Re: Global Warming: Junk science at it's [best] worst

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- *Date*: Mon, 17 Sep 2007 20:08:17 +0000 (UTC)

In <qanre353q5o2jcmat1htm2gg7p0844qmfa@xxxxxxx>, Jonathan Kirwan wrote:

> On Sun, 16 Sep 2007 21:06:35 +0000 (UTC), don@xxxxxxxxxxxxxx (Don Klipstein) wrote:

<SNIP to edit for space>

>> To have equal energy content, a quantity of liquid hydrogen would have almost 4 times as much volume as kerosene, but 1/3 the mass.

> Last year, I was helping prepare a few slides for my son in high
> school on the subject of hydrogen as a fuel supply for transportation.
> Two tables from that report are interesting:
> I add density kg/liter:
> Fuel Energy Comparison (calc. from 1st 2 columns)
> −−−
> MJ/kg Total MJ/liter H2 MJ/liter
> −−−
> H2, 20K cryogenic 120 8.4 8.4 .07
> H2, 150K cryogenic 120 3.5 3.5 .029
> H2, 5000 psi, ambient 120 2.75 2.75 .0229
> H2, 3600 psi, ambient 120 2.0 2.0 .0167
> Methane 50 21.0 12.6 .42
> Ethane 47.5 23.7 12.0 .491
> Propane 46.4 22.8 10.6 .491
> Gasoline 44.4 31.1 13.2 .700
> Ethanol 26.8 21.2 12.3 .791
> Methanol 19.9 15.8 11.9 .794
>
> The last column in the above chart represents the H2 portion of the available energy. Obviously, for hydrogen, the last two columns are identical since 100% of hydrogen's energy is hydrogen. In the case of the carbon based fuels, hydrogen is only one part of the total energy from burning with O2.

I do want noted that all of these fuels, except for hydrogen other than 20 K, appear to me to be shown in liquid form the way the densities appear.

Keep in mind that methane has critical temperature far below room temperature and cannot be liquified at any pressure at room temperature. Also that ethane has a critical temperature of 32.3 degrees C, and for all practical purposes can only be kept liquid in an idustrial or transportation setting with cooling.

Another item worth comparing − liquified natural gas, with all per−liter figures probably close to those of liquified methane and ethane. Also impractical to keep liquid without cooling, probably explains why more vehicles use propane, gasoline, diesel, methanol and ethanol.

> This chart below, too:
>
> Energy Density Chart
> −−
> MJ/kg MJ/liter
> −−
> Batteries 1 1
> Pressurized H2 2 2
> Hydrides 5 4
> Liquid/20K−cryo−H2 8 8
> Gasoline 38 27
>
> This one was actually used to make an illustrative graph. It shows clearly the difficulty we face in replacing gasoline for vehicles. Carbon is very effective at helping to pack hydrogen into smaller containers and it provides its own source of energy, as well. It is tough to beat.

I thought the main selling points of hydrogen were that it is carbon−free and can be produced with electricity. Depending on how much we want to pay for transporting and storing it, it could look good where it outperforms batteries.

− Don Klipstein (don@xxxxxxxxx)
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