

Re: Solar-hydrogen home power system?

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From: Ray Drouillard (*cosmicpam2_at_comcast.net*)

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In what way? Because I don't believe that hydrogen is economically feasible right now? If you look at the top of the thread, you'll see that my first post said exactly that.

I may agree with the conclusion, but I see a whole lot of bad science used to prove the point. I am trying to correct the bad science. The biggest blooper is the one where someone equated a hydrogen chemical explosion with an H-bomb. That was a real howler.

Ray Drouillard

"Gymmy Bob" <nospamming@bite.me> wrote in message
news:jeGdnT953d4RkurcRVn-hA@golden.net...

> *Sounds like a backpaddle for the "speak too soon foolish"*

>

> *"Ray Drouillard" <cosmicpam2@comcast.net> wrote in message*

> *news:2tofefF21iggsU1@uni-berlin.de...*

>>

>> *"Dan Bloomquist" <EXTRApblic21@lakeweb.com> wrote in message*

>> *news:4176DEE2.2040003@lakeweb.com...*

>>>

>>>

>>> *Ray Drouillard wrote:*

>>>>

>>>>

>>>> *40% Is a whole lot better than the "less than none" that Don*

>> *Lancaster*

>>>> *keeps quoting. As a matter of fact, I'm beginning to believe that*

>> *he*

>>>> *has the whole spiel stuck in a text file for quick addition to his*

>>>> *prose.*

>>>

>>> *Capital cost needs to be considered. On the other hand, Mr.*

Lancaster

>>> *has wave his hands around about wind and PV being energy sinks.*

Past

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> > > *research has shown otherwise.*
> >
> > *Capital cost is economics, not engineering.*
> >
> > *Effeciency is engineering, not economics.*
> >
> > *They can be related, but the person expressing that relationship needs*
> > *to be explicit.*
> >
> >
> > >
> > > *I went and fetched Grahams post for you:*
> > > > *This is it:*
> > > > *41 percent (of delta 'G' of hydrogen oxidation to water vapour)*
> > > > *for the fuel cell spec'd at*
> > > > *<http://www.ballard.com/resources/powergen/NexaSpecSheet.pdf>.*
> > > >
> > > > *Raising specific power -- only 1.2 kW over 13 kg --*
> > > > *to levels adequate for a car prime mover drops the efficiency,*
> > > > *I guess, by a third. Then there are inverter and motor losses,*
> > > > *and we're down to 20 percent.*
> > >
> > > *However, I don't agree to his 50% hit in the implementation. The EV*
> > *side*
> > > *of the power train can easily do 85–90% net. There are source to wheel*
> > > *traction systems that run 90% to 97% over most of thier power/speed*
> > *range.*
> >
> > *Agreed.*
> >
> > *With 65%+ efficient fuel cells, and 90%+ motors, a vehicle can turn*
> > *hydrogen into motion very efficiently. The main bugaboo is storing the*
> > *stuff (an issue that has been debated hotly in this thread).*
> >
> > *There are now 60%+ efficient methane–fuelled fuel cells. I know of none*
> > *that are commercially available, unfortunately. If they do become*
> > *available, they would be ideal for running an ev because the methane*
> > *storage technology already exists. It still isn't as energy dense as*
> > *gasoline, but it's a lot more dense than hydrogen. It also has the safe*
> > *ty advantage of dissapating and floating away in the unlikely event*

