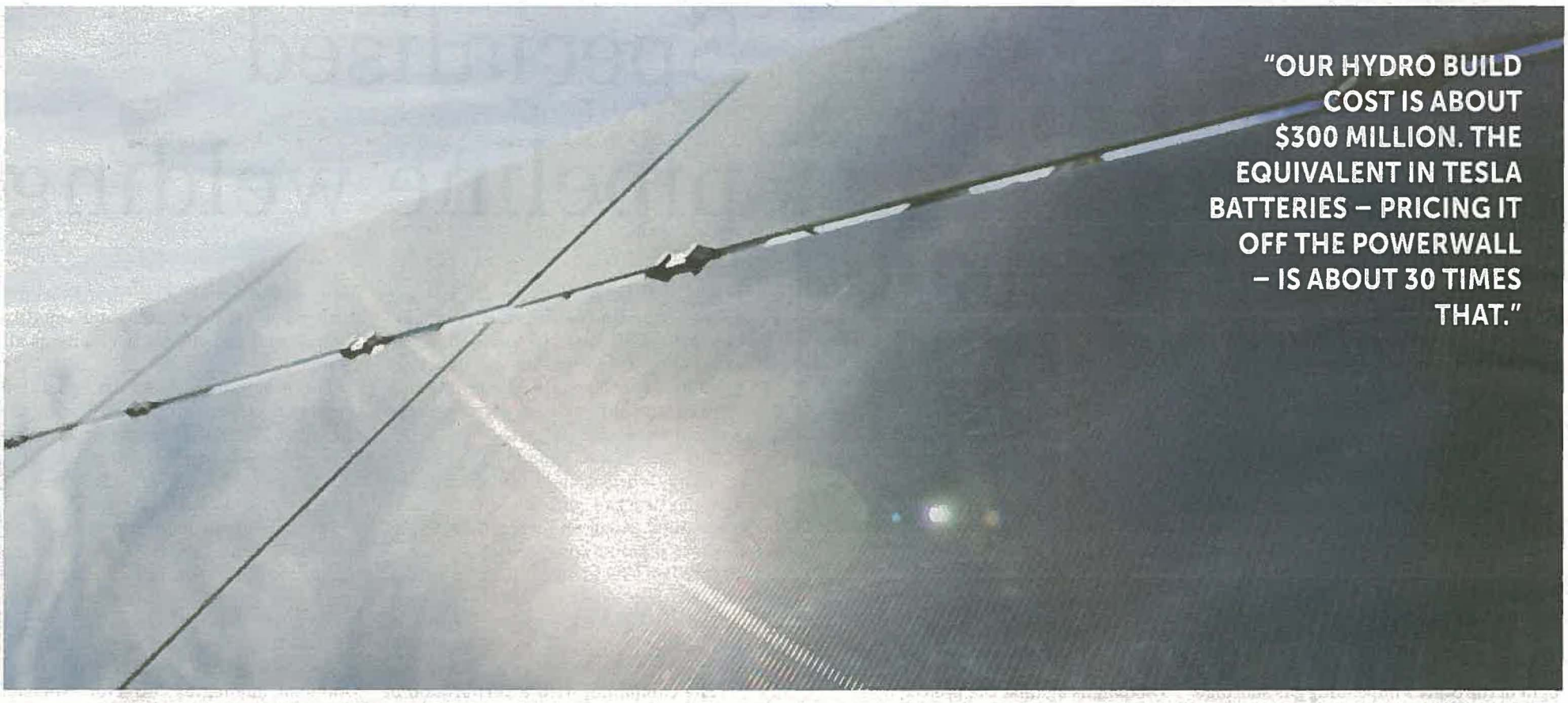


All images: Genex.

A renewables trailblazer

An innovative Australia-first project, Genex's Kidston Renewable Energy Hub, is set to be constructed on the site of the historic Kidston gold mine in north Queensland. The first stage, a 50-megawatt solar farm, has been green-lit and was expected to be operational by the end of 2017. But it was the massive second stage – comprising a 270MW hydro storage generator and 270MW solar farm – that was turning heads.

Reuben Adams spoke with Genex managing director **Michael Addison**.

Q. The Kidston project is so unique – where did the idea come from to use a disused gold mine?

Genex are building a 50MW solar farm, a 270MW solar farm –which is Phase 2 – a 250MW pump storage scheme, and a new 275kV transmission line for the last two projects. These projects are all focused on what we call the Kidston Renewable Energy Hub.

[Genex executive director] Simon Kidston and I have worked together on projects for more than a decade. Our last project was a metallurgical coal project in far north Queensland, called Carabella Resources, which was taken over by a Chinese group in 2014.

Simon and I then started looking around at projects in the energy sector, and our knowledge of Queensland led us there, even though we are Sydney-based.

Looking at the energy markets we noticed two fundamental emerging trends. The first trend was that once the construction of the LNG export plants at Gladstone was complete the cost of gas in QLD would adjust to reach the net export international price.

What we've seen is the price moving from around $3 per Gj to today's price of around $12 per Gj.

Those gas prices have tripled; we saw that coming, and the reason that is important is that the price of electricity in Queensland on hot day is set by open cycle gas turbines.

