Brainstorm: Alternative Fuels

Edited by Jason Lomberg

What's the best way to advance alternative energy research? With government grants, free market solutions, or something else?

John Perzow, Analog Devices, www.analog.com [1]

Alternative energy generation and improved energy utilization are issues that impact our national security, macro-economic growth and the health of our planet. According to a new report of the National Research Council, America's Energy Future: Technology and Transformation, actions taken (or not taken) between now and 2020 to develop and demonstrate key technologies in these areas will determine the nation's energy options for many decades to come.

The ACEEE (American Council for an Energy-Efficient Economy) published a report in May (E094) that concludes with the question "…what policies and incentives are we willing to support that will ensure this more productive investment opportunity?" This suggests new public policies are needed to accelerate the research, development and deployment of technology and not leave it entirely in the hands of free-market dynamics. Either way, the cost of the system, the payback period and the level of disruption that results from the new technology are major considerations in determining the best way to fund research.

We all support smart grids. It's clear that remotely monitoring the grid and transmitting real-time data will improve reliability and efficiency (fewer trips in the truck, etc.). The grid is in place (although in sad shape for lack of public policy attention). It's the "making it smart" part that needs help. When smart buildings and smart appliances are added to the mix, the magic begins. Plug-in hybrid electric vehicles can monitor the cost of electricity and "decide" to sell stored energy back to the grid. Clothes dryers can "decide" to run at off-peak hours. With new standards and incentives, this interactive network can create markets that will self-fund R&D.

Replacing an incandescent bulb with a florescent lamp can now pay for itself in less than one year. Consumers understand this value proposition and many are willing to pay more up front for long term savings. This fast-growing market is self-funding the development of improved CFLs, dimmers and related technologies. However, CFLs

contain mercury and new public policies are needed to motivate recycling and make full use of their potential benefit.

PG&E has entered into a multi-million dollar contract with Rockwell to install motion sensing to control hotel room light and HVAC. These sensors are expected to save $140 per room per year. Why did it take an energy crisis to drive this program when the ROI impact makes it an obvious choice? Changing human behavior, even when we know it's in our best interest, sometimes takes external motivation.

Although free-market forces support incremental advancements in energy sourcing systems or more efficient appliances, disruptions to the infrastructure or the way we do things will need a faster, more decisive hand.

Jeff VanZwol, Micro Power, www.micro-power.com [2]

When it comes to spurring innovation, either for product development or research, I am a proponent of the free enterprise methods. This typically involves the investment of internal corporate or external venture capital funds in research or product development. However, the current economic downturn, combined with the financial woes of the North American auto industry, has resulted in the allocation of substantial government funding to battery manufacturers.

The state of Michigan offers tax credits for battery R&D and manufacturing, and has allocated $555 million in credits to companies. These incentives stipulate that battery manufacturers can qualify for up $300 million in total, provided they open a Michigan plant and create at least 300 jobs in the state. Advanced Battery Group, a joint venture between Dow Chemical and Kokam America, have announced a $665 million, 800,000 square-foot battery manufacturing plant. Johnson-Controls-Saft expects to invest $220 million in an advanced battery production plant that will employ 498 workers. Most recently, A123Systems was awarded a $249 million grant from the U.S. Department of Energy's (DOE) to build a world-class lithium ion battery manufacturing facility in Livonia, Michigan.

So the federal DoE and Michigan state tax credits, combined with the revenue potential of the auto industry, have created an investment frenzy in batteries in North America. Much of this research and manufacturing has moved off shore in

the last few years. But the perfect storm of economic and environmental factors – issues with auto industry, increased demand for HEVs, and government incentives – have successfully motivated the battery industry to invest in battery solutions for the auto industry.

Jason Tollefson, Microchip Technology, www.microchip.com [3]

All successful commercial advancements in technology are ultimately economically or utility based. The end result must produce a product that either has a lower cost associated with its use or provides additional benefit over prior technology. This is also true in energy.

New energy technology will not be successful unless it fulfills the cost or utility requirements. This can be seen in the nascent solar market. Only now, as efficiencies approach 25%, does the economic equation begin to make sense. Homeowners can expect to see a return on their solar investments in less than 10 years.

Still, if the payback took only two years, many more would order panels. Dramatic investment would occur to meet the demand. Companies would invest in R&D to deliver even higher-efficiency panels.

The issue at hand is how to spur the cycle and start companies investing in the first place. Tax policy could be effectively used. If consumers of alternative energy were allowed tax rebates in proportion to their usage, this would push the economic equation in favor of new technology.

This same model works for other forms of alternative energy, beyond solar. Consider a tax rebate on bio-diesel or E85. Sales tax on gasoline is as high as 8%, and per-gallon taxes are as high as $0.42 (source: Tax Foundation, 2009). At $2.50 per gallon, typical yearly tax expenditures are close to $500.

Whether it is solar, energy harvesting, bio-diesel, high-efficiency air conditioning or wind power, tax rebates on alternative energy usage would have a strong tangible economic benefit to consumers, and would spur faster growth in all of these markets.

References:
2009 Tax Foundation – URL:
http://www.taxfoundation.org/publications/show/245.html [4]

Doug Bailey, Power Integrations, www.powerint.com [5]

There has been a huge amount of investigation into new forms of energy, but I believe the most alternative and far-reaching research you could do now would be to look at ways in which we might use less energy in the first place.

It seems to me that we humans are hard-wired to choose the easy, immediate, and most personally beneficial option rather than follow a path that promises to deliver societal benefits some time in the future. I expect that this means governments will continue to regulate energy usage to some extent through sticker programs such as ENERGY STAR or mandatory standards. I believe that societies are likely to make their decisions about the kind of environment that the people want to live in, and regulate individual, corporate, and communal behavior accordingly.

Mandatory governmental regulation tends – somewhat counter-intuitively – to be favored by business, as it provides a level playing field on which all companies operate equally. To be successful, companies don't need to worry about whether a competitor will gain a retail price advantage by bypassing an eco-regulation; they can simply out-innovate their competition in whatever fields their market considers important.

In this respect, the California Energy Commission (CEC) provides an interesting example. In 2007, it approved the world's first mandatory energy efficiency standards for external power supplies. Although there had been previous voluntary guidelines complete with comforting green stickers, the CEC legislation had real teeth. And because California is the eighth largest economy in the world, the rest of America (and the world) sat up and took notice…and, by and large, followed suit.

Since mandatory standards are favored by commerce, and the California example of mandatory regulation worked, we should expect more of the same in the future –

tightening of regulations that already exist and the implementation of new regulations for new energy-using products. Effort expended by researchers on the energy-saving alternative to alternative energy is unlikely to be wasted.

Jim Balthazar, Nuventix, www.nuventix.com [6]

There are four reasonable options available to advance alternative energy research: existing energy companies invest in new development; the government can utilize public funds to research new technologies; we can allow the private sector to finance the development of new energy; or the government can offer assistance to companies investing in alternative energy solutions.

The fourth option is the most likely to be successful. The government can provide assistance through grants, research credits or the like. This option can assist in the two critical areas where new technology meets obstacles – when the new technology is being productized and when the company deploying the technology scales the new business. Basic research from government labs made available to the public domain would also aid the effort.

Ultimately, it is the combination of private and public companies and funding that will enable new energy technologies to be developed and deployed. Fortunately, more experienced private sector people are moving to assist the government in developing an optimized government policy toward renewable energy.

Check out our Brainstorm archive [7].

See Part 2 [8]

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