IEEE-USA NATIONAL ENERGY POLICY RECOMMENDATIONS

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Background on IEEE-USA

From its Washington, D.C. headquarters, IEEE-USA develops position statements[1] and communicates technology policy recommendations to Congress, the executive branch, the media and other opinion-makers in support of member priorities outlined in the legislative agenda[2]. All IEEE-USA position statements must be approved by the IEEE-USA Board of Directors. They are first initiated and/or reviewed by IEEE-USA volunteer committees that are comprised of U.S. IEEE members with expertise in the subject field, including liaison representatives (where appointed) of IEEE technical societies, divisions, regions and sections. Once approved by the committee, a proposed position statement is then reviewed by the Vice President of Government Relations and the IEEE-USA Government Relations Council, subjected to a Communications Review, and finally presented to the IEEE-USA Board of Directors for consideration.

The National Energy Policy Recommendations[3] was developed by the Energy Policy Committee. Originally published in 2009, it was updated in 2010 and now again in 2011 to maintain its relevance with technological developments.

Excerpt from the 2011National Energy Policy Recommendations Position Statement

Energy underlies three converging challenges facing the United States today: prosperity, security and the environment. Electricity is a key enabler in addressing these challenges, but substantial changes as to how we manage our energy resources will be required. We need an integrated and balanced approach to increase energy efficiency, transform transportation and electric power supplies that are environmentally friendly. We must build a stronger and smarter electric infrastructure, which will require a cultural shift in the way we think about and use energy.

The strategic goals are clear: To ensure that we can reliably and securely meet our growing energy needs, we must use energy resources more efficiently; transform our transportation systems; transition our energy systems and our economy to one that can better manage our emissions and environment; and upgrade and expand our electrical generation and delivery systems.

[1] *http://www.ieeeusa.org/policy/positions/*
[2] http://www.ieeeusa.org/policy/issues/index.html
[3] http://www.ieeeusa.org/policy/positions/energypolicy0211.pdf adopted by the IEEE-USA Board of Directors on February 18, 2011.

Established and new technologies must be applied at unprecedented scale, and on an accelerated schedule. Bold actions and substantial investments will be required to achieve these goals.

IEEE-USA will support proactive energy policies that result in the development of new energy sources and the reduction of U.S. dependence on oil in an economically and environmentally sound way. Priorities include:

- Promoting increased efficiency in conversion, delivery and use of energy, which is necessary to help meet the challenges of prosperity, security and the environment.
- Radically transforming the transportation sector to shift our energy use from imported oil to domestic production by focusing first on electric vehicle technologies, and then replacing the remaining transportation fuels by making use of alternative fuels.
- Responding to the threat of climate change through the greening of future of electric power supply by expanding the use of renewable electric generation, expanding nuclear generation and capturing carbon emissions from fossil power plants.
- Building a stronger and smarter electrical energy infrastructure by transforming the network into a smart grid, expanding the transmission system as needed to maintain reliability and capture economic benefits and by developing large-scale electricity storage systems.

A more in-depth discussion of the Energy Policy Recommendations can be found at:
http://www.ieeeusa.org/policy/positions/energypolicy0211.pdf

INCREASING ENERGY EFFICIENCY

Increasing efficiency in the conversion, delivery and use of energy is something all Americans can participate in to address the energy challenges our country faces. Educating the country on the importance of energy efficiency and making energy efficiency a way of life are necessary to help meet the challenges of prosperity, security and the environment. Energy efficiency is an essential element in any comprehensive national energy policy.

A more in-depth discussion on the subject of Increasing Energy Efficiency can be found at:
http://www.ieeeusa.org/policy/positions/EnergyEfficiency1110.pdf

BREAKING OUR DEPENDENCE ON OIL BY TRANSFORMING TRANSPORTATION

Today, more than 96 percent of the energy used in transportation comes from oil. The transportation sector consumes about two-thirds of all petroleum used in the United States. Oil will continue to be a major fuel for decades, but our ability to substantially reduce its use will be essential to address challenges to national security and prosperity.

A radical transformation of the transportation sector is needed, not only to reduce our dependency on oil, but also to reduce emissions in the transportation sector. However, directly mitigating emissions in many millions of mobile sources is impractical. The proposed response is a two-pronged effort: to electrify transportation, focusing on plug-in electric and hybrid technologies -- and in parallel, pursue replacing conventional fuels with alternative fuels.

Electrifying Transportation: Plug-In Electric Vehicles

Greater use of electricity as an energy source for transportation could substantially reduce oil consumption. Electric motors are inherently more efficient than internal combustion engines; they do not consume energy while vehicles are stationary (idling); and they provide the opportunity to recover energy from braking. Current hybrid electric vehicle technology demonstrates the potential of this approach. The introduction and widespread use of plug-in electric vehicles (PEV) with an all-electric range sufficient to meet average daily travel needs could reduce per-vehicle petroleum consumption by 50 percent, or more.

