



Adding sustainable value to our two natural resources from Mother Earth



As we approach the end of another eventful year, it's good to reflect on where our mining industry and the contributions it makes belongs in the local and global picture.

When often asked during my travels 'what do you do?' I normally respond, as do the politicians, by saying 'before I answer your question may I pose one question to you first that will assist me to respond to yours? Since the above question often arises at a function or dinner, I therefore ask the person with whom I am conversing 'what is the utensil that I am holding to partake of my sustenance?' The usual answer is of course a fork or knife,

which is the easy part so I follow up by asking 'what is it made from?' Somewhat surprisingly to me more than ninety per cent of the respondents don't know. Most, if not all, of our members know that stainless steel is made from iron, chromium, and nickel – and by the way, it is almost indefinitely recyclable. What is less well known is that it is largely the chromium that imparts the corrosion resistance, while nickel can improve the appearance and iron makes up the bulk.

Southern Africa has almost 90 per cent of the world's chrome resources that supply the stainless steelmaking industry, which reached a production milestone of 50 Mt/a this year. China produces half of the total, having grown from almost zero to 25 Mt a year in almost as many years, and yet it has virtually no chromite resources. China has also bypassed South Africa in ferrochrome production but has very few natural competitive advantages in this regard. On the other hand, South Africa has not helped its own cause for reasons we all know only too well. It's surely time for the pendulum to start to swing back to a more balanced position that offers both parties a more sustainable longer-term future in supply and growth. However, for as long as merely digging up chrome ore and shipping over two tons overseas to produce less than one ton of ferrochrome appears to make economic sense, owing to unduly high input costs locally, this unfortunate anomaly will persist, impacting on local jobs and wealth generation.

South Africa needs to consider how to advance its relationships with China and India, as well as other regions, with a view to exploring potential synergies in the stainless steel production and manufacturing industries so that we can share in the anticipated further growth in stainless steel production to between 55 and 60 Mt/a by 2030.

Economy of scale dictates that the minimum size for a new plant for the production of standard grades in South Africa is probably around 2 Mt/a, but for niche products it is much less, depending on whether the market opportunities can be found.

This leads me to share my basic philosophy on what we all do directly or indirectly, which is to add value to the two types of natural resources that we obtain from Mother Earth. These, as we all should know, are what we grow and harvest and what we mine and process. Our food and drink that sustains us, and what we use to eat and drink with, both come from what we stand on with our own two feet.

Although the percentage of the world's population employed in agriculture and mining has decreased significantly, the products that are derived from these resources have expanded exponentially in their diversity and complexity of application in the past fifty years. This has created enormous growth in completely new industries with exciting, but often more challenging, career opportunities that most of us never dreamt of even 25 years ago.

In the 1960s and 1970s we used to hear about the strategic metals such as chromium and nickel that were stockpiled in the USA because of their use in the aerospace industry rather than in their more mundane and world-wide roles in kitchen and catering utensils. These days we hardly ever hear of strategic metals, seemingly because critical raw materials have far and away superseded them in so many ways. This is not surprising when one considers our daily, if not continual, need for the various devices that we depend on for almost everything we do; how we interact on social

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media and for a host of other things, sometimes to the detriment of our quality of life. Southern Africa has a number of these 'critical' minerals, including antimony, fluorspar, gallium, germanium, magnesium, natural graphite, phosphate rock, platinum group metals, rare earths, and vanadium. South Africa has the technology to extract most of them, but does not yet possess the ability to convert many of them into the advanced forms needed for high-tech applications.

Employment and wealth generation in these high-tech industries far exceed those of the two fundamental activities on which we all depend for our basic survival, namely agriculture and mining. However, the growing footprint of both and the hunger for more energy are taking an ever-increasing toll on our longer-term sustainability. Nevertheless, there is a glimmer of light at the end of the tunnel.

Environmental factors have become a much greater threat than we imagined when we started to burn coal to produce steam for power generation, and new products such as asbestos were first being mined and used in the construction and housing sectors when the concept of a life-cycle assessment hardly existed. We certainly appear not to have learnt all the lessons that we should have at the time. Failure to carry out life-cycle assessment studies of any value on these and many of the rapidly growing industries and widely used products, such as plastics, has led to them becoming increasingly maligned, and we need to find solutions to these problems and those in other related industries.

Another consideration is that while one can understand the medium-term benefits of mining and exporting tens of millions of tons of coal while the opportunity lasts, the reality is that coal is ultimately far too valuable to merely burn. The global and regional resources of carbon provided by coal are insufficient to supply the longer-term requirements for smelting iron, chrome, manganese, nickel and the production of many other metals. Most, if not all, of these metals can (and to some extent are) being recycled, but this must be increased.

On the positive side the huge strides being made in the generation, storage, and application of renewable energy are having an increasing impact on non-renewable resources, but much progress still has to be made in this area. As we approach the year 2020 we often hear of 2030 as the next big milestone, and when one considers how fast the past 20 years have flown by, this should be a wake-up call as to what we need to do in such a short time.

The expected growth to between 55 and 60 Mt/a in stainless steel by 2030 could result in the demand for chromium and nickel units increasing by almost 2 Mt/a and 1 Mt/a respectively, hence South Africa's significant interest in the former, while the increasing demand for nickel, for batteries as well as traditional applications like stainless steel, implies new opportunities for nickel projects.

The SAIMM, as part of its vital role in serving the mining, metallurgical, and related industries, continues to act as a prominent vehicle for information exchange between the many professional participants that contribute ever-increasing value to the industry. The SAIMM can and will no doubt play an increasingly important role in supporting the debate on resolving the challenges outlined above and how best to address these needs through its members and their colleagues both locally and internationally *via* its events and publications.

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