not exact predictions. Projections of energy markets are highly uncertain, as we have all seen recently, and are subject to many random events that cannot be foreseen. In addition, long-term trends in technology, economic growth, and energy resources may evolve along unanticipated paths. We do examine a number of alternative cases to address some of these uncertainties.

In 2003, renewable energy generation altogether accounted for 9.4 percent of total electricity generation. Over three-quarters of that amount was conventional hydroelectric power, which is not eligible for the PTC. The technologies currently eligible for the PTC accounted for 2.2 percent of total electricity generation, as illustrated in Figure 1 of my written testimony. While the combined generation of these technologies is projected to more than double by 2025, their share of total generation is projected to remain relatively small, at 3.2 percent.

One way that we often compare generating technologies is to estimate their levelized cost, which represents the discounted per kilowatt hour cost of building and operating a plant. Table 1 in my written testimony compares the projected levelized costs in 2010 for various generating technologies. A glossary attached to my testimony explains some of the terms I am using.

As shown in the table, pulverized coal, geothermal, and natural gas combined cycle plants have the lowest projected levelized cost. Solar, thermal, and photovoltaic technologies have much higher levelized costs. Wind and open-loop biomass fall in the middle.

Levelized costs alone do not determine market outcomes, and let me briefly touch on some of the issues that most affect the potential use of renewable generation.

Resource limitations are one issue. For example, while the table shows that levelized costs of geothermal are competitive with new coal plants, there are very few geothermal sites with costs as at-

tractive as those in the table and they tend to be located in remote areas. Remaining sites are more expensive.

Again, for wind, there is a lot of resource, but the quality and location are important considerations. Some of the best resources are located in areas that are relatively remote or hard to develop.

A fuel availability is another issue, especially for biomass. The supply of low-cost biomass fuel is limited, and because biomass fuel has a lower energy content per unit of volume than coal, transportation costs generally rule out moving biomass over long distances.

Wind and solar are intermittent energy sources. When the wind is not blowing or the sun is not shining, they can't generate electricity. When these technologies are developed, additional capacity may have to be added to back them up, adding system costs that are not reflected in the levelized cost table.

Transmission cost and availability also varies by technology. All technologies require some investment to interconnect with the transmission grid, but these costs can be higher for some renewables because of their relatively remote locations and small plant sizes, and it is especially true for intermittent technologies because of their low utilization rates.

Now let me offer some observations on the impact of the PTC itself. There is no question that the availability of the PTC increases the economic attractiveness of eligible technologies. Its primary impact to date has been to stimulate wind. For solar, the benefit provided by the PTC is not large enough to result in its significant expected market penetration. In fact, because of high capital costs and low capacity factors, the PTC is less valuable to solar technologies than the Investment Tax Credit, which they can take instead.

We have done some sensitivity analysis that looks at the impact of a long-term extension of the PTC. That is not meant to represent any expectation about future policy decisions. Wind power shows the largest projected gain, followed by geothermal, landfill gas and biomass.

We also ran a test case in which all the eligible renewables were given the same PTC as wind for an extended period. As you know, some of the others receive less. In that case, wind and biomass were still the major beneficiaries.

Let me close by citing some other factors that influence the penetration of renewable technology. It is not just the PTC that matters, it is other market or policy developments. We looked at a scenario that significantly raised projected natural gas prices and total additions of renewable capacity nearly doubled and their share of total generation in 2025 increased by a third. Biomass and wind were the big gainers.

We ran some scenarios that incorporate recent rules or legislative proposals to regulate emissions of sulfur dioxide, nitrogen oxides, and mercury. Those policies did not appear to have a major impact on the penetration of renewables. However, as discussed in my written testimony, we did find that significant restrictions on emissions of greenhouse gasses would result in much greater use of PTC-eligible technologies.

There is also an interaction between the PTC and State programs to stimulate renewables. We found that many States have

included provisions in their State programs, Renewable Portfolio Standards, mandates that limit the funding levels or the costs they are willing to impose. That means since the PTC lowers funding levels or costs, it reduces the likelihood that those provisions get triggered.

Finally, we have also, in response to a request from Congress, looked at analyses of proposals for national Renewable Portfolio Standards. Again, these analyses suggest that a Federal RPS could stimulate the development of new renewable capacity. However, the stated percentage targets in those programs are often not achieved because of a similar cap provision that limits the price of renewable tradable credits. If the PTC and RPS programs were both in effect, the credit price caps are less likely to limit the deployment of renewable technologies.

That concludes my testimony, Mr. Chairman, and I would be glad to answer any questions that you or other Members of the Subcommittee might have. Thank you.

[The prepared statement of Mr. Gruenspecht follows:]

Statement of Howard Gruenspecht, Deputy Administrator, Energy Information Administration, U.S. Department of Energy

Mr. Chairman and members of the Subcommittee, I appreciate the opportunity to appear before you today to discuss the economics of renewable energy electricity generating technologies that are eligible for the Section 45 production tax credit (PTC).

The Energy Information Administration (EIA) is a statistical and analytical agency within the U.S. Department of Energy. We are charged with providing objective, timely, and relevant data, analyses, and projections for the use of the Congress, the Administration, and the public. We do not take positions on policy issues, but we do produce data, analysis, and forecasts that are meant to assist policy makers in their deliberations. Because we have an element of statutory independence with respect to our data, analyses, and forecasting, our views are strictly those of EIA and should not be construed as representing those of the Department of Energy or the Administration. However, EIA's baseline projections on energy trends are widely used by government agencies, the private sector, and academia for their own energy analyses.

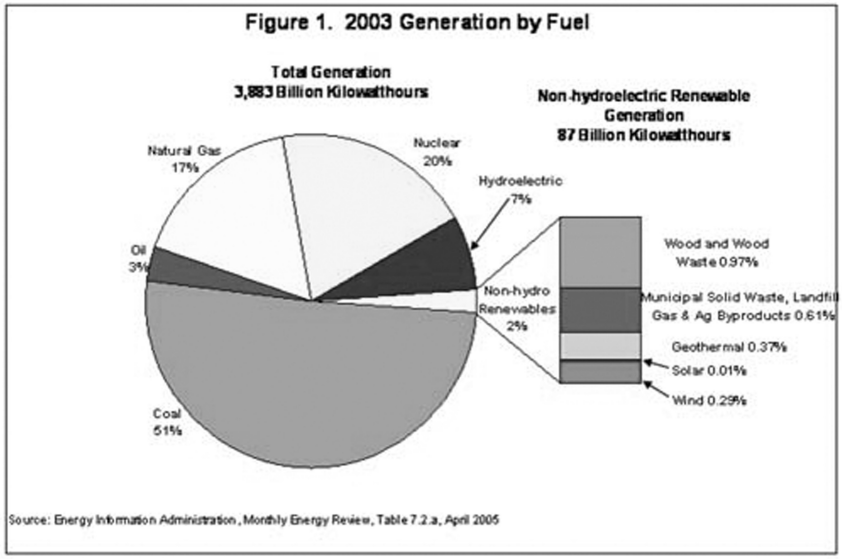
Much of the information I am providing today comes from our *Annual Energy Outlook 2005* (*AEO2005*) which provides projections and analysis of domestic energy consumption, supply, and prices through 2025. The *AEO2005* is based on Federal and State laws and regulations in effect as of late 2004. With respect to electricity generated from renewable energy, *AEO2005* includes the extension and broadening of the PTC through December 31, 2005, that was included in the Working Families Tax Relief Act of 2004 (P.L. 108–311) and the American Jobs Creation Act of 2004 (P.L. 108–357).

The projections in the *AEO2005* are not meant to be exact predictions of the future but represent likely energy futures, given technological and demographic trends, current laws and regulations, and consumer behavior as derived from known data. EIA recognizes that projections of energy markets are highly uncertain and subject to many random events that cannot be foreseen, such as weather, political disruptions, and technological breakthroughs. In addition to these phenomena, long-term trends in technology development, economic growth, and energy resources may evolve along a different path than expected in the projections. The *AEO2005* includes several alternative cases intended to examine some of these uncertainties.

Renewable Generation Today

In today's market, renewable generation accounts for 9.4 percent of total generation; over three-quarters of it comes from hydroelectric facilities (**Figure 1**). The technologies currently eligible for the PTC account for a small share of total electricity generation. In 2003, the combined generation of geothermal, photovoltaic (see attached Glossary), solar thermal, biomass, municipal solid waste, and wind plants accounted for 2.2 percent of total U.S. electricity generation. Among these renewable sources, biomass generation, mainly from industrial facilities, accounts for over 44 percent of the total, followed by municipal solid waste (26 percent), geothermal (16

percent), wind (13 percent), and the grid-connected solar technologies (1 percent). While their combined generation is projected to more than double by 2025, their share of total generation will remain small, at 3.2 percent.



Economics of Renewable Generating Technologies

Many factors affect the relative economics of various electricity generating technologies. Such factors include the costs of licensing, permitting, and constructing each plant (often referred to as the overnight construction costs), the time required to build each plant, the costs of financing the construction, the projected cost of the fuel (if any) needed to operate the plant, and other operations and maintenance costs associated with running the plant once it is built. Because the contribution of each of these cost components differs from technology to technology, it is difficult to look at any one factor to determine which technology is best for a given set of circumstances.

One approach that is often used to compare disparate technologies is to estimate their levelized costs. Levelized costs represent the discounted per-kilowatthour costs of building and operating a plant at its typical operating rate (i.e., capacity factor). **Table 1** compares the projected levelized costs to develop the next plant in 2010 for various grid-connected utility-scale renewable technologies to those for pulverized coal, natural gas combined-cycle, and nuclear plants. The values in the table represent the discounted costs of building and operating each technology for 20 years. They include the costs of building the plant, staffing and maintaining the plant, and purchasing the needed fuel each year for 20 years. As shown, pulverized coal plants have the lowest projected levelized costs, followed by geothermal and then natural gas combined-cycle plants. Solar thermal and photovoltaic technologies tend to be much more expensive than other options, while wind and open-loop biomass are in the middle.

Table 1. National Average Levelized Generation Costs for New Plants in 2010

Technology	Levelized Costs (2003 cents per kilowatthour)
Pulverized Coal	4.3
Geothermal	4.4

Table 1. National Average Levelized Generation Costs for New Plants in 2010—Continued

Technology	Levelized Costs (2003 cents per kilowatthour)
Natural Gas Combined-Cycle	4.7
Wind	4.8
Open-Loop Biomass	5.1
Nuclear*	6.0
Solar Thermal	12.6
Photovoltaic	21.0

*The time required to license, permit, and construct a new nuclear plant makes it impossible to bring one on line by 2010. The costs shown are for a plant beginning operation in 2013.
Excludes transmission costs and impact of PTC.
Source: National Energy Modeling System run, aeo2005.d102004a.

When reviewing this table, one might ask why the costs are so different and why we are not seeing greater penetration of geothermal plants. Furthermore, given the costs shown, why has so much natural gas capacity been added in recent years? While pulverized coal plants are expensive to build—typically twice as costly as a natural gas combined-cycle plant—there is an ample supply of fairly low-cost coal and the plants can operate nearly around the clock with annual capacity factors exceeding 80 percent. Because they can be operated so intensively, the recovery of their high construction costs can be spread over a large amount of electricity production, making their per-kilowatthour levelized costs relatively low. In contrast, photovoltaic and solar thermal plants, which are even more expensive to build than coal plants on a per-kilowatt of capacity basis, cannot be operated very intensively. Their potential utilization is limited by the availability of the sun and their annual capacity factors are generally between 25 and 33 percent. Unlike coal plants, the levelized costs for natural gas combined-cycle plants are driven by their fuel costs, rather than their construction costs. If a plant is to be operated intensively—what is referred to as baseload operation—the higher fuel costs for natural gas plants tend to make them less economical than coal plants. On the other hand, if a plant will be operated only occasionally (i.e., peaking operation) or moderately, such as on hot summer days when electricity usage is high, the very low construction costs of natural gas plants make them an attractive option.

For nuclear plants, relatively high construction costs, high operation and maintenance costs, and long planning and construction periods all contribute to their higher levelized costs. For geothermal plants, high construction costs and the site-specific characteristics of the geothermal resource are the key drivers of their levelized costs. At the best sites, their levelized costs can be competitive with new coal plants, but there are only a few sites with costs as attractive as those in Table 1, and they tend to be located in remote areas in the far western region of the country. Once those low cost sites are developed, the remaining sites are much more expensive. The levelized costs for open-loop biomass technologies are most influenced by their high capital costs and the availability of low-cost fuel. When low-cost fuels are available, they can be reasonably competitive, but the supply of such fuels is limited. Because biomass is dispersed and has a much lower energy density per unit of volume than coal, transportation costs generally rule out moving biomass over long distances. The size of plants using biomass can be limited by amount of biomass that can be produced at nearby locations.

For wind, the key levelized cost drivers are the construction costs of the plants and the quality of the wind resource. The wind resource in the country is quite large, but some of the best resources are located in areas where their development is restricted or in relatively remote areas where significant transmission upgrades would be needed to access them.

Two further cautions should be raised about comparing the levelized costs of wind and solar plants to other technologies. Wind and solar technologies are often referred to as intermittent technologies. Unlike the other technologies in the table, their generation is only available when their resources are available. They can not be called upon whenever needed. When the wind is not blowing or the sun is not

shining, they cannot generate electricity. As a result, when these technologies are developed, additional capacity may have to be added to back them up and ensure that consumers' electricity needs can be met at all times. The need to add backup capacity for intermittent resources adds system costs that are not reflected in their levelized costs. The levelized costs shown in the table also do not include the costs of transmission investments needed to support the capacity additions. All technologies require some investment to interconnect to the transmission grid, but these costs can be higher for some renewables because of their relatively remote locations and, for the intermittent technologies, the per-kilowatthour transmission costs can be high because of their lower generation.

Impact on the PTC

The availability of the PTC through December 31, 2005, makes the eligible renewable technologies more economically attractive than shown in Table 1. For example, the full 10-year PTC available for wind plants lowers their projected levelized costs by about 2 cents per kilowatthour. The levelized value of the PTC is larger than the nominal value of the PTC because it is an after-tax credit.

For solar technologies, the benefit provided by the PTC does not appear to be large enough to cause a significant change in market penetration. In fact, because their annual output is so limited, the PTC is less valuable to them than the 10-percent investment tax credit for which they are also eligible. For geothermal and biomass technologies, planning and construction periods are so long that it would be impossible for a new plant to be developed in time to take advantage of the current credit. Even for wind technology, only those plants that are well along in their development cycle will be able to enter service in time to qualify for the credit. Short-term extensions of the PTC are likely to have limited impact on qualifying technologies like biomass and geothermal, which have relatively long development periods, even if the credit were large enough to make them economical. Throughout the history of the PTC, its primary impact has been to stimulate the development of wind plants, albeit with the limitations mentioned above.

As stated previously, the *AEO2005* reference case assumes the PTC will expire in December 2005, as provided for in current law. In the *AEO2005*, EIA also has examined the potential impact of a longer-term extension of the current PTC. The only qualifying technology not represented in the extension case was closed-loop biomass. Because of the long establishment times and relative expense of energy crops, it was assumed that no dedicated, closed-loop biomass would be able to take advantage of the extended credit. The PTC extension case is not meant to represent any expectation about future policy decisions regarding the PTC.

In the *AEO2005* PTC extension case, wind power continues to show the largest projected gains, although landfill gas, geothermal, and biomass are also projected to experience some capacity expansion. Installed wind capacity in 2015 is almost 63 gigawatts in the PTC extension case, compared to 9.3 gigawatts in the reference case. In 2015, geothermal capacity in the PTC extension case is 3.2 gigawatts, compared to 2.7 gigawatts in the reference case. Biomass capacity in 2015 is 3.4 gigawatts in the PTC extension case, compared to 2.1 gigawatts in the reference case. In a test case where it is assumed that all of the eligible renewables were given the PTC now available to new wind plants for an extended period, wind and biomass technologies showed the largest growth.

Other Factors Influencing Renewables

Other important factors that could impact the future of PTC-eligible renewable technologies include changes in fossil fuel prices, particularly for natural gas, changes in environmental policies, and changes in other Federal or State policies. The *AEO2005* includes a case where it is assumed that natural gas supply options are more restricted than in the reference case. The key impact of these supply restrictions is higher natural gas prices, making other generating options, including renewables, more economically attractive. In the restricted natural gas supply case, the wellhead price of natural gas in 2025 reaches $6.29 per thousand cubic feet (2003 dollars), 31 percent higher than the $4.79 per thousand cubic feet price in the reference case. These higher natural gas prices cause a shift to increased use of coal and renewables for electricity generation, while natural gas generation is lower. Total additions of renewable capacity in the restricted natural gas supply case are nearly double the level seen in the reference case, and the share of generation accounted for by the renewable technologies eligible for the PTC increases to 4.1 percent, nearly one-third higher than the 3.2-percent share in the reference case. Biomass, wind, and to a lesser degree, geothermal show the greatest increases in response to the higher natural gas prices.

The AEO2005 also included a case examining the impact of the Environmental Protection Agency's (EPA) proposed Clean Air Interstate Rule (CAIR) which has now been finalized. The CAIR calls for the power sector to significantly reduce its emissions of sulfur dioxide (SO2) and nitrogen oxides (NO_x). In the AEO2005 alternative case, the CAIR was found to have insignificant impacts on renewable generation. Similarly, in a recent analysis prepared in response to a request from Senators James Inhofe and George Voinovich, the potential impact of EPA's proposed Clean Air Mercury Rule (CAMR) together with CAIR was examined. Again, it was found to have only small impacts on renewable generation.

In contrast to these findings, several EIA analyses have shown that renewable generation could be strongly impacted by environmental legislation calling for significant reductions in greenhouse gas emissions. For example, in June 2003, at the request of Senators Inhofe, McCain, and Lieberman, an analysis of S. 139, the Climate Stewardship Act of 2003, was prepared. S. 139 called for a two-phase reduction in greenhouse gas emissions for most sectors of the U.S. economy. The first phase called for reductions to the 2000 greenhouse gas emissions level, while the second phase called for reductions to the 1990 greenhouse gas emissions level. In our analysis, the greenhouse gas cap and trade program called for in S. 139 significantly increases the cost of using fossil fuel technologies that emit greenhouse gases, which encourages increased use of renewables, nuclear, and carbon capture and sequestration technologies. In that analysis, total additions of renewable capacity were more than 10 times the level seen in the *AEO2005* reference case, and the share of generation accounted for by the renewable technologies eligible for the PTC increased to 16.8 percent, more than 5 times the level seen in the reference case. Again, biomass, wind, and geothermal showed the greatest increases in response to the greenhouse gas cap and trade program.

State programs to stimulate renewables, such as power generation standards or mandates, could also influence the impact of Federal PTC changes. In a review of State programs through December 31, 2003, EIA found that the Federal PTC and State renewable programs tend to complement one another. Many of the States have provisions in their renewable programs that limit their funding or the costs they are willing to impose. As a result, the impacts of the State programs likely would be lower without the Federal PTC to reduce the costs of renewables.

Discussions surrounding Federal energy legislation have included proposals for the implementation of a national renewable portfolio standard (RPS) requiring that a certain percentage of all electricity generation or sales come from designated renewable energy sources. EIA has no position on these proposals, but we have prepared several analyses of RPS proposals in recent years in response to requests from Congress. These analyses suggest that such an RPS could stimulate the development of new renewable generating capacity. However, the stated percentage targets in these proposals are often not achieved because provisions that cap the price of tradable renewable credits are triggered. If the PTC and RPS programs were both in effect, such provisions are less likely to come into play as a factor would limit the development of new renewable generating capacity.

This concludes my testimony, Mr. Chairman. I would be glad to answer any questions you and the other Members may have.

Glossary

Closed-loop biomass. A closed-loop process is defined as a process in which power is generated using feedstocks that are grown specifically for the purpose of energy production. Many varieties of energy crops are being considered including hybrid willow, switchgrass, and hybrid poplar.

Combined-cycle. An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more natural gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.

Gigawatt. 1,000,000 kilowatts or 1,000 megawatts.

Kilowatt. A unit of electricity generating capacity equal to 1000 watts.

Kilowatthour. The amount of electricity generated by operating a 1-kilowatt generator at full load for 1 hour.

Megawatt. 1,000 kilowatts.

Open-loop biomass. An open-loop process is defined as a process in which power is generated using feedstocks that are a waste stream. Examples of such feedstocks include: agricultural residues (corn stover, wheat straw), forestry residues (logging residues, dead wood), and urban wood waste/mill residues (pallets, construction waste).

Photovoltaic. Direct conversion of sunlight to electricity through use of photoconversion cells, typically using conducting layers of crystalline silicon cells.

Solar thermal. Conversion of sunlight to electricity by concentrating sunlight to heat water or other medium (like molten salt) for use as a preheater for the boiler fluid of a steam turbine. Sunlight may be concentrated on tubes (trough thermal), points (dish), or tower focal points.

Chairman CAMP. Thank you, Dr. Gruenspecht, for that testimony. I have a couple of questions I would like to start off with. Some have suggested that increasing the amount of renewables-generated power will help reduce America's dependence on foreign oil. Is that true, and what is your opinion on that?

Dr. GRUENSPECHT. Well——

Chairman CAMP. Then, second, how will an increase in renewables affect dependence in America on natural gas?

Dr. GRUENSPECHT. In 2003, I think oil-fired generation was only about three percent of total generation and it is not expected to be an important source of generation in the future. Only about 3 percent of our total petroleum is used for electric generation. This is a big change from the 1970s, when about 10 percent of our total petroleum use was used for electric generation. So, there is probably not that large a relationship between using more of any particular fuel and backing out oil.

Natural gas is somewhat different. Natural gas is a growing source of generation, and as you know, many new plants have been constructed that burn natural gas. In several analyses, we found that programs to stimulate renewable electricity generation could reduce natural gas use. When we did that analysis I mentioned about the Federal Renewable Portfolio Standard, we found that natural gas generation in 2025 would be 3.6 percent lower than it would be in our base case, and natural gas wellhead prices were reduced somewhat. So, I would say more of an effect on natural gas, less of an effect on oil would be the short answer.

Chairman CAMP. At least 19 States and the District of Columbia have implemented Renewable Portfolio Standards, and these standards generally require a certain percentage of power sold within the State be derived from renewable sources. Does it make sense to have a tax credit and a mandate for production at the same time? Does it make sense to subsidize activities that are mandated?

Dr. GRUENSPECHT. Tough question. I guess as I mentioned in my testimony, there are many variations in the general program design and specific program details across the States that have programs, and I mentioned the fact that some of the States have cost caps, and clearly the cost caps are less likely to come into play if the Federal PTC is available.

So, there is something to be—I guess I would not say that because there are State programs, the PTC would have no impact. Whether it makes sense or not is really a policy matter to be addressed as to who should bear the costs, the consumer, as a consumer of electricity, the consumer as a taxpayer or the State.

Chairman CAMP. Well, I guess my question is does the tax credit distort choices among renewables in those States that have the Renewable Portfolio Standards?

Dr. GRUENSPECHT. It probably does have an effect. I mean, in our levelized cost numbers, the value of the full credit that wind and closed-loop biomass gets, the 10 years, the full amount of the credit, compared to some of the other technologies get a half-value full-life credit that is worth half as much, and some of them get a half-value half-life credit, which is worth 30 percent as much. So, there is no question that those differences can affect the choices among the technologies.

That said, wind is the technology that has been most prominent, and wind, even in our table, happens to be among the lowest-cost renewable technologies. So, I say there is some potential for distortion in the mix of technologies, but wind would do well under any circumstances, as it is doing now.

Chairman CAMP. Lastly, with regard to natural gas, what is the potential contribution to the overall U.S. energy supply by landfill gas?

Dr. GRUENSPECHT. I do not have that off the top of my head. Can I get back to you on the record for that?

Chairman CAMP. Yes. If you could submit that later in writing, that would be helpful.

Dr. GRUENSPECHT. Thank you.

Chairman CAMP. I just wonder, I mean, maybe this is something you want to follow up on, but how the PTC affects the creation of new landfill facilities in terms of the number and economics of those projects. If you could give the Committee that information, that would be helpful, as well.

Dr. GRUENSPECHT. Okay. I know that, initially, some of the landfill gas facilities were responding to EPA requirements and it is really only later, I think, with the extension and the expansion of the PTC that that has become an issue. But I will get back to you.

Chairman CAMP. Any significant barriers to entry for those facilities that you know of, if you could include that in your comments.

Dr. GRUENSPECHT. Okay. Thank you.

Chairman CAMP. Thank you. Thank you very much.

Mr. McNulty may inquire.

Mr. MCNULTY. Mr. Chairman, Congresswoman Tubbs Jones is a Member of the Social Security Subcommittee, as well. They are meeting right now. With your permission, I am going to allow her to go first on our side.

Chairman CAMP. No objection. Ms. Tubbs Jones may be recognized for 5 minutes.

Ms. TUBBS JONES. Thank you, Mr. Chairman, and to my second fairy godfather on this Committee, thank you, Mike McNulty, for yielding to me.

I wanted to take this opportunity to express on the record my support for the extension of this credit, and I wonder, Mr. Gruenspecht, have we put a dollar number on this credit, and if we have, specifically what it is, what the dollar value of these tax credits are. If, in fact, we have, are you able to say to the American public, they are getting on top of that credit this value for it?

Dr. GRUENSPECHT. I would not venture into revenue estimation matters which are in the purview of the Committee.

Ms. TUBBS JONES. Okay.

Dr. GRUENSPECHT. In terms of the levelized cost of renewables, which I discussed in my testimony, the credit does make a big difference. For wind, for example, it makes about a two cent per kilowatt hour difference in the levelized cost of technology, lowering it from 4.8 or so down to the neighborhood of three cents per kilowatt hour. So, that makes a substantial difference.

Ms. TUBBS JONES. I am not trying to give you our job of revenue. I was just curious——

Dr. GRUENSPECHT. Okay. Yes.

Ms. TUBBS JONES. I think it is a great selling point for the credit to be able to discuss that, but let me go on and ask you something else. The credit previously has been extended for 1 year. Now, it is asked for 2 years. Do you believe that we would get a greater bang for our buck if, in fact, the credit was extended for a longer period of time or not?

Dr. GRUENSPECHT. I think short-term extensions make it hard for certain technologies to benefit from the credit because the project development cycle for those technologies is long relative to the period of extension. So, if the credit is extended for a short period of time, it is very hard to get the project in and get it in service.

Ms. TUBBS JONES. So, your answer is yes?

Dr. GRUENSPECHT. Well, my answer is it is a policy call, but clearly, certain technologies have a hard time making use of the short-term extension. The other side of it is obviously the revenue costs and the fact that market conditions can change over time.

Ms. TUBBS JONES. What would you suggest would be a reasonable period of time for the extension, then? Come on, you can answer. We won't hurt you.

Dr. GRUENSPECHT. No, no, I know you won't hurt me—[Laughter.]—but it is really not the role of the Energy Information Administration to take a position on that.

Ms. TUBBS JONES. You are a great employee of the Federal Government.

Dr. GRUENSPECHT. I am a bureaucrat when it comes to these types of issues, but again, it is really a trade-off between what the different technologies can use, on the one hand, and I guess you guys have to worry about the revenue costs and you need to worry about possible changes in market conditions.

When we looked at long-term extensions, we did see, for instance, more biomass coming in. Again, we did that as a sensitivity analysis. Biomass has a harder time coming in with short-term extensions because you can't get the projects done.

Ms. TUBBS JONES. Got you. So, in other words, in some instances, if we have a longer credit involved, we might have greater return on some of the research or work that has been done.

Dr. GRUENSPECHT. You could certainly get more types of projects in.

Ms. TUBBS JONES. Mr. Chairman, I thank you and the Committee for allowing me to speak up, and to the second panel, please know that it is not that I don't want to hear you, but I have got to work on Social Security for the people in my Congressional district.

I yield back my time. Thank you, Chairman Camp and Mike.

Chairman CAMP. Thank you very much.

Mr. Foley may inquire.

Mr. FOLEY. Thank you, Mr. Chairman. I was interested in listening to your description of the various sources of energy, and I recognized in all of them there are some variables, some vulnerabilities, reliabilities, possibly. But at the end of the day, following up on what Mr. Camp mentioned, it is trying to free ourselves from being held hostage by what I believe are other nations, whether it is the Saudi Arabian royalty or Chavez in Venezuela. We seem to have a thirst, an unquenchable thirst for crude oil, and these technologies, in my view, seem to be the only way to ratchet backward.

Yesterday, General Electric had a two-page ad in USA Today and it basically illuminated the fact that one wind energy unit can supply the energy electricity for 440 households. Now, obviously that is probably under optimum circumstances and a number of other things, but I don't think General Electric would spend that kind of money just touting fantasy.

My hope is that we can use the constructive dialog of the tax element, Tax Code. It may not be the most perfect way in which to enhance or create development, but it seems to be one of the only ways for companies, like Florida Power and Light in my district, to venture out and embark on this opportunity. I think with a combination of those features, certainly there is inherent in these products diversity.

Landfills, we are finding ourselves at capacity in so many places, and to take that excess capacity and to make it something else seems to be on the cutting edge, methane, whether it is sugar cane in my case in the Glades with biomass. It is getting rid of a product we have no other places for.

So, when you do the analysis, not just counting dollars and tax credits, isn't it a way with the multitude of platforms we are approaching to reduce significantly our dependency?

Dr. GRUENSPECHT. Again, it is—we don't use that much oil for electric power generation. We do use natural gas, and natural gas, we would be increasingly reliant on imports over time.

I think you are correct in noting that there is a wide variety of resources and that different areas of the country have different resources. So, the top wind areas for generation right now would be California, Texas, Iowa, Minnesota. North Dakota, South Dakota have resources there. For biomass, you have the Midwest that has a lot of agricultural residue. The West and the Northeast and the Southeast have forestry resources that can be used for biomass. Landfill gas, which you mentioned, a lot of urban areas with landfills have significant landfill gas resources. Geothermal is located mostly in the West.

So, with the variety of renewable resources, you do have different parts of the country that have each one. I left out solar. Solar is obviously most attractive in the Southwest, where you have clear skies and good insulation.

So, I guess the variety of renewable resources are available throughout the country. It is hard to back out oil, because not

much oil is used. There is more opportunity to back out natural gas.

Mr. FOLEY. Why has solar energy failed, really, in consumer demand?

Dr. GRUENSPECHT. Well, our analysis shows that it is pretty expensive. The Production Tax Credit is simply not enough to bring solar in, whereas some of the other technologies that are closer to conventional technologies and costs can be stimulated by policies like the Production Tax Credit. So, I would say with solar, it has been mostly a cost issue, although there are attractive applications for solar in certain niches—remote power, the highway signs you see.

So, again, there is an opportunity for some niche power, but in terms of connecting to the electric grid, I think the costs right now are too high. Those costs might be brought down in the future, but for the foreseeable future, solar is much more expensive per kilowatt hour than the other resources we are talking about here.

Mr. FOLEY. Have you looked at the hydrogen fuel cell technology for houses?

Dr. GRUENSPECHT. I have not.

Mr. FOLEY. Have you all analyzed them for vehicles?

Dr. GRUENSPECHT. We do look at them for vehicles. We don't see a lot of market-driven penetration of those technologies. The penetration of those technologies in our outlooks is driven mostly by the mandates that exist in various parts of the country, for example, California, for those technologies. On a cost basis, those are not competitive.

