

Presidential Forum on Renewable Energy *
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Energy Independence: A Five-Point Practical Energy Plan for America

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Abstract:

America needs an energy plan that secures energy independence based on renewable energy. Government and voter initiative is critical to implementing such a plan. America can reassert its world leadership position through innovative energy solutions.

Efficiency-increasing technology and practices and localized power production in all buildings will substantially reduce energy needs. Use of incentives to affect change is recommended. Integration of all renewable energy production technologies will be necessary for complete energy independence. Serious investment in economic production of biofuels and a national electric rail system would slash energy needs, making energy independence a much more attainable goal.

1. Increase governmental leadership and action.

All significant changes in this country in the past century have been enabled by government incentives, subsidies, or legislation. The nuclear power industry could never have reached its current state without the subsidies put in place when the industry was young. The extraction industry is equally indebted to government initiatives; our Armed Forces have secured war-torn areas so that these firms can continue to be productive or even grow. The fuel and automotive industries likewise owe their current existence to government action; construction of the interstate highway system made transportation by car and truck the most practical choice for nearly every citizen or company, and the demand for transportation fuel also enjoyed a strong and stable increase because of this infrastructure. Even modern industries based on the Internet and information owe their current existence to the Armed Forces and the inception of DARPA-net! Likewise, our government leaders need to make every effort to show the nation the way; government buildings should adopt a Zero Energy/Emission policy (detailed below), and embrace recycling and carbon reduction practices at every level of administration.

* <http://www.2008energyforum.org/>

** <http://www.2008energyforum.org/forum/events/newsDetails/reqID--100990>

We as voters need to make energy independence and renewable energy our number one priority, because every other issue is impacted by our nation's energy policy. If the voters make a renewable energy policy their number one issue, then strong government leadership and resolve can be expected to follow regardless of political lobbying. Government agencies, legislators, and leaders should also support renewable energy policies openly because it is right and necessary for the good of our nation, and we stand to benefit significantly if we act now.

Focusing on renewable energy and energy independence is the most important first step in earning back our role as a benevolent world leader. The technologies, information, and know-how developed by dedicated and immediate investment in (and deployment of) renewable energy systems will become strong assets for our economy and our international influence. We can attract many more allies and foster much more productive trade and economic development at home and abroad by becoming world leaders in innovative energy solutions rather than by jealously protecting our energy interests; the majority of which lie outside our borders.

The prospect of a renewable energy economy is, in this author's opinion, an area of potential growth for the U.S. economy that likely far exceeds what we've seen from the Internet and the Information Revolution. As the world population continues to grow and continues to seek a level of affluence matching that which we find here in America, demand for sustainable energy production from renewable sources will increase steadily and dramatically. Energy production, as recent events continue to demonstrate, is the lifeblood of all affluent societies. Everything depends upon it, and everything is impacted by it.

2. Adopt a Zero-Energy/Emission Building (ZEB) policy and draft legislation favoring residential, industrial and commercial ZEBs.

Site-based power generation is becoming a growing trend in sustainable building. We can reduce the amount of energy consumed by the residential, commercial, and industrial sectors of our nation (more than two-thirds of total annual energy consumption (EIA 2006)) significantly by relying on this strategy. Some homeowners and businesses have achieved net zero or even net excesses of energy after installing wind turbines, geothermal heating, and climate-appropriate solar technologies and implementing passive efficiency-enhancing building designs and technologies (such as living roofs, site-specific planning, updated insulation, and breezeways to name a few). Many of these buildings were constructed in states that offer substantial subsidies for renewable technologies, such as California, further demonstrating the need for governmental incentives. Aggressively pursuing a Zero-Energy Building Policy in all sectors could theoretically eliminate 70% of our nation's energy needs. (Torcellini et al. 2006)

Tax-break incentives should be offered for properties that conform to a proposed ZEB policy. Combined with more available government subsidies, these incentive systems would strongly favor the use of ZEB technology. Additionally, any proposed legislation should include incentives for buildings that utilize the natural capital offered by the site. Practices that save and reuse local materials and preserve vegetative cover should be considered as qualifiers for tax-break incentives. State and municipal governments should be strongly encouraged to adopt building codes that require efficiency improvements to

various building systems; this will also save money. Additional subsidies should be offered for energy-saving residential and commercial technologies and practices. Encouraging the use of existing and future efficiency-increasing technologies will lead to a ripple effect as the loads carried by power plants, water treatment facilities and other public utilities are lessened with each installment of an efficiency-increasing technology.

