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HD **Why Abbott's faith in coal could be wrong - very wrong**
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In the baking expanses of the high desert near Reno, Nevada, a project is under way that could well make a mockery of Tony Abbott's prediction this week that the coal industry will underpin Australia's prosperity for decades.

The brainchild of billionaire Elon Musk, the technology radical who has built his fortune disrupting traditional industries, the \$US5 billion gigafactory will be one of the world's biggest building, producing lithium-ion batteries on a mind-boggling scale.

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The high-tech batteries have extraordinary capacity to store energy and are used in electric cars. Musk's Tesla company already produces high-end vehicles that are growing in popularity in the US.

Musk's aim is to use the economies of scale to drive down the price of the batteries by 50 per cent by 2020,

That will make electric cars as affordable as cars fuelled by petrol, and much cheaper to run.

If the project succeeds, the changes it will bring to the automotive industry will be huge, with obvious implications for the global demand for oil.

But rapid advances and price falls in electricity storage technologies like lithium batteries will reverberate way beyond the automotive sector.

According to a growing band of investment bankers and energy market economists, it could fundamentally recast the way the world produces and consumes power.

As Swiss Bank UBS told its clients in August, the world is on the cusp of a once-in-a-century shift towards renewable energy led by "solar and batteries". Power stations fuelled by fossil fuels like coal will be the "dinosaur of the future energy system".

"By 2025, everybody will be able to produce and store power. And it will be green and cost-competitive."

The consequences for coal producers and the fossil fuel industry that Australia relies heavily upon are immense.

Australia left behind?

At the opening of a massive new colliery in the Bowen Basin in central Queensland on Monday, the notion that the world could be on the cusp of an energy revolution was farthest from the mind of our prime minister.

"Coal is good for humanity," he said in a direct rebuke to a growing anti-coal campaign.

"Energy is what sustains our prosperity, and coal is the world's principal energy source and it will be for many decades to come."

The comments, predictably, outraged environmentalists. The global expansion of electricity generation dominated by **coal** is the biggest source of greenhouse gas emissions that scientists estimate will increase global temperatures by a catastrophic 3 to 4 degrees by the end of the century if no action is taken.

But the remarks also produced gasps of incredulity among financial analysts.

Markets have already let their views be known on **coal**'s prospects - driving down prices by 60 per cent since their highs of 2011.

While the government has been dismantling climate-change mitigation policies, acting as boosters for the **mining** industry and wreaking havoc among renewable **energy** firms, investors worldwide have been flocking to clean **energy** companies.

As one writer observed, the investment banks now "sound like green NGOs".

Citigroup believes **coal** demand is in structural decline. HSBC says traditional power plants will never see profitability "anything near" that of the past decade. Deutsche Bank won't finance polluting industries.

"Australians have been sold the myth that the world has an insatiable and everlasting desire to buy our **coal**," says Kobad Bhavnagri, head of the Australian operation of Bloomberg New **Energy** finance.

"The reality is demand for **coal** in the developed world is declining, and the developing world is turning as fast as it can to other sources of power.

"At some stage **coal** is destined to become a low-value commodity, probably at a faster pace than many appreciate or are willing to admit.

"Meanwhile, Australia's policymakers are doubling down on tying the economy to a fuel source of the past."

Betting everything on red

Not everyone is so pessimistic. Some analysts - and the industry - see continuing growth in **China** and India, the two countries responsible for almost 90 per cent of the increased demand for **coal** in the past decade.

The latest report from Australia's Bureau of Resource and **Energy** Economics notes that **coal** continues to dominate **China**, and its **coal**-fired power stations have a lifespan of 50 to 60 years, meaning it will be a "few decades" before there are any large-scale closures.

Good quality **coal**, such as that produced by Australia, plus carbon-capture technology, mean **China** can still rely on thermal **coal** while improving air quality, it adds.

Moreover, India's new prime minister Narendra Modi has announced a hugely ambitious program to electrify a nation where some 300 **million** live without power.

Tim Buckley, the former head of Citigroup's **equity** division now working for the low carbon advocating Institute for **Energy** Economics and Financial Analysis, says the assessment fails to appreciate the determination of **Chinese** authorities to address the country's terrible pollution problem.

"You just have to look at their five-year plans to see how serious they are," he says.

Accelerating a trend that's been apparent for years, two-thirds of new power generation in **China** last year came from renewable **energy** - **solar**, **wind** or hydroelectric.

