

If the world is to abandon fossil fuels and nuclear power it will have to diversify to other sources of power other than wind farms which are incapable of supplying the required energy for a human race that is rapidly expanding and converging.

Hydrogen is a suitable source of energy and it can be produced through –

- Steam Methane Reforming (SMR)
- Electrolysis

Hydrogen gas is difficult to liquify, due to the minus zero freezing (33 Kelvins: - 8,980.95 degrees centigrade) required to convert it into liquid form and maintain it as a liquid. In gas form it is highly explosive and requires to be stored in tanks that can contain a 5,000 to 10,000 PSI pressure, but consider this - to drive a hydrogen electric fuel cell in a vehicle, hydrogen would be stored in gas form in hydrogen gas stations and pumped into the hydrogen gas tanks of vehicles. These stations and vehicles are already in development.

**Steam Methane Reforming (SMR)** - Today, hydrogen is mainly produced from fossil fuels: steam reforming, partial oxidation, or autothermal reforming are the traditional technologies to convert gas, oil or coal into hydrogen. In other words, a chemical reaction using fossil fuels which defeats the purpose of mining for fossil fuels.

**Electrolysis** – A far greater challenge is to produce hydrogen from the electrolysis of water on an industrial scale and to develop the tanks that can contain up to 1,000 PSI and hydrogen gas injection systems that can drive a hydrogen combustion engine or heat water to drive steam turbine generators at a power station. The greatest obstacle to overcome is to upscale electrolyzers to generate via an electricity supply, the electrolysis of water and create hydrogen gas. In simple terms, electrical power is used to split water into hydrogen and oxygen which is accomplished in an electrolyser.

**Hydrogen Power Stations - Electrolysis Electrolysers & Perpetual Energy** – If upscaling electrolysis electrolysers can be achieved whereby hydrogen gas can be used to heat water to drive steam turbines to drive electrical generators (hydrogen power stations) to power homes and factories, the next step is to syphon some electricity off in the hydrogen power stations to power the power station's own electrolysis electrolysers and you have perpetual energy.

**Fusion Power Stations & Electrolysis Electrolysers** – The other heat/water/steam turbines/electrical generators/electrical power route to power homes with electricity and syphon off electricity to create hydrogen through electrolysis electrolysers is Fusion Power Stations. In simple and conceptual terms, the greatest impediment to creating fusion is the ability to generate enough power to start the reaction and the means to contain it. Once the reaction is started, there is a power source of heat, equal or greater than the

sun. The by-product of fusion is the fusion torch concept which can be used to incinerate garbage and solid wastes, whereby the atoms and small molecules that are produced can be used as raw materials for industry.

**Developing Hydrogen Powered Vehicles** – Once you have developed either Hydrogen Power Stations and/or Fusion Power Stations to produce hydrogen gas on an industrial scale (as above) then converting existing combustion motor vehicles to use hydrogen gas is not impossible. Existing motor cars and lorries have already been converted to use LPG gas, so why not hydrogen gas? It only requires a government with a social and environmental conscience to invest in that development.

**Existing Battery & Hydrogen Fuel Cell Electric Vehicles** – These are the white elephants of the future, due to the mining of the metals required to manufacture the batteries and the disposal of the depleted batteries. The long-term impact on the environment and the human race is not being properly analysed and to compound the problem, consider the amount of electricity and roadway charging points to re-charge electric vehicles. Given time, the technology will fail. There is no doubt that the route is not being driven by global warming but by new electric vehicle sales and tax returns which far outweigh any logical reasoning.

Likewise, the production of hydrogen driven fuel cells outweigh any logical reasoning as the fuel cell manufacturing and their depleted disposal, place the same impact on the environment and the human race as the batteries in electrical vehicles. If we are going to install hydrogen fuel stations for refilling vehicle hydrogen tanks to power their fuel cells, then why not develop hydrogen driven combustion engines?

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