Developing and Using Alternative Transportation Fuels

Alternative transportation fuels, including biofuels and natural gas, offer the possibility of further reducing oil consumption, particularly if deployed in conjunction with the greater use of electricity in transportation. However, there is a need to better understand the economic, environmental, social and political implications of various means to produce liquid fuels from biomass. Liquid fuels made from coal and natural gas may also be attractive from an economic perspective. Greenhouse gases are a by-product of their production, which must be mitigated if these fuels are to be used in large quantities.

GREENING THE ELECTRIC POWER SUPPLY

Electricity generation is dominated by fossil fuels, with coal and natural gas making up about 70 percent of the input energy, and the rest coming from nuclear and renewables (approximately 20 percent and nine percent, respectively). To respond to environmental concerns, the future of electric power should be green (i.e., using energy resources that produce less greenhouse gases, including CO_2 and NOx; or where the carbon emissions are captured and reused as feedstock for useful products; or stored for geological time). Simple and predictable economic signals must be in place to encourage investments in these green technologies.

Expanding the Use of Renewable Electric Generation

Renewable sources for generating electricity , particularly those that emit minimal greenhouse gases, must be deployed to the extent that they are technologically and economically practical, and have an acceptable impact on the environment and aesthetics. Such technologies include electricity generated from wind, sunlight, waves, tides and underground heat (geothermal).

Expanding Nuclear Power Generation

Nuclear power plants are the largest-capacity power generation sources that emit negligible greenhouse gases. They have the ability to provide continuous base-load generation, regardless of the time of day or weather conditions. They also have a high energy density and small footprint, thus making it feasible to have installations in locations nearer to demand centers. The 104 nuclear plants in the United States have proven to be cost competitive with both conventional fossil fuels and renewable sources and, through license renewal, will operate for many decades. Nuclear power is, and must remain, an important part of a balanced portfolio of energy sources.

Capturing Carbon Emissions from Fossil Power Plants

Coal is our nation's most plentiful, and one of its lowest-cost, domestic fossil fuel resources. It provides more than 20 percent of U.S. energy supplies and 50 percent of total electrical energy. Coal, however, is also one of the major sources of carbon dioxide (CO2) emissions. Only the use of petroleum in transportation is a comparable source of CO2 within the United States. The use of coal as a fuel also produces other pollutants and by-products that must be mitigated for coal to be a clean fuel.

BUILDING A STRONGER AND SMARTER ELECTRICAL ENERGY INFRASTRUCTURE

The National Academy of Engineering classified electrification as the number one engineering achievement of the 20th century. Today, the U.S. electric grid is a network of approximately 10,000 power plants, 150,000 miles of high-voltage (>230 kV) transmission lines, millions of miles of lower-voltage distribution lines, and more than 12,000 substations.

The primary objective of the expansion of the transmission system is to meet load growth reliably and efficiently. However, over recent decades, the grid has been stressed by an increase in demand for electric power and a declining rate of construction of transmission. The increasingly complex and competitive bulk power market stresses the grid. These conditions can lead to grid congestion and higher transmission losses, which can eventually result in higher rates for electricity. Reinforcing the grid when economically justified and deploying advanced technologies will help address some of these concerns and increase physical and cyber security of the grid. It is critical that market design and grid expansion programs work together to maintain adequate levels of grid reliability.

A more in-depth discussion on the subject of Increasing Energy Efficiency can be found at:
http://www.ieeeusa.org/policy/positions/ElectricInfrastructureJuly2010.pdf

Transforming the Network into a Smart Grid

Adding intelligence – sensors, communications, optimal controls and computers – to our electric grid can substantially improve its efficiency and reliability through increased situational awareness, reduced outage propagation, and improved response to disturbances and disruptions. This so-called "Smart Grid" can also enable flexible pricing of electricity that will allow consumers to reduce their energy costs and facilitate distributed generation and redundancy, opening the door to wider use of intermittent renewable generation sources.

Expanding the Transmission System

Much of the renewable energy potential in the United States is located in areas that are remote from dense population centers. Those areas lack high demand for energy, and are not connected to our national infrastructure for transmission of bulk electrical power. Sufficient transmission capacity must link on-shore and off-shore wind farms, solar plants and other renewables to customers to make resources accessible to homes and businesses, and to replace significant portions of the oil used today in vehicle transportation.

Developing Large-Scale Electricity Storage Systems

Unlike many energy resources, electric power is generated and consumed instantly. If intermittent sources of electric power, such wind and solar, are to reach their full potential to contribute to the nation's power requirements, technologies for large-scale energy storage must be developed and deployed. Such large-scale energy storage systems convert electrical energy to other forms of energy that can be reconverted to electricity when needed, enabling the storage system to act as a load leveler and to facilitate more efficient utilization of the grid that can be used in response to system contingencies.

THE NEED TO TAKE ACTION NOW

Urgent action is needed *now* because, with each passing year, U.S. dependence on imported oil is increasing, and the threat to the economy and national security is growing. We cannot allow low prices to lull our country into complacency again. The dual threats of dependence on oil and environmental degradation to the United States are real and no longer just important, but urgent.

Now is the time to invest in new and established technologies to help our nation become better energy stewards and reduce environmental impacts. Electricity has a major role to play in reaching these goals.

Notes: NOx signifies a generic term for nitric oxide or nitrogen dioxide

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