Remember, hydrogen has to come from somewhere. Hydrogen is an energy carrier. It is not a fuel. It is not a primary fuel. Hydrogen is like electricity. So, taking account of the need to create the hydrogen and then to transport it, which has some challenges, and the cost of the fuel cell, we don't see the economics as being that attractive right now.

Mr. FOLEY. Thank you.

Chairman CAMP. Thank you very much.

The gentleman from California, Mr. Herger, is a Member of the full Committee and would like to make a brief statement.

Mr. HERGER. Thank you very much, Mr. Chairman. I thank you and our Ranking Member, Mr. McNulty, for allowing me to sit in on this Subcommittee and be able to make a statement.

I requested to attend today's hearing because renewable energy generation is such an important industry in my Northern California congressional district. In particular, my district contains more biomass power facilities than any other district in the United States Over the last two decades, biomass plants have made remarkable progress in how we handle our wastewood materials.

To that end, I would like to welcome a member of the next panel, Mr. Bill Carlson, a constituent of mine, an expert on open-loop biomass.

Much of the agricultural burning in the Sacramento and San Joaquin Valleys has been eliminated, with the materials sent for clean-up disposal in biomass plants. Perhaps most importantly, biomass plants are an integral part of proper forest management in our forested communities.

I personally have a long interest in opening up the section 45 wind and closed-loop biomass tax credit to open-loop biomass dating back to the introduction of H.R. 1731 in the 106th Congress. I was very pleased that we were able to incorporate many of these important changes in last year's jobs bill, but the job of creating equity for the various renewables within section 45 is not yet complete.

Again, Mr. Chairman, I thank you and I yield back the remainder of my time.

Chairman CAMP. Thank you very much.

Mr. McNulty?

Mr. MCNULTY. Thank you, Mr. Gruenspecht. You an expert on these issues and I am going to ask you a more generic question. Just about every member who has spoken so far has talked about the need to reduce our dependence on foreign oil. I just want to get your feeling about whether we as a government are doing enough in that regard, and I don't think you should feel constrained as a bureaucrat in answering that question, because as you should well know, the President has made a point of this in his last two State of the Union Addresses and has said we need to do a lot more in this area. He has particularly mentioned wind and some of the other renewables.

Certainly, we are not going to do anything visionary today. We are talking about renewing something that already exists. I think we have to go beyond that and talk about other things that we should be doing in order to promote the production of renewables.

So, I am not putting you on the spot as far as an Administration representative is concerned. The President is on the record in two State of the Union Addresses. I want to know if you think Congress is doing enough in responding to that call from the President to do more in this area, and if we are not, what else should we be doing?

Dr. GRUENSPECHT. I guess I would say that the challenge is weighing the goal of reducing reliance on conventional sources of energy against the costs of alternative sources of energy. For the most part, conventional sources of energy have some significant economic advantages. They also raise some significant concerns, the ones you mentioned. The real——

Mr. MCNULTY. Cost concerns.

Dr. GRUENSPECHT. Potentially, cost concerns, security concerns. But generally, they are still economically attractive relative to the alternatives. So, there may be a cost to be borne in moving away from conventional sources of energy and how much cost we are willing to bear to move how far is really a political choice.

Mr. MCNULTY. That is why we have experts like you here, to give us guidance on that. What do you think about that? Do you think we are doing enough?

Dr. GRUENSPECHT. Well, I think there are policies we could look at, both from the—on the demand side and on the supply side that would reduce our reliance on conventional energy——

Mr. MCNULTY. Could you expand on that a little bit more?

Dr. GRUENSPECHT. I think there are some efforts to promote greater efficiency, perhaps some efforts to increase the use of renewable resources, and again, not just in electricity generation, in other uses, as well. But again, there are some costs associated with

those and how much cost we are willing to bear is, I think, an important question.

Mr. MCNULTY. Doctor, I don't know if you could answer this now or give us the information later, but could you maybe describe to us in general terms, and then maybe you can give us some more specific information later on, about how the various renewables break down by State or geographic areas?

Dr. GRUENSPECHT. Sure. I would be glad to do a little bit, and I can add to it later. In terms of the available resource or in terms of how much is generated right now, because you can look at it both ways. In terms of right——

Mr. MCNULTY. I would like to get information on both.

Dr. GRUENSPECHT. Both? Okay. In terms of right now, I think the leading wind States would be California, Texas, Iowa, Minnesota—I am trying to look quickly down a list here—Washington, Wyoming, Kansas, Oregon.

For wood and wood waste, you find that in a lot of places that have pulp and paper industries, which use a lot of biomass. That would be Georgia, Maine, California, Alabama, Kentucky.

For municipal solid waste and landfill gas, which, again, under the present provisions are counted as eligible for at least reduced credit, Florida, New York, Pennsylvania, Massachusetts, Connecticut.

So, again, as I described in response to an earlier answer, different regions of the country tend to have different resources that qualify for this. Again, there are some States that don't have much right now from the wind, say South Dakota, North Dakota that have very good wind potential. But again, some of that potential is very far away from markets. So, there is a trade-off there.

But I think that is a pretty good description, and I could certainly provide you a lot more detail for the record.

Mr. MCNULTY. We would appreciate that. Thank you, Doctor.

Chairman CAMP. Thank you very much.

Mr. Thompson from California may inquire.

Mr. THOMPSON. Thank you very much, Mr. Chairman.

I would like to get you to talk a little bit about the PTC, the Production Tax Credit, and specifically how it relates to geothermal. I am told by the geothermal producers that a big part of their problem are the up-front costs that are associated with the development of geothermal energy, and that also that PTC gives them the ability to leverage funding in order to help meet these up-front costs.

I want to know why we can't or shouldn't restructure the PTC to provide some long-term benefits to geothermal. In your testimony, you talk about the inability to do that in the short run, and I know the Administration has left that out of their proposal. Why couldn't we and why shouldn't we design it so we could continue to rely on geothermal and help them get to where they need to be?

Dr. GRUENSPECHT. As I understand it, geothermal gets the full value of the credit, but only gets it for half the period of time. They get it for 5 years rather than 10 years. So, clearly, if they got more of a credit, it would be more advantageous to them.

I think, though, for geothermal, and we discussed, I think, in response to one of the earlier questions the question of how long the extension is and how that affects different technologies. In addition

to having a significant up-front cost, geothermal also takes a significant period of time to develop. So, the very short-term extensions that have become the norm in recent years may not provide a lot of opportunity for a technology like geothermal because you have got the extension, you add geothermal, you would think about starting your project, but you wouldn't be able to get your project into service in time. So, geothermal, biomass, those type of technologies, they are affected by the short extension and put at a disadvantage relative to something that can be developed more rapidly, like wind.

Mr. THOMPSON. So, how long would we have to extend it in order to allow geothermal to benefit—or not just geothermal, but the consumers? I think it is about 5 percent of the energy that is developed in California comes from geothermal, so it is more than just the industries. It is the consumers and the ratepayers. So, how long would it have to be extended in order to allow full benefit to accrue?

Dr. GRUENSPECHT. I need to go back and check on what we built into our framework for the standard time it takes to develop a geothermal project. But another thing to keep in mind is that we don't think that there is a whole lot of geothermal resource to be added, so a longer extension could bring some of that on. But unlike some of the other technologies that have what I will call flat supply curves, where you can maybe bring on a whole lot more, geothermal, you will be limited by the availability of the geothermal sites.

In terms of the specific length of time that it takes to develop a geothermal project, I would like to go back and answer that for the record.

Mr. THOMPSON. You can get us that information?

Dr. GRUENSPECHT. I think we can get you our generic assumption. No two plants are alike, but there is no question that the period of development for geothermal projects is longer than a year or a year and a half, and that is typically what the extensions have been.

Mr. THOMPSON. Thank you. Mr. Chairman, I yield back.

Chairman CAMP. Thank you.

The gentleman from Georgia, Mr. Linder, may inquire.

Mr. LINDER. Thank you, Mr. Chairman.

Dr. Gruenspecht, would any of these renewable sources of energy be available if we did not subsidize them?

Dr. GRUENSPECHT. If you did not subsidize, it is a tricky question. I mean, we could ask more narrowly, if you do not have the PTC. There is a history of a variety of provisions in this country, going back, I guess, to 1978, the Public Utility Regulatory Policies Act, that had a policy that encouraged the interconnection of renewables, and in some States, those renewables were paid and avoided cost that was calculated in a pretty generous way, and that encouraged those technologies. So, some renewable capacity was brought on in response to those incentives.

There are some Investment Tax Credits. There is also the PTC. I mean, to date, the PTC has really brought on wind in a big way. A significant fraction, you could say well over half of the wind gen-

eration that we have could arguably be said to have been brought on by the PTC.

Wind generation in 2003, I think was maybe between 11 and 12 billion kilowatt hours out of a total of 87 billion kilowatt hours of generation of these non-hydro renewables. So, you had landfill gas. You had municipal solid waste. You have the industrial use of biomass in the pulp and paper industry, and they generate a significant amount of electricity. So, those technologies, I think it was not the PTC that brought those into being, but some of those may have been brought into being by some of the other incentives that we have.

So, I am reluctant to say that absent all subsidies, you would be seeing all that renewable, non-hydro renewable generation in place. I imagine some of it would come in without any subsidy at all, but it is very hard to calculate that exact amount.

Mr. LINDER. The non-hydro renewables is about 2 percent of our generation.

Dr. GRUENSPECHT. About 2 percent of overall generation.

Mr. LINDER. How much do we spend on all varying kinds of credits per year to generate two percent of our energy?

Dr. GRUENSPECHT. I am not sure. I don't have those figures, but I can get them for you and get them for the record.

Mr. LINDER. Do we subsidize any tax credit or tax angle, anything to do with storage, to make it more efficient to store in battery systems, or to make it less costly on the power lines, where we lose about 20 percent of our electricity over lines? Are we doing anything on superconductivity?

Dr. GRUENSPECHT. I think the Department of Energy has significant research activities in the area of superconductivity. I know they are working with several labs, universities, all working on reducing line losses.

Just to give you some context, I think the difference between total generation and total consumption of electricity is about five or six percent, and that reflects line losses. Some of that is in transmission, the long-distance movement of high-voltage power. A lot of it is in distribution, the local movement of power. But there is no question that there is a significant line loss associated with moving power from the point of generation to the point of consumption and that superconductivity is one of the avenues that is being explored to deal with that.

In terms of storage, I think there may also be some research activities there, but I am not aware of any tax subsidies for storage.

Mr. LINDER. Thank you. Thank you, Mr. Chairman.

Chairman CAMP. Thank you.

The gentleman from Connecticut, Mr. Larson, may inquire.

Mr. LARSON. Thank you, Chairman Camp and Ranking Member McNulty, for convening this conference. Dr. Gruenspecht, thank you for your service to the country.

I just have a few questions here. First, could you clarify for me, what is the goal from—I know you collect data and statistics. What is the goal behind providing a tax credit? Is it primarily to create a cleaner environment or to provide a cheaper form of fuel?

Dr. GRUENSPECHT. Again, it is hard for me to go back into the minds of the folks, and I guess this was from the Energy Policy Act

1992, but I think there was some desire to encourage particular technologies and I think there is a belief that some of these technologies would get down the learning curve, if you will, as more units were deployed. The cost would be reduced.

I think there had been some—this is really getting before my time, but there had been some bad experience with some investment credits for certain technologies where you received the credit for making the investment and how well the unit actually ran once it was put in place was of less concern.

Mr. LARSON. But the public policy argument in order for government to become involved would either have to be a cheaper form of energy that would provide us or a more abundant source of energy that would wean us off of dependency on foreign sources, and a public policy objective of a cleaner environment by virtue of greenhouse gasses that are emitted.

Dr. GRUENSPECHT. I think those are all motivations.

Mr. LARSON. How much money do we spend in terms of tax incentives on an annual basis?

Dr. GRUENSPECHT. I would have to get that for you for the record.

Mr. LARSON. How much money do we spend in terms of R&D in that area?

Dr. GRUENSPECHT. I would need to get that for you for the record, as well.

Mr. LARSON. Would it surprise you that if we look at what we imported in oil alone last year, we spent more than $165 billion, and with the price now at about $50 on average, we are going to be over $200 billion in terms of oil? If you add to that the cost of the war in Iraq, that is upward to $400 billion in those areas alone.

My question, I wanted to piggyback along the lines of the questions that were posed earlier by Mr. Foley with regard to hydrogen fuel cells. I understand that that is not a renewable, but what I don't understand in terms of its meeting an objective policy goal, why that wouldn't be also subject to receiving a tax incentive.

Dr. GRUENSPECHT. Again, my sense is that the cost of hydrogen fuel cells is such that even if they were to be eligible for the PTC, it is my understanding that the PTC itself——

Mr. LARSON. Here we have the dog chasing its tail.

Dr. GRUENSPECHT. I hear you.

Mr. LARSON. So, we are going in this spiral where the cost of importing oil increases annually in a dramatic fashion, and yet we are diminishing ourselves in terms of the amount of money that we are willing to put into investment so that we can find a source, and we are targeting the most abundant source in the universe in hydrogen and we are not putting the money forward that is needed to bring these to fruition.

I mean, we could put a man on the moon in 10 years, but we can't figure out how to harness hydrogen? You have the Governor of California that has proposed an energy highway from British Columbia to Baja, California, and the Federal Government sits by here, the dog chasing its proverbial tail. Why is this so? With all the data and information that we have collected, the best thing that we can come up with is this incremental death by a thousand slashes, that we get nowhere and we are not putting nearly enough

money into any form of incentive that is going to make a major breakthrough. Where is our investment in our infrastructure in that case?

Dr. GRUENSPECHT. Well, again, I think the impact that the PTC would have for hydrogen would be very limited. It is also my understanding that the Federal Government effort in the hydrogen area is mostly through the R&D programs of the Department rather than through tax policy and tax incentives. So, the focus on hydrogen is on R&D. I believe the Administration is very committed to hydrogen R&D, particularly as it relates to vehicles. So, fuel cells obviously have stationary applications as well as vehicle applications, but there is tremendous amount of work underway.

Mr. LARSON. There is no sense of urgency and it is extraordinarily frustrating to a number of Members of Congress, and I assure you my constituents in the Northeast, as we look out and we see spiraling costs and a government that is chasing its tail in Washington, D.C.

Chairman CAMP. Thank you very much.

The gentleman from Indiana, Mr. Chocola, may inquire.

Mr. CHOCOLA. Thank you, Mr. Chairman. Dr. Gruenspecht, thanks for being here today.

Just following up a little bit on Mr. Linder's questions, I think you testified that about 2.2 percent of electric generation comes from renewable energy sources——

Dr. GRUENSPECHT. From the non-hydro renewable. The hydro is another seven percent or so, the large dams, but those are not eligible for the PTC.

Mr. CHOCOLA. But those sources eligible for the PTC is about 2.2——

Dr. GRUENSPECHT. About 2.2 percent now.

Mr. CHOCOLA. It has been in place since 1992–1993?

Dr. GRUENSPECHT. The PTC has been in place since—I think it was put in by the Energy Policy Act 1992, but it only applied to wind and closed-loop biomass. Over time, it has been expanded to many of these other sources.

Mr. CHOCOLA. Have you or the Administration done any analysis of what the potential is of energy sources that qualify for the PTC if it is made permanently extended? Do you have any idea how much——

Dr. GRUENSPECHT. We have done, as I mentioned in my testimony, we have done the long-term sensitivity analyses of suppose you extended the PTC for a long period of time. What would it do? It does have a large impact on the amount of wind that gets added and it also has an impact on the amount of biomass that gets added. So, the wind and biomass are the big gainers. But again, it still remains a relatively small fraction of overall power generation.

Mr. CHOCOLA. So, what percentage do you think it has the potential to get to?

Dr. GRUENSPECHT. Well, the potential is high. I mean, it is just how far the PTC would get it. Let me cite the highest one that I am familiar with. In looking at some policies to control greenhouse gas emissions—I think it was a bill proposed by Senators McCain and Lieberman—we had these renewables that qualify for

the PTC growing to over 16 percent of total electricity generation in 2025. In our base case, it grows from 2.2 percent to 3.2 percent. So, there are definitely scenarios of the world where you can get a much larger proportion of overall generation to come from these non-hydro renewables.

But it isn't just the PTC that does that. It is some other policies, as well. We also looked at a scenario with higher natural gas prices, and again, that increased the generation of these technologies significantly. So, it is really the size of the incentive that matters, it is the market environment that matters in terms of the price of natural gas, and it is the policy environment that matters. I guess it is all three of those together. But there certainly is some significant potential if those stars would all align in a certain way.

Mr. CHOCOLA. Obviously, at least in part, the purpose of this hearing is to determine the effectiveness of the PTC. Have you or the Administration kind of outlined any criteria on how Congress should judge the effectiveness of it?

Dr. GRUENSPECHT. We have not outlined those criteria. I think we have worked with some of the staff on the Joint Tax Committee who have asked us to look at certain things, do some analyses for them. But we have not independently outlined those criteria.

Mr. CHOCOLA. Would you have any suggestions today on what we should consider?

Dr. GRUENSPECHT. I think it is probably the standard issues that you look at for tax policy. You want to look at are there people who qualify for the credit who are getting paid for what they would do anyway? Is the program effective in its goals? I guess one has to decide what the goals are, and I think one of the other questioners listed a whole set of different goals, being emissions reduction, being technology cost reduction, being displacement of imported fuels. Depending, again, on what mix of goals you would have, we would be able to calculate impacts as to how those goals were affected.

Mr. CHOCOLA. Thank you. Thank you, Mr. Chairman. I yield back.

Chairman CAMP. Thank you very much.

Thank you, Dr. Gruenspecht, for your testimony. This will conclude the first panel and we will begin the second panel. I appreciate very much your being here today.

Dr. GRUENSPECHT. Thank you very much, Mr. Chairman.

Chairman CAMP. The second panel today will include Mr. Dean Gosselin, Mr. William Carlson, Mr. Curtis Ranger, Mr. Michael Norris, Mr. Vince Signorotti, and Mr. Christopher O'Brien.

Thank you all very much for being here. Before we begin, each of you will have 5 minutes. Your written statements, we have and will be part of the record. We would ask you to summarize your testimony in 5 minutes.

Before we begin, Mr. Foley from Florida would like to make an introduction.

Mr. FOLEY. Thank you, Mr. Chairman, and I would be delighted to introduce Dean Gosselin, who is the Vice President of Business Development for Florida-based FPL Energy, a subsidiary, along with Florida Power and Light, of the FPL Group.

FPL Energy is a significant player in the development and use of alternative energy. It is among the Nation's leading generators and producers of electricity from clean and renewable sources, such as natural gas, wind, solar, hydroelectric, and nuclear. In the wind energy generation in particular, FPL Energy produces more energy from wind than any other company in the United States. With 44 wind farms in 15 States—California, Iowa, Minnesota, Pennsylvania, Texas, Washington, Kansas, New Mexico, North and South Dakota, Oklahoma, Oregon, Wisconsin, West Virginia, and Wyoming—its wind power portfolio consists of more than 2,700 net megawatts, making FPL Energy accountable for nearly 40 percent of the total wind energy generated in the United States in 2004.

It is my pleasure to introduce Mr. Gosselin.

STATEMENT OF DEAN GOSSELIN, VICE PRESIDENT, BUSINESS DEVELOPMENT, FPL ENERGY, LLC, JUNO BEACH, FLORIDA

Mr. GOSSELIN. Thank you for the opportunity to address this House Ways and Means Subcommittee. My name is Dean Gosselin and I am Vice President of Business Development for Wind Power at FPL Energy. Thank you, Chairman Camp and Ranking Member McNulty, for the opportunity to speak with you today. Also, I would like to thank Mr. Foley, who has always been a supporter of the wind industry and under whom FPL is a constituent.

FPL Energy is the largest owner and operator of wind energy facilities in the world, with more than 3,000 megawatts of wind turbines in operation and under construction in 15 States. FPL Energy is a subsidiary of the FPL Group, which is also the parent of Florida Power and Light Company, an investor-owned electric utility that serves approximately 4.1 million customers in Florida.

FPL Energy is committed to clean energy sources and strongly believes that among all of the renewable energy technologies, wind energy is the most economically viable and has the greatest potential to add significant new clean electric power across a broad range of geographic regions in the United States.

We ask that the House of Representatives take swift action to extend the Production Tax Credit for a long term. Without an extension of the Production Tax Credit, only a very insignificant amount of utility-scale wind power will be developed.

For wind energy, the PTC currently provides an inflation-adjusted 1.9 cents per kilowatt hour tax credit for electricity produced by the wind for the first 10 years of a project's life. The PTC stimulates new wind development by helping to drive down costs to consumers, making wind energy an economical and viable source of clean, renewable energy.

The current cost of wind energy production varies between 5.5 cents per kilowatt hour and 9.5 cents, prior to factoring in the PTC. The significant range in price exists because the cost depends on a number of independent variables: Location, turbine costs, access to transmission, labor costs, construction costs, and wind resource. Moreover, and most importantly, the on and off nature of the PTC has prevented the industry from realizing the manufacturing efficiencies that we would have expected would otherwise allow production costs for wind energy to continue to fall.

Currently, inefficient peak production demands are being forced upon manufacturers during PTC extension periods, with subsequent cutbacks during PTC expiration periods. The entire supply chain is being whipsawed, adding significant costs due to inefficient planning, procurement, and supply deployment that would be eliminated if a long-term PTC extension was in effect.

The most significant factor contributing to the remarkable reduction in U.S. wind energy production costs over the last two decades has been the dramatic improvement in turbine efficiency. With the support of the PTC, we anticipate that research and development will continue to drive down wind energy costs. Future generations of wind turbines are just one part of the solution.

The industry also requires improved efficiencies in manufacturing. Approximately three-fourths of the capital costs of a wind project is represented in the cost of the turbine and the tower. Turbine and tower costs are substantially a function of the costs of their material, labor, and transportation component. The cost of steel is a major determinant of installed costs. If you would refer to Attachment 3 of my written comments, steel prices, you will see that steel prices have increased by more than 120 percent since early 2003.

Additionally, because Europe continues as a predominant source of turbine components, the decline in the value of the dollar relative to the Euro is also a significant factor in increased installed costs. Since January 2002, the U.S. dollar has lost more than 30 percent against the Euro, and in Attachment 4 of my written testimony, you will see a graph on that, as well.

The industry has predicted that the PTC would lead to increased manufacturing efficiencies as more of the European component supply shifts to manufacturing in the U.S. However, the on and off nature of the PTC has precluded any significant shift in the supply to the U.S. The last 4 years illustrate the problem that the wind industry faces as a result of this on and off nature of the credit. Again, Attachment 2 of my written testimony has a graph, as well.

In 2001, 1,696 megawatts of wind energy were installed. The credit expired at the end of 2001 and was not reinstated until late spring of 2002. Only 410 megawatts of wind energy were installed in 2002. In 2003, 1,687 megawatts of wind energy were installed. But in 2004, only 389 megawatts were installed after the credit lapsed at the end of 2003, not to be extended until much later in the year. We believe that this unpredictability leads to a 20 percent or greater inefficiency in energy production costs for the domestic wind energy market.

The industry has often been asked, what will it take for the industry to survive on its own without the benefit of the Production Tax Credit? We are often reminded that at one time, the industry responded, give us 5 years and we will make it. Unfortunately, in this instance, two plus one plus one plus one does not necessarily equal five predictable years. Instead, it represents not the sum total of years the credit has been in place, but rather periods of uncertainty, when new wind construction stopped, jobs were eliminated, and costs were driven up. Business thrives on the known and fails on the unknown. The unpredictable nature of the credit

has prevented the needed investment in U.S.-based facilities that will drive economies of scale and efficiencies.

Since its inception in 1992, the PTC has proven itself to be an excellent investment. It has done what it was designed to do, serving as a catalyst that has stimulated significant development in investment across the United States of the most viable renewable energy source, wind power. But the starts and stops associated with the short-term extensions have inhibited the success and have forestalled the long-term viability of the wind industry to stand alone without the PTC.

The wind industry cannot transition to PTC independence unless Congress enacts a long-term extension. United States energy companies, including FPL Energy, will then do their part and make the investments necessary to ensure the long-term growth of wind energy in our National energy mix. Thank you.

[The prepared statement of Mr. Gosselin follows:]

Statement of Dean Gosselin, Vice President, FPL Energy, Juno Beach, Florida

Introduction

FPL Energy, LLC is the largest developer and operator of wind energy facilities in the nation with more than 3,000 megawatts of wind turbines in operation or under construction in fifteen states: California, Iowa, Kansas, Minnesota, New Mexico, North Dakota, Oklahoma, Oregon, Pennsylvania, South Dakota, Texas, Washington, West Virginia, Wisconsin and Wyoming. FPL Energy is a subsidiary of the FPL Group Inc., which is also the parent of Florida Power & Light Company, an investor-owned electric utility that serves approximately 4.1 million customers in Florida.

FPL Energy is committed to clean energy sources and strongly believes that, among all of the renewable energy technologies, wind energy is the most economically viable and has the greatest potential to add significant new, clean electrical power across a broad range of geographic regions in the United States.[1]

Wind energy has long been both a bi-cameral and a bipartisan issue that has the broad support of both Republicans and Democrats in both the House and Senate. Further, the current Administration has included an extension of the PTC for wind in all of its budget proposals, and in its National Energy Policy.

Despite this overwhelming support—as it has a number of times in the recent past—the PTC is again set to expire at the end of this year. As such, it is imperative that the House of Representatives takes not only swift action to extend the PTC, but also to extend it for a long term. Without an extension of the PTC, only a very insignificant amount of utility scale wind power will be developed in the United States after 2005.[2]

Background on the Wind Energy PTC

The wind energy PTC, enacted as part of the Energy Policy Act of 1992, provides an inflation-adjusted 1.5 cents/kilowatt-hour (kWh) credit—now 1.9 cents—for electricity produced with wind equipment for the first ten years of a project's life. The credit is only available if the wind equipment is located in the United States and electricity is generated and sold to a third party. The credit applies to electricity produced by a qualified wind energy facility placed in service before January 1, 2006.

Why the PTC Is Imperative to the Continued Growth of the Wind Energy Industry

The Wind Energy PTC stimulates new wind development by helping drive down costs, making wind energy an economical and viable source of clean, renewable power

[1] See Attachment 1, "The Benefits of Wind Energy."

[2] See Attachment 2, "Annual Wind Energy Capacity Additions," which demonstrates the boom/bust cycle of installed capacity that results from the expiration of the PTC.

The cost competitiveness of wind generated electric energy has increased dramatically since the inception of the industry in the early 1980's. The wind turbine technology of the early 1980's was in its infancy and the cost of wind energy was extremely high. Since that time, driven by the PTC, the wind industry has succeeded in reducing its production costs by a remarkable amount. As a result, with PTC, the cost of wind energy is much more competitive with fossil fuel generating sources.

In 2001, FPL Energy testified before this Subcommittee. At the time, industry production costs had been reduced to approximately 4.5 cents/kWh prior to factoring in the PTC. With respect to the PTC and its effect on the industry, FPLE's testimony stated the following:

> *With the continued support of the PTC, the wind industry expects that its costs will continue to decline as wind turbine technology continues to improve and the industry is able to realize more efficient manufacturing economies of scale. Through further turbine development and manufacturing efficiencies, the wind energy industry anticipates that the cost of wind energy will continue to be reduced until wind can compete head-to-head with fossil fuels without the need for any incentives.*

This generally accepted assumption was not entirely correct. Technology has, indeed, improved. However, the production costs have actually increased since 2001 due to, hopefully, temporary increases in material costs and the devaluation of the U.S. Dollar relative to the Euro.

Consequently, the current cost of wind energy production is anywhere between 5.5 cents/kWh and 9.5 cents/kWh prior to factoring in the PTC. The significant range in price exists because the cost depends on a number of independent variables—location, wind capacity factors, turbine costs, access to transmission, labor costs, construction costs, etc. Moreover, and most importantly, the on and off nature of the PTC has prevented the industry from realizing the manufacturing efficiencies that we had expected would otherwise allow production costs to continue to fall.

Today, the most important factors in the wind industry are: (1) the improvements in technology, (2) rising installed costs, (3) the continued need for manufacturing efficiencies, and (4) the effect of the PTC on each of the above.

Research & Development

The most significant factor contributing to the remarkable reduction in U.S. wind energy production costs over the last two decades has been the dramatic improvement in turbine efficiency. Since the early 1980s, the industry has developed numerous generations of new and improved turbines, with each generation improving upon its predecessor. As a result, better blade designs, improved computer controls, and extended machine component lives have been achieved, which in turn have reduced the life-cycle costs of energy generated by wind turbines. Proven machine technology has evolved from the 50 kilowatt machines of twenty years ago to the 3 megawatt machines of today that have the capacity to satisfy the energy demands of as many as 1000 homes.[3] Moreover, new turbines in the range of 3 to 5 megawatts are currently under testing and development; they are expected to further improve the technology's efficiency and reduce wind power costs.

With the support of the PTC, the wind industry anticipates that research and development will continue and wind energy costs will decline. These future generations of wind turbines are just one piece of the puzzle. Improved technology alone will not sufficiently lower costs to allow the industry to directly compete with fossil fuel generated power—the industry also requires improved efficiencies in manufacturing.

Installed Costs

Installed costs include material (steel, copper, and fiberglass) costs, labor costs, currency exchange rates, and tax incentives. These costs have increased from below $1,000/kW to install in 1999 to $1,100/kW in 2003, and up to $1,500/kW and higher in 2005. The cost will most likely continue to increase over the next few years. One should note that the majority of the demand on revenue of a wind project is associated with servicing the capital required to build a project. By comparison, gas-fired generation facilities require less than one quarter of revenues to service capital.

Approximately three-fourths of the capital cost of a wind project is represented in the cost of the turbine and the tower. Turbine and tower costs are substantially a function of the costs of their material, labor, and transportation content. Thus, the

[3] One megawatt (MW) (or 1,000 kw) of current technology installed wind capacity serves approximately 300 to 350 homes.

cost of steel is a major determinant of installed costs. Steel prices have increased by more than 120% since March of 2003.[4] Fiberglass (another key turbine component) costs have also risen dramatically with the increase of petroleum.

Additionally, because Europe is still the predominant source of turbine components—even the principal domestic producers rely to a large extent on imported components—the decline in the value of the Dollar relative to the Euro is also a significant factor in increased installed costs. Since January 2002, the U.S. Dollar has lost 32.5 percent against the Euro.[5]

Another factor to explain the increased cost of production is the lapse of the bonus depreciation tax incentive. When in effect, bonus depreciation represented a value of approximately $3 per megawatt-hour (or 0.3 cents/kWh). Its lapse in January of 2004 (except for certain binding contracts) effectively increased installed costs facing developers today.

In comparison to the wind energy production of 5.5 cents/kWh and 9.5 cents/kWh, a modern gas fired combined cycle plant operating with a feedstock of $6.00/mmbtu natural gas at a 7500 mmbtu/MWh heat rate can produce a kilowatt-hour of electric energy for approximately 4.5 cents plus approximately 1.0 cent for capital cost recovery.

Manufacturing Efficiencies

As I stated earlier, the industry predicted that the PTC would lead to increased manufacturing efficiencies as more and more of the European companies committed to manufacturing in the U.S. However, the on again off again nature of the PTC has precluded any significant manufacturing efficiencies.

