

Quality Asset Management

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The Hydrogen Revolution!

By Gil Hanoch, September 7, 2005

Oil prices are at a historic peak of over \$60 a barrel. Both the individual at the gas pump and the stock market as a whole are affected. During times like these, you realize how dependent we are on other countries.

The ideal world. We should have a strong interest in reducing the dependency on oil for economic and non-economic reasons. Finding alternative sources of energy would make our lives better in many ways:

1. In contrast to oil supplies, which are limited, finding renewable sources of energy would allow for a permanent solution to the energy needs of the world.
2. Energy would be cheaper by avoiding the inflated prices of oil driven by the oil cartel, OPEC (Organization of Petroleum Exporting Countries).
3. The US would not have to be beholden to the countries that produce most of the world's oil.
4. The US would not have to do business with countries whose governments, policies and/or practices Americans do not agree with.

These are huge incentives for us to find alternative energy sources, even if the initial cost is large.

The real world. In real life, many tend to focus on the short-term. It is hard for the government and corporations to spend so much money on research, with no real results for 10 years or more. Corporations are limited by their cash reserves and governments are elected for periods of 4 years, limiting their horizon.

The real world solution. There is a simple thing that can help us reach a solution, given real-world limitations. Paradoxically, it is high oil prices! The higher the oil prices, the more we will save by using alternative sources of energy, and the bigger the incentive to invest in developing them.

Seeing the magnitude of the current problem, it might be worth suffering from high oil prices in order to reach a sustainable solution. In the 70's, when oil prices were very high, people came together to create more energy efficient appliances and cars to solve the problem.

The sustainable solution. The improvements of the 70's weren't enough. We are still dependent on oil, and the world's energy consumption keeps rising. A sustainable solution requires using energy that is from renewable resources. A few examples are: wind, solar and hydropower energy. With these technologies, we may never lack energy.

Companies have been working on renewable energy sources for decades. As oil prices are rising, more companies and governments, including shorter-term thinkers, are spending many more resources on developing these alternative energy sources.

The need for a common solution. If we use a variety of energy sources, we would have to build different cars and appliances that can use the different types of energy. In addition, we would have to store energy and transport it in different forms before using it.

Another problem is that many of these sources are not available continuously. The sun does not shine at night and the wind does not always blow.

The common solution – hydrogen! In 1839, Sir William Robert Grove mixed hydrogen and oxygen in the presence of an electrolyte, and produced electricity and water. Later this invention was named fuel cell, and made it possible to transform our energy problem into a much more elegant one. The

fuel cell allows us to use two of the most common elements in the world to create energy and pure water as a byproduct. It does not solve the energy problem, because it takes energy to isolate the hydrogen from the water, but it allows us to unify much of the process. Here is how it works:

1. The first group of steps will vary depending on the renewable energy source used:
 - a. Generate energy from one of many renewable sources.
 - b. Using this energy, isolate hydrogen from water.
2. The remaining three steps are the same regardless of the renewable energy source used:
 - c. Store the hydrogen in some form.
 - d. Transport the hydrogen to the location where the energy is needed.
 - e. Use it to power vehicles and appliances requiring energy.

Now, instead of creating different versions of products for different sources of energy (e.g., solar, wind), we can design the products to accept only one source of energy: hydrogen.

If we use one product to solve the various problems, companies and governments can focus their money and efforts on a single solution to the energy problem. When compared to focusing on many different technologies, this creates a big incentive to join forces and pursue this goal.

Current work. An Internet search on “fuel cell” or “hydrogen energy” yields about 10,000,000 results. Sifting through a few of them would give you some idea about the amount of work currently being done. I was completely overwhelmed! A few links I found:

1. The World Fuel Cell Council: <http://fuelcellworld.org/>
2. International Association for Hydrogen Energy: <http://www.iahe.org/>
3. Fuel Cell Europe: <http://www.fuelcelleurope.org/>
4. US Department of Energy: <http://www.eere.energy.gov/hydrogenandfuelcells/>
5. US Department of Energy: <http://www.fueleconomy.gov/feg/fuelcell.shtml>
6. National Renewable Energy Laboratory: http://www.nrel.gov/clean_energy/hydrogen.html
7. California Fuel Cell Partnership: <http://www.fuelcellpartnership.org/>
8. National Fuel Cell Research Center: <http://www.nfcrc.uci.edu/>
9. US Fuel Cell Council: <http://www.usfcc.com/>

It is nice to learn that NASA has used liquid hydrogen since 1970 for its space shuttles, and the crew could drink the byproduct – pure water.

Smile. Now you can smile whether oil prices go up or down! If they go down, you can be happy about the immediate financial relief; if they go up, governments and corporations get greater incentives to invest in developing renewable energy sources, which brings the long-term solution closer. It's a win-win situation.

What does this mean in terms of the future of the stock market?

- If oil prices go down, the stock market may go up rapidly.
- If oil prices go up, the stock market may decline temporarily. In the meantime, the development of alternative energy sources will be accelerated, bringing a recovery that will permanently reduce the impact of oil prices on the stock market and the rest of our lives.

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