According to Buckley's projections, demand for **coal** in **China** will peak in 2016. Indeed, it may already have slumped. The figures for the nine months to September this year are down 6.7 per cent on the same period in 2013.

As for India, Modi has also embraced **solar** and **wind energy**, although he still sees a place for **coal**.

In the last three months, three-quarters of new power projects announced in India have been for renewable **energy** plants, including a massive **solar** facility in Tamil Nadu.

The "game changer" though for **coal** - and **oil** and gas - are the advances in electricity storage, exemplified by the gigafactory being built at the foot of the Sierra Nevada mountains by Musk.

The electricity system based on large-scale power stations was developed on the principle that power must be immediately consumed. That means having hugely expensive back-up capacity to be turned on for the handful of days each year when there are uncommon peaks in electricity, such as during a heatwave.

Advanced **energy** storage, says UBS, the world's largest private bank, means "you don't need to overproduce and you don't need back-up reserves."

When combined with **solar** panels, cheaper and more powerful batteries will enable households and businesses to capture **energy** during the day and store it until peak usage times, traditionally in the early evening.

"By 2020 investing in a home **solar** system with a 20-year life span, plus some small-scale home battery technology and an electric car, will pay for itself in six to eight years," it said in a briefing note to clients in August.

As such, households and businesses will rely less and less on the main power grids fuelled by **coal**, gas and nuclear **energy**.

"We are at a tipping point," Bhavnagri says. "The only question is exactly when."

For consumers looking to cut their power bills and governments determined to find cheap, green technology to combat climate change, the possibilities of the technology are hugely exciting.

On the evidence of this week, when the federal government unleashed a full court press in support of fossil fuels, the fervour for the transformation of global **energy** appears to have completely passed it by.

As well as Abbott entreaties from central Queensland, he lambasted the "stupid decision" of the Australian National University's super fund to divest from some resource companies.

On Tuesday, Treasurer Joe Hockey dismissed as "absolutely ridiculous" the notion that Australia was one of the biggest emitters of greenhouse gases, per capita, in the industrialised world, a blatantly false denial.

The coming shock

Meanwhile, the release of the government's new industry policy confirmed the government's faith in extractive industries. Two of the five priority areas identified for the economy were in the resource industry - **mining** equipment and **oil**, gas and **energy** resources.

And, as the government considers whether it will change the regulation mandating that Australia gets 20 per cent of its electricity from renewable sources by 2020, investment in **solar**, **wind** and hydropower here has plummeted almost 80 per cent in the first nine months of 2014.

In contrast, global clean **energy** investment was \$US55 **billion** (\$62.6 **billion**) in the September quarter alone, up 12 per cent, data from Bloomberg New **Energy** Finance shows.

The environmental impact of Australia's push to ensure **coal**-generated **energy** continues to dominate is well known - increased greenhouse gas emissions that underpin global warming.

Perhaps less appreciated are the economic consequences if the faith in **coal** proves to be misplaced.

As it stands, as many as half of Australia's coalmines are unprofitable.

Most continue to pump out **coal** because they are tied to long-term transport contracts that would require them to pay out rail and shipping companies whether they are loading **coal** or not.

They are also hoping and waiting that demand, and prices, will pick up again from their current nadir.

But, if the low prices continue and the predicted seismic shift towards renewables takes place, tens of **billions** of dollars invested in the **mining** boom could be wasted.

Entire communities could be decimated, especially in NSW, which mostly mines thermal **coal** used in power stations.

According to Erwin Jackson from the Climate Institute, the government's policies are "exposing communities and industries to massive shocks in the future".

"We are seeing a myopic view of the **energy** system which is entirely inconsistent with that of financial markets and policy developments in our trading partners," he says.

"Where is the risk management?"

To be sure, there are uncertainties with technologies like Tesla's lithium-ion batteries. The transformative impact many predict may fail to eventuate, or take much longer to come to pass.

At the moment though, global investors are placing their bets firmly on clean **energy** and the coming "revolution" in power storage, as UBS has dubbed it.

Certainly, the mercurial Musk - who founded the online payment system PayPal - has an extraordinary record of success.

While Tesla has come off its recent share price highs, it is - by far - the best performing major stock on the US sharemarket over the past two years.

As of Thursday, its shares were valued at \$226.35 each, up from \$28 in October 2012.

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