The last four years illustrate the problem that the wind energy industry faces as a result of the on again-off again nature of the credit. In 2001, 1,696 MW of wind energy were installed. The credit expired at the end of 2001 and was not reinstated until late spring of 2002. Accordingly, only 410 MW of wind energy were installed in 2002. In 2003, 1,687 MW of wind energy were installed, but in 2004, only 389 MW were installed after the credit lapsed at the end of 2003, not to be extended until much later in the year.

Under these circumstances, it is difficult to persuade businesses to invest in the U.S.-based production capacity, the R&D programs, and even the management capability that will lead to persistent gains in productivity and increased efficiency in wind power energy production. Emblematic of this is that, at present, only GE and Mitsubishi currently price wind turbines in U.S. Dollars. Other major suppliers (e.g., Vestas, Siemens, Gamesa, Nordex, Enercon, and Suzlon) still predominantly price based on the Euro, indicating their inability to commit to U.S. manufacturing of equipment. While unfortunate, this is understandable, given the unpredictability of the credit. The current strength in the Euro versus the U.S. Dollar only amplifies the problems faced by domestic developers.

We believe that this unpredictability leads to a 20% or greater inefficiency in energy production costs for the domestic wind energy market. These inefficiencies make the PTC an even more important revenue stream for wind developers: up to one third of a project's value comes from the PTC; another third from power sales, and a third from the five year MACRS depreciable period. Unless and until the domestic industry can attain a level of sustained predictability that can justify needed investments in U.S.-based manufacturing capacity, it will continue to be dependent on the PTC. It should be noted that the rates of return on wind projects, typically 9 to 12%, are very much in line with returns for conventional generating projects.

Transmission Complications

A final concern specific to wind energy developers are transmission costs. Windrich areas are typically far from load centers, often requiring transmission payments to multiple utilities ("pancakes rates"). The more congested the grid becomes, the more transmission costs increase. The cost can be anywhere from 0.3 to 0.5 cents/kWh for each system crossed, sometimes totaling more than 1.0 cent/kWh to deliver power over the whole distance when transmission capacity is available. Obviously, when transmission is limited, wind developers can also encounter situations where there is zero available transmission capacity.

Conclusion

The industry has often been asked, "What will it take for the industry to survive on its own without the benefit of the PTC?" We are often reminded that, at one time, the industry response was, "Give us five years, and we will make it."

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[4] See Attachment 3, a chart delineating steel prices.

[5] See Attachment 4, accompanying chart showing the Dollar against the Euro.

Unfortunately, in this instance 2 + 1 + 1 + 1 does not necessarily equal 5. Instead, it represents, not the sum total of years the credit has been in place, but rather the four periods of uncertainty when new wind construction all but stopped, jobs were terminated, and costs were exacerbated and subsequently remobilized. Business thrives on the known and fails on the unknown. The unpredictable nature of the credit has prevented the needed investment in the infrastructure that would facilitate economies of scale and efficiencies. In fact, the opposite effect occurs since businesses rush to complete projects and suppliers are forced to restart stopped manufacturing facilities and, thus, forced to recoup two years of costs in one year.

Further, and just as important, the unpredictable nature of the world plays a dramatic role in all industries, but particularly in the energy industry. An increase in fossil fuel prices does not necessarily make wind energy more competitive, rather the increase leads to commensurate increases in materials, such as steel, fiberglass, oil, labor, and transport. Because there has been no long-term extension of the PTC, most of the technology and parts are imported from Europe. Of course, the U.S. Dollar's slide against the Euro exacerbates this already difficult situation. And, without such an extension, this vicious cycle will not only not end, but may actually worsen.

Since its inception in 1992, the PTC has proven itself to be an excellent investment by the Congress. It has done what it was designed to do and has served as a catalyst that has stimulated significant development and investment across the United States of the most viable renewable source of energy: wind power. But, the stops and starts associated with the short-term extensions have somewhat abrogated the success and have forestalled the long-term independent viability of the wind industry. The wind industry cannot transition to PTC independence unless Congress enacts a long-term extension. U.S. energy companies, including FPL Energy, will then do their part and make the investments necessary to ensure the long-term role of wind energy in our national energy mix.

Benefits of Wind Energy

Wind Power is Green Power That Can Contribute to the Reduction of Greenhouse emissions

Wind-generated electricity is an environmentally friendly form of renewable energy that produces no greenhouse gas emissions or ground water pollution. In fact, a single 750KW wind turbine can displace, by replacing the combustion of fossil fuels, up to 1,500 tons of CO2 emissions per year.

Significant reductions of greenhouse gas emissions in the United States can only be achieved through the combined use of many new, energy-efficient technologies, including those used for the production of renewable energy. The extension of the PTC will assure the continued availability of wind power as a clean, renewable energy source.

Wind Power has Significant Economic Growth Potential

Wind energy has the potential to play a meaningful role in meeting the growing electricity demand in the United States. Wind power projects currently operating across the country generate approximately 7,000MW (0.5% of America's total generation) of electric power—enough energy to serve as many as 2.5 million homes. Wind will never—and probably should never—displace all other conventional generation sources, but it can—and should—be an essential component of a diverse generation portfolio, which will, of course, lessen our dependence on foreign oil and avoid harmful emissions. With an extension of the PTC and the appropriate commitment of resources to wind energy projects, the American Wind Energy Association estimates that wind energy could generate power to as many as 10 million homes by the end of the decade.

Wind Power Projects Can Serve as a Valuable Source of Supplemental Income for Farmers and ranchers and New Economic Growth Opportunities for Rural Areas

Some of America's most productive farming and ranching regions are also some of the most promising areas for wind development. Since wind projects and farming and ranching are fully compatible—wind plants can operate with little or no displacement of crops or livestock—lease payments made by wind developers can serve as a valuable source of stable, additional income for ranchers and farmers. In Iowa, for example, existing wind farms currently pay well over $1,000,000/year in rent.

Also, importantly, wind projects bring valuable new economic opportunities to areas, often rural, where wind projects are located, including increased local tax bases, new manufacturing opportunities and construction and ongoing operational and maintenance jobs. A 100 MW project, for example, requires an investment typi-

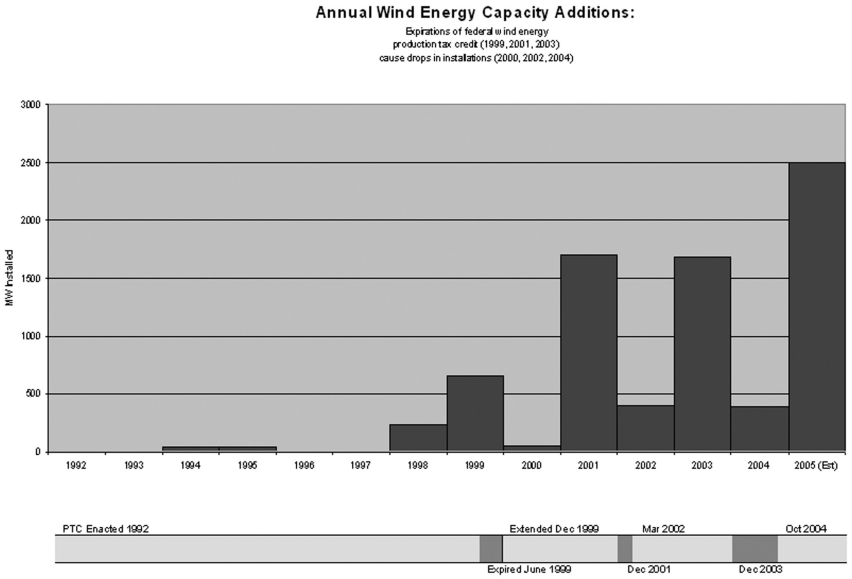
cally amounting to nearly $150 million. In addition to the millions of dollars in revenue to the local economy, wind projects generally create an average of 150 new construction jobs with a peak need of 350 workers. For ongoing long-term operations, wind projects provide 8 to 15 new full-time jobs and 4 to 7 new part-time jobs.

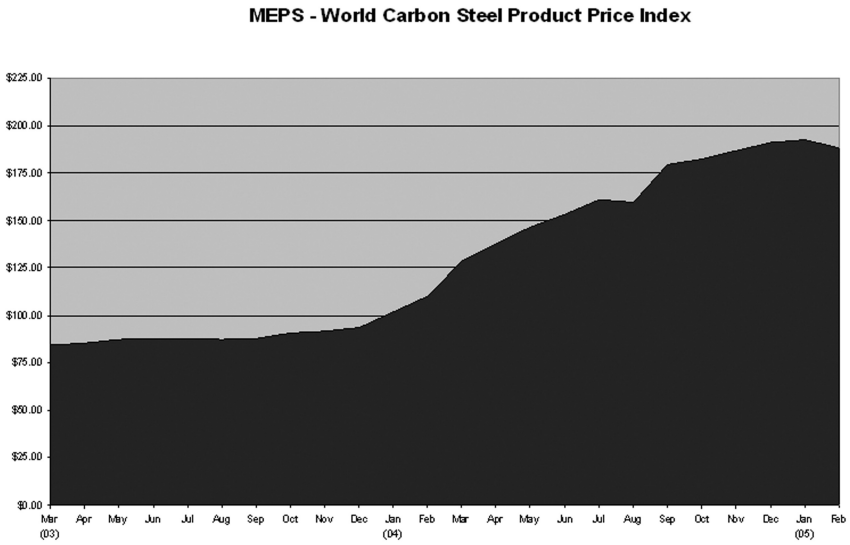
Continued Growth of Domestic Wind Industry Will Provide Economic Benefits to Other Sectors of the U.S. Economy

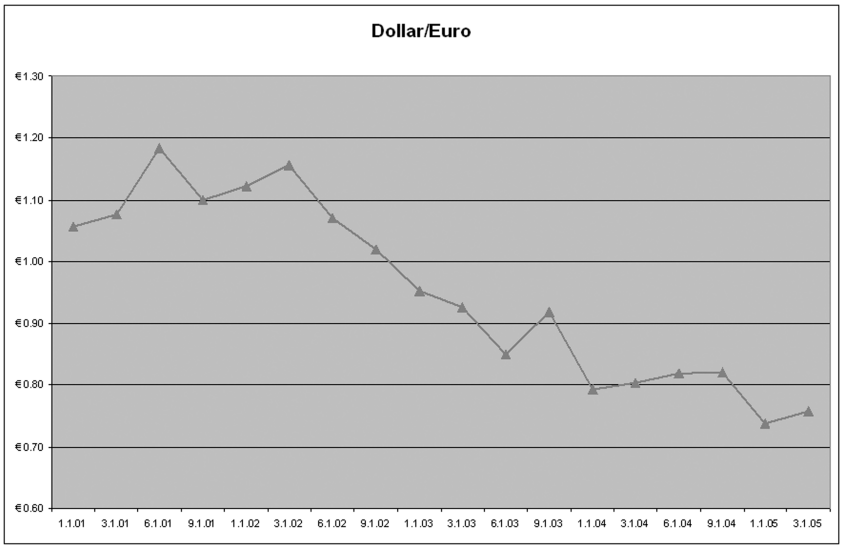
In addition to the benefits cited above which wind plants provide for farmers, ranchers and the rural communities where wind farms are sited, the U.S. wind industry provides many economic benefits to other sectors of the U.S. economy. For example, FPL Energy had its steel wind towers manufactured in Texas, Louisiana, and North Dakota; wind turbines assembled in Florida, Illinois and California; transformers manufactured in Wisconsin and Pennsylvania; and wind turbine components manufactured in Georgia, Washington, Iowa and Colorado.

International Growth Can Benefit the U.S.

The global wind energy market has been growing at a remarkable rate over the last several years and is the world's fastest growing energy technology. The growth of the market offers significant export opportunities for United States wind turbine and component manufacturers. The World Energy Council has estimated that new wind capacity worldwide will amount to $150 to $400 billion worth of new business over the next twenty years. The current worldwide market for wind turbines is approximately $5 billion per annum, and growing rapidly. Unfortunately, most of this manufacturing capacity, and its attendant job creation, is currently located in Europe. Experts estimate that as many as 157,000 new jobs could be created if United States wind energy equipment manufacturers are able to capture just 25% of the global wind equipment market over the next ten years. Only by the continued support of its domestic wind energy production through the long-term extension of the wind energy PTC can the United States hope to develop the technology and capability to effectively compete in this growing international market.







Chairman CAMP. Thank you very much, Mr. Gosselin. I do want to mention that all of your complete statements will be in the record, and if you could summarize. Next, Mr. William Carlson, who is a principal in Carlson Small Power Consultants.

STATEMENT OF WILLIAM CARLSON, PRINCIPAL, CARLSON SMALL POWER CONSULTANTS, REDDING, CALIFORNIA, ON BEHALF OF USA BIOMASS POWER PRODUCERS ALLIANCE

Mr. CARLSON. Thank you, Chairman Camp and Members of the Subcommittee We appreciate the opportunity to speak today and we thank you all for your leadership on this important topic.

The USA Biomass Power Producers Alliance, who I represent, represents 65 of the Nation's approximately 100 open-loop biomass power facilities. Each of the renewable technologies represented here today is valuable and we applaud Congress for expanding the section 45 credit in H.R. 4520 to incorporate a broad portfolio of renewable energy technologies. I advocate here that any extension of the tax credit be coupled with changes that mirror the rates and durations of the section 45 provisions included in last Congress's energy bill.

The section 45 tax credit expansion for open-loop biomass has sparked an interest in biomass not seen since the mid-1980s. Unfortunately, that interest is, as Mr. Greenspan would say, irrational exuberance. While the newly-enacted tax credit for open-loop biomass is very helpful to both new and existing plants, the current rate and duration of the credit will not fundamentally change biomass's prospects.

In a typical competition among renewables for utility contracts, biomass loses and will continue to lose as things stand. Most solicitations are dominated by technologies which receive higher tax credit rates and durations. New biomass plants can compete only if placed on equal footing with respect to the tax credit.

Unlike other renewable technologies, biomass has costs and benefits related to its fuel supply. We gather, process, and transport our wood fuel at a cost of nearly three cents per kilowatt hour. However, biomass provides the public with very significant environmental benefits not achieved by other types of renewables, with a value estimated by the DOE at over 11 cents per kilowatt hour. We eliminate 96 percent of pollutants versus open-fuel burning, avoid landfill disposal, and aid in forest restoration and fire prevention.

In other ways, we are typical of other renewables, with large capital and operating costs. Capital costs run up to $2,500 per kilowatt, or about 2.5 to three cents per kilowatt hour. Operating costs are 1.5 to 2.5 cents. Biomass has few economies of scale, since a large plant requires more fuel and thus a larger gathering area. It is a rare biomass plant producing power for less than seven cents, with most falling in the 7.5 to 8.5 cent range.

In the current wholesale power market, rising natural gas prices have pushed prices to 4.5 to five cents per kilowatt hour in many areas of the country. Renewables are typically able to do slightly better, getting perhaps five to 5.5 cents. In New England, States have imposed aggressive Renewable Portfolio Standards, or RPSs, creating a market for renewable credits that give a higher premium over wholesale prices of three to five cents. This is why in Maine and New Hampshire, entrepreneurs are contemplating restarting several closed biomass plants. Elsewhere, there is interest in biomass, but few concrete proposals for new plants.

There are only certain locales to sensibly site a plant, and then they must be spread so they don't compete for fuel. Also, virtually no plant can be up and running before the expiration of the placed-in-service date just 7 months from now.

Some have overcome these challenges by utilizing the small pool of relocated existing equipment, obtaining a captive fuel supply, or by winning a biomass-only utility contract offering that addresses a serious local need, such as forest restoration.

We forecast perhaps ten new biomass facilities over the next 5 years. Any greater expansion of the biomass industry must weight equity with other renewables in terms of the credit level, duration, and a placed-in-service date extension. These are fundamental requirements for biomass to successfully compete against other renewables for market share.

Existing plants, 30 percent of which are now closed, utilize the current credit to keep from closing. These plants typically have their energy priced at the utility's avoided cost, which is a non-renewable lower-cost source, such as coal or natural gas. They face the end of their contracts and shortly having to bid into RPS auctions, but at the lowest credit level and with most having a current credit discounted by yet another 50 percent due to tax rules for facilities with past tax-exempt financing.

We urge Congress to adopt a section 45 proposal like that offered by Chairman Thomas in last year's House version of H.R. 6. There, existing open-loop plants receive two-thirds of the full credit for 5 years, while new plants receive the full credit for the full ten-year duration. That proposal would create a vibrant biomass industry. Absent such a proposal and a placed-in-service date extension, the biomass industry will continue to struggle.

When I appeared before this Subcommittee 4 years ago, I operated five biomass plants. Two of those plants have closed, along with about eight others nationally.

Again, thank you for the opportunity, for your leadership, and for expanding section 45, and we urge you to support legislative changes to allow biomass to successfully compete alongside other renewable technologies.

Finally, we have been contacted by Congressional offices subsequent to the publication of the JCT pamphlet for this hearing, which adds a fuel source that is not described in the Code or in the conference report under the misapprehension that our group may be advocating a legislative correction to add this fuel, lignin, to the list of eligible fuel types. For the record, we are not aware of any open-loop biomass facility operators advocating such a change. Thank you.

[The prepared statement of Mr. Carlson follows:]

Statement of William Carlson, Chairman, Carlson Small Power Consultants, Redding, California

Chairman Camp, Ranking Member McNulty, and Members of the Subcommittee:

Thank you for the invitation to testify today, and thank you all for your leadership and interest in this important topic.

I appear today on behalf of the USA Biomass Power Producers Alliance (USABPPA), a trade organization that represents 65 of the nationwide total of approximately 100 open-loop biomass power facilities in the United States. (We do not represent facilities engaged in producing electricity from closed loop biomass or animal waste nutrients). We believe in the value of each of the renewable technologies

represented here today, and we applaud the Committee and the Congress for expanding the Section 45 credit in last year's American Jobs Creation Act to incorporate a broad and diversified portfolio of renewable energy industries. My purpose here is to advocate that any extension of the Section 45 tax credit be coupled with changes that mirror the rates and durations of the Section 45 provisions included in last Congress's energy bill.

Since its recent enactment, the Section 45 tax credit for electricity produced from open-loop biomass, combined with other renewable programs, has sparked a surge of interest in biomass not seen since the mid 1980's. Unfortunately, much of that interest might well be described, as Mr. Greenspan said of the stock market, as "irrational exuberance." While the newly enacted tax credit for electricity produced from open-loop biomass is very helpful to both new and existing plants, the rate of the credit, and the number of years that the credit is available to new facilities, will not fundamentally change the economics of biomass in the current energy markets.

In a typical competition among renewables for contracts under a utility renewable Request for Proposal (RFP), open-loop biomass loses, and can be expected to continue to lose as things stand. Most RFP's are dominated by Section 45 technologies which receive higher tax credit rates. In open competitions such as these, which are growing in popularity among utilities, the only chance that new biomass plants have to compete effectively is if Congress places them on an equal footing with respect to the Section 45 tax credit.

Please allow me to explain the economics of our industry. Unlike other renewable energy technologies, open-loop biomass has costs and benefits that relate to its fuel supply. We must pay to gather, then process and transport our wood fuel to the plant site at a substantial cost, typically totaling the equivalent of 2.5—3.0 cents/Kwh**.** Our fuel is especially expensive to transport to the plant because its energy density during transport is only about ⅓ that of coal. However, biomass provides the public with very significant environmental benefits that are not achieved by other types of renewable fuels. Combusting biomass fuel in a controlled setting eliminates 96 percent of pollutants versus open field burning, avoids landfill dumping, and aids in forest restoration and fire prevention.

In other ways, biomass is typical of other renewables, having a large capital cost component and an ongoing operation and maintenance cost. In our case, capital costs run $2,000–2,500 per installed kilowatt, which equates to about 2.5–3 cents/Kwh over a 20-year contract at today's interest rates. Operating costs will run upwards of 2.5 cents/Kwh for a small plant and as low as 1.5 cents/Kwh for a very large plant. This technology has few economies of scale, however, since building a large plant increases the amount of fuel required, quickly exhausting nearby fuel sources and requiring the operator to pay higher prices for fuel trucked from farther away. It is a rare biomass plant that can produce power for less than 7 cents/Kwh with purchased fuel, with most falling in the 7.5——8.5 cents/Kwh range.

We must now relate these costs to the current electric power market, both for bulk wholesale power, and for renewables. Rising natural gas prices have raised the value of bulk power to the point where, in many areas of the country, the wholesale price is now 4.5–5 cents/Kwh. Renewables are typically able to do better than this in the market, getting perhaps 5–5.5 cents/Kwh. In certain markets, particularly New England, the states have imposed aggressive Renewable Portfolio Standards (RPS), creating a market for Renewable Energy Credits (RECs) that give a premium over bulk power prices of 3–5 cents/Kwh. This is why, in Maine and New Hampshire in particular, entrepreneurs are contemplating restarting a few closed biomass plants. The current Section 45 credit is also a factor in these restart decisions.

Elsewhere in the country there is some interest in biomass, but very few concrete proposals to build new biomass plants. This is principally due to the fact that, unlike other technologies, there are only certain locales at which it makes sense to site an open-loop plant, and even there they must be spread out far enough that they don't compete with each other for the same fuel. Also, even in the relatively small number of situations where the circumstances would support building a new facility, almost no one will be able to get a facility up and running before the expiration of the tax credit's placed in service date at the end of this year. In a couple of instances, enterprising individuals have risen to these challenges by utilizing a small pool of existing equipment from closed plants that are being relocated, by obtaining a captive fuel supply for most of their needs, or by winning a "biomass only" utility contract offering designed to address a serious local need (forest restoration)—they are the exception, not the rule.

Currently the industry forecasts the possible addition of a total of approximately 10 new biomass facilities over the next five years. Any greater expansion of the biomass industry to address the nation's energy and environmental problems under a new PURPA contract or in a state mandated RPS auction will not occur unless bio-

mass achieves equity with other renewables in terms of the credit level and duration, and the Section 45 credit placed in service date is extended. These changes are fundamental requirements for biomass to have a chance to successfully compete against other renewables for a share of an RPS.

Existing plants, which have seen an erosion of their number by over 30 percent in the last 15 years, are utilizing the current credit to keep from closing. These plants typically have their energy priced at the utility's avoided cost, which is usually a non-renewable lower cost alternative source, such as a coal or natural gas unit. While under contract, they are prohibited from participating in developing REC markets, but instead receive an earned capacity payment. Many of them face the prospect of their contracts ending and shortly having to bid into RPS auctions, but at the lowest level Section 45 credit, with the loss of their current capacity payment, and with a majority of the industry having their current Section 45 credit discounted by yet another 50% due to tax rules applied to facilities with past tax-exempt financing.

USABPPA urges Congress to adopt a Section 45 proposal like that offered by Chairman Thomas in last year's House version of H.R. 6, the energy bill. In that legislation, the existing open-loop plants received two-thirds of the full credit for 5 years, while new plants received the full credit for the full 10-year duration. This level and duration of tax credit would create the conditions for a vibrant biomass power industry, tackling and solving many of the nation's energy and environmental problems. Absent adoption of such a proposal, and without an extension of the placed in service date, the open-loop biomass industry will continue to struggle.

When I last appeared before this subcommittee four years ago, I testified that I operated five biomass plants. Since that time, two of those plants have closed, along with approximately 8 others across the country. Again, I thank you for your leadership on this issue, I thank you for the recent expansion of Section 45 accomplished last year, and I urge you to support legislative changes that would allow open-loop biomass to successfully compete alongside other renewable technologies.

Chairman CAMP. Thank you very much, Mr. Carlson. Now, Mr. Curtis Ranger, who is President of DTE Biomass Energy from Michigan. You have 5 minutes.

STATEMENT OF CURTIS T. RANGER, PRESIDENT, DTE BIOMASS ENERGY, ANN ARBOR, MICHIGAN, ON BEHALF OF THE SOLID WASTE ASSOCIATION OF NORTH AMERICA

Mr. RANGER. Thank you, Mr. Chairman and Members of the Subcommittee. I am Curtis Ranger, President of DTE Biomass Energy of Ann Arbor, Michigan, and I appreciate your invitation to be here today on behalf of DTE. I am also representing the Solid Waste Association of North America, also known as SWANA. I have submitted a written statement on behalf of DTE and SWANA regarding the Federal tax credit support for electricity production from landfill gas and I would like to spend a few minutes elaborating on my written statement.

We support the Administration's fiscal year 2006 budget proposal which recommends a continued investment in the development of renewable energy resources. Federal tax credits, both section 29 and 45, have spurred investments in projects that produce electricity from landfill gas.

Congress has a history of supporting alternative energy resources. Through 1996, landfill gas was included as a fuel under section 29. These tax credits worked as Congress intended. According to the EPA, 380 landfill gas projects operate today. Most of these came to fruition under the section 29 tax credit. These projects generate over nine billion kilowatt hours of electricity per year and deliver over 73 billion cubic feet per year of landfill gas

to direction use applications. This is equivalent to nearly 40 million barrels of oil.

Many of these projects operate today without tax credit support. For example, DTE's first project in Riverview, Michigan, used innovative landfill gas combustion turbine technology in 1988. This project's tax credits expired in 2002, yet the facility continues to generate over 7,000 kilowatts of power daily. When the landfill closes in 2017, this facility will continue to supply the energy needs of nearly 5,000 Michigan homes well beyond 2030.

A medium-sized landfill typically generates about 1,500 cubic feet per minute of methane gas. When collected and converted to electricity, that gas could supply 4,000 kilowatts of power and meet the electrical needs of over 3,000 American homes. Landfill gas projects use reciprocating engine generators or combustion turbines. Micro-turbine technologies are being used at smaller landfills in niche applications. Other technologies, like Sterling and Organic Rankine Cycle engines, and fuel cells are still in the development stage.

A typically landfill gas-fired electric generating facility costs about $1,200 per kilowatt and has operating expenses of 1.8 cents per kilowatt hour. As described in the Joint Tax Committee's report prepared for today's hearing, electricity rates vary by region. Assuming electricity can be sold for 3.7 cents per kilowatt hour, an investor in such a facility might expect a 6.5 percent return on investment. With the current section 45 tax credit of 0.9 cents per kilowatt hour, that same facility might earn 10 percent. While interesting, that return is unlikely to spur many projects.

On the other hand, if the rates were what the other renewables receive, for example, 1.8 cents per kilowatt hour, or if a ten-year credit period were provided, investors might expect returns between 12 and 15 percent. That would likely attract investments in new facilities with the fuel risk inherent to our landfill gas industry.

Under the JOBS Act of 2004, Congress took another helpful step by recognizing landfill gas as a renewable energy resource. While we appreciate the continued tax credit support, the tight December 31, 2005 deadline will restrict many opportunities. Previously, Congress recognized the long gestation period required for landfill gas projects. For example, under section 29 projects, our industry had up to 18 months to execute contracts and another 18 months to construct facilities. Currently, only well-advanced projects will meet the deadline. If Congress extends the deadline, more projects will come online.

If landfill gas were afforded the same provisions as other renewable energy resources, such as a 5-year placed-in-service deadline and a ten-year tax credit period, Congress could help in the development of more projects.

I want to thank the Chairman for his past support and I appreciate your Committee's time in working with Treasury to ensure there was an understanding of the application of the anti-double-dip rule between section 29 and section 45 tax credits for landfill gas projects. Clarity on this matter will support investments and avoid issues during future audits with the IRS.

In the case of emerging technologies, like landfill gas-fired microturbines, this tax credit support can be just the encouragement an investor needs. This tax incentive is not a windfall to landfill gas developers, but it would encourage us to make sizeable investments in certain areas of the country.

Mr. Chairman, I appreciate this opportunity to present the views of DTE and SWANA. An extension of the deadline to construct new facilities is critical to ensure that Americans realize the energy and the environmental benefits available from landfill gas. Thank you.

[The prepared statement of Mr. Ranger follows:]

Statement of Curtis T. Ranger, President, DTE Biomass Energy, Inc. and the Solid Waste Association of North America, Ann Arbor, Michigan

Mr. Chairman, and members of the subcommittee, I am Curtis Ranger, President of DTE Biomass Energy, Inc. ("DTE") of Ann Arbor, Michigan. I appreciate your invitation to testify on behalf of DTE and the Solid Waste Association of North America ("SWANA") regarding federal tax credit support of electricity production from landfill gas. I have been responsible for DTE's landfill gas-to-energy business for over two decades, and I have served as Chairman of SWANA's Advocacy Committee since 1999. SWANA is a national association of over 7,300 solid waste management professionals, companies and government agencies dedicated to advancing environmentally acceptable and economically sound municipal solid waste management practices. DTE is a member of SWANA and is a leading company in developing landfill gas-to-energy projects with 31 facilities in 14 states.

We support the Administrations' Fiscal Year 2006 budget proposal, which recommended a continued investment in the development of renewable energy resources as a means of bolstering our nation's energy security. Federal tax credits, both Section 29 and Section 45, have spurred investments in projects that produce electricity from landfill gas, which is collected from decomposing organic waste in our nation's municipal landfills. We commend you for holding this hearing on renewable energy policy to help educate Congress about how renewable energy resources can support our nation's energy self-sufficiency goals and help achieve its important environmental goals.

Congress has a long history of supporting the development of alternative energy resources. This support dates back to the non-conventional fuel tax credits originally enacted in 1980. Through 1996, Congress saw fit to include landfill gas as a fuel under the Internal Revenue Service ("IRS") Section 29 Code and enacted several extensions for constructing landfill gas-to-energy projects. I am very pleased and proud to report to you that these tax credits have worked as Congress intended. According to the Landfill Methane Outreach Program ("LMOP") of the Environmental Protection Agency ("EPA") 380 landfill gas-to-energy projects operate today in an industry that was non-existent in the late 1970's. Most of these projects came to fruition primarily due to the Section 29 tax credits.

Today, these projects generate over 9 billion kilowatt-hours of electricity per year and deliver over 200 million cubic feet per day of landfill gas to direct-use applications. This amount of energy is equivalent to nearly 40 million barrels of foreign oil.

Even more encouraging is the news that many of these projects, which were developed with tax credit support, still operate today without tax credit support. For example, the first Michigan project to use landfill gas-fired combustion turbine technology was installed by DTE in 1988 at the City of Riverview landfill. While the Riverview Project's Section 29 tax credits expired in 2002, this facility continues to generate over 7,000 kilowatts of power daily, operating at a nearly 90% production capacity. When the landfill closes around 2017, this site will continue to supply the energy needs of nearly 5,000 Michigan homes and businesses well beyond the year 2030.

It all started largely because of the availability of landfill gas tax credits, which encouraged the project investors to take a chance on relatively unproven technology and uncertain fuel supplies. Similar stories have played out at many other landfill gas-to-energy projects in America.

For example, a medium sized landfill typically generates over 1,200 cubic feet per minute of methane gas. When collected and converted to electricity, that landfill gas could annually provide 3,000 kilowatts of power, supplying the electrical needs of nearly 3,000 American homes. This electricity can be generated for on-site use or sold into the electrical grid through a variety of technologies, such as reciprocating

engine generators, combustion turbines, micro-turbines, Stirling engines (external combustion engine), Organic Rankine Cycle engines, and fuel cells. Most landfill gas fired electric projects use reciprocating engine generators or combustion turbines, but micro-turbine technologies are being used at smaller landfills and in niche applications. Other technologies, like the Sterling and Organic Rankine Cycle engines and fuel cells are still in the development phase.

