



THE MYTH THAT "IMPORTED OIL" IS THE OBSTACLE TO AMERICA'S ENERGY INDEPENDENCE

By Robert J. Horn

Foreign oil accounts for roughly 30 percent of all of America's energy consumption, nearly matching the amount of oil consumed in the transportation sector. In the U.S., more than 55 percent of all energy produced is wasted in its delivery to the user (a few quads less than what we import is wasted in lack of efficiency alone!). Thus, to truly achieve energy independence, whether in the United States or elsewhere, the ability to reduce the amount of waste between production and use may well be the ticket to self sufficiency. The key to eliminating energy loss lies in micro grid and alternative energy use that more closely matches available resources, investment strategies and skill sets.

Of the total U.S. consumption of energy over 100 quads, electrical generation accounts for almost 50 percent (55 percent coal, 20 percent nuclear, 15 percent natural gas, 7 percent hydro, 3 percent bio and other) and imported oil represents 30 percent. Combined, electric power generation and imported oil used by transportation account for almost 80 percent all energy used in the U.S.

America's dependence on foreign oil will not end until oil is no longer the critical source for the energy that powers our transportation sector. Simply, the U.S. will become independent, as will the rest of the world, when our technology allows it. Why? Because when we have other sources of energy from which to choose or no longer use the internal combustion engine as our primary power conversion technology, we will be free of the addiction to oil, imported or otherwise.

In the last forty years, three "man on the moon" efforts to achieve energy independence in America have failed¹. The "tweaking" of technologies without curtailing the demand for foreign oil (or offsetting the demand), hasn't worked. The 2008 election may be viewed by many as the voice of the people shouting for swift action to end policies that no longer make sense.

So how do we stop the pain? In America, and perhaps throughout the world, true energy redemption may come from a plan that "lets people have more of their own money²;" one which provides infrastructure de-control, eliminates the internal combustion engine from the transportation equation and accelerates transition to an alternative renewable energy economy. We must:

1. Understand the link between the cost of energy and the "health" of the economy.
 - a. Failure to keep the cost of energy linked to one's economy (in all the sectors) creates an opportunity for speculation and leveraging that can result in an economic cascading effect.
2. Understand the strategic advantage of investment in U.S. renewable infrastructure markets caused by the difference between other currencies and the U.S. dollar.

Despite being politically attractive, hydrogen for fuel cell vehicles will make a poor business model at least for another 30 years (unless demand or government subsidization changes it), automakers say. According to the National Academy of Science, it will take that long to develop the scientific infrastructure needed to make the hydrogen model attractive. Four years ago the NAS concluded that "a hydrogen system must be economic, safe and appealing, and offer energy security and environmental advantages. For the transportation sector, dramatic progress in fuel cell development, storage, and distribution systems is essential. Success is not certain". The academy cited four fundamental technological challenges:

- Developing safe and environmentally acceptable fuel cells and hydrogen storage systems;
- Building an infrastructure providing hydrogen for light duty vehicle use;
- Reducing the costs of hydrogen production from renewables over the next few decades; and
- Capturing and storing (sequestering) the CO₂ byproduct of hydrogen production from

The Bush administration proposed 6,500 hydrogen fueling stations to be built in the top 100 metropolitan areas and another 5,200 on the national highways. The 11,700 stations would have cost \$11.7 billion dollars, serving over a million fuel cell vehicles (FCV) a week.

¹ For example, Sen. John Kerry (6-13-03) announced his energy plan (tweaking) would create 500 k jobs.

² President George W. Bush June 16, 2003.



Today we are no closer to the hydrogen solution than we were thirty years ago, even though the short-term supply of hydrogen would have, oddly enough, come from a coalition of oil, natural gas, coal and commercial nuclear power companies. This should have sparked the interest of suppliers looking to produce profits from the traditional suppliers of fuel. Since this has not happened often enough, American universities, entrepreneurs, scientists, inventors and those who need the power most have turned upon themselves to provide the answers. They have reached the cusp of commercialization by refinancing and enhancing European models to produce the next generation of solar and wind machines. These new units, which are 1/10th the cost of previous units, will be micro grid, and grid deployable. Scalable from 10kw to 10MW, they will revolutionize and leapfrog the American solar and wind industry into a “must have” item for everything from households to industrial facilities, office buildings and utilities.

Transitioning from one energy economy to another challenges the most heroic efforts of the man behind the curtain. The energy clock had been ticking for some time, starting in the fall of 1973 when the Organization of Arab Petroleum Exporting Countries (OPEC) declared an oil embargo. Twenty days later, America’s President called on the nation to achieve energy independence by 1980. President Ford, in his January 1975 State of the Union address, focused on the energy dilemma by outlining a list of energy independence initiatives. When in 1977, President Carter declared that energy independence was critical to national security, calling its quest the moral equivalent of war, America was on its third President in a little more than four years, its fourth energy czar in as many, and had enacted five major energy legislative packages, the last creating the Department of Energy. By the time George W. Bush became President in 2001, “America’s addiction to imported oil (is no longer) a future risk ... (but) a risk to this nation right now.”

In one of the last energy reports prepared by the Lawrence Livermore Laboratory for the Secretary of Energy and President Bush, it was shown that in the U.S. the amount of imported oil is almost proportionate (equal) to the domestic transportation consumption requirement. Therefore, it makes sense to conclude that the degree to which America is an “energy hostage” is a function of the transportation demand. The current technology (internal combustion engine) for transportation bears significant responsibility for the resource demand.

