Committee on Ways and Means

Hearing on Energy Tax Incentives and the Green Job Economy

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US Energy policy should aim for three simultaneous goals: **energy security** for the US, **technological leadership** in cutting-edge energy systems, and the efficient transition to a **low-carbon economy**. A sound energy policy must pass all three tests. Otherwise, we will spend tremendous effort and find ourselves once again in crisis.

A sound energy policy will create jobs and lots of them, but mainly on a time horizon of a decade, not of months. We should view energy policy as one key to full employment, with significant impacts being felt over a three-to-five year period and continuing to rise throughout the coming decade. Energy policy will not solve the short-term jobs crisis over the next 18-24. Yet unless we have a sound energy policy, the short-term jobs crisis will become a long-term jobs crisis.

Energy security means safe and assured access to plentiful energy at reasonable prices. Our current policies do not ensure this. The world market for petroleum is tight and likely to get much tighter over time, as China, India, and other emerging markets continue to achieve rapid economic growth with rapid increases in automobile ownership and other demands for petroleum. The scramble for oil resources in the Middle East will threaten continued instability and conflict. The simple arithmetic of offshore oil shows that even in the most optimistic scenarios,

America's offshore oil hardly registers in significance when compared to the increases in world demand. The US will therefore face steeply rising prices to meet our energy needs unless we take steps to alter our production and use of energy resources.

Fortunately, the US has many large-scale alternatives, including large-scale deployment of solar and wind power, and a revival of the nuclear industry. The recent discoveries of significant natural gas deposits are also promising, but potentially pose severe environmental challenges unless properly developed and deployed. A major shift to any alternative energy source will require a time horizon of twenty years and a consistent public policy, backed by public support. Any alternative energy sources should meet the three tests of security, technology, and low carbon.

The technological options are very exciting, and can potentially transform not only the United States but in fact the entire world economy to sustainability and increased prosperity. The key is to develop new technologies to harness alternative energy sources, and to deploy energy in new ways, for example by transforming automobiles from the internal combustion engine to electric vehicles. At least five major areas of technological change are paramount.

Large-scale solar and wind power. The US has vast untapped solar and wind resources that require various technological advances to bring to full utilization. There are important improvements possible in power generation, energy storage, and energy transmission, all of which will significantly lower costs and improve reliability.

Nuclear power. Nuclear power must remain a significant option for the United States because it offers the prospect of safe and plentiful energy assuming that the challenges of waste storage and security of facilities are properly addressed. Dozens of countries around the world will scale up their nuclear power industries in the

coming decades. The US should be among them. US leadership can help to develop improved and safer technologies, and to help guide the safe management of a potentially very dangerous industry.

Carbon capture and sequestration. The continued use of fossil fuels is not only inevitable in practice, but also desirable as well to ensure continued economic growth and prosperity. Yet the continued use of fossil fuels without a solution to the carbon problem poses grave threats to US and international security. The most promising option is to develop and deploy systems to capture and sequester carbon dioxide emitted from power plants. The two major technological options are CO_2 capture at the site of the power plant or CO_2 capture directly from the air.

Conversion to electric vehicles. The hundred-year dominance of internal combustion engines is very likely coming to an end, with the major question being which economies will lead in the new electric-vehicle age. EVs offer several enormous advantages: zero-emission vehicles; greater flexibility of fuel choice (to power the grid); smarter cars; and smarter traffic design and overall urban mobility. EVs promise the convergence of three classes of technology: automotive systems, information and communications systems, and energy systems.

Energy efficiency: smart buildings, smart grid, and smart machinery. There are tremendous advances possible in energy efficiency through improved building design, smarter grids, and more efficient appliances. As with vehicles, the gains will come through synergies of systems design, linking power generation, smart grids, and more efficient end-users.

