Joining the Dots – 'Value Adding' our Mineral Resources

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Pursuing my early career as geologist working for US mining companies exploring for copper, I grew accustomed to the fact that the Australian resources sector was predominantly focused on finding, extracting, milling and then exporting mainly mineral processed ores to overseas markets - from a professional development viewpoint, a fine collaboration of geologists, mining engineers and metallurgists. Later in my career, I had the opportunity to visit the Roxby Downs/Olympic Downs uranium and copper mine in South Australia and to follow the metallurgical and refining processes to see copper cathode sheeting (i.e. a manufactured 'higher value' product) leaving the plant.

Many years later, when I joined the Australian Electrical and Electronic Manufacturers Association (AEEMA) as its chief executive, the common complaint I heard from Australian electrical manufacturers was the fact that they could not buy refined copper at the ex-mine prices in Australia, but had to endure the higher global market prices determined by the London Metal Exchange. Their 'beef' was that Australia was giving way a significant competitive input cost advantage that could have been of considerable benefit to the Australian electrical manufacturers.

In recent years, I have had the pleasure to work closely on a number of projects with entrepreneur Chris Gilbey OAM who is a fellow member of the Experts Network of the Australian Governments Entrepreneurs' Infrastructure (formerly Commercialisation Australia) Programme. Gilbey, who was formerly chief executive of Lake Technology before he sold the company to Dolby, is acutely aware that the Australian investor culture differs from that in the USA or Singapore. In the US, he has pointed out that there is a Silicon Valley startup culture that anticipates the future and invests in disruption of industries suffering from hubris. He also points to Singapore where we are seeing now the seeds laid down by Lee Kwan Yu back at the time that Singapore became an independent country. He recalls on his first visit to Singapore in 1970 seeing the 20/20 vision for Singapore. It stated in simple terms that there was a business plan for the country to become a regional leader by the year 2020. Fifty years seemed a lifetime away at the time, but that strategic vision is now being realised. The country is leading the region in patent filings and a staggering amount of capital is situated there ready to be deployed into building businesses. Every significant technology company in the world has a strategic headquarters in Singapore and R&D is running apace.

Meanwhile in Australia, we both remain acutely aware that our 'mining culture' pervades everything. Notwithstanding this fact, through my mining industry contacts, I had the opportunity to reconnect not so long ago with a fellow geologist from 'way back' – Julian Malnic, the long-standing chairman of the Sydney Mining Club and who is now also a 'serial entrepreneur' in mining, and whose expertise is to develop technology plays within mining (e.g. Direct Nickel, where there is an industrial process for inexpensive extraction of nickel from laterites). I formed the view that it would be timely to join up these two 'sectoral entrepreneurs' and to see

what they could 'cook up' together. It didn't take long, like adding diesel to ammonium nitrate – an explosive mix!

So just recently, the formation of NanoCarbon was announced, and Chris Gilbey, the chief executive, announced an exclusive patent licensing deal with the University of Wollongong to commercialise a scalable production method for graphene. Working together with the Australian National Fabrication Facility (ANFF) and the Australian Research Council Centre of Excellence for Electromaterials Science (ACES), NanoCarbon plans to build its own graphene production plant in Sydney next year and is already negotiating deals with local Australian manufacturers who want to gain an edge on global competitors in product innovation.

Graphene is pure carbon in the form of a very thin, nearly transparent sheet, one atom thick. It is remarkably strong for its very low weight (100 times stronger than steel) and it conducts heat and electricity with great efficiency. Graphene is extracted from the mineral graphite, deposits of which are located in Australia. Curiously graphite may also be considered the highest grade of coal, just above anthracite and alternatively called meta-anthracite.

NanoCarbon's directors include venture capital firm Allen & Buckeridge co-founder Roger Buckeridge and not surprising, Julian Malnic who also brings to NanoCarbon a sense of how mining entrepreneurs think about shipping big, big volumes. Gilbey explains that "it's about developing and building a new kind of culture that understands and references the existing culture too".

Along with Julian Malnic Roger Buckeridge is also a director and investor. Roger was a key backer of the early development of Australia's photonics industry and understands how investors think and how to engineer a corporate structure to be investor friendly. Gilbey believes that this is an essential ingredient in an evolving story of a company that aspires to be a critical global player in a brand new industry.

What Gilbey wants to achieve is to build a significant Australian industrial capability in graphene. To do it means building NanoCarbon into a business that understands that its entire team needs to be leaders, building trust and integrity within the company and in their partner and customer network. Gilbey also believes that the company will face some very interesting challenges, given the rapidly changing landscape of intellectual property, business models and capital.

Based on my time a few years ago as chair of the Australian Materials Technology Network ('Future Materials'), I am in total agreement with Chris Gilbey that nanomaterials and composites are, arguably, the next iteration of digital technology. Engineered materials and additive manufacturing are the first glimpse of what may well be the future of manufacturing.

Gilbey believes that you need to have an exotic mix of skills in a company that is formed now, and it is why NanoCarbon is being architected the way it is. From my own perspective, the evolution of NanoCarbon also highlights the benefits of being

part of the ‘Expert Network’ which comprises a select group of experienced business people, domain and industry experts and investors based in Australia and overseas. We are asked to invest a small amount of our time to sharing our knowledge, insights, experience and business connections with Australian businesses seeking to commercialise new IP.

In return, members of the Expert Network gain opportunities to engage with a selection of the best early stage, innovative businesses in Australia and to expand our own networks. Every now and then, we have the opportunity to ‘join up the dots’ with potentially exciting outcomes! And as with NanoCarbon, let’s hope that with the enhanced processing of mineral sands to produce titanium powders to feed an emerging metals additive manufacturing industry, Australia could just be at the cusp of realising a transition into a ‘mining-advanced manufacturing’ continuum characterised by continuous ‘value adding’ from the mine site to finished products sold into global markets.

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