

Are we really living and mining sustainably or are we just heading for an epic fail?

An industry comment by Professor Ken Mercer, Australian Centre for Geomechanics

In the global mining industry one increasingly hears of sustainability, sustainability science and sustainable mining. The focus on sustainability has arisen as a result of increasing concerns regarding the path of human socioeconomic development and environmental impacts. These have emerged in a context of the ever increasing rate of extraction of natural resources in order to produce the goods and services demanded by an increasingly affluent population. To their credit, many companies have made it a corporate goal and appointed leaders to actively promote sustainability within their organisations.

But perhaps we should take a brief moment to consider what sustainability really means and whether it can ever be realistically achieved in the context of mining as we know it, and perhaps, even our society in its current state. Sustainability has been defined as the capacity to prevail. In ecology the word describes how biological systems remain diverse, self-sustaining and productive over time. The Brundtland Commission report defined sustainable development as, *“development that meets the needs of the present without compromising the ability of future generations to meet their own needs”*.

The key issues here are clearly living within the constraints of our environment and maintaining the long-term continuity of human society.

The first thing we need to consider is how does our performance rate in terms of sustainability on a macro scale? The Global Footprint Network (GFN) tracks humanity's demand on the planet's ecological resources, such as food provisions, raw materials and carbon dioxide absorption, which it calls its ecological footprint. The GFN measures this footprint against nature's ability to replenish those resources and absorb and biologically degrade waste products. Their data shows that currently, in less than eight months of each calendar year, human activities consume as much natural capital and ecosystem services as our planet can regenerate in that year.

The GFN 2012 national footprint accounts show humanity is now using ecological resources and services at a rate where it would take just over 1.5 Earths to renew. We are on track to require the resources of two Earths by mid century. Their data also shows that in terms of country footprint, China currently uses the ecological resources of 2.5 Chinas to self-sustain, the USA 1.9, Qatar 5.7 and Japan 7.1. Australia is still less than one in this assessment. Today, more than 80% of the world's population reside in countries that use more than their own ecosystems can renew within their boundaries. These ecological debtor countries either deplete their own ecological resources or deplete them from elsewhere.

In addition to the GFN, there is a growing body of literature which confirms the increasing degradation of the Earth's biosphere. Given the recorded loss of species over the past millennia and current rates of depletion of remaining natural environments, biologists now suggest that a sixth mass extinction may already be underway. Many global fisheries are in free fall or have collapsed altogether, as industrial fishing fleets with staggering overcapacity continue to scour the oceans for the remaining fish. This is not to mention accelerated climate change where continuously increasing levels of carbon in the atmosphere mirror the exponential economic growth and has now overwhelmed the Earth's capacity to absorb it. Rapidly receding and disappearing glaciers and exponentially collapsing ice sheets all point to an ice free arctic summer, possibly as early as 2016. All these warnings of course go unheeded while industries and politicians endlessly debate the cost of carbon and its detrimental effect on economic growth.

Despite what some might ignore, we live in a world that is finite in every respect. These finite systems impose absolute limits on the ecological processes and human activities embedded in it. The ever decreasing natural and ecological resources have in themselves a finite capacity to replenish themselves. Modern economies are based on ever increasing expansion and consumption of goods and services which is clearly unsustainable within the finite resources of planet Earth. The fallacy of exponential growth on a finite planet has long been recognised but continually ignored. The actual availability of energy and materials must ultimately limit human

population and the level of socioeconomic development. Consumption by the current generation is constantly increasing, compromising future generations' ability to provide for their own needs. If civilisation in anything like its present form is to persist, it must start to take into account the finite nature of the biosphere.

The modern mining industry has made great strides in promoting sustainability, however is itself embedded in an increasingly unsustainable society. It has also made great improvements in efficiency, however, it is still dependent on large quantities of finite natural resources such as fossil fuels and fresh water supplies as inputs. Over centuries, industry has logically extracted the easiest to obtain and highest quality resources first, but continuously declining grades means it is more and more costly in financial and environmental terms to extract additional quantities of these items. Orebodies have poorer grades, are deeper and require ever larger mining fleets, as well as energy requirements to mine cost effectively and to meet continually increasing demand. Consequentially, magnitudes of land disturbance and pollution continue to increase in scale. This will result in mining in its current form becoming compoundingly unsustainable.

The bottom line is that the growing human population and economies are being fed by both unsustainable use of finite non-renewable resources and by unsustainable harvests of renewable resources. We are producing ever larger quantities of waste and carbon emissions. Furthermore, attaining sustainability is additionally complicated by inevitable, yet unpredictable, changes in both human socioeconomic conditions and the extrinsic global environment.

We therefore need to be mindful of the bigger picture. The current unsustainable trajectory of the resource industry mirrors the course of modern civilisation. Society needs to transition to a truly sustainable steady state to ensure a future for the next generations. One that is not reliant on ever increasing economic growth and resource usage and one that does not result in the continuing decline in biodiversity. The mining industry has shown enormous ingenuity in finding ways to tap more and more inaccessible resources. Now is the time for the mining industry to put its tremendous resourcefulness to the test in finding and promoting the truly sustainable use of the finite resources it takes from the Earth. This will require nothing short of a complete re-invention of the resource industry to become global custodians of the ecosystems and resources it mines and manages. I do not know exactly what form this transformation can take but several trends are clear. The capacity for endless economic growth in a finite world is limited at best. There will be less linear resource use, a dramatic reduction in the removal of virgin resources from the Earth, and a lot more closing of the loop involving full recycling or reuse of these assets and resources. All of this will need to be done with very little fossil fuel usage, high energy efficiency, little or no net carbon emissions, minimal waste, a high degree of recycling and no loss in species diversity.

The hour is late. We cannot expect or wait for elected politicians to chart the difficult course of change needed ahead. As individuals we need to bolster change by aligning together to embrace these goals and force the rapid emergence of a truly sustainable society and supporting industries. Failing to do so will impair the viability of Earth's finite systems for future generations who will discover, possibly too late, that we have stolen everything from them, in order for us to live a very brief, selfish, and highly unsustainable life. For everyone, it's a case of rapidly adapt our society to our finite ecological limits or face the catastrophic consequences.