America has the potential to create major new industries around these advanced technologies, drawing upon our engineering strengths, national marketplace, innovative consumers, and deep capital markets. Yet the incentives and strategies are poorly designed. Price signals are only a part of the story. For every major technological system, we face multiple problems:

- Pre-commercial technologies
- Complementarities of public infrastructure and private investments
- Unclear regulatory framework
- Unclear public acceptance
- Lack of a roadmap

The idea that a simple corrective such as cap-and-trade legislation can bring about large-scale technological systems change is mistaken. To bring about the changes that will be needed in any of these areas, much less all of them, requires a far more coherent national strategy than trading of emissions permits. Technological changes of the scale that we must contemplate will require all of the following:

- A clear national commitment with targets and timetables on deployment and emissions reduction
- Public funding of R&D for pre-commercial technologies, guided by a long-term national strategy
- Public funding for pre-commercial demonstration projects, such as for electric vehicle deployment within targeted cities, carbon capture and storage, and long-distance transmission grids
- Long-term tax and other market incentives (e.g feed-in tariffs) for targeted energy systems

I would strongly urge that the President set forth to the nation an overall energy strategy designed to meet the three goals of energy security, America's technological lead, and transition to a low-carbon economy. Within that overall strategy, separate chapters would deal with solar power, wind power, nuclear power, electric vehicles, energy-efficient buildings, energy-efficient appliances, and smart grids and transmission systems. In each area, the strategy would combine public and private R&D, demonstration projects, public infrastructure, incentive pricing, and

regulatory framework. The core of the strategy will be a framework to 2020, with a clear recognition that the scale of the challenge will require large-scale technological transformation carrying us to mid-century.

Without such guideposts, the US will continue to be paralyzed, as we have been in the past two decades. We will see our technological lead eliminated by China and other competitors, and our auto industry, for example, unable to sustain it s current very fragile recovery. We will see jobs disappear under the burden of increasingly inefficient infrastructure and outmoded technologies unable to compete. And we will be unable to provide leadership on the global cooperation needed to reduce greenhouse gas emissions.

For each of the policy chapters, it will be possible to specify a set of milestones to 2015 and 2020. We can envision realistically the minimum levels on new solar power, wind power, electric vehicles, and transmission systems that can be put in place by 2015 and 2020. We can set targets on re-licensing or new licensing of nuclear power plants. We can establish a portfolio of carbon-capture-and-sequestration programs, with targeted goals in scientific and engineering advances.

Regarding the critical role of the Ways and Means Committee, tax policies will be vital in the overall policy framework at several points: R&D incentives; demonstration projects; and especially on pricing and incentives for low-carbon technologies, through feed-in tariffs, tax rebates, and other incentives to consumers. The needed incentives should be long-term, offering predictability in pricing and tax incentives of a decade or more, something that cap-and-trade prices, which fluctuate day to day, are very unlikely to accomplish. If inventors and businesses know that they stand to receive a net benefit of, say, $30 per ton of CO_2 avoided during the coming decade to 2020, for example through a combination of advantageous feed-in tariffs for low-carbon energy sources coupled with small and rising levies on carbon emissions, the market's supply response of R&D, demonstration projects, and deployment would be dramatically accelerated.

To the extent possible, there should be a roughly level playing field across technological choices, for example, tax and other incentives that offer *roughly* comparable financial incentives per ton of CO_2 emissions avoided. The dream of a completely level playing field is a dream however. Large-scale technological change will require distinctive policies for each sector that will guarantee a certain non-comparability across sectors.

Most importantly, energy policy should be constructed as a decades-long framework, one that can secure our future in the 2020s and beyond, our global technological leadership, and our long-term environmental sustainability. In the past our policies have been haphazard, unsystematic, short-term, and shifting. They have aimed to address problems over a time horizon of months rather than years. The most important step, therefore, is to take a firm hold of the medium-term, and thereby get the job done. This would also have a major ancillary benefit, of enabling the US to lead on global negotiations once again. Our current international stature in this area is dreadfully compromised by our national confusion and indecision on energy policy.

Necessarily, I have not gone into detail on any specific measures or technologies, and of course would be happy to do so in response to specific queries.