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of a

> > *pressure tank rupture.*

> >

> > *Thirdly, it's a real fuel -- not something that is derived from a fuel.*

> > *It can be mined, or very easily created from biomass.*

> >

> >

> > >

> > > >

> > > > *I still want more details about that 40%. I'm hearing figures*

> > *anywhere*

> > > > *between 60% and 90% for both electrolysis and fuel cells. Where*

is

> > *the*

> > > > *hard data?*

> > >

> > > *Crunch the numbers for your self, on that PDF above for that*

mighty

> > > *pricey PEM unit, if you don't believe Graham.*

> > >

> > > > *Yes, I can google until I'm blue in the face and crippled*

> > > > *from carpal tunnels, but some of those quoting the efficiencies*

> > *ought to*

> > > > *have real data somewhere.*

> > > >

> > > > *If we have electrolysis going at 80% efficiency, and a 70%*

efficient

> > > > *fuel cell (just to throw in some reasonable numbers). you have a*

> > *total*

> > > > *efficiency of better than 50% (allowing for some modest storage*

> > *losses).*

> > >

> > > *Electricity to wheels. Electrolysis 80%, storage 90%, PEM 40%, vehicle*

> > > > *85%. So you net 25% of your electrical input. There are EVs in*

> > > > *production that net better than 50% now. Also, compare the capital*

> > *cost.*

> > > *Hydrogen, rough guess, will run some 5 to 8 times an EV commuter.*

> >

> > *It pretty well goes without saying that making hydrogen from grid*

> > *electricity is a no-win situation.*

> >

> > *As far as comparing a hydrogen system to a battery system -- well, I*

> > *expect the battery system to win when you consider efficiency. The*

> > *biggest obstacle for EV transportation is the lousy range of even*

the

> > *best vehicle. It would be worth it to some people to give up some*

> > *efficiency just to get more range.*

> >

> > *Getting back to the original post, though -- he was talking about a*

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> > *totally fixed application. The electricity --> hydrogen --> electricity*
> > *idea had occurred to me, too. I was pondering what to do with cheap*
> > *solar cells of those much–promised organic semiconductor cells*
become
> > *available at a reasonable price. At the time, I lived in the city,*
and
> > *was limited to the area of my (small) roof. Therefore, storage to*
pick
> > *up the slack in the winter would be a necessity. Since we also had*
> > *natural gas piped in, I planned on generating any additional*
electricity
> > *needed using a natural gas fuel cell. The waste heat would be used*
to
> > *heat the house.*
> >
> > *Now that we live on a nice ten acre parcel, I'm not nearly so*
limited
> > *when it comes to the area that I can cover with solar cells. That*
makes
> > *it more feasible to get enough area covered to produce a day's worth*
of
> > *electricity on even the shortest day. That cuts the storage*
> > *requirements considerably -- both in quantity and time. Hydrogen*
> > *wouldn't be necessary at all.*
> >
> > *Of course, all of the above depends greatly upon the much–promised*
cheap
> > *solar cells, as well as the availability of relatively inexpensive*
fuel
> > *cells.*
> >
> > *Then, of course, there are things like inverters and/or DC*
appliances.
> > *The ceiling fans would have to be ripped out and sold. I would also*
> > *have to find something to replace the compact fluorescent lamps that*
we
> > *have used to replace almost every incandescent light in the house.*
I
> > *would probably use regular red, yellow, green, and blue LEDs in*
fixtures
> > *that allow the light to mix because that is more efficient than*
using
> > *white LEDs (for very good quantum physics reasons).*
> >
> > *Incidentally, the cheapest way to save energy right now is to*
replace
> > *all your incandescent lights with fluorescent lighting. Soon, LED*
> > *lighting will be more available.*
> >
> > *So, my next realistic step is to make a digester to turn organic*

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garbage

> > *into methane. I don't expect to find an affordable methane fuel cell*

> > *any time soon, so if I get more methane than I can burn in my appliances*

> > *and vehicles, I'll use it to fuel a standard CNG generator, and use the*

> > *waste heat to heat the house. Lots of research has to be done before*

> > *getting anywhere near that far, though.*

> >

> >

> >

> > >

> > > >

> > > > *If you want to compress the hydrogen to store it, and if the energy*

> > *cost*

> > > *of that is significant, you can recover some of the energy by using*

> > *an*

> > > *'air engine' to decompress the hydrogen before it is fed into the*

> > *fuel*

> > > *cell.*

> > >

> > > *Capital cost and energy density.*

> > >

> > > >

> > > > *Also, in a solar energy system, you are going to be getting more energy*

