

Re: Low Cost Hydrogen is here to stay

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- *From:* Willie.Mookie@xxxxxxxx
 - *Date:* Wed, 12 Dec 2007 17:18:04 -0800 (PST)
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On Dec 13, 1:19 am, Monkey Clumps <spacebrai...@xxxxxxxx> wrote:

On Dec 9, 8:24 am, Willie.Moo...@xxxxxxxx wrote:

On Dec 9, 8:20 pm, Eeyore <rabbitsfriendsandrelati...@xxxxxxxxxxxx> wrote:

Willie.Moo...@xxxxxxxx wrote:

Eeyore wrote:

Willie.Moo...@xxxxxxxx wrote:

Eeyore wrote:

How
many
tons
of
*electrolytically
manufactured*
hydrogen
have
you
sold
to
date
?

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\$24 billion
worth. 1/3
of it will be
used to
upgrade
lower rank
fuels, 2/3
will be
burned
directly.

And when will you deliver
these 30 million tons ?

30 billion you mean

No, I meant 30 million tons. As in \$24 bn/ \$800 per ton.

– these are 40 year contracts with first
deliveries in 2011.

OK. Good luck with that.

Graham

Thanks, I can feel the love. lol.

William, here are a few engineering type questions regarding your
plans:

1. How will airborne contamination, dust, dirt, soot, pollen, etc.
that floats around and lands on things outside impact the optical
performance of your PV devices? How often will the need to be cleaned
or otherwise maintained to achieve desired performance? How will they

be cleaned?

When is the last time you saw a street light was cleaned? How about an overhead light in your company's conference room? How about the windows in a commercial greenhouse?

Please consider that I am not making pictures of the sun. I am condensing sunlight with my lenses. So, scratches, dust dirt pollen reduce efficiency, but is not objectionable if efficiency losses are acceptable. How do you define acceptable? What is the value of the gain in efficiency? What is the cost of that gain?

If you sit down and do the engineering you'll find just as in the examples I gave above, in most situations, and most environments, under most conditions, barring exceptional situations – the operator is better off not cleaning them at all.

2. Since your projects are located in the tropics, it seems likely that in the course of a few decades, one of your sites may be hit by a tropical cyclone. Your description of the PV devices made them sound somewhat lightweight in construction. How do anticipate they would weather a cyclone?

Take the plastic from a six pack of soda – fold it so all the circles overlap – now attempt to tear it apart. Unless you're exceptionally strong, you can't do it. That shows you just how strong lightly constructed plastic can be. The land is graded to intercept sunlight and control run off. Drains are put into place and holding ponds – using technology very similar to drainage systems used in agriculture. The panel strings are wired together 1,100 at a time and z-folded for transport. These are dropped off near the graded/drained land. A specially built tractor picks up the z-folded block and unfolds a 4 foot segment from the 4,400 foot string, each segment is 4ft x 8ft in size. A 4 ft trench is dug 8 ft apart by the tractor (think Ditch Witch) Two webs of plastic folded on the backside of each segment are unfolded and inserted in the trench, and disks and rollers compress soil around the webbing. So, the entire 4,400 x 8 ft sheet has two plastic nets buried 4ft in the ground. When you consider that most membrane roofs are held securely in place by a few inches of gravel you'll see how secure this approach is.

The real problem when you sit down and do the work is water, not wind. Wind is nil only a few inches above the ground. Besides the panels are inside what amounts to a ditch, facing the sun running east to west, so wind can't really get at it. Heavy rains are another matter. So, that's why we pay special attention to drain designs on the back side of the panel and how that integrates with the drainage

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system and land grading. We use GPS controlled tractors and graders to shape the land as its needed.

3. In addition to the creative and proprietary technical aspects of your projects, it would seem to me that there will be a large amount of meat and potatoes engineering to build the type of facility you describe. Is your company doing the detail design of the entire project? Who is going to do the construction?

These aren't engineering questions, they're highly proprietary legal and financial questions. So, I will answer them generally not specifically.

Generally speaking I have an off-shore holding company in an appropriate nation that holds all the IP and manages its application world wide. I create subsidiaries to license this IP for use in specific energy projects throughout the world. Each subsidiary builds owns and operates a specific facility and is responsible for delivering the products called for in the project. This subsidiary then hires qualified vendors to design and execute the project. While specific vendors for specific functions on specific projects is more than what I can tell you now, I will say that these vendors include folks like; Boeing, IDC, CH2MHill, Accenture.

