

Re: Solar-hydrogen home power system?

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From: Gymmy Bob (*nospamming_at_bite.me*)

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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" <EXTRApublish21@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

>> research has shown otherwise.

>

> Capital cost is economics, not engineering.

>

> Efficiency 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>.

>>>>

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>>>> *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 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 carpel 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).*
>>

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

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> 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)
>>
>> 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

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> 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
> 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?

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> *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>
>> *No EXTRA stuff for email.*
>>
>
>