A typical landfill gas-fired electric generating facility costs about $1,000,000 per megawatt to install with typical operations and maintenance (O&M) expenses averaging 1.8 cents per kilowatt-hour. As was described in the Joint Tax Committees report prepared for today's hearing, electricity rates vary by region. As a result, the existing landfill gas credit encourages an attractive rate of return in some parts of the country.

Given that all landfills generate methane, it makes environmental sense to capture and use the gas to generate electricity rather than waste it into the atmosphere. According to EPA estimates, each ton of methane captured and used in a landfill gas-to-energy project is equivalent to capturing 21 tons of carbon dioxide. That means the 380 existing landfill gas projects are reducing the nation's greenhouse gas emissions by the equivalent of about 60.7 million metric tons of carbon dioxideper year. The EPA equates the greenhouse gas reduction benefits of a typical 4 megawatt landfill gas project to the planting of over 60,000 acres of forest per year, or the removal of the annual carbon dioxide emissions from over 45,000 cars.

Under the American Jobs Creation Act of 2004, Congress took another helpful step by recognizing landfill gas as a renewable energy resource, eligible for IRS Section 45 tax credits. While we appreciate the continued support, this effort to spur more landfill gas-to-electricity projects will fall short of its mark. The tight December 31, 2005 deadline provided in the JOBS Act restricted many opportunities for negotiating and executing contracts, designing and permitting facilities and procuring and installing equipment. In the past, Congress recognized the long gestation period required of landfill gas-to-energy projects. For example, under Section 29 projects, our industry was afforded up to 18 months to execute the necessary contracts and then another 18 months to construct the facilities. Congress understood that the construction season in many parts of the country is limited to a few months each year. This factor alone has inhibited many new projects from moving forward under the existing timetable established for the Section 45 tax credits.

Currently, only well advanced projects will meet the deadline for Section 45 tax credits provided in the JOBS Act. If the rest of the industry behaves like DTE, I suspect that less than 20 new, Section 45 tax credit eligible projects will be on-line by year-end. Simply put, many taxpayers are effectively precluded from pursuing landfill gas developments because they are unwilling to legally bind themselves to spending considerable resources on building new renewable energy projects with only a wing and a prayer's chance of realizing tax credit benefits.

If Congress enacts an extension of the current December 31, 2005 placed in service deadline many more projects could come on-line. Based upon the EPA estimates that over 500 landfill gas-to-energy projects can still be developed, and based upon DTE's experience, extension of the construction deadline by three years would enable the landfill gas industry to build up to 150 more projects. Furthermore, if the landfill gas industry was afforded the same provisions as other renewable energy resources, such as, a 5 year placed in service deadline and a 10-year tax credit period, Congress could enable the development of most of the EPA's 500 viable candidate sites.

An extension of the construction period is extremely fair to all renewable energy project developers. The resulting new projects will not disrupt the retail electricity market due to their small, but still meaningful market shares. Congress would continue to demonstrate its support of sound public policy by encouraging the development of America's energy resources that deliver significant environment benefits. Good public policy should dictate that all renewable energy projects should be treated equitably, including the rate of return on investment.

Furthermore, I want to thank the Chairman for his past support of including landfill gas-to-electricity projects as qualifying facilities under Section 45. I also want to express my appreciation for your committee's time in working with Treasury to ensure there was an understanding of the application of the anti-double dip rule between Section 29 and Section 45 tax credits for landfill gas-to-energy projects. Clarity on this matter will support investments and avoid issues during future audits with the IRS.

DTE stands ready, willing and able to invest its fair share in new landfill gas-to-electricity projects. While I realize that Congress must balance the cost of its tax incentives, the value of the Section 45 tax credit represents only 30% of the total project capital costs. In the case of emerging technologies like landfill gas-fired

micro-turbines, this tax credit support can be just the encouragement an investor needs. While this tax incentive is not a windfall to landfill gas project developers, it does encourage us to make sizeable investments in certain areas of the country. The potential 150 new projects represent over $450 million in new capital that would create construction and operating jobs throughout the United States. The relatively small federal tax share would be more than offset by the new taxes generated from these projects and by the environmental benefits America would realize in using its own internal resources.

Mr. Chairman, I do appreciate this opportunity to present the views of DTE and SWANA regarding the need for federal tax credits to support renewable energy production from landfill gas. An extension of the placed in service deadline for constructing new facilities under the Section 45 tax credit is critical to ensuring that America can realize the benefits available through landfill gas-to-electricity projects. If Congress confirms its support of landfill gas as a renewable energy, many landfill gas development companies will deliver on a promise to build environmentally beneficial projects that will help improve America's reliance upon domestic energy resources.

Chairman CAMP. Thank you very much, Mr. Ranger. Now, Mr. Michael Norris, who is Director of Business Development for American Ref-Fuel Company.

STATEMENT OF MICHAEL NORRIS, DIRECTOR OF BUSINESS DEVELOPMENT, AMERICAN REF-FUEL COMPANY, MONTVALE, NEW JERSEY, ON BEHALF OF THE INTEGRATED WASTE SERVICES ASSOCIATION

Mr. NORRIS. Thank you, Mr. Chairman and Members of the Subcommittee. My name is Michael Norris and I serve as Business Development Manager for American Ref-Fuel. I am testifying today on behalf of the Integrated Waste Services Association, the national trade association for America's waste energy industry.

The IWSA was pleased to have our trash combustion facilities included as a qualified facility for purposes of receiving the section 45 Production Tax Credit last year. Inclusion of waste-to-energy continues more than 20 years of recognition as a source of renewable energy under Federal law. The Federal Power Act, the Public Utility Regulatory Policies Act, the Federal Energy Regulatory Commission regulations, and the Biomass Research and Development Act of 2000 all recognize waste-to-energy power as renewable energy, as do 15 States, the U.S. Department of Energy, and the U.S. EPA.

A tax credit for new waste-to-energy facilities or new generating units at existing facilities continues the Federal Government's policy to encourage clean, renewable electricity and promotes energy diversity while helping cities meet challenges of trash disposal.

Waste-to-energy facilities generate clean, renewable energy through the combustion of municipal solid waste in specially-designed power plants equipped with the most modern pollution control equipment in the power generation industry. Trash volume is reduced by 90 percent, therefore conserving landfill capacity. The remaining residue consistently meets strict EPA standards for reuse. America's 89 waste-to-energy plants operate in 27 States and generate 2,700 megawatts of electricity while safely disposing of 95,000 tons a day of trash.

Our industry meets the power needs of nearly 2.3 million homes and serves the trash disposal needs of more than 36 million people.

The 30 million tons of trash combusted in our facilities each year has an energy value of 48 million barrels of crude oil worth more than $2 billion.

America's waste-to-energy facilities meet some of the most stringent environmental standards in the world and employ the most advanced emissions control equipment available. In February of 2003, EPA wrote that America's waste-to-energy plants produce electricity with less environmental impact than almost any other source of electricity. In addition, a study published by multiple authors, including an official from the EPA, determined that waste-to-energy technology annually avoids 33 million metric tons of carbon dioxide, a greenhouse gas that would otherwise be released into the atmosphere.

I would like to provide you with a brief description of the economics of a typical waste-to-energy facility. The facility's revenues come from two sources, fees paid by disposal of trash and fees paid by the facility generating energy. New facilities or new units at existing facilities require significant capital investment. A new unit is a new boiler unit built at an existing facility, which is oftentimes more economical and politically feasible than constructing a new facility.

Take an example of an existing waste-to-energy plant that has two boilers. A facility might burn 1,500 tons a day of municipal solid waste and generate 40 megawatts of electricity. If a company adds a third boiler, a facility would be capable of disposing of 2,250 tons a day of waste and 60 megawatts of energy. Construction of that 750-ton-a-day unit would cost about $120 million price tag, or about $6,000 a kilowatt. A greenfield plant of the same size could cost as much as $350 million.

The combined electricity and disposal fee revenues will, on average, not be sufficient to cover the total cost of new waste-to-energy units. Added to these costs, of course, is an adequate return on investment that is required to justify the investment. In part, due to economic considerations, no new waste-to-energy facilities have been constructed in the past decade. An adequate Production Tax Credit will, in many cases, make up the shortfall and make projects feasible. We view the PTC as a much-needed tool that will make development of this form of clean, renewable electricity more economically viable.

We urge Congress to extend the section 45 PTC, as it is set to expire at the end of the year. We would recommend changes to the tax credit that would greatly enhance our ability to develop new waste-to-energy capacity. The IWSA urges the Committee to make the tax credit applicable to energy generating new units built at existing facilities as well as newly-sited facilities.

The IWSA also urges the Committee to extend the existing section 45 Production Tax Credit to apply to new facilities and units placed into service within 3 years of enactment and to make the credit available for 7 years after the facility has been placed into service. In addition, we recommend the Committee provide a credit amount that provides a level playingfield for all renewable technologies with respect to the rate of return on investment.

We fully support the goals of Congress to provide the incentives for the development of renewables in order to diversify the Nation's

energy supply. We also provide that the PTC is one of the most effective tools to achieve this goal.

I want to thank you for the opportunity to appear today.

[The prepared statement of Mr. Norris follows:]

Statement of Michael Norris, Director of Business Development, American Ref-Fuel Company, Montvale, New Jersey, on behalf of Integrated Waste Services Association

Good afternoon, Mr. Chairman and members of the subcommittee. I would like to thank you for providing me with the opportunity to testify today. My name is Michael Norris, and I serve as Director of Business Development for American Ref-Fuel Company. I am testifying today on behalf of the Integrated Waste Services Association (IWSA), the national trade association representing America's waste-to-energy industry. IWSA and its members commend you for conducting this very important hearing on Section 45 renewable energy production tax credits, so that we may describe to you the importance of this tax credit for both the public and private sector members of the waste-to-energy industry.

The IWSA was pleased to have our "trash combustion facilities" included as a qualified facility for purposes of receiving the Section 45 production tax credit last year. Inclusion of waste-to-energy continues more than twenty years of recognition as a source of renewable energy under federal law. The Federal Power Act, the Public Utility Regulatory Policies Act, the Federal Energy Regulatory Commission's regulations, and the Biomass Research and Development Act of 2000 all recognize waste-to-energy power as renewable energy, as do fifteen states, the U.S. Department of Energy, and U.S. Environmental Protection Agency (EPA).

A tax credit for new waste-to-energy facilities or new generating units at existing facilities continues the federal government's policy to encourage clean, renewable electricity, and promotes energy diversity while helping cities meet the challenge of trash disposal.

Waste-to-energy facilities generate clean, renewable energy through the combustion of municipal solid waste in specially designed power plants equipped with the most modern pollution control equipment in the power generation industry. Trash volume is reduced by 90%, thereby conserving landfill capacity. The remaining residue consistently meets strict EPA standards for reuse. America's 89 waste-to-energy plants operate in 27 states and generate about 2,700 megawatts of electricity while safely disposing of 95,000 tons of trash each day. Our industry meets the power needs of nearly 2.3 million homes, and serves the trash disposal needs of more than 36 million people. The 30 million tons of trash combusted in our facilities each year has the energy value of 48 million barrels of crude oil worth more than $2 billion. The $10 billion waste-to-energy industry employs more than 6,000 American workers with annual wages in excess of $400 million.

America's waste-to-energy facilities meet some of the most stringent environmental standards in the world and employ the most advanced emissions control equipment available. In a February, 2003 letter, EPA wrote that America's waste-to-energy plants produce electricity "with less environmental impact than almost any other source of electricity". In addition, a study published by multiple authors, including an official from EPA, determined that waste-to-energy technology annually avoids 33 million metric tons of carbon dioxide—a greenhouse gas that would otherwise be released into the atmosphere.

I would like to provide a brief description of the economics of a typical waste-to-energy facility. A facility's revenues come from two sources: 1) fees paid to dispose of the trash, and 2) fees paid to the facility for generating energy. New facilities or new generating units (boilers) built at existing facilities require significant capital investment. A new "unit" is a new boiler built at an existing facility, which is often times more economical and politically feasible than constructing a new facility. Take for example an existing waste-to-energy plant that has two boilers. Such a facility might burn 1,500 tons of municipal solid waste per day and generate 40 megawatts of electricity. If a company added a third boiler, that facility would be capable of disposing of 2,250 tons of waste per day and generate over 60 megawatts of energy. Construction of a 750 ton per day unit at an existing facility might carry a $120 million price tag in capital.

In the case of the construction of a typical new "greenfield" facility, the capital cost of, a facility that converts 2,250 tons of trash each day into 60 MW of electricity is approximately $350 million. The operations and maintenance cost without capital recovery approaches $28 million annually.

The combined electricity and disposal fee revenues will, on average, not be sufficient to cover the total cost of a new waste-to-energy unit. Added to these costs, of course, is an adequate return on investment that is required to justify the investment. In part due to these economic considerations, no new waste-to-energy facilities have been constructed in the past decade. An adequate production tax credit (PTC) will, in many cases, make up for the shortfall and make projects feasible. We view the PTC as a much-needed tool that will make development of this form of clean, renewable electricity more economically viable.

We urge Congress to extend the Section 45 PTC, which is set to expire at the end of the year. We would also recommend changes to the tax credit that would greatly enhance our ability to develop new waste-to-energy capacity. IWSA urges the Committee to make the tax credit applicable to electricity generated at new units built at either existing waste-to-energy facilities or newly sited facilities. Given the complexity of siting and permitting new facilities, it is likely that most new capacity in the industry will be added through the construction of new units at existing facilities.

The IWSA also urges the Committee to extend the existing Section 45 production tax credit to apply to new facilities or units that are placed in service within three years of enactment and to make the credit available for seven years after the facility is placed in service. In addition, we recommend that the Committee provide a credit amount that provides a level playing field for all renewable technologies with respect to the rate of return on investment.

We fully support the goal of Congress to provide incentives for the development of renewable energy in order to diversify the nation's energy supply. We also believe that the PTC is one of the most effective tools to achieve this goal. The availability of the tax credit plays a critical role in determining whether or not new waste-to-energy capacity will be brought online and we urge you to construct the credit in a manner that maximizes its success of promoting new renewable capacity.

Thank you for the opportunity to appear before you today, and I will be happy to answer any questions.

Chairman CAMP. Thank you very much, Mr. Norris. Now, we will have Mr. Vince Signorotti, which is Vice President for CalEnergy Operating Corporation.

STATEMENT OF VINCE SIGNOROTTI, VICE PRESIDENT, REAL ESTATE ASSETS AND COMMUNITY RELATIONS, CALENERGY OPERATING CORPORATION, BRAWLEY, CALIFORNIA

Mr. SIGNOROTTI. Thank you, Mr. Chairman and Members of the Committee. My name is Vince Signorotti. I am a Vice President for CalEnergy. With me today is Jonathan Weisgall with MidAmerican Energy Holdings, our parent company.

CalEnergy generates 340 megawatts of clean, reliable, renewable geothermal electricity from ten plants near the Salton Sea in southern California, and the experts believe there is another 2,000 megawatts of geothermal energy still in the ground at this location.

Two weeks ago, the State granted us a license for a new 215-megawatt geothermal plant called Salton Sea 6. However, despite this approval and despite a 30-year fixed-price contract that we had signed for 95 percent of the output, these 2,000 megawatts will remain untapped in this reservoir if the geothermal Production Tax Credit is not extended in a viable manner.

As a developer, I am alarmed by what I am seeing in the marketplace, especially the volatile and rising price for natural gas. Increasing the production of electricity from renewable resources is a sensible alternative to this concern.

Production wells at our facilities extra super-heated fluids from deep underground reservoirs which is flashed into steam and used to create electricity. The fluid is then injected back into the res-

ervoir, completing the closed-system process. Geothermal plants produce what is called baseload power, consistent energy production, 24 hours a day, 7 days a week. Geothermal energy is an important indigenous renewable resource.

However, the industry faces serious challenges, primarily the high up-front capital cost of building a plant. For example, our costs are more than four time per megawatt higher than comparable natural gas-fired power plants.

The output from Salton Sea 6 will make it the largest renewable energy project of any kind in the United States. It took us 5 years and over $8 million in development costs to reach this point and it will take an additional 28 months to build, a total of more than 7 years from start to finish. Construction costs will exceed $700 million, which would represent the single largest capital investment in Imperial County, the most economically disadvantaged area in California and one of the poorest in the country.

The bottom line is this. We have a permit to build the plant, so we could break ground tomorrow. We have a customer, and we are prepared to move forward with financing and construction. But the project is not yet commercially viable. Put simply, obtaining a Production Tax Credit for this facility is the difference between an economically viable project and wishful thinking.

The first issue we ask you to address is the eligibility period. For geothermal projects, the placed-in-service date should be extended for an appropriate term to make a PTC viable. Given the construction time of most geothermal plants, a one- or two-year eligibility period extension will do nothing to make our plant a reality and probably won't help other geothermal developers. Three years is the minimum needed to benefit most geothermal developers, who must deal with the lead time challenges of planning, permitting, and construction.

I, therefore, propose that you either extend the section 45 placed-in-service date for at least 3 years or provide transition rules enabling new geothermal projects with binding contracts in place to qualify for a Production Tax Credit.

The second issue is the duration of the PTC. We believe geothermals should receive the same ten-year term that is provided for wind. These improvements will result in better long-term planning and significant additional geothermal development.

If Congress extends the PTC for geothermal energy in this manner, we will build Salton Sea Unit 6. It is that simple. It will greatly increase the odds of seeing Salton Sea Units 7, 8, and 9, because non-polluting baseload geothermal power is an attractive substitute for fossil fuel plants.

Providing the geothermal industry with a PTC does not get us off the tax hook by any means. Geothermal plants pay more than three times more taxes than gas-fired plants pay on a per megawatt hour basis. This is largely the result of geothermal's high capital and related infrastructure costs and the fact that a much higher percentage of our costs go to labor than a comparably-sized gas plant. In fact, over the next 30 years, even with the benefits of a PTC, Salton Sea 6 will still pay more than $300 million in Federal, State, and local taxes.

If, as policy makers, you want to encourage more renewable energy development, you can impose a mandate, like a Renewable Portfolio Standard, or offer an incentive, like a PTC. As a businessman, I like incentives and the PTC fits that bill perfectly. First, it is output-based, so you get your reward only after making your investment and operating your plant. Second, you can take it to the bank. Third, a low-cost producer gets the biggest reward.

In sum, then, geothermal energy provides reliable baseload power. It is virtually emissions-free, contributes to fuel diversity, is an indigenous, renewable fuel source, contributes to energy security, provides price stability, as seen by our 30-year fixed-price contract with our customer, and creates more jobs than a comparable fossil-fired plant.

As President Bush has said, a key goal of comprehensive energy legislation must be to develop new sources of energy. The single best way to encourage new development of geothermal power is to extend the PTC together with a longer or modified placed-in-service date. That will do more to increase domestic production of geothermal energy than any previous government action. It would represent a huge win for the environment and, therefore, the country and all U.S. energy consumers.

Thank you again for this opportunity, and at the appropriate time, I will be pleased to answer any questions.

[The prepared statement of Mr. Signorotti follows:]

Statement of Vince Signorotti, Vice President, CalEnergy Operating Corporation, Brawley, California

Thank you, Mr. Chairman. My name is Vince Signorotti. I am a Vice President of CalEnergy Operating Corporation. I have lived in Imperial County, California for 17 years and have worked in the geothermal industry for the past 24 years. CalEnergy is a subsidiary of MidAmerican Energy Holdings Company, an international energy company headquartered in Des Moines. With me today is Jonathan Weisgall, Vice President of Legislative and Regulatory Affairs for MidAmerican Energy.

My company currently generates 340 megawatts of clean, reliable and renewable geothermal electricity for California's energy consumers from our plants adjacent to the Salton Sea in the extreme southern part of the state. We believe there are six times this amount available, or another 2,000 more proven megawatts of geothermal energy that can be developed near the Salton Sea. In fact, just two weeks ago we received approval from the state for a new 215-megawatt geothermal plant, called Salton Sea Unit 6. However, despite this approval and despite a 30-year fixed price contract we have signed for 95% of the output, this power and the other 2,000-plus megawatts will remain untapped in this reservoir if the geothermal production tax credit is not extended in a viable manner.

As a developer, what I'm seeing in the marketplace is volatile and rising natural gas prices and increasing concerns about climate change, clean air, job growth, and increased dependence on foreign sources of energy. Increasing the production of electricity from renewable energy addresses all of these problems head-on. As the Speaker's Task Force For Affordable Natural Gas concluded, "A sound energy policy should encourage the development of renewables."[1] Other recent studies show that reducing demand pressure on natural gas through increased use of clean, domestically-produced renewable energy can help bring down natural gas prices.[2]

Geothermal power, as the word implies, is energy that comes from heat in the earth. Production wells at our facilities extract the geothermal brine from under-

[1] Speaker's Task Force For Affordable Natural Gas "Final Summary of Finding," September 30, 3003, p. 6 (download at http://energycommerce.house.gov/NaturalGasTaskForce/scripts/file.pl?file=findings.htm).

[2] See, e.g., Ryan Wiser et al., "Easing the Natural Gas Crisis: Reducing Natural Gas Prices through Increased Deployment of Renewable Energy and Energy Efficiency," Lawrence Berkeley National Laboratory (January 2005) (LBNL–56756) (download at http://eetd.lbl.gov/ea/ems/reports/56756.pdf).

ground reservoirs. When that superheated brine reaches the surface, it flashes into steam, which turns a turbine to create electricity. These wells range in depth from 5,000 to 9,500 feet below the earth's surface. We then re-inject the brine back into the reservoir. Geothermal plants thus produce what is called baseload power: consistent energy production, 24 hours a day, seven days a week. In addition, a well-managed geothermal reservoir is a sustainable resource; there has been no measurable decrease in pressure in our Salton Sea geothermal reservoir since we started production in the early 1980s.

Geothermal energy is a significant power producer, supplying about 5% of California's electricity generation, 9% of northern Nevada's, and 25% of Hawaii's. However, the industry faces serious challenges, primarily the high up-front capital costs of building a geothermal plant. Our costs are more than four times per megawatt higher than comparable natural gas-fired power plants.[3] In addition, we typically sign long-term (20- to 30-year) fixed-price contracts, while coal- and natural gas-fired plants typically enter into shorter contracts—and usually with fuel adjustment clauses to hedge against fuel price volatility. Geothermal energy thus bears the dual financial burdens of higher initial capital costs combined with greater price risks going forward—a combination that makes it difficult to attract investment dollars.

The output from Salton Sea Unit 6 will make it the largest renewable energy project of any kind in the United States. It took us five years—and over $8 million in development costs—to obtain our permit from the California Energy Commission, and it will take an additional 28 months to build—a total of more than seven years from start to finish. Construction costs will exceed $700 million, using 550 construction workers and leading to more than 60 high-paying, fulltime positions. It will represent the single largest capital investment in Imperial County, which is the most economically disadvantaged area in the state and one of the poorest in the country.

We have a permit, so we could put shovels in the ground tomorrow. We have a customer—the Imperial Irrigation District—which strongly supports the development of geothermal power and has signed a 30-year contract for 95% of the plant's output. We are also ready to go with financing and construction. However, the project is not yet commercially viable. Put simply, obtaining a production tax credit for this facility is the difference between an economically viable project and a dream. The present values of future production tax credits (especially if allowed for ten years of energy production) will launch this project and other geothermal projects around the country.

The first issue we ask you to address is the eligibility period. For geothermal projects, the placed-in-service date should be extended for an appropriate term to make the production tax credit viable. Given the construction time of most geothermal plants, the existing one-year eligibility period does nothing to help make our plant a reality and probably won't help other geothermal developers. Three years is the minimum needed to benefit most geothermal developers, who, like us, must deal with multi-year lead time challenges of planning, permitting, and construction. I therefore propose that you either extend the Section 45 placed-in-service date for at least three years or provide transition rules enabling new geothermal projects with binding contracts in place to qualify. This modification would more realistically help to achieve Congress' intent to provide an incentive for more geothermal development.

The second issue is the duration of the production tax credit. We believe geothermal projects should receive the same term provided for wind generation—ten years—as opposed to the current five years for geothermal. A five-year duration would represent an improvement to the existing investment tax credit, but re-aligning the duration of the credit from five years to match the ten years afforded other renewables such as wind will result in better long-term planning and significant additional geothermal development.

If Congress extends the production tax credit for geothermal energy in this manner, we will build this plant; it's that simple. And it will greatly increase the odds of seeing a Salton Sea 7, 8 and 9, because non-polluting, baseload geothermal power is seen as an attractive substitute for coal and gas plants. The power from our plants near the Salton Sea can be directed west to San Diego, northwest to Los Angeles, northeast to Las Vegas, or east to Arizona. These are all areas with urgent needs for new, reliable electric power. They are having difficulty meeting current clean air requirements and they expect substantial growth in their power demands. While they are also subject to state or local renewable portfolio standards that man-

[3] A 2003 California Energy Commission study concluded that the capital costs of geothermal plants are four to six times higher per megawatt than natural gas plants. Final Staff Report, "Comparative Cost of California Central Station Electricity Generation Technologies," June 5, 2003 (download at http://www.energy.ca.gov/reports/2003–06–06—100–03–001F.PDF).

date higher percentages of renewable energy, they are not likely to meet those standards in the absence of the production tax credit.

Providing the geothermal industry with a production tax credit does not get us off the hook on the tax front by any means. Indeed, one recent study has shown that geothermal plants pay, on average, more than three times the taxes that gas-fired combined cycle power plants pay on a per megawatt-hour basis.[4] This is largely the result of geothermal's high capital and related infrastructure costs and the fact that a much higher percentage of our costs go to labor than a comparably sized gas plant, whose highest cost item is fuel.[5] In fact, our pro formas show that over the next 30 years, even with the benefits of the production tax credit in place, Salton Sea Unit 6 will still pay $100 million in federal income and payroll taxes and nearly $200 million in state and local income, property, and payroll taxes.

Our industry does have another option—the energy investment tax credit. However, for my company, the one-time investment credit provides nowhere near the benefit that the recurring PTC does and simply cannot make the project commercially viable.

If, as policy makers, you want to encourage more renewable energy development, you can impose a mandate like a renewable portfolio standard or offer an incentive like a tax credit. As a businessman, I like an incentive, and the production tax credit fills that bill perfectly. First, it is output-based, so you get your reward only after making your investment and operating your plant. Second, you can take it to the bank, and third, the low-cost producer gets the biggest reward. State renewable portfolio standards are somewhat limited by the cost of renewable power, but the PTC will literally energize these standards by reducing costs and stimulating investment.

Lessons of the last few years—with record high prices for natural gas, coal, and gasoline—teach us that the United States must diversify and expand its domestic energy supply, and that means tapping our nation's entire renewable energy resource base.

It is important that tax measures in the energy bill help to ensure that future U.S. electricity supplies will be available from a diverse, domestic, and environmentally friendly resource base located right here in the United States.

Geothermal energy: (1) provides reliable baseload power; (2) is virtually emissions-free; (3) contributes to fuel diversity; (4) is an indigenous, renewable fuel source; (5) contributes to energy security; (6) provides price stability, as seen by our 30-year fixed price contract with our customer; and (7) creates more jobs than a comparable fossil fuel-fired plant.

As President Bush has said in several recent speeches, a key goal of comprehensive energy legislation must be to develop new sources of energy. The single best way to encourage new development of geothermal power is to extend the production tax credit, together with a longer or modified placed-in-service date. Simply put, that action will do more to increase the domestic production of all renewable energy than any previous government action. It would represent a huge win for the environment and therefore the country and all U.S. energy consumers.

Thank you. I would be pleased to answer any questions.

Chairman CAMP. Thank you very much, Mr. Signorotti. Now we have Mr. Christopher O'Brien, who is Vice President of Sharp Solar Systems.

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[4] "Does the PTC Work?," by Brandon Owens (PR&C Renewable power Service, July 2004), pp. 10–12.

[5] One study has shown that "job creation from geothermal energy is 11 times higher than from natural gas." "Renewables Work: Job Growth from Renewable Energy Development in California," by Brad Heavner and Susannah Churchill, June 2002 (http://www.calpirg.org/reports/renewableswork.pdf).

STATEMENT OF CHRISTOPHER O'BRIEN, VICE PRESIDENT, STRATEGY AND GOVERNMENT RELATIONS, SOLAR SYSTEMS DIVISION, SHARP ELECTRONICS CORPORATION, KINGSTOWNE, VIRGINIA, AND CHAIRMAN OF THE BOARD OF DIRECTORS, SOLAR ENERGY INDUSTRIES ASSOCIATION

Mr. O'BRIEN. Mr. Chairman, Members of the Subcommittee, I thank you for the opportunity to testify today. My name is Christopher O'Brien. I am Chairman of the Solar Energy Industries Association, the national trade association of the solar energy industry, representing over 100 companies who manufacture and sell solar energy systems and representing all major solar energy technologies—photovoltaics, solar thermal, and concentrating solar power.

I am also Vice President for Strategy and government Affairs for Sharp Corporation's Solar Systems Division. Sharp is the world's largest manufacturer of solar photovoltaics, or PV, with manufacturing plants located in Japan, in the U.K., and in Memphis, Tennessee. The Sharp Solar plant in Memphis was inaugurated in 2003, with a capacity of manufacturing 20 megawatts per year of solar panels. The capacity was doubled to 40 megawatts per year in 2004, and will increase to 60 megawatts later this year.

I would like to make three points in my testimony this afternoon. First, the section 45 Production Tax Credit as structured has insignificant value to the solar industry. Second, meaningful incentives are key to bringing down the cost of solar energy and increasing deployment. Third, we would, therefore, recommend that solar be removed from the list of eligible technologies under Section 45 in exchange for an expansion of the existing section 48 Investment Tax Credit.

Now, it may come as a surprise that the section 45 PTC does not benefit all eligible renewables. However, as structured, it simply is not beneficial to any sector of the solar energy industry. Let me explain.

The section 45 credit, first of all, is available only to projects that engage in the sale of power. Most solar PV and solar thermal projects are distributed generation, installed on rooftops of homes and businesses, and the energy generated by these solar energy systems is used on-site. The definition of a power sale used by the legislation, therefore, excludes distributed solar energy systems from the credit.

Larger utility-scale solar plants are also unlikely to claim the section 45 PTC because under current law, developers must choose between the section 45 PTC and the existing Section 48 Investment Credit, and the latter is more significant in value.

So, the most effective way to bring solar energy online in the U.S. would be to increase the Section 48 solar ITC to approximately 30 percent and make that credit available to all solar applications, even if that credit were to come at the expense of our being excluded from section 45 PTC.

Congress has used Investment Tax Credits for the last 40 years as a mechanism to support key emerging industries and to realize public value. Solar provides excellent public value, reducing peak demand, reducing pollution, and avoiding or deferring transmission

and distribution upgrades. Furthermore, the U.S. has the best solar resources in the developed world.

An expansion of the section 48 Investment Credit would have a strong positive effect on the U.S. solar energy market, increasing the scale and competition among manufacturers, accelerating the drop in the cost of solar energy to the point where solar energy would more rapidly and broadly compete with convention peaking and retail electric prices.

