



WAVE OF AMBITION

WASM graduate Dr Michael Ottaviano never planned to be a global leader in renewable energy technology. Charting his journey from a degree in metallurgy to CEO of Carnegie Clean Energy, he discusses the opportunities renewable energy holds for the mining industry and shares how optimism, timing and luck over planning can shape a successful career.



At seventeen Mike Ottaviano wanted to be a geologist.

“I really loved rocks I guess,” he said.

An industry scholarship to the WA School of Mines changed his mind and Ottaviano graduated with a degree in Metallurgy in 1994.

“What sealed it for me was that I got a scholarship you know, someone paying me to go to University and to leave home at 18,” he said.

“If I was going to work in a mining industry why not live in a mining town?”

Ottaviano says he never planned a career path and doubts those who claim to have mapped theirs from a to b.

“Is anyone really like that? I think they make it up retrospectively, look back and connect the dots, but purely for me I only ever look a couple of years ahead at best and if an opportunity arises that I’m passionate about, even if it involves a bit of risk, if I think I can get my head around the downside then I’ll jump at it.”

“Between my third and fourth years [at WASM] I did my vac work in Perth at an engineering firm called Hoffman engineering who did mining servicing work – they maintained equipment on mine sites – but they

also had a metallurgical department, secondary metallurgy doing heat treatment.

“They offered me a job there and then and I accepted it and then I reneged on it thinking ‘no, I better go back and finish my degree,’ so I went back and did my last year at uni and they were kind enough to offer me a job again when I finished.”

At Hoffman, Ottaviano was introduced to what would become his passion: research and development.

“A lot of their research and development was metallurgically lead, materials and metals based R and D. So that got me into R and D generally.”

Ottaviano says his experience at WASM was “fantastic.”

“As an institution, to be in a mining town, with vacation work on mine sites- I worked underground at Golden Crown gold mine, on the mill

and in processing labs so I don't think it could prepare anybody better for working in mining."

He believes Kalgoorlie remains a vital center for mining education, despite the exodus of industry and population during the downturn.

"Mining companies will always have an interest in employing the best graduates and I think that's what WASM focuses on producing, the best for the mining industry, and I think having a local presence is what's a part of that."

"If [WASM] was diluted to become a purely Perth based campus I think it would lose a lot of its value."

"I had a fantastic time in Kalgoorlie, I played a lot of footy and cricket, I lived in the pub, worked behind the bar, I had a great time."

"It's not always an easy experience living in Kalgoorlie, for a 17/18 year old, but it essentially prepares you for that life because you're going to end up working in places a whole lot smaller, and hotter, and less pleasant, so you're better off going in with your eyes open I think."

After working for Hoffman Ottaviano moved to Germany, where he first came in contact with renewable energy.

"I was fortunate enough to be in Germany just at the time for what's called the energy bender, the energy change there – they really led the world in solar energy. So I watched that sort of evolve and thought wow, now if Germany can do this with their poor solar resources then why can't Australia?"

"So it was kind of in the back of my mind that this was inevitable and I'd love to be a part of it at some point but I didn't really have a plan."

Having completed a Masters degree in product development, Ottaviano returned to Australia where he

achieved a PhD in research and development and worked as an R & D consultant.

"I got to the point where I wanted to get back into doing R and D properly in the sense of commercializing the technology myself," Ottaviano said.

"It just happened to be that the technology, when the opportunity presented itself, was a renewable technology."

"The opportunity arose with Carnegie where there was intellectual property around wave energy, there was a shell and there was an opportunity for me to be involved in R&D again so I jumped at it," Ottaviano said.

Perth based company Carnegie has intellectual property rights over the CETO system, a wave energy collection device. But as the technology has yet to be commercialised, the ASX listed company has relied upon Federal and State government support and investors to generate income.

Ottaviano says he always saw Carnegie as a diversified renewable energy company.

"It might have taken a bit longer than planned; we started working on diversifying the business in 2014," he said.

"The opportunity arose when we were talking to island nations, who were approaching us wanting to purchase a wave energy product which we weren't ready to sell them."

"But when we spoke to them what became apparent was what they needed wasn't a wave energy product but an energy solution – an integrated, technical solution, some combination of different generation sources - and they needed potentially energy storage - but they also needed a financial solution as well."

"We saw then we had the capability that could allow us to bring together an integrated energy product to a very underserved market of island and indeed off grid sites. What we couldn't do was the solar battery piece so we looked for a partner."

In 2015 Carnegie started working with Energy Made Clean, acquiring 100 per cent of the company last December.

"I guess for a lot of people it was like 'wow, Carnegie's suddenly moved into solar batteries,' but we've been working on and talking about microgrids for a few years," Ottaviano said.

The company's acquisition of microgrid developer Energy Made Clean has placed it in a prime



position to supply cheaper, cleaner energy to isolated and off-grid mining operations.

