

Position Statement #82



Nuclear Power: A Strategy to Reduce Oil Imports

The long-term threats to energy sustainability, energy security, and global environmental quality represented by the growing demand for oil are well documented. Of the more than 20 million barrels/day of oil used by the United States, about 45% is devoted to the production of motor gasoline. This has resulted in the growing energy security problem for our country due to an increasing dependence on imported oil from unstable regions. The large consumption of oil also is a major contributor to the nation's greenhouse gas emission levels. The partial substitution of electricity for gasoline as a transportation fuel could have a major impact on both our energy security and environmental quality while improving our energy sustainability posture. It is possible to use nuclear power to provide this contribution economically without large external or opportunity costs. Increasing the use of plug-in hybrid electric vehicles (PHEVs) appears to be a feasible means of beginning this transition.

The purpose of this position paper is not to argue that PHEVs should be adopted as the only solution to our energy supply challenge. Indeed, the American Nuclear Society favors a broad and intensive approach to the problem including study of all the attractive alternatives that might eventually contribute to the solution—feasibility will eventually determine those options that are sustained. We argue only that PHEVs now stand high on the list of “good” approaches to the problem.

Based on today's technology, a typical 20 to 30 mile daily usage of a car can be completely accomplished on battery power at commuting speeds. For longer trips the car seamlessly switches to its small gasoline engine and operates as an ordinary hybrid. This range using only electricity, of course, is dependent upon the specific vehicle and the storage capacity of the battery used.

The move to the use of plug-in hybrid technology offers the possibility of a smooth transition from today's oil-based system to one that increasingly uses electricity as a substitute. As an example, if one-third of our vehicles were plug-in hybrids, a practical goal by 2020, we could reduce our use of oil for motor transportation by about 25% from today's levels, sharply reducing our needs for oil imports. A significant reduction in CO₂ emissions also can result as electricity use increases.

The increased use of electricity makes sense only if it can be produced in a manner that is economical, sustainable, and minimizes CO₂ emissions and other environmental effects. There are several generating technologies that could accomplish these important goals, including hydro, wind, solar, fossil fuels with carbon capture, and nuclear. Of these, a clear practical approach that is capable of economically providing the large quantities of additional electrical energy required is nuclear power. Based on the use of today's technology, nuclear power has demonstrated an enviable safety record while producing electricity at a competitive cost. The availability of nuclear power has been shown to be sustainable for thousands of years through the implementation of a closed fuel cycle. The technology is positioned to support a major increase in the use of electricity as the designs lend themselves to the construction of large base-loaded plants that would be particularly well suited to a nighttime demand for recharging. About 48 new 1400-MW(electric) plants would need to be built over the next 20 years to support the needs of one-third of our current motor vehicle fleet—a large but not impractical number. The recognition of the important potential role of nuclear power in transportation strengthens the need to ensure that this technology becomes one of the central building blocks toward a secure, sustainable energy future for the nation.

Bibliography

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