SEIA, or the Solar Energy Association, estimates that an expansion of the ITC would over 10 years stimulate an estimated 50,000 new jobs, decrease solar costs by 50 percent, and save consumers over $15 billion in electricity and natural gas costs. In California alone, we estimate that these provisions would create over 10,000 jobs and spur $8.5 billion in economic investment. In other places, like Saginaw County, Michigan, home to one of the largest producers of silicone for the solar industry, Hemlock Semiconductor Corporation would expect to see significant investment and capacity expansion.

In other nations, similar policy models have been used to spur manufacturing scale-up, increased competition among installers, and improved marketing. This international market growth has cut the cost of solar energy sharply and demonstrated the ability of the industry to move off of incentives after that initial jump-start.

On the other side of Capitol Hill, Senator Lamar Alexander has proposed in S. 727 a temporary 5-year expansion of the Investment Tax Credit that would apply to both residential and commercial sectors.

We have an opportunity to shift a tax policy that does not work as effectively as intended for solar energy into one that does. Expanding the section 48 ITC would give the solar industry a credit of approximately the same proportional value as that enjoyed by other renewables through the section 45 PTC. This would help to accelerate the public benefits associated with the increased use of solar energy and bring a booming solar market back to the United States

Once again, I appreciate the opportunity to testify and the willingness of this panel to explore new policy options. I look forward to answering your questions.

[The prepared statement of Mr. O'Brien follows:]

Statement of Chris O'Brien, Vice President, Strategy & Government Affairs, Sharp Electronics, Solar Systems Division, Kingstowne, Virginia, and Chairman, Solar Energy Industries Association

Mr. Chairman, members of the committee, I thank you for this opportunity to testify.

My name is Chris O'Brien. I am Vice President for Strategy and Government Affairs at Sharp Electronics, Solar Systems Division. We are the largest photovoltaics manufacturer in the world. Our Memphis facility will soon be the largest solar manufacturing facility in the United States. I also serve as Chairman of the Solar Energy Industries Association, the national trade association of the solar energy industry,—representing the photovoltaics (PV,) Concentrating Solar Power (CSP,) and solar heating industries.

I would like to make three points this afternoon.

- First, the current production tax credit has no value to the solar industry.
- Second, meaningful incentives are key to bringing down solar costs.
- And third, we would willingly be removed from the section 45 credit in favor of an expansion of the existing investment credit.

It may come as a surprise that the current credit does not benefit all eligible renewables. However, the PTC as currently written is simploy not relevant to any sector of the solar industry.

For different reasons, the credit is of no value to either distributed retail, or central station wholesale, solar power.

As you know, this credit is available only to projects that engage in the sale of power. Most solar PV projects are *distributed* generation, installed on rooftops and run through the customer's meter. The definition of a power sale used by the legislation therefore excludes them from the credit.

Even if they could *theoretically* take the PTC, owners of most PV systems would not realistically benefit. A typical home PV system is 2 kilowatts—one twenty-five-thousandth the size of a small wind farm. With the PTC, that system would generate just $50 in annual credits. The difficulty inherent in somehow having the IRS "read your meter" would remove any economic benefit.

Of course, photovoltaics are not the only solar electric technology. For almost 20 years, approximately 400 megawatts of concentrating solar ("CSP") projects have been operating in the Mojave Desert of California. These plants use fields of mirrors to bring heat into a conventional steam power plant, feeding valuable peak power into the grid. New projects are currently in the pipeline. And although the developers of these new CSP plants could at least theoretically claim the PTC, they will not. Under current law, developers must choose between the PTC and the existing 10% commercial solar investment credit. While the current PTC represents 30–40% of power costs for wind, it is perhaps 6—10% of solar costs. Given the realities of commercial finance, no project developer will trade 6 % over 10 years for 10% up front.

We appreciate that the expansion of the PTC indicates a desire by Congress to support clean, domestic solar power. Unfortunately, as written, it simply will not work.

So, while our industry represents many different technologies, we speak with one voice on this issue.

The most effective way to bring solar on-line in the United States would be to increase the existing investment credit to 30%—and make that credit available for all solar applications.

The reasoning would be that increasing market size allows the industry to increase the scale of manufacturing, bring competition into the marketplace, and decrease costs.

Historically, solar prices have come down 20% for each doubling of installed capacity. A usable ITC would "jumpstart" the U.S. market by bringing already-declining solar costs over the "tipping point" in many areas, to the point where they broadly compete with conventional peaking and retail electric prices.

Similar models have been used by other countries to expand the solar industry, resulting in double-digit annual market growth. (Though the U.S. lags, global PV industry is now 10 times the size it was in 1996.) In other nations, manufacturing scale-up, increased competition among installers, and improved marketing have proven the ability of the industry to move off of incentives after that initial "jumpstart."

Congress has used investment tax credits for the last 40 years as a mechanism to stimulate economic growth in emerging industries, and realize public value.

Solar provides excellent public value, and the United States has the best solar resources in the developed world. From Maine to Nevada, we could use solar power to meet some of our most pressing energy concerns—from peak demand reduction, to environmental benefits, to the avoidance of transmission and distribution upgrades. I would be happy to provide the committee with a body of work that quantifies these benefits.

In S. 727, Senator Alexander has proposed a temporary 5-year expansion of the investment tax credit that would apply to both the residential and commercial sectors.

This bill also proposes changes that would make the PTC usable for some types of solar projects. However, I've asked my colleagues, and we agree that if we seek to see significant near-term deployment and really bring down solar costs, the most important policy change that Congress could enact would be an expansion of ITC—*even if that credit were to come at the expense of our being excluded from the production tax credit.*

Over 10 years, these credits would stimulate an estimated 50,000 new jobs, decrease solar costs by 50%, and save consumers over $15 billion in electricity and natural gas. In California alone, we estimate that these provisions would create over 10,000 jobs and spur $8.5 billion dollars in economic investment. Expanding the ITC is the most meaningful solar policy that Congress could enact in the energy bill.

We have an opportunity to shift a tax policy that does not work into one that does. Expanding the existing ITC, would give the solar industry a credit of approximately the same value as that currently enjoyed by other renewables through the PTC. This would begin to bring the booming solar market back to the U.S.

Once again, I appreciate the opportunity to testify, and the willingness of this panel to explore new policy options. I look forward to answering your questions.

Chairman CAMP. Thank you very much. Thank you all very much. That was excellent testimony. I just have a couple of questions.

Mr. O'Brien, do you see the market share of solar in the U.S. comparable with other countries, and if other countries have a larger solar use than the U.S., what reasons do you attribute that to?

Mr. O'BRIEN. Probably the most dramatic example of an effective policy has been taking place over the last 10 years in Japan. Japan put in place a policy targeting installation of solar on residential rooftops. This is back in 1994 and they set a goal of five gigawatts of installed solar capacity by 2010. At that time, the world market for solar was in the tens of megawatts, so it was an outrageous goal. Nevertheless, they committed to a long-term set of incentives. That, in turn, gave businesses a framework that they could work with, a degree of certainty to make the investments, to drive down the cost, and to increase deployment.

What happened? Over the next 10 years, the installed cost of solar systems in Japan dropped by 70 percent. The subsidy level that the government provided decreased from approximately $8 per watt installed to—it will be phased out to zero next year. The total number of systems installed increased from approximately 500 in 1994 to 70,000 per year this year. So, it has overall been a great example of a short-term stimulus that has very effectively increased the dissemination and the use of solar energy in Japan.

Chairman CAMP. That is one of the concerns, that data shows the cost of solar power is higher on a kilowatt hour basis than other kinds of renewables, and I wondered, if sounds as if in Japan it was economies of scale that brought that price down. Are there any technologies on the horizon that you see that may make solar power more economically comparable to other renewables?

Mr. O'BRIEN. There are technologies emerging. There are some new—I think you see over the last 20 or 25 years, you have seen that the cost of the solar module, the solar panel itself, has decreased by about 20 percent each time that the global volume has doubled. It is about an 18 to 20 percent learning curve. There are new breakthrough technologies that are being worked on, including deposition of photovoltaics on plastic substrates. There are concentrating photovoltaic technologies. Concentrating thermal solar power is proving to be economic. So, I think that there are a variety of solar conversion technologies that are effective.

I think equally important, though, and what we have seen in some of our larger markets is the productivity and the efficiency between the factory gate and the rooftop. What we have seen in places in larger markets is that some of the largest solar companies in Japan now are home-building companies. They have incorporated solar so that they have standard model homes that are eco-homes or zero-energy homes that you as a consumer can walk in,

and instead of getting granite countertops, you can get a solar system on your roof and no energy bill. So, it is making much more efficient solar—market channels has been a big part of the successful outcome there.

Chairman CAMP. Okay. Thank you very much.

Mr. Ranger, I have a couple questions. I wondered, this obligation, this current requirement to flare landfill gas, how does that affect—how does that flare requirement factor into the economics of using the gas to generate and sell electricity, this preexisting requirement of flaring landfill gas?

Mr. RANGER. Well, generally, Mr. Camp, the landfills are flaring that gas, so those systems are already installed at the bigger landfills. What has excited the industry about the section 45 tax credit is it is something that can go into putting in new capital to change that gas, take it away from the flare and turn it into electricity. It is still a capital-intensive industry past the flare, and that is where we need the support of the tax credit.

So, one thing that is troubling to me, personally, is that landfill gas gets penalized because there is an environmental benefit that is attached to collecting the gas. We still have the same capital requirements as any other renewable energy provider and we still need some support to make that investment. I would like to see all renewables be treated equally and make more of these projects happen.

Chairman CAMP. All right. Thank you. Do you mean equal in terms of the time period as well as the amount, credit amount?

Mr. RANGER. Correct.

Chairman CAMP. From the charts we have, the production from wind and closed-loop biomass receive basically 1.9 cents per kilowatt hour for the first 10 years and others are not, are either equal or less than that. You think that has had an effect on the ability to compete in that area?

Mr. RANGER. Well, the EPA estimates that there is another 500 landfills that are candidates for landfill gas electricity projects. So, if we were at that level of support, you would see almost all those projects come about. But what has happened in the landfill gas industry is we keep getting ratcheted back. We have looked at numbers at 1.3 cents a kilowatt hour, and what finally came out was the 0.9. That is going to generate some activity, but we are talking 20 projects, in my estimation, that were going to come forward, not only because of the deadline but also the magnitude of the tax credit.

Chairman CAMP. You said in your testimony that a medium-size landfill would meet the electrical needs of 3,000 homes. That is fairly significant.

Mr. RANGER. Yes, it is, and I think it is just a resource that continues to go up a flare and this country can't afford to watch that kind of energy evaporate, no matter what the reasons it is going into a flare.

Chairman CAMP. All right. Thank you very much.

The gentleman from New York, Mr. McNulty, may inquire.

Mr. MCNULTY. Thank you, Mr. Chairman. I also thank all of you for your testimony.

We have heard so many times today that we have had this goal of reducing our dependency on foreign sources of energy. I mentioned earlier that the President has made this a highlight in his State of the Union Address for the last couple of years and I was very enthusiastic about that. Then we get going through the legislative session and I find myself asking the question, where is the beef, because we talk about it a lot and we don't do a lot about it.

So, in my limited time, I just wanted to kind of go down the line and get a little bit more from you about what you think the government ought to be doing. Now, I understand that is a limited role, and it should be. But I really appreciate Mr. O'Brien's testimony because he got into that. He talked about other things that we ought to be doing in order to help his industry.

Now, I know how all of you feel about the PTC and the ITC, but in your opinion, what else should—I am looking for a sense of urgency here. I am not talking about you, about us, about getting the information so that we can move on something and get some things done, the things that—the urgency that Mr. Larson was talking about earlier.

In your opinion, what else should we be doing beyond the PTC to help your industries grow and to reduce our dependency on foreign sources of energy? Mr. Gosselin, we can start and just go down the line. Just take about a minute.

Mr. GOSSELIN. Thank you. For wind industry, we clearly believe a long-term extension is what is necessary for us to get traction, remove the inefficiencies from the production of the equipment, and drive down our costs to remove the dependency from the PTC itself and add significant new wind into the country's energy mix. It is as simple as that. Thank you.

Mr. MCNULTY. Mr. Carlson?

Mr. CARLSON. Thank you, Mr. McNulty. Basically, you heard a lot today about the cost of the various renewable technologies. Some are closer to the fossil fuel-driven electricity market than are others, and basically, the bridging of that gap really requires two actions, in my opinion.

One isn't necessarily a Federal action, because many of the States have moved forward with things like Renewable Portfolio Standards, and that is basically a spreading phenomena that creates a market segment for just renewables which allows them to compete among themselves for that market segment. So, that is one action that needs to continue and spread across the country.

The other basically is this Production Tax Credit and the levelizing of that so that all of these renewables have an equal opportunity to grab some of that market share where it is appropriate, because many of them, as you have heard today, are also very driven by location. Where there is forest restoration to be done, it may favor biomass. Where there is the large resources that Mr. Norris talked about in terms of trash, that may be the chosen technology. But we need to level the playingfield for all of those so they have an equal opportunity to compete.

Mr. MCNULTY. Thank you, Mr. Carlson.

Mr. Ranger?

Mr. RANGER. I appreciate your openness and willingness to consider other ways to help our industry. From the landfill gas per-

spective, I think this incentive is going to be sufficient to see a lot of activity, but we just need more time. This was the first time we were included in the PTCs and the one-year time frame, as you have heard, is just insufficient. I think if you gave us an extension of at least 3 years, we will see a lot more of these, and if you would make the incentive the same as all the other renewables, I think you are going to be surprised at how many projects we could bring online in that time frame. Thank you.

Mr. MCNULTY. Thank you.

Mr. Norris?

Mr. NORRIS. I think for the waste-to-energy industry, the big issue that we have, or the two big issues are the capital costs and the amount of time it takes to put one into operation. If we were to build a new waste-to-energy facility, by the time we got through developing, permitting, and construction, we are seven or 8 years in and probably close to $15 or $20 million, similar to what the geothermal is. With that, it is hard to get incentivized to build one when we have such a short period of time in order to put this into place.

We have asked for a three-year here, thinking that we could add some small number of units at existing facilities because we think they may take a little less time to permit and to put into operation. But to make some wholesale big move as far as generating electricity out of the waste that comes out of urban areas that would normally go to landfills, to do that, we are going to need a lot longer time and a tax credit either through this way or the ITCs.

If we will remember back in the mid-1980s when the vast majority of the waste-to-energy plants got built, there was an Investment Tax Credit there that went through that drove the vast market of that, and probably 40 percent of the plants, 40 to 50 percent of the plants that are operating today got put into place because of that Investment Tax Credit. Since then, in the last 10 years, we have not built a new waste-to-energy facility anywhere in the United States.

Mr. MCNULTY. Thank you.

Mr. Signorotti?

Mr. SIGNOROTTI. Well, clearly, as I hope I have illustrated, the single most important point that the government can do to help us is to extend the in-service date and to levelize the playingfield for geothermal. However, in my opinion, since so much geothermal in the West is located on public lands, and that does not apply to our project in southern California, but a vast amount of geothermal energy does exist on public domain lands, lands that are controlled by the Bureau of Land Management, it would seem to me that to accelerate leasing, to perhaps simplify some of the rules as far as getting permits to drill and the various other components that are involved in exploratory drilling and development of geothermal resources on public lands would be a tremendous benefit to the industry.

Mr. MCNULTY. Thank you.

Mr. O'Brien, I think you have answered some of my question, but if you wanted to add anything else——

Mr. O'BRIEN. If you would, I think the most important point would be the longevity of the incentive program that was put in

place, that for businesses like Sharp would provide a timeframe of certainty to justify investments in everything from new product development, project development, and manufacturing capacity expansion.

There are two documents that I would like to enter into the record. These pertain to the PV industry. One is a PV roadmap that outlines a set of policies that would support that. The second is a job study associated with that that shows the related jobs development.

[The information was not received at the time of printing.]

Mr. O'BRIEN. I would say in addition to the Investment Tax Credit that I described, probably for distributed technologies like photovoltaics and solar thermal, the most important thing is really the, in addition to the tax credit, is the ability to easily interconnect to the electric grid and to get the full benefit of the energy that is used on-site. So, those would be some standardized interconnections, or interconnection standards and what is called net metering, or the ability to capture the value of the energy that is generated on site are the two things.

Mr. MCNULTY. I thank you all and I thank the Chairman for letting me go over a little bit.

Chairman CAMP. All right. Thank you.

The gentleman from Florida, Mr. Foley, may inquire.

Mr. FOLEY. Thanks, Mr. Chairman.

One of our biggest challenges, obviously, is getting the people that proclaim they want to save the environment to allow us to try to by implementing new technologies. When we talk about methane gas, oh, no, I don't want a landfill. We talk about wind energy, Walter Cronkite, no, I don't want them off of Nantucket. No matter where you are located, they don't want a nuclear facility. Well, I don't want those solar panels on the roof in this development. We can't mar the nice-looking Mexican tile by having that ugly solar panel. So, it seems like everybody has an objection, yet they are all in unison screaming, we have got to do more to lessen our dependency on oil.

Now, you all suggested equalizing the credit. I assume you would like to go to the 1.9, not reduce accordingly, is that correct? Okay. I am just making sure we are all on the same wavelength, singing from the same hymnal, because I do think it is important.

Now, I must have missed something, but the gentleman from Energy led me to believe that very, very little of our energy production in the United States is by crude oil, am I correct in that statement, and is that a correct statement? It is mostly natural gas?

Mr. O'BRIEN. He was speaking about the electricity generation.

Mr. FOLEY. So, we are out of diesel fuel generation, we are out of light crude. I know the City of Lakeworth still has some old generators. So, everybody in the Nation has converted, is that true? Does anybody know? I am just curious.

Mr. CARLSON. Yes. Let me answer that, if I could, Mr. Foley. He said only about three percent of our electric generation is from oil, and that is correct. The largest single source is coal, which represents slightly over half of the total. Then nuclear and natural gas making up perhaps 40 percent, between those two. Then the hydro

and renewables basically making up the rest, the last 10 percent or so.

Mr. FOLEY. Then maybe I should have framed the question "fossil fuels," those that are brought up from the ground. So, then I would have had a higher number?

Mr. CARLSON. Yes. Fossil fuels would represent somewhere, I believe, between 70 and 75 percent of the total.

Mr. FOLEY. Okay. I failed to ask the question. They always teach you, make sure you know the question.

Well, I am encouraged at least that we are having the debate, and I think each one of the members here presents real options and real opportunity. We have seen in Florida particularly solid waste facilities. Where we used to bury, now we are finding recycling. Where we used to use the methane, now we are trying to find ways to plumb it in and create the burn rate that will make it cost effective. When we used to throw everything into landfills, vegetative resources, now through biomass credits, we are seeing people really clean up the environment. So, if people give us a chance to do every one of these options listed, I sense ten or so years from now, we will be in a better place.

People in this country are impatient. I mean, I remember when I had a cell phone in the 1980s. Nobody thought, oh, what are you doing with that thing, that big lug? It was this big. I could have used it for an attack weapon. Now they are this small. But people assume, oh, nobody will ever need a cell phone.

I think in this particular quarter, we have to think way outside the box. I, myself, would be even interested in being more aggressive with tax credits for all of your industries because I think it is the pathway from reliance, whatever it is, fuel, coal, in order to minimize the degradation of the ozone and other things that you are able to provide for us.

So, I applaud each and every one of your industries. I think we should try to make them equitable. I think that creates a competition between the sectors. So, I appreciate your input, and particularly those from Palm Beach County. We are very, very encouraged by some of the things we are seeing. On the interstate, we see phone systems now that are using photovoltaics in order to power those. No longer do you have to connect with electric wires. So, we are seeing a lot of new technology that I think is spurring the use now and the abilities in downtowns—new downtowns are going with photovoltaic lighting systems.

Again, I guess the other reason we all want to support you equitably, and one of you mentioned it, we are all in different locations. Florida has an abundance of sunshine, as does Arizona. In fact, Arizona has quite a bit this last couple days. But that sunshine can help do things that in other climates may not be as practical.

We certainly know we generate a lot of waste around here, and I am not talking about the government, I am talking about the confines of Washington, D.C., because there are a lot of people that have to have their product go to the landfill, which again would help us in the treatment of the methane and other things.

Thank you for your presentations.

Chairman CAMP. Thank you very much.

The gentleman from California, Mr. Thompson, may inquire.

Mr. THOMPSON. Thank you, Mr. Chairman.

To my colleague from Florida's early remarks, I think that he would be interested, knowing his interest in a specific product that comes out of my district, I saw two wineries this weekend, both of which were heavily dependent, and one of which was totally dependent on solar energy. They had their panels, one on the rooftop, the other one covering the septic system, an area that couldn't be used for anything else. That particular one at Frog's Leap was generating all the power that they needed to run their whole winery. So, I think some of that NIMBY stuff is going by the wayside and some folks are being very creative and very helpful at the same time.

Mr. FOLEY. Would the gentleman please bring some of the finished product so we could test it?

Mr. THOMPSON. I have never let you down in that regard, Mr. Foley.

[Laughter.]

Mr. THOMPSON. I just want to say that I think Congress has been way behind the curve in regard to providing a strategic energy plan that the voters that we all represent want. I think that those of you on the panel today represent the industries that can help get us ahead of that curve. So, thank you for being here.

I understand and appreciate the value that all your industries bring to this discussion, so I don't want to sound like I am excluding anyone, but I do have nearly half the geothermal producers, or 17 of them are located in my district, so if you would bear with me, I just want to focus a little bit on the geothermal issue.

Mr. Signorotti, you had talked about the facility that you are planning to build down in Southern California. I know that from what is happening in Lake County in my district in California, that the geothermal industry has done more than provide a cleaner environment. They have also provided an incredible boost to local government revenues, to local revenues in regard to job creation, and it has been a real plus to the entire community.

I don't know if your industry quantifies that somehow, but do you see the same coming to the area in southern California where you are proposing your new facility?

Mr. SIGNOROTTI. Absolutely. In Imperial County, where we have our ten plants and 340 megawatts, we employ about 220 full-time employees. We are the largest taxpayer in the county and have been for many years. This new project, we estimate will generate an additional $3 million in new property taxes annually. We estimate that there will be 550 construction jobs created over a 24- to 28-month period and over 60 new full-time jobs. Again, this is in a very economically disadvantaged part of California.

Mr. THOMPSON. If this is like Lake County, these are good jobs. They have benefits. They pay well.

Mr. SIGNOROTTI. These are jobs that people stand in line for in our area, and I just wanted to follow up on your NIMBY comment. When we permitted this plant through the California Energy Commission, Commissioner Purnell commented at the conclusion of one of the public hearings that he had never been to a public hearing in his career as a Commissioner for the California Energy Commission where there was not one comment in opposition to this

plant. I think that that speaks volumes about the environment that we live within Imperial County. Imperial County wants this, as does California.

Mr. THOMPSON. I know the industry folks in my district are great neighbors, and you have the same response there.

I asked the last panel, or the last witness, about a couple of specific issues, and I guess I would like to ask you about those, too. It seems to me, and the last witness, at the end of his testimony, he stated that studies show an increased use of biomass, wind, and geothermal technologies in the wake of higher natural gas prices or changes in environmental policies, such as greenhouse gas caps and trade programs.

Given this, it would seem to me that we would want to restructure the PTC in a way that would allow you maximum leverage on getting investment dollars. I think the current proposal is going down the wrong road. Any comments on that?

Mr. SIGNOROTTI. Well, clearly, with regard to Salton Sea 6, the PTC is the key factor. This project is PTC dependent. With the PTC, it will go forward. Without a PTC, it will not.

Mr. THOMPSON. So, the PTC should be extended to include all of the industries that are providing us with these——

Mr. SIGNOROTTI. I certainly wouldn't speak against that, but I am focusing in on our geothermal projects in the Imperial County, but I certainly think that there is a lot of equity and a lot to be said for that.

Mr. THOMPSON. Thank you. I yield back, Mr. Chairman.

Mr. SIGNOROTTI. Thank you.

Chairman CAMP. Thank you.

The gentleman from Indiana, Mr. Chocola, may inquire.

Mr. CHOCOLA. Thank you, Mr. Chairman, and thank you all for being here today.

Mr. O'Brien, I just wish that solar energy had a more viable future in Indiana. We don't get as much sunshine as I would like.

But I guess the question I would ask all of you is how do we, or when do we declare victory? When would you all come here and say, you know, we don't need the tax credit anymore? Should we think about this as kind of a venture capital, helping new technology emerge, or should we think about this as a long-term subsidy that supports good policy?

I will throw it open to all of you to try to give your perspective on that. Mr. Gosselin, I will start with you.

Mr. GOSSELIN. Thank you. Again, from the wind industry perspective, we have been enjoying the benefit of the PTC and what it drives in technology for approximately the last 13 years. We have seen at least eight generations of new machine technology come to bear and continually lower costs. It is just in the last couple of years that we have seen higher costs come into the capital base of a wind project, and we believe that by having a long-term, stable PTC environment, that manufacturers will come to the U.S., create a U.S. base, and use that long-term PTC to drive out their inefficiencies that we currently have with the on and off again nature of the PTC.

So, victory is removing ourselves from the dependence on the PTC and being able to stand alone on our own capabilities and

merits in terms of economics associated with wind energy production. We believe that happens within the timeframe of a long-term PTC extension.

Mr. CHOCOLA. Just briefly, one of the things you mentioned in your testimony was the rising cost of steel. I used to be in the grain bin business and I am painfully aware of the steel escalating cost. But doesn't really every industry have to deal with that? It is not unique, is it, to the wind generation?

Mr. GOSSELIN. No, it is not unique, but wind energy has a very large component of steel in it. The towers alone are something on the order of 60 tons of steel. So, it has a very large component relative to other technologies. While steel is driving costs up, it is not as material as what has happened with the dollar-Euro, and also as we see new technologies introduced, again, seeking to drive down the production cost, the cents per kilowatt hour that allows us to stand alone and compete on our own.

Mr. THOMPSON. Mr. Carlson?

Mr. CARLSON. Thank you. I think we declare victory basically when we are no longer dependent on foreign sources of energy for any significant percentage of our total national total. If you take our raw material, for example, biomass, it cannot just be used to generate electricity. It can also be used to make fossil fuels for automobiles. There is a synergy between those two activities that goes beyond just having, for instance, electric cars replace internal combustion engines, where we can actually produce the fuel for the internal combustion engine, and a substantial amount of that activity does take place in Indiana in terms of the ethanol production.

So, I think that it is all part of a coordinated total where the renewables must start to displace fossil fuels and the same activity must take place in the transportation fuel network to the point where we can push back our dependency on foreign sources of oil. I can't predict when we would declare victory, but I think we will know it when we get there and I think bringing renewables up to a substantial fraction of our Nation's electric supply, for instance, say 20 percent over the next couple of decades is a reasonable goal, and the PTC and levelizing the PTC is probably the key element in doing that.

Mr. THOMPSON. Is poultry waste used in open-loop biomass?

Mr. CARLSON. It can be. It is not to any large degree at this point. Those systems are typically very small and are based essentially on the farm where the waste is produced. But it certainly in some cases can be a viable fuel for electric generation, certainly.

Mr. THOMPSON. I see we are going to run out of time here quickly, but if anybody has a quick comment——

Mr. RANGER. I would like to just comment on the question. In the case of the landfill gas industry, we are not looking for a perpetual subsidy. In fact, one of the reasons that I shared with you the Riverview project story was that the subsidy has worked in the landfill gas industry to get energy projects built and that subsidy basically helped them pay off the capital.

In the case of Riverview, Michigan, I declare that one a victory every day I look at the bottom line. We still have a project that is bringing in money into our company. It enables us to reinvest in that facility. You still have to keep the technology upgraded. We

are putting in PLCs now, modernizing that plant. But Congress was successful in creating that project and the Congress should feel good about that and we need some help for another 500 more.

Chairman CAMP. Why don't we move on quickly. The gentleman from Connecticut, Mr. Larson, may inquire.

Mr. LARSON. Thank you again, Mr. Chairman, and I thank the panelists. I have indeed enjoyed your comments this afternoon.

My question will be more in association with one a lot of the Members have raised in terms of a question following along the lines philosophically, I guess, of what Congressman McNulty raised earlier and Representative Chocola. What is the most important factor in attracting capital to your businesses?

Mr. GOSSELIN. Certainly from the wind industry, the return of the capital and the understanding or the known part of the business is the single most important part of attracting it.

Mr. LARSON. So, that is why, with respect to the tax credit, if there is certainty, if there is across-the-board distribution, so you set up a system of competition where solar isn't excluded or is included more under section 48 or Section 45, then we are leveling the playingfield and we are providing an opportunity for you to compete.

It seems again like we get into these vicious circles where we never directly get at the problem because we are always chasing our philosophical or economical tails, because it seems to me, and coming from perhaps a Keynesian perspective, that government has a responsibility in promoting sound public policy to make sure you are able to compete because you are fulfilling an objective. Whether that is energy sufficiency, and I won't even say total weaning ourselves off of dependency, but at least energy sufficiency so that we can compete on our own, that these are the kinds of things that we ought to be pursuing.

Should the market dictate where we go, or is the combination of the market and government providing an opportunity for otherwise industries that would be dwarfed because of lack of capital coming to it, and therefore lack of investors? Where should Congress strike this balance in your minds? Anyone?

Mr. CARLSON. If I could, sir, let me take a crack at that. I don't know that it is—that Congress needs to pick the winners and the losers. I think the market should pick the winners and the losers, and I think we have demonstrated as a panel that in different locations, you will have different winners.

Mr. LARSON. Correct. That was a good point you made.

Mr. CARLSON. Clearly, I think that what Congress should do is levelize the playingfield and make sure that we have the opportunities. We don't have——

Mr. LARSON. As Mr. Foley said, is 1.9 percent the right figure? Does it need to be more? Does it need to be less?

Mr. CARLSON. I think the 1.9 cents is a good starting point, and we have to have access to the contracts with the utilities, which is what PURPA gave us back in the late 1970s, is that they had to purchase power from independent suppliers that could supply it at their what was called avoided cost, the same cost that it would cost them to produce it. That was a watershed for the country.

Now, there have been ways in which they have attempted to back away from that, certain utilities, and that needs to be reemphasized, that if you can buy it from an independent supplier at your cost, you should do so. Then any difference could be made up by this PTC that we are talking about.

Mr. LARSON. Anyone else? Mr. O'Brien?

Mr. O'BRIEN. I think the lesson learned in our industry was that there are successful policy examples that we can look to in other countries. Actually, two of the most successful countries have more sunshine than Indiana does, Japan and Germany.

But I think that the clear ingredients for our industry and what has worked well has been a reasonable horizon for the longevity of the incentive combined with a clear signal that there is a sunset. So, I think sending the right signal to the folks that are making investments in product development and manufacturing capacity and in project development is important. You effectively get what you pay for by the longevity of the program. So, those technologies that are less mature, that require more development, I think require perhaps a longer timeframe to recoup those investments.

Mr. LARSON. Is there a grand plan to synergistically link your industries together, and could such be conceived?

Mr. GOSSELIN. Not that I am aware of.

