



BATTERIES VERSES OIL – THE WAY AHEAD

Signatories to the 2016 Paris climate accord are working towards emissions reduction targets and, as part of this, replacing gasoline and diesel vehicles with cleaner alternatives will be essential. The UK and France have declared they will halt sales of fossil fuel-burning cars by 2040, while China and India are also keen to restrict the vehicles.

The challenge is that batteries will have to play a key part in this transformation; as well as in other areas such as storing unused energy produced both by alternative energy and by power stations using fossil fuel.

Conventional batteries are working at the edge of the rules of physics and chemistry and will require ever larger quantities of rare earth minerals, such as lithium. It is not clear that there is sufficient supply in the world. But, advances are being made. Battery costs, currently estimated at \$190-210 kWh, are forecast to drop to \$125-150 kWh as soon as 2020-2024.

A possible alternative is hydrogen. And there are plans to build a number of plants within the next few years. The hope is that an alliance of globally competitive energy and automotive companies will get things rolling. But, the costs are significant. Setting up a hydrogen station typically costs \$3.75 million to \$4.69 million.

Electric and hydrogen cars have their pros and cons, but at this point, electrics have a big lead. There are key challenges which have to be tackled: charging points and the range per battery charge. There may be a need for as much as a \$50 billion investment to install a national U.S. charging network by 2030.

But is this the end of oil? With improving technologies, and the potential to reduce the amount of CO₂ being vented into the atmosphere by power stations and engines, will oil be able to compete in parts of the marketplace well into the future? For instance, it is not yet clear that ships and aeroplanes will be able to convert to electricity/hydrogen/biofuels in the 2040 or even 2050 timeframes.