Additionally, imported oil (22-24 quads) almost equals the amount of energy required for the entire transportation sector (23- 25 quads). Every quad costs over \$4 billion and produces 74 million metric tons of CO₂. Each quad of imported oil equals 100 thousand jobs. Converting twenty quads of imported oil into domestic hydrogen fuel cells would create 2 million new jobs, protecting domestic oil industries, petrochemicals, coal and other fuel resource jobs, not to mention allied and supportive industries. The impact on the domestic economy would be overwhelmingly positive.

Stopping the hemorrhaging of export capital and outsourcing of jobs offers a slam-dunk to the domestic economy. For every quad not imported, \$4 billion are not exported and can be reinvested into the domestic economy in the transitional energy infrastructure, recapturing 2 million jobs.

Serendipitously, environmental emissions (CO₂) can be reduced by 74 million metric tons for every quad transitioned to hydrogen fuel cells. The technical recommendations of the NAS suggest that between now and 2030, hydrogen vehicles will account for only 5 percent of the market share. Though the technologies will be around by 2010, costs won’t become competitive until 2020. The inability of the infrastructure to provide fueling, distribution and safety will distort the competitive value, affecting performance, cost, convenience and more through 2040. Given a significant energy security threat causing an expedited hydrogen vehicle introduction, H₂ vehicles might account for 10 percent market share by 2010.

The Stimulus – Changing U.S. Energy Policy

A few years ago a colleague of mine and I wrote that “[w]hen the domestic energy policy epiphany comes — it will come because a ‘disaster’ happened and doing the usual will be more painful than doing something different.”

All new technologies simultaneously offer the pain of transition and the opportunity for economic stimulation. From the dot-com and cellular communication technologies of the last few years, to the transportation evolution begun in the late 1800’s, change has brought opportunity — and more importantly, national security.

Does the quantum leap in technology come from the need or the resources? The reason there isn’t a Hydrogen Economy today is because the concept doesn’t resonate with voters. Consumers haven’t demanded hydrogen because it isn’t relevant to their lives — yet.



The \$787 trillion stimulus program that Congress enacted provides an opportunity for the Administration to make energy resources and their costs relevant once again. For \$100 billion (little over what is being spent in Iraq for a month or spent by the telemarketing industry in two), there would be enough renewable energy to reduce the produced energy loss and, perhaps with enough hydrogen production in individual states, reduce the dependency on foreign oil.

The alternative renewable energy investments would create 2 million new jobs and reduce carbon dioxide emissions by 2 billion metric tons.

The nature of energy is at once a concept and a thread running through the future and the fabric of life. An “ambitious new approach to U.S. strategic energy policy” may not have prevented the cascading loss of power in 2003, or thwarted the panic on Wall Street, but it might stop such losses in the future. Until the lights go out, we sit in gas lines or our kids die in a far off war, we remain detached from the issues which control and shape our lives. Perhaps it is time for us to become reconnected. President Obama views the outcome of the last election as such a call for change.

Business Opportunities

Crises cause epiphanies to happen. President Obama seems willing to embrace change by considering new and novel approaches to restructuring the energy paradigm. In the U.S., he has begun developing energy policy initiatives designed to condense a long-term energy security solution so that they match his presidential term of office. This has never been tried before and is intended to provide an economic stimulus that can promote infrastructure revitalization as well. His goal is to promote green energy efficiently in order to reduce acid emissions, while at the same time achieving the energy independence that we have sought since the early 1970’s. Such an unprecedented step could create over one million new jobs (while protecting existing jobs). Not only is it designed to stimulate the economy, it could also reduce emissions to a level not even hoped for by the most ardent environmentalists.

The new Administration has already begun to provide investors with incentives to accelerate the transition by offering them tax and accelerated depreciation options. Retained export capital can guarantee existing infrastructure stability while transitioning jobs to the new green initiatives, possibly including a new hydrogen infrastructure.

The President’s stimulus package provides additional benefits for renewable energy, including, for example, bonus depreciation, energy efficiency, tax credits for investment in the sources of green energy and energy efficiency. Specifically, there is \$6.3 billion for energy efficiency and conservation to the states. This includes \$3.2 billion for Energy Efficiency and Conservation block grants, of which \$400 million will be awarded competitively. Until now, the lack of capital access has been a major barrier to project initiation and completion. The Obama energy initiatives are designed to change that. The federal government is offering to provide necessary capital to entrepreneurs interested in developing green energy projects, including nuclear power plants, wind and solar generation projects, municipal waste to energy projects, accelerated nuclear legacy waste cleanup initiatives, energy retrofits, construction of transmission, smart grid distribution, cogeneration and the development of a hydrogen fuel source. There will also be other opportunities that are still to be determined.

President Obama’s approach to addressing energy problems is different from his predecessors. Previous approaches seemed directed toward repairing short-term problems. However, President Obama appears to understand that in the long-term, the importance of energy efficiency remains unchanged. After all, no one expects the cost of oil and other forms of fossil energy to stay at their currently depressed levels forever. Prices will eventually bounce back, and businesses will once again feel the pinch. Some companies view rising energy costs as an unavoidable cost of doing business. But it doesn’t have to be that way.

Forward-thinking organizations recognize that energy is a strategic input that can — and should — be continuously reinventing itself. These kinds of enterprises may now have access to federal stimulus money by developing projects which were previously thought to be uneconomic because they were too costly. The cost issues often overrode the opinions of many energy and environmental experts who supported the projects. They believed that despite the costs, the benefits would result in reduced green house gas emissions and improved energy security. The issues of cost may be alleviated, in part, by the availability of funds from the stimulus package. Companies that fail to take advantage of this program may very well be left behind. In all probability, this is a once in a lifetime opportunity.



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