> > > > *in the summer than in the winter. That means that you will be using*

> > *the*

> > > *fuel cell in the winter if your solar array is sized such that you*

> > *need*

> > > *to store power in the summer for use in the winter. In that case,*

> > *the*

> > > *heat that is generated by the fuel cell can be used to heat the house.*

> > > *In that way, you can use 100% of the energy that you have stored in*

> > *your*

> > > *hydrogen tanks. Any inefficiencies end up heating the house, or maybe*

> > > *even cooking the meals (depending on how 'retentive' you want to be*

> > *when*

> > > *designing the system)*

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> > >
> > > *It will never ever make sense to use hydrogen in a terrestrial
> > > application. Just run some numbers and compare them to the
> > alternatives
> > > that are presently applied.*
> >
> > *I won't argue that point. Before I buy the equipment needed to
> > generate, store, and use hydrogen, I will build a big water tower
and
> > use my excess energy to pump the water uphill, and use a turbine or
> > water wheel to get the energy back. As a bonus, I'll also have
either a
> > swimming pool or a fishing pond.*
> >
> > *I might argue with the people who are scared to death of hydrogen,
or
> > those who say "less than zero", but I have already thought through
the
> > hydrogen–as–a–fuel situation to have a good handle on what it would
take
> > to make that practical. On a large scale, off–shore nuclear energy
> > would make it a good option. On a small scale, it would take a very
> > specific set of conditions to make it worthwhile.*
> >
> >
> > >
> > > > *Certainly, the cost of photovoltaics makes the system
uneconomical
> > now.
> > > > But, this is rec.arts.sf.science, so speculation of future
advances
> > in
> > > > the art are definitely on topic.*
> > >
> > > > *Sure, we could see thin film at a buck a watt. Still not cheap.
I've
> > > > been reading about it for years and I still don't see it
happening.
> >
> > *I'm talking about organic semiconductors, which may very well be
made
> > very cheaply. Still, I'll believe it when I see it. I'm hopeful,
but
> > far from convinced.*
> >
> >
> >
> > > > *If I could go out and buy a bunch of plastic sheeting that
converts
> > > > light into electricity with an efficiency of about 8% for a few**

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> > cents a
> > > watt, what would I do with it? Putting it on the roof would be
a
> > good
> > > start. Storing power in batteries short-term for use at night
would
> > > also be a good idea. In fact, I can save on the cost of an
inverter
> > if
> > > I use a bunch of batteries in series and store it at 180V, then
just
> > use
> > > some MOSFETs to generate a pseudo sine wave output -- no
> > up-converting
> > > switching regulator, no muss, no fuss.
> > >
> > > As a past poster would say, 'If we only had some ham, we could
have
> > ham
> > > and eggs, if we only had some eggs...'
> > >
> > > Inverters are \$.50/watt, off the shelf. No muss, no fuss.
> > >
> > > They will probably be cheaper once electric cars come more into
> > production. Right now, high-power switching transistors and fast
> > high-power diodes keep the prices up.
> > >
> > >
> > > Qusetion, why hydrogen?
> > >
> > > Because it's cool?
> > >
> > > Remember, I'm not advocating the hydrogen solution. I have thought
it
> > > through, and share the conclusion of some or the people I am arguing
> > > with. I don't share their reasoning, however.
> > >
> > >
> > > Ray Drouillard
> > >
> > >
> > >
> > >
> > > >
> > > > Ray Drouillard
> > > >
> > > > Best, Dan.
> > > >
> > > > --
> > > > <http://lakeweb.net>
> > > > <http://ReserveAnalyst.com>

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> > > *No EXTRA stuff for email.*

> > >

> >

> >

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