CROW Newsletter

August, 2018

CSIRO massive breakthrough for hydrogen powered vehicles.

Two cars powered by hydrogen derived from ammonia were tested in Brisbane on Tuesday, 7th August, thanks to a Queensland breakthrough that CSIRO researchers say could turn Australia into a renewable energy superpower**.**

CSIRO principal research scientist Michael Dolan said it was a very exciting day for a project that has been a decade in the making.

"We started out with what we thought was a good idea, it is exciting to see it on the cusp of commercial deployment," he said

For the past decade, researchers have worked on producing ultra-high purity hydrogen using a unique membrane technology.

The membrane breakthrough will allow hydrogen to be safely transported and used as a mass production energy source.

"We are certainly the first to demonstrate the production of very clean hydrogen from ammonia," Dr Dolan said.

"Today is the very first time in the world that hydrogen cars have been fuelled with a fuel derived from ammonia — carbon-free fuel."

Program leader David Harris said Australia has a huge source of renewable energy — sunlight and wind — that can be utilised to produce hydrogen.

… but will fast charging keep battery powered cars in front?

One of the last advantages touted for the hydrogen fuel-cell electric vehicle (FCEV) over the battery electric car (BEV) is the speed of hydrogen refuelling vs battery charging.

With the recent start of the US and European roll-outs of 350kW chargers using the newly agreed 350 kW CCS standard (called *Ultra-Fast* charging to separate it from the 50 kW CHAdeMO and earlier 50 and 150 kW CCS fast-charging), that advantage has now effectively been lost.

350 kW charging would allow a 100 kWh EV battery to charge to 80% in less than 15 minutes. That equates to adding another 400 km worth of charge in the time it takes to drink a coffee. (Which, after travelling 450- 500 km if beginning on a full charge, you should be stopping for longer than that anyway!).

… or even crap-powered jets?

The masses of sludge left over from sewerage and wastewater processing could be refined into renewable diesel and aviation fuel, under an ambitious plan announced today.

Led by Southern Oil Refining, the project has set out to create crude oil from biosolids at their plant near Gladstone in Queensland, which can then be further refined.

Australia produces a lot of 'biosolids'. Left over from the wastewater treatment process, the term describes solids that remain once sewage sludge has been treated to remove the worst of the pathogens and other nasties.

Hundreds of thousands of tonnes of the soil-like solids are created every year, much of which is stockpiled, landfilled or diverted to other low value uses such as fertiliser.

The Australian Renewable Energy Agency is providing up to $4 million to get the project off the ground, seeing potential to make use of a waste product while also decarbonising the transport fuel sector.
Costing a total of $11.8 million, the project's centrepiece is a demonstration scale hydrothermal liquefaction reactor which will convert wastewater solids into biocrude, which can then be refined further into diesel or even jet fuel.

Are graphene batteries the next big thing?

The Spanish company «Graphenano» has presented together with its Chinese partner «Chint» batteries made with a graphene polymer which, if they are used in electric vehicles, it would allow an autonomy of 800 kilometers. It also occupies between 20 and 30% less than a lithium battery and could be charged in just 5 minutes.
Graphene is a nanomaterial formed by pure carbon, with atoms arranged in regular hexagonal pattern, similar to graphite and whose characteristics are hardness, flexibility and elasticity.
It is transparent, has a very high thermal and electrical conductivity, is light and generates electricity when reached by light.
Grabat batteries presented by Graphenano's president and CEO, Martín Martínez, are aimed to be used as home batteries – to be self-sufficient – in electric vehicles (both cars and bicycles), drones or even pacemakers.

Because Australia can provide the raw material.

First Graphene (ASX: FGR) has kicked off production at its commercial graphene facility in Western Australia, which the company states is a "significant milestone" for the global graphene industry.
The company has been advancing its graphene production technology for three years. Until recently graphene has been uneconomic to produce in bulk, despite its advantageous features for numerous applications.
As one of the developer of one of the first commercial graphene productions facilities, First Graphene claims it is positioned at the "cutting edge of the graphene revolution".
"This commissioning of the commercial graphene facility is a significant milestone for First Graphene as it progresses towards being a world leader in the production of high-quality graphene," First Graphene managing director Craig McGuckin said.