Funding for incentives and subsidies could come in part from a new Value Added Tax (VAT) system. Americans currently pay the lowest taxes compared to any other first-world country. (WWT 2008) Adding a federal VAT to fossil fuels such as gasoline and diesel would be a step towards realizing the real cost of using these fuels, and would consequently compel consumers to move towards renewable energy. Additionally, a VAT on coal (the primary and most polluting source of our electricity) would further reduce demand and reflect the true cost of infrastructure based on these polluting and expensive resources. These new taxes will enhance the speed of the transition to a renewable energy economy and national energy independence.

3. Diversify renewable energy production methods.

There is no single renewable energy technology that seems practical as a final solution for the nation's energy needs in the residential, industrial, and commercial sectors. The challenges facing the use of solar, wind, water, and geothermal technologies have been discussed extensively in the popular media by supporters and critics. Despite the well-publicized shortcomings of these technologies, innovative solutions have been proposed, and wind and solar power seem to be gaining ground worldwide despite the frequent negative commentary.

For example, Germany has been a strong leader in the development of more efficient, higher-yield, and economically feasible methods of producing and using wind turbine technology, and has installed substantial numbers of solar power systems. The German firms REpower and Vestas Deutschland GmbH have done very well in expanding their wind power business, and demand in the wind power market continues to increase markedly. (Feller 2004) There is nothing to stop American firms from experiencing the same success if we implement incentive systems such as subsidies and low-interest government loans that favor development of these technologies—using the ventures of other nations such as Germany as the blueprint for our own.

Talk of increasing subsidies is often met with strong opposition, but really the subsidies currently available to firms wishing to install wind and solar technology already have strong positive influences on the market as evidenced by the fledgling industry here in America. Creation of a federal subsidy or tax incentive for renewable technology and marginal strengthening of state subsidies is all that is needed to really begin to see growth. Academic institutions such as the State University of New York College of Environmental Science and Forestry (SUNY ESF), individual homeowners and businesses have already taken advantage of the money available through organizations like NYSERDA, US DOE, and EPRI, to name only those that contributed to renewable ventures in New York.

Simply removing the subsidies in place which artificially depress the price of gasoline and other fuels (such as the Percentage Depletion Allowance and Foreign Tax Credit and ending state and local undertaxation) would go a long way towards phasing out these

truly expensive commodities (the real cost of gasoline was estimated in 1998 dollars at between \$5.60 and \$15.14 a gallon (ICTA 1998)). Replacing fossil fuel technology with renewable technology will actually work toward strengthening the economy and will create new jobs and potential for real economic growth. Initiating a “GreenBond” campaign in the image of the World War 2 “War Bonds” campaign is another strong possibility for generating funds.

Solar power is also rapidly increasing in its appeal for widespread use. We are fortunate as a nation to have vast stretches of prime land ready for development of solar power facilities in the Midwest. Proper development of ideal land in the Midwest combined with new solar technologies could satisfy up to 69% of the nation’s electricity and 35% of total energy needs by 2050. (Zweibel et al. 2007)

While transmitting power from the Midwest to the rest of the nation isn’t achievable by our current energy grid (without suffering significant losses in transmission), this does not mean that we lack a solution. High-voltage Direct-Current technology could “pipe” power to far-off areas with little energy loss along the way, and would be converted to AC current for local distribution using the existing local grid. (Zweibel et al. 2007)

Despite the new potential of renewable technologies such as wind and solar power, the siting requirements of these methods of energy production will still limit their use. As all of the highly productive areas are developed, further development of the same energy source would force prospectors onto less and less adequate land. This is why diversification of our renewable energy supplies is absolutely a necessity. While the total theoretical power generation of any single renewable energy technology may fall short of the total fossil fuel replacement needs of our nation, a combined-arms approach will take us to energy independence.

A cautionary word is needed, however, because hydroelectric power should not be significantly included in our renewable energy development plans. The ecological effects of altering the water cycle—whether by dam or tidal energy or ocean-floor turbines—are difficult to foresee and can be quite problematic, as demonstrated by Australia’s damaged wetlands (Kingsford 2000) and the Glen Canyon Dam’s effects (Goings 2008), to name only two cases among many. Any proposal that might alter or impact our fragile and life-sustaining water resources—upon which we are absolutely and permanently dependent—should be treated with the utmost caution and an unflinchingly critical eye.