“It could be a mining company running off grid and looking for energy to power its processing plant or mining operations; under that scenario they could do two things: buy the design and plant from us and then do it themselves and finance it themselves and just pay us a lump sum for the delivery of that, or we could design an offtake supply program with them where we basically disrupt the finance and sign a contract to supply them with a 10 to 15 year lump sum,” Ottaviano said.

“Mining has a huge positive impact on a community or environment, obviously if done the right way, no one is more aware more than me that solar panels, batteries, waves all rely on those commodities.”

“[Mining] can power itself with renewable energy but also there is the mining opportunities renewable energy throws out. Lithium is the obvious one but there are any number of often quite rare elements in solar panels and batteries— and something simple like copper, the more electrically powered we are the vast amount of copper we’ll need.”

“The beautiful thing about hybrid systems or micro systems is that when you go off grid currently, and you’re a mining company, solar battery diesel microgrids are cleaner, cleaner and more efficient than diesel itself.”

He says more mining and resource companies would be enjoying the cost-benefits of microgrid technology if their executives better understood the technology.

“It’s usually just a matter of education,” he explained.

“Energy is inherently complex at the best of times without layering it without policy and uncertainty; not even just your average dad, even CEO’s of mining companies have difficulty understanding it.

Ottaviano said being CEO of Carnegie required him becoming part salesman, part translator.

“Absolutely [you’re a salesman], that’s an important part of being CEO...you’ve got to be technically literate enough to understand what the engineers are telling you or talk to an investor and that’s the same if you’re a mining CEO or a renewable

CEO or an R&D CEO.”

“That ability to communicate is integral,” he said.

“Wave technology is highly complicated you know, it’s almost the impossible renewable challenge, everybody’s known about the power in our oceans – waves - for a very long time but nobody has successfully commercialized the technology, so that tells you how hard it is.”

Moving into the solar battery market ensures Carnegie a revenue stream while waiting for commercialization.

“Wave continues as our kind of risk – reward play and we’ve got this proven technology business on the side as well now,” he said.

He criticized the lack of long term vision by governments which he said had taken a toll on Australian uptake of renewables.

“That’s not a criticism of the current government but a criticism of governments over the last decade. That lack has ramifications across many aspects of the economy

in renewable energy in the last decade, really in Australia, and whenever I go up to the UK and Europe these guys they love this and they know it is a great place to invest.”

Yet attitudes are changing and Ottaviano says it was easier to raise capital as Australia slowly wakes up to renewable energy.

“The great thing about WA is that we do produce good engineers. So that’s great for us. We’ve been able to leverage, mechanical, electrical engineers, draftsmen and the like who have done time in the oil and gas or mining industries then have come into something like Carnegie to do something different and maybe make an impact.”

“It’s not going to happen overnight but...we’ve gone in the last couple of years from saying there’s no way in the world we’re going to hit our 20% renewable energy target by 2020 to now, just in the last few months, people saying we’re going to hit it and probably exceed it, and I think if we progress business as usual renewable energy will probably hit 30 to 40 per cent penetration by 2030; that’s without trying to do anything.”

“I think we’ll quickly end up at 50% across the country, certainly by 2050 there’s no reason why we couldn’t be north of 80% renewable power as a country by then.”

Ottaviano said he felt extremely fortunate to be in the middle of the energy disruption.

“This clean energy revolution really, that by a little bit of luck and a little bit of good management we just happen to be in the middle of at the moment and taking



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including the fact that it’s very hard for big companies to make any investments in power generation at the moment because they don’t know what the policy will be next year, let alone in ten years, and ironically enough all that uncertainty has meant an increase in pricing, and your average consumer ends up paying.”

Carnegie’s main offices are in the Perth suburb of Belmont, which Ottaviano said sometimes made doing business in renewables difficult.

“I often think it would be much easier if Carnegie’s headquarters were in Sydney or in London... particularly in the energy space and renewable energy, it’s been pretty tough to get anyone in WA interested

advantage of it.”

The Carnegie CEO joked that his positive attitude was “probably indicative of a lack of intelligence.”

“I am I suppose a pretty optimistic person, and if Carnegie has any success - and one of the reasons it’s been able to succeed where others have failed- is we’ve always got options. You know we formulate a strategy, we work towards meeting that strategy but we know that there’s uncertainty in what we do, technology uncertainty and funding uncertainty but also regulatory uncertainty and market uncertainty that if you locked your job into a single pathway, something is likely to come unstuck.”

“If you’ve got a range of options and we have a range of options around our technology, in the worst case you’ve got at least one which is still viable.

“It’s a great thing to be able to work on something which is both exciting and can have a positive impact on the environment.

I think I would struggle to go back and work in or for an organization that wasn’t having a positive impact on its community or environment.”