Aussie all electric delivery vans

The first fully electric, zero emission delivery van in Australia is now available to freight and taxi operators who want to not only reduce their fleet running costs but benefit from the gains of being an environmentally friendly operator.
The large capacity E4V van, the driveline of which has been developed by Melbourne-based SEA Electric, was officially made available last weekend after successfully completing trials that achieved a 400km range.
The vans, which are built on glider vans imported from one of the world's largest van manufacturers, XGD, use SEA Electric's proprietary powerchain, the SEA-Drive, which the company uses in all its 100 per cent electric transport vehicles.
The E4V, also available as a 14-seat minivan, is the first of SEA Electric's delivery vehicles, and was joined by the company's E4B 12-seater model in the successful 400km range trials.
The powerchain technology is not limited to vans however, as managing director Tony Fairweather tells RE.
"The technology can power commercial vehicles from the delivery van size, up to Australia's largest rigid 6×4 vehicles at 23.5t," he says.

Climate Council report – Energy without pollution

The energy sector continues to be a battleground for progress on climate action. And right now, the debate is raging.
In a discussion riddled with conflicting opinions and vested interests, **facts can be hard to find.Here's what we know:**
1. The electricity sector is Australia's biggest opportunity to act on climate change. That's because it's our biggest polluter, generating 33% of our emissions and yet the solutions - energy efficiency, renewable energy and storage technologies - are readily available and can be rapidly deployed..
2. Burning coal is the most polluting way to generate electricity. Since 1990, greenhouse gas pollution in the coal-dominated electricity sector has increased by 42%, largely because of the burning of fossil fuels.
3. "Clean coal" is not a thing. All coal power stations, old or new, cause greenhouse gas pollution. Even a new, "high-efficiency" coal power station would produce about 75% of the emissions of an existing power station of similar size.
4. On reliability, renewable power and storage - not ageing, inflexible coal power stations - are the clear winners. Australia's ageing coal power stations are struggling to cope, with most rapidly approaching the end of their operating lives.
5. Wind and solar can't be beaten on cost. Renewable energy from wind and solar farms is now the cheapest form of new energy generation in Australia. And when coupled with storage, renewable energy technology is best placed to replace old, polluting coal (1).
At the Climate Council, we cut through fiction with fact. That's why we've written a new report about Australia's coal fired power stations, and why they're not fit for purpose. Read and share it today.

Another Climate Council report – End of Coal in Australia

AUSTRALIA'S COAL POWER STATIONS are not fit for a 21st century power system with almost 100 breakdowns at fossil fuel power stations in the seven-month period to the end of June 2018, according to a new Climate Council report *'End of the Line: Coal in Australia'*.
Climate Councillor and energy sector veteran with more than 40 years experience, Professor Andrew Stock said, "by 2030, 55% of **coal power stations** in Australia will be over 40 years old. These **ageing** coal stations are increasingly **unreliable** and **expensive** to operate, risking blackouts and higher consumer power costs."

Energy companies to work with local communities

Some of Australia's largest energy companies have signed onto a new renewable energy development charter, pledging to work respectfully with local communities to share the benefits of a growing pipeline of new projects.
In total 37 businesses signed onto the charter at last week's Australian Clean Energy Summit, committing to engage respectfully with communities, be sensitive to environmental and cultural values and contribute positively to the regions where they operate.

Building strong relationships with the people that live and work near large wind and solar farms has proven vital to get projects off the ground in a timely and cost-effective way.
Amongst the signatories are gentailers AGL and Origin, sustainable infrastructure and energy leader ACCIONA Australia and clean energy innovators Tesla. (The full list of signatories announced at the conference is available here)
Clean Energy Council Chief Executive Kane Thornton said it's important for the renewable energy industry to share the benefits of new projects with local communities.
"Renewable energy is now the lowest cost kind of energy generation we can build today, and regional communities will see more of these projects over the coming decades. The industry understands we need to invest strongly in bringing local communities with us on the journey to secure the clean energy sector's long-term success."

Will the reef $444 million cash splash make a difference

At the end of April a $500 million package to help the Great Barrier Reef was announced by the Federal Government.

It didn't take long for questions to be raised about the decision to give $444 million in funding to the Great Barrier Reef Foundation, a small charity with a revenue of only $8 million in 2016.
The funding will be split between improving water quality, supporting reef restoration science, increasing crown-of-thorns starfish control, community engagement and reef monitoring.
But there is no acknowledgement of what scientists argue is the biggest threat facing the reef: climate change.
Without climate action, can this package actually do anything to help the reef?

Controlling the coral-eating crown-of-thorns starfish has been a priority on the reef for many years.

(Flickr: Ryan McMinds)
The answer is no, according to many involved in reef research, management and conservation, including University of Queensland coral biologist Sophie Dove.
"Unless we mitigate the CO2, a lot of the other solutions such as cleaning the water and removing crown of thorns are somewhat immaterial," Dr Dove said.
"All of those things can assist in helping any coral reefs that remain to survive and prosper in the future — but without climate mitigation, I think that's an issue."