Mr. O'BRIEN. I think I would just answer that, I don't think there is a silver bullet. I think that when you look at the size of the gaps that need to be addressed, when you look at where we are today in terms of a dependence on fossil energy and you look at the—if you look going forward, there will be a portfolio that includes all of these technologies. I think it is important to recognize, and I think each of the technologies has different attributes. Some are distributed, some are central, some are large-scale, small-scale. But I think there is going to be—I would expect if you flash forward 20 years, you are going to see a portion of the portfolio with each of these technologies.

Mr. LARSON. Thank you all very much. Thank you for your indulgence, Mr. Chairman.

Chairman CAMP. Thank you, and again, I want to thank the panel for your excellent testimony this afternoon. The hearing of the Subcommittee on Select Revenue is now adjourned.

[Whereupon, at 4:09 p.m., the hearing was adjourned.]

[Submissions for the record follow:]

Statement of the American Public Power Association

The American Public Power Association (APPA) is the national service organization representing the interests of over 2,000 community-owned utilities located in every state but Hawaii. Collectively, public power utilities deliver electricity to one of every seven electric consumers (approximately 43 million people), serving some of the nation's largest cities. However, the vast majority of APPA's members serve communities with populations of 10,000 people or less.

We appreciate this opportunity to offer our views on federal financial incentives for production of electricity from renewable energy sources. Appropriate incentives for renewable and clean coal generation are essential to achieving a balanced energy bill. At the same time, we believe an important element of the debate on renewable energy sources and clean technologies is absent from this hearing—comparable incentives for public power systems. Without comparable incentives, nearly 3000 public power and rural cooperatives serving approximately 25 percent of America's electric consumers will be hampered from investing in renewable energy facilities.

Under current law, investor-owned utilities are eligible to receive a production tax credit for generating electricity from renewable energy sources. However, not-for-profit utilities are ineligible for such incentives because they do not incur any federal tax liability. The only incentive provided to consumer-owned electric utilities for renewable energy production is the Renewable Energy Production Incentive (RPEI) Program subject to the annual appropriation process and has been grossly underfunded since its creation as part of the Energy Policy Act (EPAct) of 1992 and is discussed further in this section.

The lack of comparable incentives will exacerbate problems for public power systems due to a growing trend of state mandates and prospects of a federal requirement that utilities generate a certain percent of their electricity from renewable energy sources. For-profit utilities have federal incentives in place to offset the cost of investing in renewable energy facilities to comply with government mandates while not-for-profits must pass on the cost as rate increases to their customers.

Financial incentives for public power to invest in renewable energy projects will also contribute to the reduction of greenhouse gas intensity. As part of APPA's voluntary commitment with the U.S. Department of Energy for participation in a voluntary greenhouse gas reporting and reduction program, comparable incentives for *all sectors of the electricity industry* is specifically outlined in the proposal as an important strategy to achieve this objective and recognizing the role not-for-profit utilities play in the industry by serving 25 percent of the nation's electricity customers.

Comparable Tax Incentives for Municipal Electric Utilities

Current market conditions make the of production of electricity from renewable energy sources three to 10 times higher than from traditional fuel sources such as coal and natural gas. APPA's members have a commitment to their customers and the communities they serve to keep rates at the lowest possible level. This commitment makes it difficult to participate in a national energy policy that promotes diversification of sources of electricity generation to include greater use of renewable energy.

Many APPA members are extremely interested in expanding generation capacity to include renewable generation facilities. Because public power systems are governed by local elected or appointed officials, they are responsive to the needs and expectations of their respective communities. Public power communities want clean energy even when this results in higher rates. In fact, public power has an excellent record of providing clean energy. However, the availability of comparable incentives would provide a more reliable and non-regressive financial mechanism to make it easier to invest in qualified projects to generate from renewable energy sources.

Traverse City Light and Power (TCLP) Department in Traverse City, Michigan, is one example of a community's commitment to renewable energy. TCLP has a nameplate capacity of 1,000 Kilowatts (kW) from hydroelectricity generation. Furthermore, the TCLP owns and generates 800,000 kWh/year of electricity from a nine-year old wind turbine to serve its 10,256 customers. The decision to make this investment was finalized after enough volunteers in the community agreed to pay a 1.5-cent/KWh premium on their electricity rates to cover the cost of the production from a renewable energy source. The decision to make the investment has been a positive one for the community as it has diversified its energy supply and contributed to cleaner air. In addition, TCLP has recently begun discussions with the local school to provide some electricity from the wind turbines to charge a hybrid electric bus that the school hopes to put in to operation soon.

Several of the dams used by TCLP for hydropower generation are in need of heavy capital investment. However, these improvements provide little additional power supply. TCLP estimates the dams would need approximately $4 million for upgrades and improvements. With little return on their investment and discussions in the Michigan legislature regarding a renewable portfolio standard, TCLP is considering additional wind generation capacity, but its options are limited because it will be difficult to garner enough volunteers to accept a surcharge given the necessity to ask citizens for help for the first wind project. Therefore, the viability of pursuing this new wind project will depend highly on whether or not public power systems receive a comparable tax incentive.

Renewable Energy Production Incentive Program

The only federal incentive currently available to public power systems is the Renewable Energy Production Incentive (REPI) program authorized under the Energy Policy Act of 1992. This program was created to be a comparable counterpart to the renewable energy production tax credits made available to investor-owned utilities under this law. Under REPI, the U.S. Department of Energy (DOE) is authorized to make direct payments to not-for-profit public power systems and rural coopera-

tives at the rate of 1.5 cents per kWh (1.8 cents when adjusted for inflation) from electricity generated by solar, wind, geothermal, and biomass projects. Unfortunately, the REPI program is subject to the annual appropriations process, and the program has been woefully under-funded since its inception. According to DOE sources, approximately $80 million would be required in Fiscal Year (FY) 2006 in order to fully fund all past and current REPI applicants. Despite the demonstrated need, however, DOE has only asked for $5 million for FY 2006, citing budgetary constraints.

Renewable Portfolio Standards

Complicating the issue is a recent trend by several states to enact renewable portfolio standards (RPS) and the prospects of a federal RPS mandate. According to the U.S. Energy Information Administration (EIA), almost 20 states have enacted some form of an RPS, and there are further discussions in other state legislatures to enact similar mandates. For-profit utilities can have the ability to use the federal tax incentives granted to them to offset the costs associated with the state laws. Not-for-profit utilities required to comply with these RPS mandates will not have comparable incentives to assist them in doing so.

Without federal financial assistance, public power systems must finance more expensive renewable energy facilities internally—through higher rates for everyone or surcharges paid by those willing to pay more for "green" power. For example, the Board of Water and Power Commissions for the Los Angeles Department of Water and Power (LADWP) recently adopted a policy in response to a state RPS and a resolution passed by the City Council. The policy approved by the Board set the goal of LADWP supplying 20 percent of its generation load by 2017 from renewable energy resources and an interim goal of 10 percent by 2010. In order to determine how LADWP will pay for this effort, a study will be conducted to examine a renewable surcharge for its customers to pay for meeting the RPS goals and possibly a calculation method and plan for implementing the surcharge. Also included in the study will be an assessment for a solar surcharge to support installation and generation of electricity from photvoltaics. But without comparable incentives, the LADWP is limited to what financial options can be used to meet the City Council's resolution.

Greenhouse Gas Initiative

APPA has joined with partners in the electricity industry in signing a Memorandum of Understanding (MOU) with DOE that commits us to voluntarily reduce greenhouse gas intensity. This MOU was part of President Bush's proposal for a voluntarily greenhouse gas emissions reporting and reduction program. The goal of the program is to reduce greenhouse gas intensity levels by 18 percent by 2012.

APPA worked diligently to ensure that the MOU recognizes the need to provide investment incentives to public power systems in order to utilize the latest clean technologies and renewable generation. The MOU specifically spells out the need to promote policies that provide "investment stimulus on an equitable basis *to all segments of the power sector* in order to accelerate use of existing [greenhouse gas]-reducing technologies, deploy advanced technologies and maintain America's critical energy infrastructure (emphasis added)."

Taxable Tax Credit Bonds

In the 108th Congress, the Senate twice passed legislation that included a proposal to offer comparable tax incentives to consumer-owned utilities. The proposal, included as part of the Senate passed comprehensive energy bill and the Foreign Sales Corporation/Extraterritorial Income (FSC/ETI) Bill, would have established a mechanism—known as tradable tax credits—whereby public power systems and rural electric cooperatives could earn tax credits for production of electricity from renewable sources and then sell the tax credits to entities with federal tax liabilities. The proceeds from the sale of the tax credits would be used to offset the higher cost of renewable energy generation. However, concerns expressed by the White House and Members of the House prevented the plan from making it into the final version of either bill.

In response to recommendations made by the Bush Administration and Members of Congress to develop an alternative to the tradable tax credit, APPA has worked closely with the National Rural Electric Cooperative Association (NRECA) and others to develop an alternative approach to the production tax credit so that the not-for-profit utilities that serve nearly 25 percent of the total population can receive incentives to help them invest in renewable energy resources. The proposal is similar to a tax policy already incorporated in the U.S. Tax Code. While not exactly identical, the alternative to tradable tax credits utilizes a financial investment previously recognized in the tax code that is familiar to most. The proposal is referred to as clean energy bonds and has been introduced in the Senate as S. 962. Senate

Finance Committee Chairman Grassley and Ranking Member Baucus have recently introduced this bill to provide for the use of taxable tax credits bonds for qualified renewable energy facilities. APPA strongly supports S. 962.

The clean energy bond would allow municipal utilities and rural electric cooperatives to issue interest-free debt through a taxable tax credit bond to raise revenue for renewable energy generation projects as defined under Section 45 of the U.S. Tax Code. In lieu of interest on the investment, the bondholders would receive a tax credit from the federal government that could then be put toward reducing their personal income tax liability. The bond is taxable, so if the credit is worth $100 and the bondholder is in the 35 percent tax bracket, the bondholder would deduct $65 from his or her tax liability.

In addition to renewable energy generation facilities, proposals in Congress are being considered to expand the clean energy bond to include new clean coal generation technologies. Coal is the most abundant natural resource for producing electricity in the United States. Increased use of clean coal technologies will allow us to increase our use of this readily available and reliable resource. At this time, the technology for clean coal facilities is not cost effective compared with traditional generation facilities. But including this technology as an eligible project under the scope of the clean energy bond will allow for greater market share across theelectricity industry; thereby reducing the cost for utilities to install and generate from clean coal technologies**.** Senator Bunning and others have introduced legislation in the Senate incorporating the clean energy bond as a financing method for clean coal technologies

Conclusion

Not-for-profit electricity utilities need comparable tax incentives for renewable and other clean energy generation. The debate amongst policymakers regarding greenhouse gas emissions, RPS and reducing our dependency on foreign sources of energy make the call for comparable incentives that are much more important to keep electricity rates affordable. While some not-for-profit electric utilities have taken steps to advance renewable energy projects, the burden of the cost has fallen exclusively on their ratepayers. These communities, both large and small, should be recognized for their desire to promote clean technologies and renewable energy generation. However, the ability to participate in "green" power generation should be made available to all communities regardless of economics, population or geography and without the need to implement a regressive tax.

The policy to reduce our nation's dependence on foreign sources of energy by investing in renewable energy and clean energy will greatly benefit the economy and health of all Americans. But such a decision should not exclude utilities that serve 25 percent of Americans from receiving incentives to help achieve this positive goal.

Again, APPA thanks both the Chairman and Ranking Member for their leadership on this issue, and we encourage the House to work with the Senate to enact comparable tax incentives for not-for-profit electric utilities in the 109th Congress. We look forward to working with you on this issue.

Solar Mission Technologies, Inc.
Missoula, Montana 59801
No date available

Honorable Committee Members:

Solar Mission Technologies, Inc is a privately owned, renewable energy power station developer based in the U.S. Solar Mission's core business is to develop Solar Tower power stations globally.

The first Solar Tower development is in advanced stages of project feasibility in Australia by local developer, Enviro Mission Limited; a publicly-traded Australian company. Solar Mission has maintained an investment in the Australian project since 2001.

Australia was selected as the launching place for Solar Towers due to the favorable political and market sector receptiveness for clean green electricity from a fully dispatchable solar powered generating plant.

The success of the Australian roll-out is cornerstone to development of similar power stations in the United States.

U.S. federal tax credits for renewable energy generators form part of the impetus and timing for Solar Mission's decision to commence development in the U.S. as a priority over markets where political incentives do not exist.

The market case for renewable energy development is also supported by evidence that energy supply is set to lag behind demand based on GDP growth figures plotted against the equivalent energy indicators, whether BTU's (natural gas/oil) or MWH (electricity generally). This worldwide trend supports investment and policy incentives for energy infrastructure development, particularly renewable energy.

The imperative for energy development was driven home at the World Energy Congress (WEC) Sydney, Australia, (September 2004) with the call that recommended "no energy source should be taken off of the table."

See: http://www.worldenergy.org/wec-geis/wec_congress/default.asp

In addition the WEC concluded "[a] larger share of global infrastructure investment must be devoted to energy".

Tax credits will help move the electricity market in the United States toward those two goals.

Solar Mission's development strategy for the U.S. is influenced by the current tax policy although the tax credit structure could go further to standardize the term, quantity and value of tax credits for all renewable fuel sources. Standardization will provide certainty in planning and costing renewable energy projects and will foster investment confidence in renewable energy development.

Solar Mission seeks the support of the Legislative Committee to continue shaping legislation that aims to capture electricity production from renewable sources.

Thank you for the opportunity to table the views of Solar Mission's directors and management.

Sincerely,

Christopher Davey

Statement of Edison Electric Institute

The Edison Electric Institute (EEI) appreciates the opportunity to submit this statement for the hearing record on tax credits for electricity production from renewable sources. EEI is the trade association for U.S. shareholder-owned electric companies, and serves international affiliates and industry associates worldwide. Our U.S. members serve almost 95 percent of the ultimate customers in the shareholder-owned segment of the industry and nearly 70 percent of all electric utility customers in the nation. They generate almost 70 percent of the electricity generated by U.S. electric companies. Several of our members have made significant investments in renewable technologies including wind, biomass co-firing, landfill gas and waste to energy, and geothermal, and many others may do so in the future.

While last year's extension of the Production Tax Credit (PTC) for five or ten years was a step in the right direction, the requirement that the facilities be in-service by the December 31, 2005 severely limited the PTC's effectiveness. To maximize the impact of the tax credit, there must be a realistic opportunity to plan for equipment purchases in a sustained business cycle, address transmission and siting issues, and begin production over a longer time period. The "boom and bust" business cycles created by frequent twelve-month extensions of the tax credit have not helped developers of renewable energy technologies and have only increased costs for the consumer. The PTC extension was authorized in the JOBS Bill last fall and did not provide enough time for technologies with long lead times, or technologies that face equipment shortages, transmission access issues, and siting challenges. It is very difficult to have all these functions prepared for implementation or construction within a twelve-month period. Consequently, EEI recommends extending the in-service date requirement until December 31, 2010 and continuing the ten-year opportunity to claim PTCs. Alternatively, a binding contract rule for the project output could be substituted for the in-service requirement.

EEI supports extending the PTC for renewable technologies because it will increase fuel diversity. This diversity is necessary to assure domestic energy security, provide affordable reliable power to customers, moderate fuel price fluctuations and increase in generation costs, and improve the quality of the environment. For many companies, their strategic business goals include asset diversification among technologies and fuels, and renewable energy is expected to play an important role. Achieving these goals will require policies that optimize the use of all fuels. The PTC assists in furthering national electric industry goals of fuel diversity by making it easier for immature, but promising technologies to compete more effectively in a brutally price competitive market: generation. The electric industry supports subsidy only until such time as these technologies achieve sufficient production to reach marketplace success through economies of scale.

As you can see from the attached charts, non-hydro renewable energy is a small but growing segment of the U.S. electricity generation portfolio. However, the increase in a given year has varied depending on the availability of the PTC. Ensuring that no one fuel type dominates the electricity production will increase electricity pricing stability for all consumers. EEI supports the PTC to help develop renewable technologies so that they can be an important part of the electricity production mix, along with coal, hydro, natural gas and nuclear generation. Additionally, renewable technologies have the potential to impact natural gas demand in some locations. The renewable energy industry needs the PTC because it is still a new industry that has yet to achieve the economies of scale that mature industries have achieved. In the few cases where per unit costs are nearing conventional fuels, there are still outstanding issues that are being resolved. Because many of the best renewable resources may not be near the load centers, additional transmission is likely to be needed to bring the output to the load. Also, addressing local concerns about siting can be expensive, difficult, and time consuming. In most cases, the costs of renewable technologies are still higher than conventional fuels because they have not yet achieved the necessary economies of scale.

A five-year in-service rule would give developers adequate time to plan forward to place facilities in service and provide a dependable source of revenue so that multi-year projects could be developed. This is particularly important for geothermal and landfill gas projects, which would allow electric utilities to plan and build required transmission facilities. This is consistent with other Congressional efforts to use the tax code to increase sources of energy. EEI is confident that such a program would result in increased renewable investment, thereby increasing the nation's fuel diversity. Additionally, an extended PTC is also likely to stimulate the development of new technologies and more efficient devices to convert the raw fuel input into electricity, whether the technology is geothermal, wind, biomass, or land-fill gas.

GENERATION FROM RENEWABLE SOURCES OF ENERGY HAS INCREASED SIGNIFICANTLY SINCE 1990

Note: Numbers exceed 100% due to rounding.

*Includes wind, solar, biomass, geothermal and other non-hydro renewable energy sources

Source: Energy Information Administration, 2004 preliminary data

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Statement of Carolyn Elefant, Ocean Renewable Energy Coalition, Potomac, Maryland

Introduction

Ocean Renewable Energy Coalition is a trade association founded to promote energy technologies from clean, renewable ocean resources. The coalition is working with industry leaders, academic scholars, and other interested NGO's to encourage ocean renewable technologies and raise awareness of their vast potential to help secure an affordable, reliable, environmentally friendly energy future.

We seek a legislative and regulatory regime in the United States that fosters the development of ocean renewable technologies, their commercial development, and potential for export.

The United States is falling behind in the race to capture the rich energy potential of our oceans. While other countries have already deployed viable, operating, power generating projects using the emission-free power of ocean waves, currents, and tidal forces, the U.S. is only beginning to acknowledge the importance these technologies.

Ocean energy can play a significant role in our nation's renewable energy portfolio. With the right support, the United States ocean energy industry can be competitive internationally. With the right encouragement, ocean renewable energy technologies can help us reduce our reliance on foreign oil—fossil fuels, in general—and provide clean energy alternatives to conventional power generating systems.

Why the Ocean Energy Industry Needs the Production Tax Credit

1) What is ocean energy?

Ocean energy refers to a range of technologies that utilize the oceans to generate electricity. Many ocean technologies are also adaptable to non-impoundment uses in other water bodies such as lakes or rivers. These technologies are can be separated into three main categories:

Wave Energy Converters: These systems extract the power of ocean waves and convert it into electricity. Typically, these systems use either a water column or some type of surface or just-below-surface buoy to capture the wave power. In addition to oceans, some lakes may offer sufficient wave activity to support wave energy converter technology.

Tidal/Current: These systems capture the energy of ocean currents below the wave surface and convert them into electricity. Typically, these systems rely on underwater turbines, either horizontal or vertical, which rotate in either the ocean curren or changing tide (either one way or bi-directionally), almost like an underwater windmill. These technologies can be sized or adapted for ocean or for use in lakes or non-impounded river sites.

Ocean Thermal Energy Technology (OTEC) OTEC generates electricity through the temperature differential in warmer surface water and colder deep water. Of ocean technologies, OTEC has the most limited applicability in the United States because it requires a 40 degree temperature differential that is typically available in locations like Hawaii and other more tropical climates.

2) Is ocean energy commercially viable now?

Yes, but thus far, on a small scale and not in the United States:

- The LIMPET project, a 500 kw shore-based wave plant in Scotland has been feeding power to the grid for 5 years at a cost of 7 cents a kilowatt/hr. Another 600 kw project similar to LIMPET on Island of Pico in the Azores is operational.
- The Pelamis, a Scottish wave energy converter has been feeding power to the grid in Scotland since August 2004—and recently announced plans to construct a 2.25 MW plant off the coast of Portugal.
- An Australian company, Energetech, is in the final stages of anchoring a 500 kw wave energy device in Port Kembla, Australia which will feed power into the Australian grid.

3) What is the status of U.S. wave, current and tidal projects?

A number of such projects in the United States have been proposed and are on the cusp of deployment:

- New Jersey based Ocean Power Technologies has operated a test wave energy buoy off the coast of Hawaii for the U.S. Navy and plans to interconnect to the grid by the end of the year.
- Washington state based Aqua Energy has proposed a 1 MW pilot project for the Makah Bay off the coast of Washington state. The project is currently in the midst of what is now verging on a three year permitting process at the Federal Energy Regulatory Commission. (FERC)
- New York based Verdant Power is undergoing licensing at FERC and intends to deploy six units of a tidal/current project located in the East River and supply power to customers on Roosevelt Island imminently, once all regulatory clearances have been obtained.
- Australian based Energetech has formed a subsidiary in Rhode Island which has received funding from the Massachusetts Trust Collaborative and has planned a 750 kw project for Port Judith Rhode Island. Permitting has not yet commenced.

4) Are these projects discussed above the start of real commercialization?

Yes—or at least that's what the Electric Power Research Institute (EPRI), perhaps the nation's most prominent utility research collaborative, concluded. An EPRI Report released in January 2005 found that "wave energy is an emerging energy source that may add a viable generation option to the strategic portfolio." Among the benefits of wave that the report identified are that it is environmentally benign, has a low profile and is generally not visible and is more predictable than solar and wind so it is more dispatchable to the grid. In light of the success of its wave energy report, EPRI has now embarked on a second stage of exploring the energy potential of tidal and current ocean and coastal resources.

5) But is ocean energy economically viable?

The EPRI report found that presently, the cost of power from ocean technologies ranges from 7 cents to 16 cents/kw in a low case scenario. But these costs are expected to decline as the industry matures and as economies of scale make ocean projects less costly. To compare, back in 1978 wind energy cost 25 cents/kwh to produce—but now costs between 4.5 and 6 cents/kwh. Wave is already less costly than wind. Moreover, the EPRI report found that if wave had obtained the same

government subsidies as wind, it would be a far more advanced technology than at present.

6) So how would a PTC help the ocean energy cause when ocean plants are not yet producing power in the United States?

Several reasons. First, ocean projects are already operating commercially, albeit on a small scale overseas and are on the cusp of doing so in the United States. Second, in the absence of a PTC, ocean is perceived by investors as a second class renewable, thus making it impossible for ocean developers to attract necessary capital. Third, the absence of a PTC also makes ocean a less desirable renewable investment than other renewables like wind or solar that do receive the credit.

Because currently, the government offers no funding or programs for ocean energy, the industry, though nascent, has had no choice but to seek out private investment. But the ocean, wave and tidal/current energy industry cannot attract financing effectively if handicapped by the absence of a PTC for new technologies with applicability to ocean, lakes and other free flowing non-impounded bodies of water.

Statement of Glenn English, National Rural Electric Cooperative Association, Arlington, Virginia

On behalf of the National Rural Electric Cooperative Association (NRECA), I appreciate this opportunity to provide testimony for the record on an issue of great importance to our members—incentives for renewable generation. Electric cooperatives are an untapped market force for deploying more renewable generation technologies. Developing additional renewable generation in rural America would help to advance these technologies and bring down their costs. But although electric cooperatives are uniquely situated to develop additional renewable resources, the cost of these resources is too high for their consumers. Electric cooperatives need an incentive comparable to the Production Tax Credit so they can bring the benefits of renewable generation to their communities.

Background

Electric cooperatives are private, not-for-profit utilities, owned by the consumers they serve. In most states, member-elected boards have ultimate sign-off on rates, terms and conditions of daily business transactions. Today, 930 electric cooperatives serve electric consumers in 47 states. There are generally two types of electric cooperatives: "distribution" cooperatives that deliver electricity directly to the consumer and "generation and transmission" ("G&T") cooperatives that generate and transmit electricity to distribution cooperatives. Distribution cooperatives may also purchase power from the marketplace and from investor-owned utilities and public power systems.

Electric cooperatives serve an average of 6.6 consumers per mile. By way of comparison, investor-owned utilities serve an average of 34 customers per mile and municipal utilities serve an average of 44 customers per mile. Although cooperatives serve 12% of the nation's electric consumers, they own and maintain 43% of the miles of distribution lines (lines that move power from higher voltage transmission substations into homes and businesses). Revenue per mile for cooperatives averages only $8,558 while it is more than six times higher for investor-owned utilities, at $58,981.

Electric Cooperatives Face Cost Impediments

Given the relatively low revenue per mile that electric cooperatives receive from members, keeping electricity rates affordable depends upon access to low-cost generation. The capital cost to install new renewable generation capacity is three to ten times more expensive than the cost to install conventional gas generation. Despite this challenge, electric cooperatives are committed to offering renewable generation to their consumers. In 2003, electric cooperatives purchased more than 200 megawatt hours of energy from renewable resources operated by developers that benefit from the Production Tax Credit (PTC). Nearly 250 co-ops offer renewable energy options through "green power" programs. Yet only *twelve* out of 930 electric cooperatives own renewable generation. Electric cooperatives generate about 5% of the electricity produced in the United States, but taking renewable generation alone, electric cooperatives own less than 1%. Why? Because renewable generation is driven by the PTC and the developers and utilities that benefit from the PTC. There is no incentive that enables electric cooperatives to affordably develop renewable generation for their communities.

Electric Cooperatives Are Ideally Situated to Plan More Renewable Generation

Renewable generation should be planned not for the purpose of receiving a tax break, but to deliver electricity to consumers on a long term, affordable basis. Electric cooperatives are ideally situated in rural America to site, build and transmit renewable energy to their consumers. I say transmit, because having a good spot for a new wind project does not mean that the power can actually be delivered to the grid. The transmission grid is a complex and often highly constrained system. There are utilities that would like to sign contracts to take delivery of power from wind farms but are prevented because transmission constraints prevent delivery of that power. Electric cooperatives have a tradition of integrated, long-term planning and expertise on the nation's electricity grid that must be taken into account as Congress seeks to foster more renewable generation. Renewable generation must ultimately reach end consumers in order to appropriately fulfill Congress' goals of more renewable energy production at lower costs.

Beyond the planning that electric cooperatives can provide when developing a new project, there is a potential for a significant synergy given our rural geography. Electric cooperatives serve many farm communities and have an opportunity through a partnership with farmers to solve problems of animal waste runoff. A farmer can purchase a methane digester, and the local electric cooperative can in turn purchase the methane output and convert it to electricity. Electric cooperatives are also located in many wind-rich areas, as well as in proximity to landfill gas facilities. Electric cooperatives are positioned to make renewable energy more affordable and economically competitive with convention generation.

Electric Cooperatives Need Affordable Options for Complying With New Policies

Given their mission of providing affordable electricity to rural consumers, electric cooperatives rely and have historically relied upon inexpensive generation from coal. But electric cooperatives are seeking the means to provide more costly renewable generation to their consumers on an *affordable* basis. Increasingly stringent clean air standards addressing NOx, SO2 and Mercury are being set forth in new federal and state regulations and possibly new legislation. Climate change standards requiring carbon reductions, if enacted, will require electric cooperatives and the entire utility industry to seek more production from non-emitting generation sources. And, electric cooperative consumers in some states are impacted by renewable portfolio standard mandates.

Given the increasing costs that these policies are imposing, those electric cooperatives with access to local renewable generation resources should have the option that all others have to develop those resources for their consumers on an affordable basis. And, electric cooperative consumers should not face the uncertainty of being entirely dependent upon purchases from third parties. Depending upon the market, private developers may or may not pass through the savings they realize through the PTC in power sales to cooperatives. Electric cooperatives need an opportunity to develop local generation resources for the benefit of the consumers within their service territories.

The Cooperative Business Model: Why Comparable Incentives are Needed

NRECA supports the extension of the PTC equitably to all renewable resources, given that many electric cooperatives purchase from the developers who rely on the PTC. But electric cooperatives also need access to comparable incentives. Electric cooperatives provide power to their consumer-owners "at cost" and thus are not-for-profit. Therefore electric cooperatives do not generally pay federal income tax. Revenues above cost of service are returned to customers, used to reduce rates or reinvested in utility infrastructure rather than paid to shareholders. Traditional tax incentives do not work for not-for-profit utilities as they have no federally taxable income to offset. And, while electric cooperatives have access to low-interest loans from the Rural Utilities Service (RUS), the interest rate on those loans does not nearly approach the approximately 30% cost reduction that the Production Tax Credit, for example, achieves for the wind developers.

In order for Congress to fully realize the benefits of tax incentives that are designed to make renewable energy economical, a tax incentive tailored to the unique characteristics of not-for-profit utilities is required. Electric cooperatives previously proposed a "tradable tax credit" incentive for electric cooperatives, but it was rejected by the Committee due to tax policy concerns. Electric cooperatives have therefore developed a new approach—a "clean energy bond." Clean energy bonds can provide electric cooperatives with an incentive comparable to the production tax credits that are available for the private sector. Clean energy bonds are based upon a "tax

credit bond" that currently exist in the tax code for school construction under the "qualified zone academy bond" (QZAB) program. In essence, a clean energy bond would provide cooperatives and public power systems with interest-free loans for financing qualified energy projects.

S. 962, the "Clean Energy Bonds Act of 2005," was recently introduced by Chairman Grassley and Senator Baucus, and a House companion will soon be introduced. The bills provide the clean energy bond for the renewable resources in Section 45 of the Code. I urge the Committee to consider this legislation in a potential energy conference.

Conclusion

Electric co-ops need incentives to afford renewable generation, just as investor-owned utilities and private developers are able to afford renewable generation through the PTC. The Clean Energy Bond provides an incentive tailored to co-ops, acting as an interest-free loan to finance qualified renewable energy projects. I appreciate the Subcommittee's consideration of our business model, which is critical to serving rural America; the significant renewable generation opportunities that exist in the areas we serve; and our desire to provide our consumer-owners with affordable green energy options. Please let me know if I or anyone in our organization can be of assistance to the Committee as it considers these important issues.

Statement of the Geothermal Energy Association

On behalf of the Geothermal Energy Association, we submit this testimony to the Subcommittee on Select Revenue Measures for inclusion in the record of its hearing on May 24, 2005 on tax credits for electricity production from renewable energy sources.

Geothermal energy is a clean, renewable resource that provides energy in the United States and around the world. Geothermal energy is defined as heat from the earth. It is considered a renewable energy resource because the heat emanating from the interior of the earth is essentially limitless. The heat continuously flowing from the earth's core is estimated to be equivalent to 42 million megawatts of energy.[1] The interior of the earth is expected to remain extremely hot for many years to come, ensuring a permanent flow of energy.

The benefits of geothermal energy include minimal air emissions, marginal land impact, reduced waste, and reduced environmental costs. In addition, geothermal energy is one of the most reliable renewable energy sources available. Electric power from geothermal sources is very desirable because it is base load power, not peaking, and it enjoys the highest capacity and availability factors of any power generation system.

Today, geothermal energy provides nearly 3,000 MW of reliable electric power in the U.S. But according to the USGS, this represents only a small fraction of U.S. resource potential.[2] Because of the high initial cost and risk of developing new geothermal power projects, geothermal, one of the largest energy resources in the western U.S., has not been developed to its full potential.