The other emerging trend was the State's strong push to expand its rooftop and large scale solar generation; just as we've seen in South Australia, when the sun stops shining the power stops generating, and when the wind stops blowing, wind farms stop generating.

An aerial view of the Kidston site.

We needed some sort of large-scale electricity storage capacity built to accommodate the intermittency of the growing renewable energy market up in Queensland.

That led us to look at storage, focusing on renewable energy type storage products. Our scheme is 1/30th of the cost of the equivalent amount of batteries, which is significant. Our hydro build cost is about $300 million. The equivalent in Tesla batteries – pricing it off the Powerwall – is about 30 times that.

Queensland is ideally positioned for a pumped storage scheme, so [we] started looking at potential sites.

We were aware that in a couple of countries around the world, old quarries were used as reservoirs for a pumped storage scheme, so we started looking at old mine sites.

We consulted with the Queensland State Government which was very excited about the project; they actually seconded one of their people to look for sites for us, while we did the same.

They came up with seven potential sites, and we came up with 11; but at the top of both of those lists was the Kidston gold mine, located at Kidston. It provided what we believed to be an ideal site for the project.

The solar scheme was not envisaged at that time. We did was the whole concept study on the hydro scheme prior to the IPO, but shortly after IPO it became obvious to us that the Kidston site was located in the highest solar radiation part of the country. There are other important benefits. Our site is the only site in that part of the country where we have grid connection via the old transmission line, and we are working off of a disturbed mine site so the environmental issues are minimised.

There is also a 300 hectare tailing storage facility – flat as a pancake with no native vegetation on it – so it was a no brainer to construct a solar farm there.

Q. Does Simon Kidston have a connection to the original Kidston gold mine?

Simon Kidston's great, great grandfather William Kidston was the premier of Queensland twice in the early 1900s. When the old timers discovered gold up there the town was named after him. It was just coincidental that we came along 115 years later and established a project there.

Q. Was the acquisition from Barrick a painless process?

We approached Barrick about the old mine, and at that stage the company was exiting Australia. The Kidston mine had been decommissioned in 2001, so it was a legacy asset of theirs, and they were delighted to be able to offload it. The negotiations with Barrick went very smoothly and the deal was done in a timely manner.

Q. How important was the existing old mine infrastructure to the current developments?

When we spotted the site some people viewed it as greenfields development. In actual fact, it was brownfields because the site came with a number of existing assets and intellectual property assets, which were effectively worth hundreds of millions of dollars to us.

Firstly, there are two massive voids in the ground, 52ha and 54ha in surface area, one is 240m deep and the other is 300m deep. I think Kidston was the largest open cut gold mine in the country before the Kalgoorlie Super pit; you could literally put three 20 storey buildings on top of each other and not see them from surface. That was the compelling asset.

Also, when it was run as a gold mine, a 132kv transmission line was built from Townsville to the site. They also built a reasonably large dam just up the road and a 17km steel pipeline – which we own – from that dam to the site, so we have access to water. When the mine was run at its peak there were 300 workers there, so they built a camp to accommodate them, which has largely stayed intact. We are busy as we speak upgrading it for construction workers.

It was the first fly-in, fly-out mine in

The site of the solar farm.

Australia so we also have Kidston airport and concrete bridges established over the rivers.

Those were the tangible assets. The site also came with an Environmental Authority to operate the gold mine, and we had very little trouble adapting that.

The mine had been closed since 2001, and under the Environmental Authority it was a requirement for Barrick to maintain and monitor the site from an environmental perspective. We acquired 10 to 15 years of data on water levels, pit water quality, rainfall, and runoff – just a whole myriad of data that was pretty essential to us completing our feasibility study on the hydro project.

Q. Is it true the conversion from old mine to power plant hasn't been done yet in Australia? Has Genex encountered unique challenges and logistical issues or has it been pretty smooth sailing thus far?

No, we were very lucky when we did the technical feasibility. We engaged Aecom to do the feasibility study on the solar, and we engaged Entura – who are part of Hydro Tasmania – to do our feasibility on the hydro. The hydro technical feasibility is now completed, but that did involve a lot of work on hydrology, geology, and addressing all the potential risks.

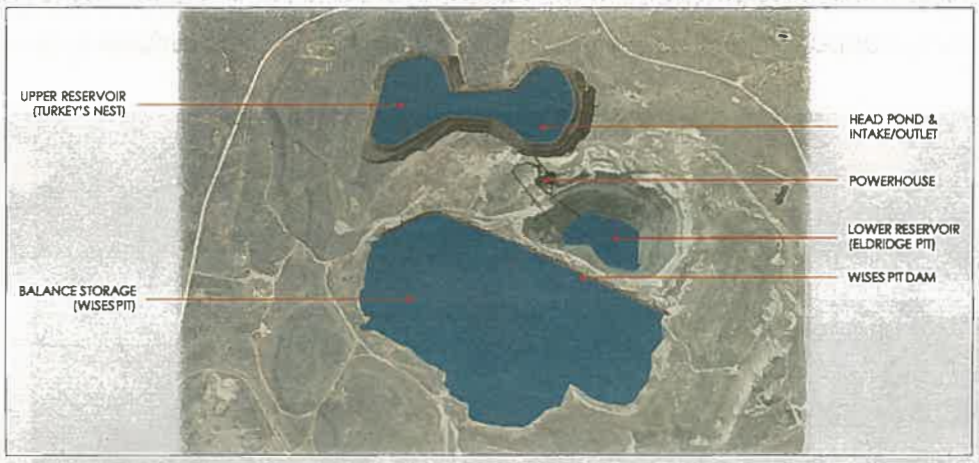
But in the process of doing the hydro technical feasibility we uncovered a number of good things.

