

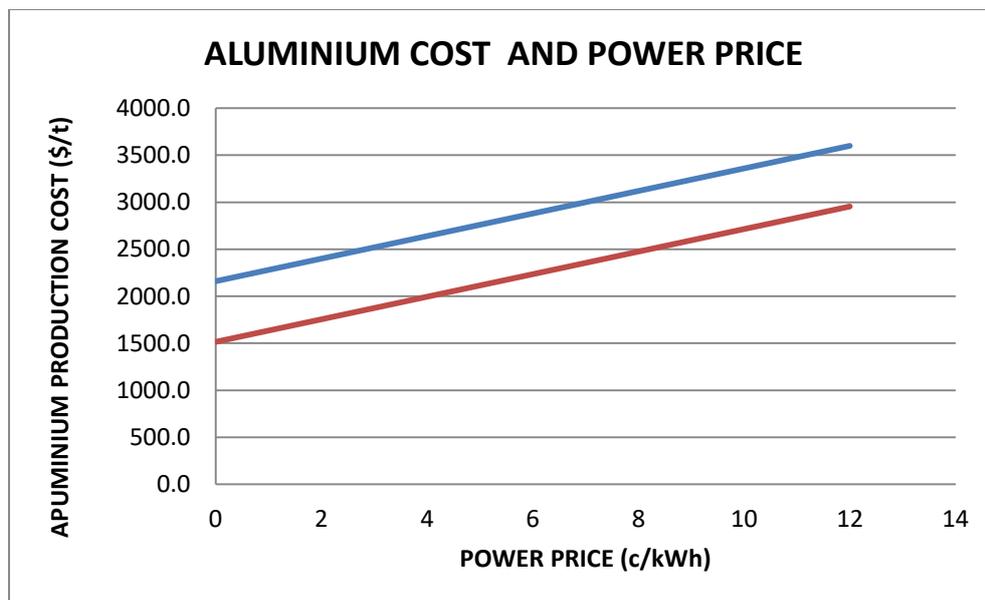
## CHEMICAL ECONOMICS - STEEL, ALUMINIUM, LNG - RECENT EVENTS

At the time of writing there is a major concern surrounding the viability of the Arrium Steel Works at Whyalla in South Australia. This operation, which is based around a blast furnace and coke oven, is small by world standards. The steel works produces mainly unsophisticated products such as rails, wire and construction steel. This is supplemented by several electric arc furnace operations in Victoria and NSW. In recent years a major part of the company profits have come from iron ore export from the nearby Middleback range.

The collapse of commodity prices for both iron ore and steel has exposed Arrium to apparently unsustainable levels of debt. Problems seem to be exacerbated by dumping of steel from the large integrated steel mills in Asia (particularly China, South Korea and Taiwan).

Because of its impact on the township of Whyalla if the steelworks closes, there is considerable pressure on the Commonwealth and state governments to financially support the company. Blast furnace operations are innately carbon emission intensive, so the reintroduction of carbon charges would inevitably lead to demands for further government subsidy to maintain viability.

It is about a year now since I reported on the production cost of aluminium in Australia and its strong dependence on the power price. The key features are illustrated in the figure below:



The Figure illustrates the relationship between aluminium production cost and power price (US dollars) - aluminium metal production being highly electricity intensive. The top line is the cost for a greenfield smelter and the lower line represents the cash cost for production of metal.

Since the earlier article (*Chemistry in Australia*, April 2015), we have witnessed a significant fall in the price of oil which lowers the production cost of aluminium by reducing the price of anode carbon which is a major cost input. This has been reflected in the graph which now shows that the cash cost is approximately \$1500/t compared to \$2000/t as given in the previous article. Unfortunately, there

has been a concomitant fall in the price of aluminium ingots which at the time of writing is reported as US\$1478/t (March 31, 2016).

However, Australian producers have been helped with the fall in the Australian dollar which has served to reduce the cost of electricity (this is generally charged in Australian dollars) and employee and related costs. However, aluminium smelting in Australia still remains a marginal operation at best.

In the next few months it is reported that in Victoria the Portland aluminium smelter power supply contract is up for renegotiation. This was the foundation contract for the Loy Yang A power station in the La Trobe valley and as the foundation contract, was negotiated at a low power price. There is now considerable pressure to increase the power costs which will further marginalise the operation and may force its closure. If this happens it could have serious repercussions on the supply and price of electricity to other users, not only in Victoria, but in other states which now rely on the Victorian generators for back-up power - South Australia and Tasmania.

In October 2015, I reported on the possible impact of the gas demand of the three large LNG facilities at Gladstone on the chemical process industries, and gas intensive industries in general. There have been several developments since the article was written. An important change has been the collapse in the price of oil which is now feeding into lower prices for LNG. This is rendering new LNG investments uneconomic at the high capital constructions cost for land based facilities, especially in Australia.

Shell and its partner Petro China has cancelled its proposed LNG project at Gladstone and has written off a substantial part of its Arrow Energy coal seam gas joint venture. The latter was stated to be due to poor results for Bowen Basin coal seam gas recovery. At the time of writing Shell are in the final stages of taking over the BG Group which operates two LNG trains at Gladstone. We may speculate that any CSG gas developed from Arrow's Bowen Basin resources would be dedicated to support the BG operations and be unavailable for use elsewhere in Queensland.

The write down of Bowen Basin assets by Shell, and other reports of abandonment of CSG projects in NSW, will increase concerns that there is insufficient gas on the eastern seaboard not only to supply the three LNG export plants but also to continue to supply other gas intensive industries and customers. This concern serves to maintain a reluctance of gas suppliers to enter into long term contracts at what the present chemical industry users consider a reasonable price. This has further increased calls for some sort of gas reservation system, keeping gas for domestic use.

One proposal which has gained some momentum is for a gas pipeline from the Northern Territory to the eastern seaboard. This would bring gas from the north to the Moomba gas hub from where it would be distributed to Adelaide, Sydney or Brisbane. Unfortunately there is little conventional gas in the Northern Territory and any that was to become available would probably be diverted to the Darwin LNG facility which is now running short of gas from the Timor Sea. The aim of the pipeline proponents is to develop unconventional gas reserves, mainly in shale, by fracking and similar production techniques. However, The Northern Territory government is considering banning these advanced production methods which would eliminate the territory as a source of gas for the eastern seaboard.

At this time, the demise of the process industries is being welcomed by commentators across the political spectrum as "the economy transitions to the digital age". As to what this "digital age" is only vaguely defined and as I have opined in the previous articles on lithium/graphite batteries there is little in this new technology for Australia other than a supplier of the basic (low value) raw materials.

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