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An Energy Policy We Can Stick To

By Andrew S. Grove
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Energy independence is the wrong goal.

Oil, like all other goods, flows toward the highest bidder. Consequently, talking about "independence" in a global economy ruled by market forces is a contradiction.

As national policy, we must protect the U.S. economy from interruptions in the supply of such a critical commodity -- whether those interruptions are related to natural or political causes. I believe that the appropriate aim is to strengthen our energy resilience to adjust to such changes.

We can do this by increasing our reliance on electricity.

Electricity can be transported only over land. Consequently, it will stay in (or stick to) the continent where it is produced. Equally important is that electricity can be produced using multiple sources of energy. Petroleum, yes -- but also coal, which is abundant in the United States; wind; hydroelectric; nuclear; and solar energy. If one source suffers a shortage, we can produce electricity from another. Electricity will give us the greatest degree of energy resilience.

Most everything today runs on electricity. A big exception is the transportation sector. Transportation uses more than half of the petroleum consumed in this country. If we don't convert a large portion of the transportation sector to electricity, we cannot make real progress toward energy resilience.

This conversion will not be easy. It requires growth in generation capacity as well as in the capacity and reach of the transmission infrastructure. Most important, it requires vehicles to run on electric power.

Given the size and weight of ordinary automobiles, current technology allows electric cars to run only 100 miles or so before their batteries need to be recharged -- the way we recharge our cellphones, by plugging them into the national electric grid. Many drivers can live with this limitation most of the time, but few will find it satisfactory all of the time. Still, today's capabilities can get us off to a good start.

New technology often appears in this manner: It is not completely satisfactory in the beginning but good enough to get going.

The automobile industry has been waiting for batteries to improve until they can allow electric cars to enter the marketplace with the same driving range as gasoline-fueled cars. Battery developers, for their part, have been waiting for demand from the automobile industry to develop before fully committing the resources required to do the job. The generation and transmission infrastructures have not been built up to service the potentially explosive demand from transportation.

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To be sure, this situation is starting to change. Start-ups such as [Tesla Motors](#) and Project Better Place have begun to experiment with all-electric cars, and important developments are underway at [Nissan](#) and [General Motors](#). But our exposure to the vagaries of oil supply is growing by the month.

We must sharply accelerate the conversion to electricity. To start, the U.S. government should lead the way by requiring that a growing percentage of new cars be built with dual-fuel capability. These cars would have an electric engine and an auxiliary gasoline engine. The car would run on electricity and after the batteries were depleted would switch to the gasoline engine.

The forces of disruptive technology would eventually bring improvements in battery technology, ultimately allowing the production of an all-electric car with satisfactory driving range.

Our biggest problem, however, is how long all this takes. No matter how fast the production of dual-fuel cars is ramped up, replacing the bulk of the approximately 250 million cars on America's roads will take a decade.

We must mobilize all segments of our economy to accelerate the process. Enterprising folks are working to devise ways in which existing gasoline cars could be converted to dual-fuel. Not all vehicles have the space and design that allow this process to happen easily. Luckily, the most gasoline-hungry cars do. Pickups, sport-utility vehicles and the like represent about 80 million vehicles, with mileage of perhaps 13 to 16 miles per gallon. Converting these should be our first priority.

Estimates show that converting these vehicles to dual-fuel operation, even with electricity providing no more than 50 miles of driving range between daily rechargings, could cut petroleum imports 50 to 60 percent -- a stunning opportunity.

A task of this magnitude requires changes in the behavior of millions of consumers. We may need to apply tax incentives over some initial period, perhaps one or two years, to offset the cost of the retrofit and couple them with deep discounts on the cost of electricity used by the vehicle.

The move to electric miles also has the added advantage of helping to mitigate a major environmental threat. A shift from petroleum-based vehicles to electricity-based ones would move the locus for addressing carbon emissions from millions of individual vehicles to far fewer centralized electricity-generating plants. Controlling emissions thus becomes an industrial task, easier technologically. Estimates indicate a potential reduction of carbon emissions of around 50 percent.

There is no issue more urgent. History shows a pattern of using access to energy to influence diplomatic outcomes, with events often escalating into violence. We must prevent this from happening to our country. National security as well as economic needs require that we urgently adopt a strategy to strengthen our energy resilience. The most practical and immediate way is to encourage the mass manufacture of vehicles, as well as the retrofitting of existing ones, so that they first run on electricity.

Andrew S. Grove was chairman and chief executive of Intel Corp. from 1987 to 1998 and now serves as senior adviser. A longer version of this column appears in the current issue of the American magazine; much of the work for that article was based on collaboration with Robert Burgelman of Stanford Business School.

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