<http://finance.yahoo.com/q/pr?s=ACN>
<http://biz.yahoo.com/ic/138/138531.html>
<http://biz.yahoo.com/ic/110/110227.html>

This is called the Timex business model of outsourcing. Timex was the first, but certainly wasn't the last. Timex owned the marketing channels, the intellectual property rights, the brands, the name, the financing. They then outsourced all the work to vendors that they purchased.

A variant of Walmart's successful model. Walmart buys so much of the output of a vendor that they basically control that vendor through the sheer volume they buy.

4. For the electrolyzer, what will be the source of water? How pure does the water need to be and what will you do with the removed contaminants?

Depends on the details. One application will use hydrogen fired distillers and Persian Gulf sea water to produce salt and distilled water. Another application will use condenser heat from hydrogen fired boiler for a power plant converted to hydrogen to distill water

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from the Pacific. Another application will take the water vapor from dewatered coal, plus rain run off and water from a river, purify that and and electrolyze it.

5. After the hydrogen is produced does it need to be liquified for use in your coal to high quality hydrocarbon process?

No.

How are you going to deal with the metal embrittlement issues in handling the hydrogen?

Hydrogen has been produced industrially since 1911. Embrittlement was an issue then, and throughout most of the middle of the 20th century, but compared to other pipeline issues, like corrosion, embrittlement was a secondary problem. It never really became a huge issue. In August 2006 ASME completed B32.12 standards for hydrogen pipelines. More here;

<http://www.apia.net.au/events/docs/IPChydrogen.pdf>

6. Where will the PV devices, electrolyzer and coal-to-liquid reactor be designed and built?

Generally speaking the products I am building are designed and tested based on 14 years of R&D by me. Based on these products and efforts data was developed that were used by qualified vendors to design factories to build them in quantity on a larger scale. These included cost estimates from qualife qualified architects and engineers that made them in a sense bankable. Banks required confirmation of this or that detail. Test articles were made for unusual processes and tested. Cost estimates were verified or adjusted, and the financial models were created.

In the end, we didn't need any greenfield developments since most of the stuff is off-the-shelf. The PV devices will be built at converted wafer fabs I am buying. The electrolyzers will be built at a vendor I've purchased. The coal-to-liquid reactor is built by a consortium of vendors I've hired, and will be completed at a company I purchased for that purpose who builds hydrogenation reactors.

For each element of the supply chain there is a make/buy decision to be made based on IP I contribute, and volume of purchases, and state of the industry, and so forth. Classical economics textbook stuff.

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To carry this out over the past 5 years cost more than the technology piece, and the financial piece cost more than that.

Each of these supply chains take time and energy to develop and execute on. Accenture and others have spent the last 5 years working through all this. Of course, this also takes financing which is a whole other ball of wax. Obviously I will not give away strategies that cost me dearly to acquire.

Clearly, I can talk generally about what's going on. Take the wafer fabs as an example. About 90 wafer fabs are sold every year as the electronics industry upgrades its processes. My solar dies do not need the latest dimensional accuracies, and so, I have a list of criterion that I need, and judge potential acquisitions based on that. Some fabs are sold off with workers, some with equipment in place, others empty buildings, others OLD empty buildings. Each has advantages and disadvantages based on what they're doing and so forth.

Here is one resource – of many – that are then reviewed by qualified analysts to determine acquisition strategy.

http://www.scfab.com/index.php?p=view_product&product_id=6

which is then acted upon once funds are in place.

Is your company designing and supplying all of that equipment?

Yes using the timex model described and the supply chain I have put together.

7. How big is your company?

Its quite small for the amount of projects we own, but we cast a long shadow through our partnerships, vendors and subsidiaries.

Do your intend to take it public eventually?

No. I have adequate access to risk capital through the energy project finance model I described, so I don't need to sell capital. The projects then become bankable and the value of the projects are such that I can leverage value of existing projects to expand as rapidly as my supply chain allows. In fact I have a capital buy-back in place

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for my original US based company, since I've transferred all IP offshore.

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