As a gold mine Kidston was in a hard rock area, and the rock integrity – the ability to withstand pressure on the rock walls in the pit – was such that we weren't getting significant seepage through the rock cracks and fissures.

Also, a lot of that rock was crushed, so we have all the rock we need to do the concrete works. As far as concrete works are concerned we have all the aggregate on site, and with the Copperfield River about 300 m away we have water and river sand. All we really need is cement and a batching plant.

We spent a lot of money on drilling to identify underground rock faults and underground fissures which were crucial to locating and orientating the tunnels and the underground powerhouse. That involved rock pressure testing as well.

Q. Can you explain how the projects will complement each other (eg) using solar power to pump water to the higher reservoir?



The 50MW solar scheme is a standalone project that has a 20 year power offtake agreement to the State Government. All the power produced from that 50MW solar scheme is effectively sold into the grid, but the price is supported by the Queensland Government which collects the Large-Scale Generation Certificates (LGCs) for their own use.

That project is on a subdivided part of the site and runs off the existing power line.

The large-scale solar project, in the planning stages at the moment, and the hydro project are designed to operate together as a hybrid scheme or independently.

The hydro scheme is effectively a peak power generator; you can think of them as giant batteries.

Water is pumped at low peak times from the lower to the upper reservoir and it sits there as potential energy, waiting for peak demand periods when the water is released and generates electricity back into the grid when it is most needed.

The typical operating regime for these projects is to pump water overnight, drawing power from the grid and then releasing that water into the morning, afternoon and evening peak periods.

With our large scale solar scheme we will be able to use power from 10am until 3pm to pump water from the lower reservoir to the upper reservoir.

On that basis we achieve a lot of benefits. We aren't suffering transmission losses by drawing power from the grid 300km away, and we aren't affecting market prices by drawing large amounts of power, and therefore paying a lot more for it. Also, the marginal loss factor attributed to our scheme will be more benign if we operate the solar in conjunction with the hydro scheme.

Q. How is Phase 1 of the solar project tracking?

It's going very well. We are running around at the moment finalising the documents for financial close. We have already commenced construction; we have done some pre construction works on the substation – another asset we inherited – where we have had to do some modifications.

We are also quite well progressed on refurbishing the construction camp, and we have people on site at the moment putting togther added accommodation.

Full construction will begin in the next week or so for an estimated nine month to 10 month build process.

Our aim is to be generating electricity in the last quarter of calendar year 2017.

A lot of that cash flow will go towards servicing debt; the cash flow that's left will be useful, but it won't be a key driver of our bigger schemes.

Q. When do you expect Phase 2 construction to begin? What will that entail in terms of planning, approvals, development, and capital raisings?

We have now completed our technical feasibility study on Phase 2. Between now and year end we will be putting together the funding for these projects, and we anticipate reaching financial close on the bigger projects by the end of this calendar year.

On a program like that I anticipate that we will commence construction in January 2018 for a two and a half year to three year build.

Q. What sorts of logistics are involved with such a massive project?

It's all planned ready to go, we just need to fund it and then we can start construction. We have just kicked off more serious funding discussions recently.

As far as the transmission line is concerned, which we also need to build for the larger projects, we've been in discussions for some time with two significant parties who are interested in doing a build-operate-maintain arrangement – they will effectively design it, funding it, build it, operate it and we will rent it from them. That removes a large chunk of capex requirement away from us, but imposes an ongoing rent.

Being in far North Queensland we qualify as a potential project for funding from the $5 billion Northern Australia Infrastructure Facility; so we are having discussions with them.

We have a good relationship with ARENA and the CFC, and so we will also be holding discussions with them regarding funding assistance.

We will also need funding from a commercial bank, and potentially project partners; these are big projects, and we have a reasonably small market capex of $50m.

Q. Is the hydro project still slated for construction late 2017, for a three-year build?

Yes that could happen, but my particular view is that probably the first quarter of 2018. There will be some pre construction works this year, but I anticipate full construction to begin early next year.

Q. The company stated that there are disused mine sites around the country which can be transformed into similar hydro schemes – does the company have a long-term vision to replicate its project at Kidston elsewhere?

We actually do have a number of other sites in mind – both pumped storage and solar sites – and we would like to pursue that in more depth this year, as soon as we have this small 50MWmw solar scheme closed and on its way.

One of the hydro sites is in South Australia; no one would need pumped storage more than they do. We are also looking at a couple of solar sites in Queensland.