4. Aggressively develop biofuel technology.

Cellulosic ethanol—ethanol derived from cellulose, the basic chemical building-block that makes up all plants’ bodies—should be aggressively pursued as an alternative energy source. Unlike biofuel from crop production such as corn or soybeans (whose surpluses could still supplement the total supply), ethanol-from-cellulose won’t impact our food supply to the same extent and also has much greater potential for widespread use. Cellulosic ethanol can be produced on a much greater scale because the technology makes use of the whole body of a plant and even cellulose-containing waste. This allows crop residues, biomass grown on waste sites or marginal land (like SYNY-ESF’s “Willow Biomass Project” (Adegbidi et al. 2003)), food processing byproducts and even landfill waste (paper products contain cellulose) to be transformed into carbon-neutral biofuel while simultaneously reducing our waste stream and improving marginal land

worth. We can even fertilize biomass production plots with sewage sludge, further reducing our waste stream. (Adegbidi et al. 2003)

Cellulosic ethanol technologies are rapidly developing and plans are already in place to utilize cellulosic ethanol in New York State. Governor George Pataki recently granted a \$10.2 million state subsidy for New Energy Capital and its partners to develop the nation's first cellulosic ethanol refinery and power plant in Lyonsdale, NY. (SUNY ESF 2006) Facilities such as the Lyonsdale plant, if nationally implemented, could produce enough ethanol to lead to significant displacement of fossil fuels for transportation compared to crop-based ethanol production, and would also make headway for the competitive viability of biofuels in the marketplace. (Hill et al. 2006) While the ability of ethanol-from-cellulose technology to completely eliminate our need for oil is still uncertain, it seems likely we can come close (corn-only production as of Jan. 29th 2008 stands at over 7.8 billion gallons annually (RFA 2008)), especially if we utilize waste cellulose and cultivate sustainable biomass projects like SUNY ESF's "Willow Biomass Project." The march towards matching our fuel needs is well underway, and cellulosic ethanol is imminent. (Schmer et al. 2008)

A second cautionary word is needed here. While ethanol and biodiesel are regarded as "carbon-neutral" energy sources (meaning the carbon released in combustion is used up in growing the next crop for more fuel (Martin 2006)), ethanol emits pollutants similar to gasoline and can even emit greater amounts of them than traditional gasoline combustion. Biodiesel, on the other hand, tends to emit lesser amounts of harmful byproducts from its combustion, and is actually preferable to traditional diesel fuel (Hill et al. 2006). Biofuels have other negative effects such as massive land use. It's important to realize that biofuels should not be solely relied upon. Development of new, more efficient transportation methods are needed that can harness electricity produced by renewable sources such as wind and solar power to meet our transportation needs.

5. Implement a national electric rail transportation system by passing legislation similar to the National Interstate and Defense Highways Act of 1956.

A national rail system is well within our reach today. The rail and road infrastructure already in place reduces the cost of installing a new infrastructure. Compared to the cost of the Interstate System (adjusted for inflation, \$425 billion in 2006 dollars (Neuharth 2006)), the cost of a national rail system would almost certainly be far less. Reuse and integration of existing (and still quite extensive) rail networks combined with new rail routes built above or alongside existing highways lowers the resource and labor costs of constructing a complete national rail network because people and materials would have much easier access to the build sites compared with construction of the interstate system.

Government action like the 1956 legislation would provide significant growth for our economy, and constructing a national rail system would create thousands of jobs in nearly every state. Continued operation and maintenance of such a system would create even more jobs, and the reduced cost associated with traveling by such a system (half that required to own your own car, per mile traveled (Swan 1998)) would free up a substantial portion of the budget of all citizens that use the new rail system. This would further strengthen our economy. Transportation by rail is incredibly cost efficient compared to travel by car, and the investment lasts longer; a new rail car that costs \$2 million and lasts

20 years replaces the mileage of 6,000 personal vehicles costing their owners a combined total of at least \$90 million! (Swan 1998)

Additionally, new technology can be implemented to make travel by rail much more enjoyable and practical than it is now or ever was. A firm from San Francisco, CA—called Suntrain—has proposed a rail transportation system that allows passengers to schedule and pay for a trip by placing a call on their mobile phone. Suntrain proposes an integrated transportation network that uses vans to carry passengers from their door to the nearest rail stop, schedules passengers to avoid wait times, and provides rental cars or van transportation at the destination end as well. The Suntrain vision is just one possibility for what a future national rail system might look like. (Swan 1998)

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