www.better-management.org provides invaluable insights that will help you understand and deliver better organizational performance.

Better-Management Newsletter 6 August 2015

Electric vehicle progress / As the energy density of batteries increases…

Electric vehicle progress

For at least the next five years we will not have an electrical energy storage system available for transport purposes that competes in large scale with fossil fuels for general consumer use. Why? Because nothing, can be put into commercial production within that timeframe – even if it does get invented *(Editor's note: a tad pessimistic?)*. That even includes the mythological EESU.

And remember that globally about 65% of all oil is used for transport fuels.

We will know when the magic cross-over time comes, because we will be looking then at solid state and scalable electrical energy storage systems that combine many of the benefits of both a battery and a capacitor. To even start that ball rolling, we will need a battery with an energy density of at least 300 watt hours per kg of weight – where all of the energy can be discharged in a single cycle without any damage to the battery. The motor vehicle industry has always accepted the need for a battery that costs less than USD250 per kwhr of usable charge, if they are to achieve mass market penetration. All newish existing Li-ion batteries tout energy densities of around 100 whrs/kg plus. But they require battery management systems that don't allow them to use much more than 50% of a charge. For the Toyota Prius, as an example, that leads to impressively long battery life. The electric running range per charge must be sufficiently long for consumers' purposes... and the total vehicle cost and battery life must also be acceptable.

Most battery systems used today in electric vehicles are sensitive to both high and low temperatures. So as a result of limitations, very few electric cars are being manufactured as yet, relative to total annual car production. This means that the fleet of cars alone that use fossil fuels is still growing rapidly, as is the fleet of trucks, tractors, buses, planes and ships. It is anticipated that commercial airliners must continue to use fossil fuels until batteries have a useable energy density of more than 400whrs/kg (according to Elon Musk). Ships can use nuclear energy and trains can use electric power via lines and rails.

Over the next five years we can expect fewer straight hybrids (aka HEVs), unless they also have the plug-in feature. Plug-in hybrids (PHEVs) will likely be the norm for a while, for three reasons...

1. The range under electric motor will continue to be too short for other than short commutes....maximum of 100 miles with newly proposed battery systems. So petrol and diesel support will be needed from a separate internal combustion engine.
2. Plug-ins can be recharged overnight or within a couple of hours using dedicated fast chargers.

3. More and more plug-in vehicles are being used as the dedicated solar power storage system for houses with solar panels installed. This makes motoring almost free of a mileage cost.

We can expect greater market penetration of battery operated buses and trucks as the economics of electricity progressively (specially solar charged) become more widely accepted.

As the energy density of batteries increases…

As the energy density of batteries increases, we will see a trend towards households installing more solar panels because the payback from the solar transport usage will ramp up the economics of the acquisition.

People can prepare for a non-fossil fuels future by installing solar panels and then progressively acquire over time the vehicles that suit their travel/load requirements.

All car companies are scrambling to improve range and cut price. So far I have seen instances of Nissan Leafs and small VWs being used as a storage arrangement for home solar. This move by GM and others will doubtless increase that trend...from Seeking Alpha...

"**General Motors' redesigned Chevrolet Volt** model will get 53 miles of driving range on its battery pack before using any gasoline, a nearly 40% increase from the previous model's 38-mile range. "We pushed to get every one-tenth of a mile we could," said Pam Fletcher, GM's (GM) chief engineer for electrified vehicles. The new Volt starts at $33,995, about $1,000 less than the current version."

The exercise in a full switch from fossil fuels to electricity will take 20-30 years after the provision of batteries which are suitable for mass application. How do you replace the 1.2 billion cars now running on petrol otherwise? How do we find sufficient materials and funding to achieve that change-over? None of these issues are receiving attention despite the ridiculous suggestion by politicians, that with a growing population and increasing demand from emerging economies, fossil fuels shall be replaced by renewable energy.

If the folk who run our empires would address themselves to what is possible, they would do us all a favour.

Meanwhile, this guy is trying to rationalise what is happening from an investment perspective...not sure I agree with all his opinions, but I do with most ...

http://seekingalpha..com/article/3397065-why-oil-will-never-be-replaced?source=email_macro_view_com_3_27&ifp=0