Geothermal projects take years to bring to fruition. Early exploration is high risk, and verification of a geothermal resource on a prospective site typically involves ten million dollars or more for drilling and related geophysical studies and reports. The success rate for "green field" exploration has been estimated to be between 20 and 50 percent in recent years, which is significantly higher than historical success rates. Once a resource is verified, permitting and construction can take 3–5 years or more, depending upon the resource location and the number and variety of governmental authorities with jurisdiction over the project. Despite all of these barriers, new geothermal projects are coming on-line today for initial prices between 6.0 and 7.5 cents/kWhr

[1] Energy and Geosciences Institute, University of Utah. Prepared by the U.S. Geothermal Industry for the Renewable Energy Task Force (1997), *Briefing on Geothermal Energy*. Washington, D.C.

[2] The U.S. Geological Survey testified before the Subcommittee on Energy and Mineral Resources of the House Resources Committee, U.S. House of Representatives, on May 3, 2001 that their 1978 report still represents the best available resource estimate. According to that report, there is an identified geothermal potential of 22,000MW and an undiscovered, unidentified potential for geothermal production of an additional 72,000 to 127,000 MW. This does not include all resource types considered to be part of the geothermal resource base.

In 2003, the California Energy Commission estimated that the average capital cost of a geothermal facility was roughly $2700 per kilowatt, which is 4–6 times greater than the capital cost involved in a comparable-output combined cycle natural gas power plant as shown in the following table.[3] (The CEC estimate does not reflect recent increases in steel and drilling costs discussed later in this statement, and does not include "site specific" costs such as permitting and transmission shown later in Figure 1.)

Table 1: Capital Costs of Natural Gas and Geothermal Facilities

(CEC estimates)

	Capital Costs	Installed Costs	In-service Cost
Combined Cycle Natural Gas	542	592	616
Geothermal Flash	2128	2410	2558
Geothermal Binary	3210	3618	3839

Because a geothermal facility has very low fuel costs and no fuel market volatility, in the long run, over 30–50 years, the "levelized" cost of a facility might be quite reasonable. But without the Section 45 Production Tax Credit (PTC), the initial risks, long lead times, and high capital cost will compel many investors to choose other alternatives that have shorter lead times, less risk, and lower front-end costs.

An expanded Section 45 Production Tax Credit (PTC) that includes geothermal energy helps overcome these barriers. An expanded PTC gives geothermal energy the opportunity to develop to its full potential alongside other renewables on an equitable basis, and spurs development of one of the nation's largest under-developed energy resources. While geothermal development in the U.S. flourished in the late 70s and 80s, since roughly 1992 there has been very limited development of new geothermal facilities. During this period, natural gas became a plentiful and cheap energy source and states struggled with changing their laws to allow more competition in the power industry. With cheap and plentiful gas and substantial legal uncertainty, developers shied away from making expensive and risky investments in geothermal power.

Congress' decision to expand the PTC to include geothermal energy in 2004 appears to be changing these trends as interest in new projects is evident in several western states. With continued support, geothermal power can rebound from the stagnant 90s and provide needed, reliable energy to meet our nation's needs. An expanding geothermal power industry will mean improvements in technology, expansion of the resource base, and as the infrastructure supporting geothermal development is rebuilt reduced production costs.

Here are some reasons to support making geothermal energy eligible for the full, ten-year Section 45 PTC:

- It will spur new investment, adding hundreds of new megawatts of highly reliable base load geothermal power to the grid. Geothermal power provides some of the most reliable electric power produced today, and produces electricity virtually emissions free.
- New geothermal development will mean new jobs and an immediate economic stimulus, and will bring substantial, long-term economic benefits to many communities in the West.
- It is justified. Geothermal power plants are capital intensive, costing several times more than a comparable fossil fuel plant, and involve greater risk due to the uncertainties of the subsurface resource. Providing investors a production tax credit incentive helps overcome these barriers and spurs new development.
- Development of geothermal energy resources will add to our nation's energy security. As former CIA Director Woolsey, National Security Advisor McFarlane, and Chairman of the Joint Chiefs of Staff Admiral Moorer said in their September 19th, 2001 letter to the Senate, "disbursed, renewable and domestic supplies of fuels and electricity, such as energy produced naturally from wind, solar, geothermal, incremental hydro and agricultural biomass address the chal-

[3] California Energy Commission (2003). "Comparative Cost of California Central Station Electricity Generation Technologies."

lenges [to America's energy security]." Their letter went on to urge immediate action on renewable energy production tax credits.

- It is equitable. Federal tax incentives for renewable energy have favored wind energy more than other renewable technologies. Extending the PTC on an equal basis to geothermal and other renewable energy sources would allow the market to choose which technology to pursue.
- The net cost to the federal government should be negligible. A recent study of the economic impact of extending the PTC to geothermal energy conducted by the National Renewable Energy Laboratory found, "from the perspective of the U.S. Treasury, it is likely that the net cost of the PTC would be insignificant or perhaps even negative . . ." (NREL/TP–620–31969, April 2002)

In many areas, rural economic development is nearly as important as securing reliable energy at stable prices. The geothermal facilities operating today provide high quality jobs in many rural counties, and are often among the principal sources of income supporting local schools and government services. New facilities spurred by extending the PTC to geothermal energy would provide reliable electricity, income and economic benefits for decades. As GEA stated in its October 3, 2001 testimony before the House Resources Committee, "If the goal of the DOE [Geothermal Energy] Strategic Plan could be reached, the cumulative federal royalties from new power plants would reach over $7 billion by 2050, and estimated income tax revenues would exceed $52 billion in nominal dollars.[4] From just the state share in these royalties, alone, that would mean an additional investment of $3.5 billion in schools and local government facilities in the western states."

There is broad support outside of Congress, as well. Not just the renewable power companies, but also the National Association of Regulatory Utility Commissioners, the Edison Electric Institute, and the Western Governors' Association have been among the groups calling for the expansion and extension of Section 45 as a national priority.

For similar reasons, Congress should consider providing equivalent incentives to public power entities and cooperatives that face similar investment choices. These organizations provide power to 25% of the nation's consumers. One approach that we believe deserves support is embodied in The Clean Energy Bonds Act of 2005, recently introduced in the Senate as S. 962.

Background on the PTC

A recent report from Platts Energy Resource provides some interesting background and insight on the role of the PTC:

The U.S. government has a long history of supporting renewable power technologies. This support has taken the form of publicly funded research and development (R&D) activities, on the order of over $15 billion in the past 20 years, as well as direct market intervention through the enactment of favorable regulatory policies, such as the Public Utilities Regulatory Policies Act of 1978 (PURPA, P.L. 95–617) and direct tax incentives like the investment and production tax credits. Among these support mechanisms, the production tax credit (PTC) is viewed as the most effective method for achieving increased market expansion of renewable energy sources.

Before its expiration on December 31, 2003, the PTC provided an inflation-adjusted tax credit of 1.8 cents (θ) for every kilowatt-hour (kWh) of electricity produced from wind farms, "closed-loop" biomass systems, or animal waste facilities during the first 10 years of operation. Policy-makers and the renewable energy industry generally believe that this credit, originally enacted as part of the Energy Policy Act of 1992, was the primary driver behind the double-digit growth of the U.S. wind power industry over the past five years. U.S. wind power capacity grew by 31 percent between 1998 and 2003, increasing from 1.6 to 6.3 gigawatts (GW).[5]

However, while the wind industry grew by double digits between 1998 and 2003, the geothermal industry grew by 2%, adding two new facilities—49MW and 10MW power plants in California—that received state production-based incentive payments similar to but slightly less than the current 5-year geothermal PTC. These incentive payments were enacted in association with the initial power industry deregulation legislation and are no longer available. Two other projects that should have been completed with incentive payments in the northern part of the state were mired in a stranglehold of federal reviews given their location on National Forest Service land. While these two projects are still moving forward, the cost to the developer of delays caused by federal land management agencies has been substantial.

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[4] Princeton Energy Research Inc (December 15, 1998). *Review of Federal Geothermal Royalties and Taxes.* Volume I, page 17.

[5] Owens, Brandon (July 2004). "Does the PTC Work?" PR&C Renewable Power Service.

Today, several states are moving ahead with laws that will promote contracts for new renewable power development. The geothermal industry is hopeful that these will lead to new power development, but the jury is still out on their overall effectiveness.

State "renewable portfolio standards" ("RPS") were recently reviewed in a report by the National Geothermal Collaborative, supported by the U.S. Department of Energy, entitled "Evaluating State Renewable Portfolio Standards: A Focus on Geothermal Energy," available at *www.geocollaborative.org/publications.* This report concludes that state RPS laws have so far had mixed success and have predominantly assisted wind energy development: ". . . early experience with the RPS in U.S. states has been mixed. Moreover, geothermal energy has not yet been the primary beneficiary of many state RPS policies."[6]

In its examination of the existing state RPS programs, several drawbacks were identified: *". . . we also find that the RPS has some potential disadvantages relative to other types of renewable energy policies: (1) due to its complexity, the RPS can be difficult to design and implement well, (2) an RPS may be less flexible in offering targeted support to renewable energy than some of the other renewable energy policies, (3) the exact cost impacts of an RPS cannot be known with certainty in advance, (4) operating experience with the RPS remains limited, (5) if an RPS does not lead to the availability of long-term power purchase agreements, the ability to finance new renewable projects will be limited and compliance costs may increase, and (6) an RPS is not necessarily suited to supporting diversity among renewable technologies, although an RPS can be designed to do so through the use of resource tiers and credit multipliers."*[7]

Policy Justifications for Adding Geothermal Energy to the PTC

While recent analysis by the California Energy Commission (CEC) cited by the staff of the Joint Committee on Taxation in their report for this hearing, JCX–36–05, shows that on a long-term basis, investment in geothermal energy makes economic sense, the marketplace is geared towards short-term decisions and minimum risk. As a result, the CEC analysis misses the point.

What the PTC is doing is not so much levelizing cost as equalizing risk. Given the high capital cost and risk associated with geothermal development, the PTC gives the investor the incentive necessary to consider geothermal energy on an equal basis with conventional power projects. In addition, by lowering the capital risk for the geothermal projects, the ratepayer and the economy benefit by avoiding price spikes and instead ensuring long-term stable prices for energy.

While the California Energy Commission's report presents an interesting case for supporting geothermal energy and other renewables, there are several points that need to be made about their analysis. First, we do not agree that there is such a great disparity in the cost of electricity between binary and flash plants as their study concludes. Second, their capital cost estimates do not reflect recent increases in world steel prices, which have more than doubled. Geothermal facilities use significant amounts of steel, and this price increase can result in a 10–20% or more increase in the cost of a project. Similarly, the recent surge in world oil prices has led to a rebound in the demand for drilling equipment and drilling supplies. Geothermal developers are finding the cost of drilling has increased at least 20–30% in the past year, and drilling is a significant part of the cost of new facilities as shown in the Figure below. (Also, as the Figure below indicates, only about half of the investment needed for a new geothermal facility qualifies for the Investment Tax Credit, making it effectively a 5% credit, while an output-based credit like the PTC makes no such distinction.)

Comparative Taxation Rates

It is generally observed that geothermal facilities pay significant federal, state and local taxes. A study conducted for the Department of Energy in 1998 by the Princeton Economic Research, for example, states:

"A lot more Federal income tax is being collected from geothermal electricity than from electricity produced from natural gas, on a per kWh basis. It appears that geothermal power systems, while having been granted a number of Federal tax incentives . . ., nevertheless appear to bear much heavier Federal income tax loads than are borne by some natural gas power generating systems. This is mostly because geothermal systems are much more capital intensive than natural gas power sys-

[6] Wiser, Ryan, et al. (2003). *Evaluating State Renewables Portfolio Standards: A Focus on Geothermal Energy*. National Geothermal Collaborative (NGC). page 1.

[7] Ibid, page 2.

tems, and profits and income taxes are generally proportional to the size of investments."[8]

More recent analysis supports this conclusion. Brandon Owens, who is currently Associate Director at Cambridge Energy Research Associates, published a study entitled "Does the PTC Work?" which found: "Fossil fuel—fired technologies have a lower tax burden relative to all renewable power technologies. The difference in tax burden is most pronounced for biomass and geothermal technologies, which, in this example, pay 227 percent and 338 percent more in total taxes, respectively, than they do for gas-fired combined-cycle units on a per megawatt-hour (MWh) basis."[9]

That study, published by PR&C Renewable Power Service, presents the following graphic of the relative tax value per Megawatt hour of different technologies:[10]

Assessing Positive Geothermal Externalities

Another policy reason often given as a justification for support for geothermal and other renewable technologies is compensation for their values to the nation that are not reflected in the market price of electricity—or their "externalities." Domestic energy production has obvious national security benefits, and electricity production has new relevance to national security since EIA and others are projecting significant and growing imports of natural gas. Obviously, reducing natural gas imports will have national security benefits, as well as benefits for our balance of trade. However, it is beyond GEA's capability to estimate a dollar value for these attributes. While gas-fired power plants must keep buying imported gas long into the future, geothermal power plants do not buy fuel at all and have a captive source of domestic energy.

A more measurable externality is the air emissions benefits of geothermal power. One way to approximate positive geothermal externalities is to examine the economic values received for these attributes in existing emissions trading systems. In assessing geothermal externalities through trading systems, we do not necessarily advocate the inclusion of renewables in trading schemes over other legislative policies nor speculate that the values here would be received in any particular plan. There are a range of challenges to analyzing such approaches that are beyond the scope of this statement. We also recognize that if renewables were to be included in emissions trading, prices would likely fluctuate, as markets would shift. In response to these uncertainties, we have opted to use somewhat conservative price per ton estimates, which we believe result in conservative assessments. We have extrapolated average price per ton values from the existing trading systems (NO_x and SO_2 systems in the U.S., CO_2 systems in Europe) that currently exclude renewables.

Here are the results. Using the mid range value of the reported price per ton estimate of each emission (NO_x, SO_2, and CO_2), we obtained a rough sense of the positive externalities created by geothermal power production for each emission. Valuing NOx at $2250 per ton, and estimating that geothermal power production prevents emissions of 32 thousand tons of NO_x per year, U.S. geothermal power production generates a value of $72 million a year ($2250 x 32,000). Valuing SO_2 at $150 per ton, and estimating that geothermal power production prevents emissions of 78 thousand tons of SO_2 per year, U.S. geothermal power production generates a value of $11.7 million a year. Valuing CO**2** at $10 per ton, and estimating that geothermal power production prevents emissions of 16 million tons of CO_2 per year, U.S. geothermal power production generates a value of $160 million a year. The total equals $243.7 million in equivalent air emissions value.

While this calculation is very rough, it does give an approximation of the externality value provided by geothermal power production. Assuming average annual geothermal power production of 15 billion kWhrs in the U.S., this equivalent air emissions total represents roughly 1.6 cents/kWhr in value that is not marketable and not recognized in the market price of geothermal power.

Tax Policy Advantages of a Production Tax Credit

The structure of the Production Tax Credit is unique, and when first enacted in 1992 it represented a radical change from the Investment Tax Credit. The move to a production tax credit makes sense from a number of policy perspectives.

- The Production Tax Credit works—the PTC has stimulated new investment in wind energy;

[8] Entingh, Daniel J. (December 15, 1998). "Review of Federal Geothermal Royalties and Taxes." Princeton Economic Research, Inc., page 4.

[9] Owens, Brandon (July 2004). "Does the PTC Work?" PR&C Renewable Power Service, page 9.

[10] Ibid, page 10. Figure and legend note are duplicated from the original work.

- The Production Tax Credit encourages cost reduction and efficiency by rewarding investors based upon project output instead of total expenses; and,
- The Production Tax Credit requires production for the full period of the credit to ensure that projects are legitimate power producers and not tax credit "scams."

Conclusion

Congress' decision to expand the Production Tax Credit to include geothermal technology was an appropriate policy choice. To make this effective, we urge Congress to extend the credit three to five years. If any shorter period is enacted, we urge Congress to allow geothermal projects to qualify for the credit based upon binding contracts, not just the "in-service" date of the power plant. Further, we urge Congress to provide geothermal projects the same ten-year credit period as wind sources.

These changes would make the PTC an effective and equitable stimulus for new investment in geothermal power and result is substantial economic, energy security, and environmental benefits.

Statement of the Independent Wind Power Association

The Mission of the Independent Wind Power Association (IWPA) is to enable small to mid-size wind energy companies to grow in order to meet the United State's future energy production needs. The IWPA seeks to define issues and support legislation that allows significant expansion of the opportunities and capital investment pool available for these companies.

In considering whether to extend the Production Tax Credit ("PTC"), Congress should seize the opportunity to encourage more competition among participants in this emerging segment of the power industry. The PTC is a positive incentive that has stimulated the development of clean energy projects throughout the United States, yet the structure of the PTC can and should be perfected and improved to increase market efficiency.

More competition can be achieved by allowing the PTC to be more equitably utilized by independent, smaller developers including ranchers, farmers, small businessmen and start-up renewable energy project entrepreneurs—in addition to the nation's largest power generators which under the current law benefit first from renewable PTCs.

Such an amendment to Section 45 can be easily accomplished without incurring a negative fiscal impact to the Treasury. Furthermore, by encouraging more robust competition among renewable power facility operators, the Congress can quickly and substantially diversify the country's supply base thus increasing the number of taxable entities and hastening the marketability and cost-competitiveness of renewable electric power.

The practical imbalance of the current PTC is a function of price and income. Though the price gap is narrowing, electricity generated from renewable sources is currently more costly than electricity generated from conventional power plants. Congress clearly intended for the PTC to stimulate the development of renewable projects in the face of this price differential.

As we have seen in recent months, global energy prices have become increasingly volatile. Many economists predict crude prices could spike as high as $100 per barrel in the coming years. The negative impact of such a spike would be a significant blow to electric consumers and our economy as a whole. It is important that Congress act now to promote more electric generation in this country from sources other than fossil fuels to avoid the negative impacts resulting from price volatility and potential supply/capacity shortages. Wind power is one the cleanest and most abundant sources of energy making it an important part of any solution addressing America's energy needs.

To take full advantage of the PTC, a taxpayer must first have sufficient offsetting taxable income. While large power producers enjoy multiple revenue streams generated from diversified business segments, ranchers, farmers, small businessmen and start-up renewable energy project developers tend to be focused on a single renewable power source and subsequently lack this offsetting income. As a result, these smaller entrepreneurs are typically forced to sell their projects, often in complex and costly transactions, to large financial institutions whose chief interest in renewable energy is acquiring the PTC to offset unrelated income.

As a solution, the IWPA proposes a more fair and equitable structure of the PTC designed to allow competitive wind developers, who commonly lack substantial taxable income, to retain ownership of their projects by building the value of the PTC into the power purchase agreement with their energy buyer. IWPA's proposal allows the purchasers of renewable energy, who likewise have a direct interest in expanding the development of renewable energy, to acquire all or a portion of the PTC in connection with a long-term power purchase agreement. This proposal confines the benefit of the PTC exclusively to those investors taking the risks associated with bringing these clean sources of electricity to the market.

The IWPA recommends the Congress consider legislation that would allow the PTC, in a one-time election, to be utilized by a qualified renewable-energy purchaser through a long-term power purchase agreement. The experience of the current PTC indicates this proposed modification will make the PTC more practical for the small businesses taking financial risks in developing clean energy. The proposal effectively allows the current PTC benefit to reside with the utilities (which it was originally intended to benefit) seeking to purchase clean energy and thus benefits the consumers who will see long-term benefits in price, security and reliability from the production of clean, domestic energy.

The proposal simply creates more efficient use of the PTC without altering the definition of the current PTC. Furthermore, the IWPA believes the amendment will not increase the government's cost of the credit. The proposal will significantly improve the availability of private capital for new wind-power projects thus lower financing costs.

Finally, the uncertainty associated with successive short-term extensions of the PTC in recent years has added to rising costs. The drive to complete construction within the one-year extension time frames has created strains on turbine supplies and construction contracting as project developers rush each year to develop projects before the PTC expires.

A multi-year extension combined with the ability to join the PTC into a power purchase agreement as proposed herein will provide the industry better tax predictability and improved market stability. This more attractive incentive will create favorable private financing and is a significant step towards achieving Congress' initial goals in establishing the PTC to promote renewable energy development.

Statement of David Koenig, American Forest and Paper Association

The American Forest & Paper Association (AF&PA) is the national trade association for the forest products industry. We represent more than 200 companies and related associations that engage in or represent the manufacturers of pulp, paper, paperboard and wood products. America's forest and paper industry ranges from the state-of-the-art paper mills to small, family owned sawmills and some 10 million individual woodlot owners. The U.S. forest products industry is vital to the nation's economy. We employ approximately 1.3 million people and rank among the top ten manufacturing employers in 42 states with an estimated payroll of $50 billion. Sales of the paper and forest products industry top $230 billion annually in the U.S. and export markets. We are the world's largest producer of forest products.

Today, the U.S. forest products industry is facing serious domestic and international challenges. Since 1997, 101 pulp and paper mills have closed in the U.S., resulting in a loss of 70,000 jobs, or 32% of our workforce. An additional 67,000 jobs have been lost in the wood products industry since 1997. New capacity growth is now taking place in other countries, where forestry, labor, and environmental practices may not be as responsible as those in the U.S.

Energy is the third largest operating cost for the forest products industry. In the pulp, paper and paperboard sector of the industry, energy makes up 10–15 percent of the total operating costs. Since 1972, our industry has reduced its average total energy usage by 17 percent through increased efficiencies in the manufacturing and production process. In addition, we have reduced our fossil fuel and purchased energy consumption by 38 percent, and increased our energy self-sufficiency by 46 percent.

The American Jobs Creation Act (H.R. 4520) included a provision to expand the Section 45 tax credit to include open-loop biomass. For purposes of the credit, open-loop biomass is defined as any solid, non-hazardous, cellulosic waste material which is segregated from other waste materials and which is derived from forest-related resources, solid wood waste materials, or agricultural sources. Eligible forest-related resources are mill and harvesting residues, pre-commercial thinnings, slash, and

brush. The 2005 credit for electricity produced from open-loop biomass facilities is 0.9 cents per kilowatt hour compared with 1.9 cents per kilowatt hour of electricity generated from closed-loop biomass facilities. To qualify for the credit for both open and closed-loop biomass, the facility must be placed in service prior to January 1, 2006.

The forest products industry is the largest user of biomass for energy production, which is used largely to fuel our wood and paper manufacturing facilities. In addition to biomass like bark, sawdust, and other residues from the wood harvesting and product manufacturing processes, the industry uses biomass in the form of "spent pulping liquors." Spent pulping liquors are created as a residual during the pulping process, and the wood residuals (mostly lignin) are burned in a process that separates and recovers the chemicals for reuse and captures the heat value from the lignin to create steam and electricity. In total, the forest products industry currently uses biomass to generate 60% of its power needs. With continued research and development of new technologies, and expanded tax incentives, the potential exists to greatly increase our industry's capacity for energy production.

Regarding Section 45, the placed in service date for facilities that produce electricity from open-loop biomass needs to be extended from January 1, 2006 to January 1, 2010. Such projects take several years to complete and the industry needs the certainty of knowing that the current tax credit will be available in the future to take the risk of making the investment. At the very minimum, Congress should extend the placed in service date to January 1, 2008 as the Administration proposed in its FY 2006 budget.

Also, clarification is necessary to the Section 45 definition of open-loop biomass to ensure inclusion of the lignin content from spent pulping liquors used to produce electricity at new or expanded facilities. Wood is composed primarily of cellulose (wood fibers) held together by lignin. Wood bark is composed of hemicelluloses. Pulping chemicals are used to dissolve the wood used for making paper. The cellulose fibers become paper products, the pulping chemicals are recycled from recovery boilers for reuse in the pulping process, and the wood residues (mostly lignin) are used to generate heat for making steam and electricity.

Finally, the current inflation adjusted tax credit of 0.9 cents per kilowatt hour needs to be increased to 1.5 cents per kilowatt hour to make the additional electricity produced competitive with other traditional forms of electric generation. The increased tax credit would provide a critical incentive for new investments in energy production facilities connected to current paper mill infrastructure, thus helping to improve the competitive position of the forest products industry.

We appreciate the subcommittee's interest in our thoughts on the need to extend and modify the Open-Loop Biomass component of the Section 45 tax credit.

Statement of Richard Kolodziej, American Biogas Alliance

The American Biogas Alliance (Alliance) is an organization of companies and individuals dedicated to increasing the production of methane from renewable sources in the United States.

COMMENT SUMMARY

Currently, the federal government provides tax credits for the production of electricity from waste or renewable sources for new projects. Landfill operators may receive 0.9 cents tax credit per kilowatt-hour for electricity produced from landfill gas at facilities placed in service during 2005. This is the equivalent of $2.64 per million btus of electricity (delivered energy). For electricity produced from animal and crop waste and municipal sewage, the tax credit is 1.8 cents per kilowatt-hour or $5.28 per million btus. For ethanol produced from crops or biomass, the credit is 52 cents per ethanol gallon or $6.87 per million BTUs.

While the Alliance applauds Congress for providing these incentives and for encouraging the production of electricity from renewable sources, we believe that Congress can replicate the success of these incentives for electricity production by also providing an incentive for producing methane from these same renewable sources. Rather than having the federal government pick winners among the energy forms, the Alliance urges Congress to treat companies that own and operate facilities that produce methane (biogas) from landfills, animal and crop waste and municipal sewage the same as those companies that own and operate facilities that produce electricity from these sources. Specifically, Congress is urged to provide companies that produce methane from landfills, animal and crop waste and municipal sewage the

same tax credit per million btus of methane produced (and either used by that organization or sold to a third party) as they would receive if they produce a million btus of electricity from these sources.

BACKGROUND

Almost a quarter of America's primary energy consumption is natural gas, and natural gas is primarily composed of methane. Over 70 percent of new single-family homes have natural gas service and, for the past decade, more than 90 percent of new power plants have been natural gas fueled. The reasons for this growth are the inherent environmental, economic and form-value attributes of the fuel itself. Unfortunately, the popularity of natural gas is driving demand to levels that will exceed domestic and North American supply. As a result, the price for natural gas has increased significantly over the past few years, and there is renewed interest in building new liquefied natural gas (LNG) receiving terminals in the U.S. to capitalize on the growing world-wide trade in LNG. While LNG imports have benefits (especially if the gas were imported from non-OPEC countries), it would be even more beneficial if the U.S. took advantage of its undeveloped domestic methane sources. One of the most valuable is the production biogas from waste products.

- Biogas is a product of the decomposition of organic materials, such as animal or crop wastes. Biogas composition is typically about 60 percent methane and 30 percent carbon dioxide, with the remaining 10 percent dominated by nitrogen and water vapor. This gas is produced at landfills, sewage waste treatment plants, feedlots, and any other place where there is decaying organic material. The biogas resulting from these activities can be released to the atmosphere, collected and flared, or collected and used as a fuel. It also can be collected and concentrated to match the composition of natural gas, and used to supplement America's natural gas supplies. Unfortunately, atmospheric release and flaring are the most common methods of dealing with biogas today. A 1998 U.S. Department of Energy study[1] estimated that, worldwide, between 25 and 37 quadrillion btus of methane each year is released into the atmosphere (beyond the methane currently captured) due to natural decomposition of organic material. This is equivalent to between 25 and 38 percent of all of the energy used in the U.S. each year. Much of the naturally occurring renewable methane is produced in small quantities from disparate sources (e.g., swamp gas), and, therefore, is difficult and expensive to capture. *Fortunately,* much of the biogas generated from *human activity* is produced in larger quantities in discrete locations, where it can be captured. In the U.S., the DOE study referenced above estimated that the potential biogas production from farm waste, landfills and municipal sewage alone is approximately 3.5 quadrillion btus of methane. Of that amount, the study estimated that it would be feasible to capture and use over a third of this methane (or about 1.25 quadrillion btus). This is equivalent to:
- 6 percent of all the natural gas used in the U.S., or
- 175 percent of all the LNG currently being imported into the U.S., or
- The output of four new one billion cubic-foot-per-day LNG terminals

Landfills: Landfills generate a substantial amount of methane through the anaerobic (oxygen-free) degradation process that occurs naturally within the landfills themselves. The methane can be a safety hazard if not "drained" properly. In November, the Bush Administration co-signed a "Methane-to-Markets" agreement with 12 other countries, in part, to help developing countries implement landfill gas collection programs. Currently, the federal government offers incentives for new projects to convert landfill gas to electricity. As a result, according to the U.S. EPA, there are 380 such landfill gas electrification projects in place today. Unfortunately, not all landfills are located in areas where the economics of electricity production are sufficient to make landfill gas collection and processing financially feasible (e.g., inadequate electricity prices or access to the electricity grid), and, therefore, many U.S. landfills do not capture their methane. They simply "flare" the gas or allow the gas to vent into the atmosphere. The U.S. EPA estimates that there are 600–700 additional landfill gas-to-energy projects that could be constructed nationwide. An alternative to electrification is to clean and concentrate the gas into pipeline-quality methane, and (1) inject the gas into the local natural gas distribution system, (2) use the gas to fuel trash trucks and other local vehicles at (or very near) the landfill site or (3) transport the gas by truck to a location where the gas can be used to displace petroleum or other, more polluting fuels.

[1] "Biogas For Transportation Use: A 1998 Perspective," July 9, 1998, QSS Group Inc.

Animal Waste: The processing of waste from domesticated animal operations (such as dairies, and pork and poultry production) is an expensive process that presents significant environmental challenges. With the proper financial encouragement, farmers and other operators of these animal facilities could install anaerobic digester systems to convert the waste to usable methane—with valuable, sanitary fertilizer as a byproduct. As with landfill gas, there currently is a federal incentive to convert animal waste to electricity, but no federal incentives to convert animal waste to methane. Companies that must cope with large quantities of animal waste can become significant producers of methane through the use of anaerobic digesters. For example, Smithfield Bioenergy today is producing biogas with a substantial methane component at a Smithfield Foods hog farm in Utah. That Smithfield facility shows that hog farms and similar operations can be a viable source of methane that can reduce our dependence on imports if the process can be made economically viable.

Sewage: The amount of human sewage that must be processed continues to grow with the population. The economic costs are large, and the environmental costs are significant. As with animal waste, sewage can be converted to methane via anaerobic digesters. In Malmo, Sweden, for example, the city runs part of its fleet of transit buses on methane produced at its local sewage treatment plant. As with landfill gas and animal waste, there currently is a federal incentive to convert municipal sewage to electricity, but no federal incentives to convert municipal sewage to methane.

Biomass: While not a major source of fugitive methane, recoverable biomass—including crop waste, plants (such as switch grass) grown especially for energy production and other organic matter—also can be used as a feedstock for the production of methane. Here, too, Congress has provided financial incentives for the conversion of biomass into some forms of energy. For example, federal tax credits are available to those who blend of ethanol with gasoline and to producers of biodiesel from virgin plant oils (e.g., soy beans) that is used to displace diesel fuel in vehicles.

While producing and capturing methane from these sources is generally not economic given existing prices for competing fuels and the fact that many of the technologies for producing and capturing methane from these sources are new and just developing, with adequate federal incentives, projects to capture and use methane from these sources could become quite economically attractive. Currently, commercial technologies exist for the production of biogas from all these sources. However, since the demand for these technologies is limited, there is little mass production and economies of scale. Early projects stimulated by federal incentives would help demonstrate the technology, help reduce the cost of similar future commercial projects and increase competition for this equipment.

RECOMMENDATION

The Alliance urges Congress to treat companies that own and operate new facilities that produce methane from landfill gas, animal and crop waste and municipal sewage the same as those companies that own and operate new facilities that produce electricity from these sources. Specifically, Congress is urged to provide companies that produce methane from landfill gas, animal and crop waste and municipal sewage the same tax credit per million btus of methane produced (and either used by that organization or sold to a third party) as they would have receive if they produce a million btus of electricity from these sources.

History has shown that such incentives for the production of natural gas can be very effective. In 1979, Congress approved an incentive for the production of methane from coals seams and coalmines. For the first decade, investment and production grew slowly. Since then, however, the production of methane from these sources has mushroomed, so that, last year, nine percent of the natural gas used in the U.S. was produced from coal seams and coalmines.

It is difficult to estimate prospectively the cost of the proposed biogas incentive. However, the Alliance would urge Congress to consider two points. First, from discussions with a number of project owners/operators, it is believed that many of the renewables-to-electricity projects that would be constructed in the future (assuming that the existing Section 45 incentives for electricity production are extended) would instead become renewables-to-methane projects if methane production were provided the same incentive as electricity production. To the extent that producers choose the methane course, this expansion of Section 45 would offset itself. In other words, for those projects, the additional cost to the Treasury would be zero. Second, it is expected that it would take significant time to identify appropriate sites, negotiate contracts, and then build and install the methane producing technologies. The cost of those new facilities would run into the millions, a reality that ensures that new entrants into this method of methane production would be limited in number

in the initial years, hopefully, increasing as the credit is shown to make methane production economically viable. The slow growth of coal seam methane production over the first decade of the incentive illustrates this point. As a result, the additional cost in the first several years of extending the incentive to methane production should be comparatively modest at first and climb only gradually in future years.

Increasing the production of biogas from animal and crop waste, landfills and municipal sewage would help address several public policy problems simultaneously. It would increase the supply of domestically produced, non-fossil fuel energy while reducing the amount of greenhouse gas now emitted into the atmosphere. It would lead to the development and deployment of new technologies, and create jobs here at home as the industry grows. It would help dairy, hog and poultry farmers and their surrounding communities to successfully address the significant environmental challenges to waste disposal while providing them a valuable supplementary revenue source. And, for municipalities, it also would provide a valuable supplemental revenue source while reducing the amount of sewage that currently needs to be processed.

The noted scientist and inventor R. Buckminster Fuller observed: "Pollution is nothing but the resources we are not harvesting. We allow them to disperse because we've been ignorant of their value." Encouraging the harvesting of methane from these renewable sources would be a win-win-win for America.

US Geothermal, Inc.
Boise, Idaho 83706
May 24, 2005

Dear Members of the Subcommittee:

My name is Daniel Kunz and I am President of US Geothermal, Inc. My colleague's name is Douglas Glaspey who is the Chief Operating Officer of our company. We have lived in Boise, Idaho for over 25 years and have worked in the natural resource development and energy industries. US Geothermal, Inc. was formed nearly 4 years ago to develop the Raft River geothermal site in southeastern Idaho.

US Geothermal, Inc. is developing the Raft River geothermal resource to initially produce 10 megawatts of clean, reliable and renewable geothermal electricity under a 20-year contract with Idaho Power Company. The power will be delivered to Idaho Power's energy consumers from our site in the southeastern part of the state, half way between the capital city of Boise and Salt Lake City, Utah on Interstate highway I–84. We believe there are 10 to 20 times this amount of energy available at Raft River, or another 100 to 200 megawatts of geothermal energy, that can be developed. In fact, two months ago we signed two new 10 megawatt, 20-year power sales agreements with Idaho Power Company. This means that we now have 30 megawatts under contract. However, despite having these 20-year fixed price contracts it is probable that the other 100 to 200-plus megawatts will remain untapped in this reservoir if the geothermal production tax credit (PTC) is not extended in a viable manner. Idaho has additional geothermal sites that we will seek to develop if the PTC is extended in a viable manner.

Geothermal power plants produce what is called base load power: consistent energy production, 24 hours a day, seven days a week. In addition, a well-managed geothermal reservoir is a sustainable resource as evidenced by many geothermal power projects in California and Nevada. Geothermal plants enjoy the highest capacity and availability factors of any power plant or project. Once the capital costs have been paid for, these plants are very low cost to operate and have very little "down time" because there is no combustion that requires significant maintenance in other plants like coal, nuclear and gas. Our problem is primarily the high upfront capital costs of developing a resource and building a geothermal plant. Our costs are more than four times per megawatt higher than comparable natural gas-fired power plants. In addition, we typically sign long-term (20- to 30-year) fixed-price contracts, while coal- and natural gas-fired plants typically enter into shorter contracts—and usually with fuel adjustment clauses to hedge against fuel price volatility. Geothermal energy thus bears the dual financial burdens of higher initial capital costs combined with greater price risks going forward—a combination that makes it difficult to attract investment dollars. The benefits of the power source often go unnoticed and unaccounted for. For example, geothermal power has a high capacity factor that allows the customers to rely on this source over very long periods of time. These plants have no market fuel costs and are not subject to market

related price adjustments. The fuel source is secure, located in the United States: no worry about the foreign energy sources.

We need a stable production tax credit program with a term of 3 to 5 years so that the capital allocation people can plan and rely on the credit in order to invest in geothermal power development.

The first issue we ask you to address is the eligibility period. For geothermal projects, the placed-in-service date should be extended for an appropriate term to make the production tax credit viable. We believe three years is the minimum needed to benefit most geothermal developers, who, like us, must deal with multi-year lead time challenges of planning, permitting, and construction. Five years would be better. We propose that you extend the Section 45 placed-in-service date for at least three to five years.

The second issue is the duration of the production tax credit. We believe geothermal projects should receive the same term provided for wind generation—ten years—as opposed to the current five years for geothermal. Making the duration of the credit match the ten years afforded other renewables such as wind will result in better long-term planning and significant additional geothermal development. If Congress extends the production tax credit for geothermal energy in this manner then the development program at Raft River can proceed toward building the ultimate capacity that we believe is between 100 and 200 Megawatts.

While we are the "little guys" in geothermal development, we have a great opportunity to grow and develop new geothermal sites in Idaho and elsewhere in the west, adding good paying jobs to mainly rural areas, providing tax revenues to those same rural areas, providing a "flywheel" effect from our jobs and tax payments that helps local businesses and suppliers, and developing new technological advances in this clean form of power development. For example, we have been awarded a grant from the U.S. Department of Energy to be applied to the use of a potentially higher efficiency power cycle using ammonia absorption. This is an additional risk that may be difficult to finance without the PTC. However, if successful, the ammonia absorption power cycle could open doors for geothermal electric power development at resource sites that today may not be economically viable.

We appreciate the opportunity to "be heard". We are thankful for the hard work that the committee does in support of energy development and independence. We respectfully request that you support the extension and improvements in the PTC as outline herein.

Sincerely,

Daniel Kunz
President

Douglas Glaspey
Chief Operating Officer

Public Service of New Hampshire
Manchester, New Hampshire 03101
May 26, 2005

Dear Chairman Camp:

On behalf of Public Service of New Hampshire (PSNH), a subsidiary of Northeast Utilities (NU), I am pleased to submit comments to the Subcommittee on Select Revenue Measures of the House Ways and Means Committee concerning renewable energy production tax credits.

PSNH, the largest electric utility in the State of New Hampshire, operates three fossil electric generating facilities and nine hydro-electric generating plants in the state. Both PSNH and New Hampshire understands and has prioritized the value of fuel diversity; and continues to look for ways to meet today's and tomorrow's energy challenges, while being environmentally responsible.

PSNH has first hand knowledge of the benefits and challenges of embarking on a renewable biomass project. The Northern Wood Power Project (NWPP), located in Portsmouth, is our renewable energy initiative in which we will be replacing an existing coal-fired boiler with a state-of-the-art boiler designed to burn biomass. Biomass, or clean wood, is a resource abundant in the New England region. Because of its innovative approach, this project has enjoyed broad support, but has not been without its challenges. Biomass projects are often smaller in scale and therefore borderline in their financial viability. Federal support, by way of the renewable production tax credit, can be the critical piece which allows these important projects to move forward.

Supporting the application of the renewable energy production tax credit for open loop biomass expands the fuel diversity of America's energy supply and lowers dependence on foreign oil and gas supply. Encouraging the use of biomass as a fuel to generate electricity expands the fuel diversity while providing low-emissions generation options.

Biomass as a renewable, using biomass as a fuel, is uniquely important in supporting sustainable forest management practices and selective forest clearing—an important wildfire prevention treatment. Biomass power also generates jobs in rural economies and injects sizable revenue into the regional economy. When completed, PSNH's NWPP is estimated to add approximately $20 million annually into the New Hampshire economy.

For these reasons, PSNH urges the Subcommittee to treat biomass no differently than other forms of renewable energy. Extending the time frame for the "placed in-service date for qualifying facilities" provision under the renewable energy production tax credits for units placed in service through 2006 would encourage the environmentally cleanest use of biomass for electricity generation. The newer, state-of-the-art boiler design we plan to use at the NWPP is a great benefit to the environment since air emissions are significantly reduced. Extending the in-service date would provide an important boost in encouraging industry to participate in the renewables program since it takes many years to plan, site and develop these projects.

PSNH appreciates the opportunity to offer comments on the Renewable Production Tax Credits hearing of the Subcommittee on Select Revenue Measures. Please contact Mr. Todd W. Lavin, Executive Director of Governmental Affairs for Northeast Utilities at (202) 508–0901 should you require further information on this topic.

Sincerely,

Gary A. Long
President and Chief Operating Officer

Statement of Market Street Energy Company, Saint Paul, Minnesota

Mr. Chairman and Members of the Subcommittee, Market Street Energy Company appreciates this opportunity to submit a statement for the record for the Subcommittee's hearing on Federal tax credits for electricity production from renewable resources.

Market Street Energy Company

Market Street Energy Company is an experienced leader in energy conservation and the conception, design, operation and management of renewable energy systems. The company is a for-profit affiliate of District Energy St. Paul, a non-profit heating utility, and District Cooling St. Paul, a non-profit cooling utility, in St. Paul, Minnesota. Market Street Energy's mission is to deliver quality, cost-effective energy projects and services that benefit communities, investors, clients and the environment. The company is committed to expanding the presence of renewable energy systems that achieve outstanding energy efficiencies and improve the environment throughout the United States.

Deep water air conditioning

Deep water air conditioning offsets the demand for electricity by using a renewable energy source to provide reliable, environmentally friendly, low-cost air conditioning. Cool water from a deep lake or ocean is pumped through a pipeline to a cooling system on the shore. The intake pipe is placed at a depth where the water temperature is 39–46 F. A cooling station transfers the water's chill to water circulating in a closed loop pipeline system (district cooling system) that provides air conditioning service to consumers. The water is returned at a depth where the water in the lake or sea has a similar temperature as the returned water.

Recent deep water projects include a system using cold water from Cayuga Lake to cool campus buildings at Cornell University, another using water from LakeOntario to cool buildings in downtown Toronto, and another using water from the Baltic Sea to cool buildings in downtown Stockholm. We are currently developing projects in Hawaii.

The benefits

Deep water air conditioning offers many advantages over conventional methods to provide air conditioning.

Uses a renewable, energy source—cold, deep water.

Significantly reduces electrical usage—each ton of deep water air conditioning saves about 0.7 kW of electric capacity.

Reduces reliance on fossil fuels.

Reduces emissions from power plants—r educed use of fossil fuels provides for significant reductions in greenhouse gas emissions as well as CO, NOx, SO2 and particulate emissions.

Eliminates need for chillers and cooling towers—eliminating the use of cooling towers reduces potable water consumption, toxic chemical use, and the production of sewage.

Eliminates use of ozone-depleting and greenhouse gas refrigerants.

Current law

While the Internal Revenue Code (sec. 45) provides a tax credit for the domestic production of electricity from renewable resources, there are no tax incentives for the use of renewable resource technology that replaces the consumption of electricity, even though the environmental advantages are the same. Sec. 48 provides an investment tax credit for any property that uses solar energy or geothermal deposits for heating or cooling, but does not apply to the use of deep water. Private activity bonds (sec. 141) can be issued to finance local district heating or cooling projects, including deep water air conditioning projects, subject to the volume cap in sec. 146.

Need for change

The Congress has recognized the importance of tax incentives in developing and accelerating the use of similar renewable energy technologies. Deep water air conditioning projects provide the same benefits as technology that qualifies for the sec. 45 credit for electricity production from renewable resources and technology that qualifies for the sec. 48 energy investment credit. The startup cost for these projects is considerable. A lake source cooling project to cool the central campus of Cornell University had a $60 million price tag. A proposal to cool a significant portion of downtown Honolulu will cost about $120 million.

Proposed change

In order to encourage the substantial up-front investment required for deep water air conditioning projects, Congress should:

Extend the sec. 45 credit for production from renewable resources to deep water air conditioning projects,

Extend the sec. 48 energy investment credit to deep water projects, or

Allow the issuance of private activity bonds for such projects outside the volume cap.

Statement of Richard A. Meyer, Ocean Energy Council, Inc., Royal Palm Beach, Florida

Mr. Chairman and members of the Subcommittee, I welcome the opportunity to add my Submission for the Record regarding including OCEAN ENERGY as a significant renewable energy source worthy of becoming eligible for the Section 45 production tax credit (PTC).

The Ocean Energy Council has over 80 members including representatives of federal, state and local government, private industry, research facilities, the offshore (oil) industry, power generating firms, and others. There has been an abundance of testimony by various witnesses to your Committee on the importance of adding to and extending PTCs to encourage expansion of development of renewable sources of energy.

Ocean energy encompasses various technologies including harnessing the energy in the oceans from wave, thermal differences (OTEC), offshore wind, tidal, current, biomass and salinity gradients. Each has its champions, and all have been demonstrated not only in research laboratories worldwide, but in recent years with demonstration facilities in the ocean.

The keynote speaker at the April, 2005 EnergyOcean2005 Conference, held in Washington, was Spencer Abrahim, Secretary of Energy in President Bush's Cabinet until he left the administration in February. He referenced the powerful and positive report on ocean energy that the Edison Power Research Institute / EPRI, an independent energy research organization, had just released in February, saying it

would be a great asset towards influencing Congress, the offshore industry, power producers and investors.

He said: "The ocean energy industry has matured over the past few decades, and the technologies are becoming commercially viable at a time when our nation seeks greater energy independence. The time is right."

I want to make 3 points regarding ocean energy:

1. Ocean Emergy outranks nuclear, oil, coal, and natural gas in net energy analysis.

Ocean Energy outranks these energy sources *economically*. When producing electrical power, an associated amount of energy is expended. The costs of finding, extracting, processing, transporting, and delivering energy too often goes unconsidered. Ocean energy is not the most economical: hydroelectric and geothermal rank higher. But these energy sources are found in only a limiting small number of locations. Ocean energy is widely available.

Three major studies of net energy analysis have been done, by the University of Massachusetts, Stanford University and the Oregon Office of Energy Research.

2. Ocean Energy has far wider potential for adding to the energy picture than other renewables including wind, biomass, geothermal and direct solar.

Renewable ocean energy has vast potential because the sun's heat warms the entire planet, but unlike land surfaces where it is dissipated, this heat is

stored in the oceans, where it is waiting to be utilized. The oceans cover over 70% of the earth's surface. The oceans are, indisputably, the earth's largest solar collector. And while all this energy takes up residence in the world's oceans, it is constantly renewed and replenished. Throughout most of the world, it is available 24/7—unlike most other solar and renewable technologies. It is truly "The 24/7 Energy".

3. The U.S. is far behind Europe, China, Japan and Austrailia in developing renewable energy.

Offshore wind farms have been operating for several years in Denmark, Sweden, and the U.K. Two wave energy facilities have been connected to local grids off Scotland and England. France and Canada have had tidal generating installations providing power for decades. Portugal, just last month, contracted for a wavefarm off its shores. Australia has initiated two wave generating plants, and China has just authorized an offshore wind farm. OTEC plants are planned for the Mariana island of Saipan and in Tamil province in India.

I will be happy to provide further references regarding any of the above statements upon request at 561.795.0320 or www.oceanenergy@adelphia.net.

We ask that you include ocean energy in the renewable sources of electrical energy production eligible for Production Tax Credits. Thank you.

Statement of Honorable Earl Pomeroy, a Representative in Congress from the State of North Dakota

I first want to commend the Chairman and Ranking Member for holding this hearing on the important subject of providing incentives to the renewable energy industry in our country. I would like to bring the subcommittee's attention to two significant issues with regard to the production tax credit.

1) Extend the production tax credit for wind energy development for a minimum of five years. There are currently some 6,700 MW of installed wind generation in this country. That number is expected to climb to nearly 9,000 MW by the end of the year. Without an extension of this tax credit, growth in the wind energy industry would virtually grind to a halt.

In North Dakota, about 60MW of wind energy has been installed that is owned and operated by FPL Energy. FPL is the owner and operator of these facilities. The incentive provided to FPL through the production tax credit (PTC) allows the company to sell wind generated electricity in our market at a competitive price. That price has been attractive enough for FPL to secure purchased power agreements from Basin Electric Power Cooperative, Bismarck, (for 40 MW) and Otter Tail Power Company,Fergus Falls,Minn. (for about 20 MW). Without this production tax credit, the price of wind generation would not be competitive in a state like ours where generation costs are extremely low compared to national averages.

Another reason the PTC needs to be extended is to encourage suppliers to gear up for this market. Already, utilities in my state that are interested in developing

more wind energy tell me that equipment costs for wind generation have risen 20 to 25% in the past year. That's because not enough companies are gearing up to supply equipment to the industry. Congress needs to provide certainty to this market and the manufacturers who supply equipment to it. The stop and start nature of the production tax credit must end; we must provide long term certainty for a robust market to develop.

2) Provide a comparable incentive for nonprofit and municipal utilities: The PTC is essentially not available to about 25% of the electricity market supplied by nonprofit cooperatives and municipal electric utilities. That's because these entities are generally not subject to federal income tax. I encourage this committee to support a comparable incentive for nonprofit and municipal utilities that wish to own and operate wind generation facilities. I support a proposal for Clean Energy Bonds, which could provide electric cooperatives and municipal utilities with an incentive comparable to the production tax credit. Clean Energy Bonds are based upon a "tax credit bond" that currently exists in the tax code for school construction under the qualified zone academy bond (QZAB) program. This program would allow the U.S. Treasury to provide the holder of such bonds a tax credit to be applied against federal income tax liability in lieu of interest payments from the issuer of the bond. Essentially, a clean energy bond would provide cooperatives and public power systems with interest-free loans for financing qualified renewable energy projects.

Technology Transfer Partners
Chicago, Illinois
No Date Available

Honorable Committee Members:

I offer the following observations upon use of tax credits to help promote electricity from renewable resources. These comments are based upon 25 years experience worldwide literally in all facets of the energy industry. First if one looks at economic development trends worldwide, and then plots GDP growth against any rational energy equivalent factor in BTU's (natgas/oil) or in MWH (electricity generally), what becomes apparent is that worldwide, energy supply will potentially begin to lag energy demand over the next decade.

For that reason as the World Energy Congress concluded in Sydney, Australia in September 2004 that "no energy source should be taken off of the table."

With that thought in mind Congress has developed and attempts to encourage alternative energy supply development under the rubric of "renewable energy". In light of the World Energy Congress conclusion above, "renewable energy" really has no absolute definition or application, but ultimately functions as a flexible working definition to include any alternative source of energy whose use may be stimulated by reasonable incentives.

One category of energy supply readily available but often overlooked is waste heat or waste energy off of existing electrical or industrial applications. Congress may want to stimulate both industry and creative minds to capture and employ this currently available-but untapped—energy source. There are technologies already developed that may be employed for this task; traditional cogeneration, the new expansion gas motor technology, and other rankine cycle technologies.

I would encourage this legislative Committee to give serious consideration to shaping its legislation in part to capture this readily available energy supply. Specifically I suggest that tax credit coverage be broadened to include particular types of equipment that capture waste heat or energy. Alternatively the Committee may consider creating an entirely new fiscal measure to further encourage productive use of waste heat/waste energy. Thank you for your time.

Sincerely,

David Rosenberg

Verdant Power
Arlington, Virginia 22207
June 6, 2005

Thank you for allowing us to comment on this critical issue of paramount importance to the emerging ocean renewable energy industry. As you know the Production Tax Credit (PTC) has been and continues to be a tremendous impetus to the successful development and maturation of the wind industry. One of the values of

the credit is that it recognizes actual electricity production, not mere promises. All of the business and market risks of the technology development and implementation remain the obligation of the private sector.

We as a country need to extend the same principles to the emerging ocean energy industry in order to provide needed critical support to the development and growth of a domestic industry. Currently much of the governmental support for research and development of this technology is based in the European Union, which provides significant financial, technical, and regulatory assistance to its budding marine energy industry. Great strides are being accomplished as a result, with a danger that the irrevocable dominance of this industry will permanently reside outside of the United States.

The domestic industry is real. Our own company has been actively developing a 200kW showcase demonstration project in the East River in New York City, to be followed by a build out of a larger field of up to 5–10 MW. This facility would place New York City as one of the largest urban renewable energy producers in the world. This particular effort has been followed by the filing by other developers of preliminary permits with the Federal Energy Regulatory Commission for more than a dozen similar ocean energy projects.

In conclusion, we appreciate the advantages that the PTC has provided the wind industry and its development. It has helped put the wind industry on a path toward self sustainability. Might the same be done for an emerging industry—ocean energy? The PTC would go a long way toward accelerating the development of a new industry, which the United States could dominate.

Sincerely yours,

Ronald F. Smith
Chairman

Statement of Mark R. Stover

Hydropower is one of the nation's most valuable energy resources. It is low-cost, clean, domestic, renewable and emits no air pollution. Hydropower also provides vast recreational opportunities, improves electric grid reliability and significantly reduces the amount of carbon emissions from the United States.

In fact, NHA estimates that U.S. hydropower generation avoids 130 million metric tons of carbon each year. Put another way, the carbon emissions avoided by U.S. hydropower generation is equivalent to removing approximately 40 percent of the vehicles from U.S. roadways. Truly a unique electricity source, hydropower provides numerous benefits every day to millions of Americans.

Despite its many benefits, data from both the Energy Information Administration and the Department of Energy confirms that the nation's hydropower resources are greatly underutilized. Hydropower has *significant* growth potential. Considering the nation's growing need for clean and domestic energy, the time has come for Congress to ensure that this potential is developed.

Less than three percent of the nation's 75,000 dams produce electricity. The Department of Energy estimates that as much as 21,000 megawatts of hydropower capacity sits unused at existing hydropower facilities and non-hydropower dams—this is capacity that could be developed *without* building new dams or impoundments. This is enough power for eight cities the size of Seattle or for the entire state of Virginia. It is enough yearly power for 7.8 million homes.[1] Developing this unused capacity would also result in the avoidance of 42 million metric tons of carbon emissions each year.

Of the 21,000 MW identified by DOE, 4,300 MW of new hydropower generation could be achieved by simply further developing our nation's existing hydropower infrastructure through efficiency improvements and capacity additions. This is known as incremental hydropower. There is enough incremental hydropower to meet the electricity needs of the states of New Hampshire and Vermont. Put another way, it is enough yearly power for 1.6 million homes.

In addition to the conventional hydropower technologies mentioned above, DOE estimates that a wealth of potential exists for micro, low-head, kinetic and low-power hydropower development. In fact, DOE believes that the hydropower industry could double its present contribution to the nation's electricity supply if these emerging, cutting-edge, non-conventional technologies are fully deployed.

[1] Using a 45% capacity factor and an EIA figure stating that the average U.S. home consumes 10,524 KwH of electricity per year.

Unfortunately, almost none of the nation's potential hydropower capacity is being developed. Bringing new hydro generation on-line is capital intensive, and the costs are increasing. In addition, hydropower faces costly regulatory hurdles of new development not faced by other resources. While the costs clearly vary from project to project, new hydro generation—depending on the type of upgrade—runs from $650 to more than $2,500 per kilowatt (Kw), sometimes much more.

Hydropower's development costs are very similar to the development costs of the resources that are presently included in the Section 45 production tax credit (PTC). In short, hydropower faces similar obstacles in today's energy markets as other renewable energy sources and deserves similar policies designed to encourage the development of renewable energy, such as the Section 45 PTC.

In its December 2004 Report, the bipartisan National Commission on Energy Policy recommended *that Congress expand the renewable energy production tax credit to include "new hydropower generation."* During the 107th and 108th Congresses, members in both the Senate and the House, on both sides of the aisle, introduced 15 bills that recognized the hurdles to new hydropower development by providing incentives—none of which were adopted. The *Energy Policy Act of 2005,* which was recently adopted by the House, authorizes appropriated payment incentives, but the Section 45 PTC is without question the best mechanism to ensure that new hydropower generation will come on-line in the near future.

Incentives work. One need only look at the recent growth of the wind energy industry, as well as some of the other renewable energy industries. Or, look at the last time there was any significant growth in the hydropower industry—the 1980s when Congress last provided incentives for hydropower development. Those incentives resulted in approximately 10,000 MW of clean energy being placed on the electricity grid. Since then, development has been stagnant at best. It's time for Congress to provide hydropower incentives again.

Without incentives, the wealth of valuable hydropower potential will continue to sit unused at a time when it is most needed. NHA urges Congress to include a strong role for hydropower in its renewable energy tax incentive package. Specifically, the National Hydropower Association calls on Congress to amend the Section 45 PTC to include as "qualified energy resources:"

1. incremental hydropower;
2. qualified hydroelectric facility; and
3. kinetic hydropower.

As stated above, "incremental hydropower" is additional electric generation achieved from increased efficiency or additions of capacity at an existing hydropower facility. A "qualified hydroelectric facility" is a FERC-licensed minor diversion structure less than 20 feet in height *or* an existing non-hydro dam to which turbines or other generating devices are added to produce energy. "Kinetic hydropower" is any technology that uses water to generate electricity but does not require the use of a dam or impoundment.

Hydropower enjoys strong public support. It's time for policies in Congress to better reflect this support. A 2002 poll showed that 93 percent of America's registered voters believe that hydropower should play "an important role" in our energy future.[2] Of those voters, 75 percent support incentives from the federal government to develop more renewable power in the United States and favor incentives for new hydropower capacity at existing hydropower projects. Put another way, they support increasing the efficiency and generating capacity of existing hydro projects (incremental hydropower).

Of the registered voters who support incentives from the federal government to develop more renewable power in the United States, 74 percent favor incentives for new hydropower capacity at existing non-hydro dams (qualified hydropower). Put another way, they support retrofitting non-hydro dams with power generating equipment.

Hydropower, to quote FERC Chairman Pat Wood, III, has long been "a backbone of the nation's energy infrastructure." Considering the nation's growing interest in fully developing its clean, domestic energy supplies, the public's support for hydro, as well as the growing bipartisan support for maximizing the power output of the nation's existing hydropower and dam infrastructure, it's time for Congress to bolster the nation's hydropower resources. The best way to do that is to include a strong role for hydropower in the Section 45 PTC. In addition to clean energy, development of new hydropower will lead to jobs, investment in the economy, fees to the

[2] *Public Opinion Surveys with Registered Voters, January 2002*; Bisconti Research, Inc. (BR*i*). Error of +/—3 percent.

government for the use of federal non-hydro dams, general hydropower fees and a new source of tax revenue once the tax credit expires.

This year marks the 125th anniversary of hydropower usage in the United States. Including hydropower in the Section 45 PTC is the right way to celebrate this milestone. Hydropower has long played an important role in the nation's energy portfolio and energy strategy, but it stands ready to play an even greater role in the future with the proper incentives from Congress. With proper incentives, such as the Section 45 production tax credit, Congress can ensure that the nation's hydropower resources and its many power, environmental and societal benefits are fully deployed and available to future generations of Americans.

Statement of Pat Wolff, American Farm Bureau Federation

The American Farm Bureau Federation stands in strong support of the multi-year extension of tax credits for renewable fuels. We thank the committee for the opportunity for Farm Bureau to provide its comments for the record of the May 24 hearing on tax credits for electicity production from renewable sources.

The Renewable Electricity Production Tax Credit (REPTC) is a small but important piece of a renewable energy strategy for the United States. The tax credit provides incentives for the development and expansion of a reliable source of "home grown" fuel that will help to ensure adequate supplies, stabilize energy costs and reduce dependence on traditional energy resources. Wind power capacity in the United States has quadrupled since 1990 and currently provides enough energy to support the electrical needs of 1.5–1.9 million households. Biomass conversion is already one of the most widely used renewable technologies, accounting for 12 percent of renewable energy supplies.

The tax credit also promises to provide a steady source of income to our nation's farmers and ranchers. As one of the largest holders of private land, the agricultural sector is the most logical provider of the resources needed for the continued growth of the wind power industry. Producers stand to benefit from lease payments provided by wind energy developers using land for placement of wind turbines.

Income realized from wind energy projects is usually very stable, increasing revenue security for farmers. In addition, many leasing/royalty contracts contain a provision for a minimum payment per turbine, providing reassurance during low-wind periods. Farmers and ranchers can harvest the air around them while they grow crops and graze livestock. Wind turbines have a small "footprint" and provide little obstruction, with the largest models utilizing only one-quarter acre, including access roads. Furthermore, the turbines can be placed on CRP land with USDA's approval.

Information collected from the Department of Energy (DOE), the Government Accounting Office (GAO) and the USDA outlines the current and potential benefits to the agricultural industry. While there are several types, a typical leasing agreement provides $2,000 per year for a 750-kilowatt wind turbine, roughly two to three percent of a wind project's gross revenue. A 250-acre farm could increase annual income up to $14,000 per year, given the common turbine spacing requirements. With DOE's goal of producing five percent of the nation's electricity through wind energy by 2020, farmers and rural landowners could see $1.2 billion in additional income from wind energy over the next 15 years.

Extension of the tax credit for electricity produced from biomass fuels will boost demand for the crop residues and the bioenergy crops needed to fuel biomass conversion. An extension of the credit could be expected to generate demand for as much as 40 million acres of land for bioenergy crops. Bioenergy crops could become the fourth most important crop market from an acreage standpoint after wheat, corn and soybeans.

USDA and DOE's assessment of the potential pay-off from expanded production of biomass indicates that an expanding conversion industry would generate higher commodity prices. USDA's feasibility studies suggest crop prices would be up to 14 percent higher with bioenergy crops using 40 million acres of production. This would boost farm incomes $3 billion to $6 billion due to higher receipts for existing crops and receipts from bioenergy crops. As a result of improved crop prices, there would be a reduction in farm program costs of $2 to $3 billion with lower commodity payments due to higher prices and conservation costs reduced by allowing CRP contract holders to grow bioenergy crops on reserve acreage in return for a lower rental payment.

The REPTC is set to expire at the end of this year. A long-term extension of the credit will speed up adoption of renewable technologies and support development of

the market infrastructure necessary to make these technologies more competitive. Furthermore, a multi-year extension of the REPTC will ensure the stability of the tax credit, attracting the capital necessary to realize the benefits of long-term planning.

Farm Bureau urges Congress to act quickly to pass a multiple-year extension of the Renewable Electricity Production Tax Credit.