



Sustainable supply chains—minerals and sustainable development, going beyond the mine

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ABSTRACT

If the minerals and metals sector is to contribute successfully to sustainable development, it must adopt principles and practices which address the entire life cycle of the materials it creates. This paper examines how the social and environmental sustainability performance of products influences the sustainability agenda of the mining and metals sector. It illustrates how access to markets drives improvements in sustainability. It also considers how the sustainability of metal and non-metal products are using lifecycle approaches and outlines the importance of using appropriate tools for metals.

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Introduction

The past two decades have seen a growing realisation that the current model of global development is unsustainable: from the loss of biodiversity with the felling of rainforests or over-fishing to the negative effect our consumption patterns are having on the environment and the climate. Our way of life is placing an increasing burden on the planet. There is mounting evidence to suggest that this cannot be sustained.

This is underscored by the Millennium Ecosystem Assessment ([Millennium Ecosystem Assessment, 2005](#)), an unprecedented study of ecosystem change on the planet that involved over one thousand experts worldwide. The Assessment concluded that “over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history [and this] has resulted in a substantial and largely irreversible loss in the diversity of life on Earth”.

Equally as important as environmental pressures are social concerns (including health considerations), economic development and governance. The Mining, Minerals and Sustainable Development (MMSD) project broadly defines Sustainable

Development as the integration of these four spheres, with the goal of “maximising the contribution to the well-being of the current generation in a way that ensures an equitable distribution of costs and benefits without reducing the potential for future generations to meet their own needs” ([IIED, 2002](#)). For the minerals sector, this usually means making choices and trade-offs – in terms of mining, metals refining and the use of mineral products throughout the supply chain.

There is broader societal awareness of these issues more so now than ever before. Greater expectation means that pressure is increasing on all actors in society to do their part to support the shift to more sustainable consumption and production practices. The minerals sector – like many other industrial sectors – is recognised as having a vital role to play in meeting the future needs of society. The challenge industry faces is how to manage products and processes in a manner that facilitates a more equitable distribution of costs and benefits, and enables the industry to maintain a ‘social licence’ to produce and market. Customers are increasingly sensitive to the environmental and social performance of the products they utilise, and companies must respond appropriately.

Given the potentially significant impacts and benefits of mining activity in the locations where it takes place, much attention is paid to costs and benefits at this scale. However, the downstream supply chain of mineral products provides us with a different lens for looking at the contribution to sustainable

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development of mineral products. On one hand, it is useful to look at the extent to which downstream supply chains and access to markets act as a driver for improved sustainable development performance for the sector. The other aspect revealed by looking at the supply chain is a more holistic understanding of the contribution of a given mineral material to sustainable development more broadly. This concept of *materials stewardship* means looking at how the use of mineral materials is optimised and how the environmental, health and safety risks are minimised.

This paper focuses on access to markets as a driver for improved sustainability performance for the mining and metals sector and the need for companies to pay greater attention to materials stewardship. It also covers some of the key elements of materials stewardship, including life-cycle thinking and chemicals management.

Market access

Access to market is the logical starting point for considering what drives sustainable supply chains. Market access can be affected by actions and decisions taken by regulators, materials specifiers/product designers, end users, opinion formers and other stakeholders with an interest in the value chain of minerals and metals. It can also be influenced by wider issues of reputation. Maintaining the balance between this pressure and science-based reality is critical for an industry that has not always been regarded as being the most responsible, particularly in terms of environmental performance. Some illustrations of the ways in which market access can affect the mining and metals industry are discussed below.

Substance restrictions

Based largely on scientific assessments and chemicals management policies, there are many instances of access to market being restricted by local, national and international legislation. For example, one regulatory action that has implications for the industry is the European Union Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment. This Directive requires that such equipment must not contain lead, chromium VI, mercury or cadmium as well as a number of organic compounds. The primary driver behind removing these metals from electronic equipment is to divert them from the waste stream — currently much electrical waste is consigned to landfill at end of life where hazardous materials may leach into the environment.

Few would argue that this basis for legislation is not warranted. However, product policies should take into account the overall impacts and benefits (environmental, health, economic and usability), particularly where appropriate risk management practices can be employed. For example, the continued use of lead in lead-acid batteries remains sustainable due in part to the ability to maintain high recycling rates of batteries, thus minimising the amount of material for disposal and reducing potential risk to the environment.

The industry must remain engaged to ensure that even before the stage of legislation is reached, environmental and health concerns are considered on the basis of sound-science. By acting collaboratively and taking a lead role in issues such as hazard and risk management, mining and metals companies can place themselves in a better position to work with regulators and policy makers to ensure that all parties are clear where the potential for environmental concern lies. For companies, the case for doing so is clear: this can enable industry to develop appropriate risk management practices (when this is possible) and help to maintain access to important markets.

De-selection by manufacturers/producers

Manufacturers and materials specifiers have become increasingly aware of the need to account for the sustainability of their products. Environmental and social attributes are being evaluated in materials selection processes in a number of sectors, including electronics, automotive, heavy manufacturing and building, and construction. An increasing number of companies in each of these sectors want to ensure that the materials they select do not cause undue risks. In some cases, companies are actively searching for materials that will contribute to the environmental or sustainability performance of their products or projects throughout the entire life cycle.

For example, a growing number of architects and other actors in the construction industry are applying sustainable development principles. The US, Australia, China and Canada have established green building councils and systems for certifying the environmental performance of construction materials and entire buildings. The types of criteria used to assess materials and certify buildings include the recycled content of materials, locally-sourced materials and durability of products. This could, for example, result in using wooden rather than metal components for certain parts of a building. Another example is Nokia's Substance List (NSL) which identifies substances that they have banned, restricted, or targeted for reduced use. The list is divided into restricted and monitored substances and includes a number of metals and metal compounds.

The emergence of these 'green procurement' systems and associated materials performance indicators means that market access is becoming increasingly dependent on the ability to identify and quantify the environmental and social impacts of materials and products throughout the life cycle. It is clear that there is an unprecedented requirement for metal and mining companies to act in partnership with actors downstream in the supply chain to ensure that the performance of their products can be assured and that appropriate concerns are addressed. Learning more about what is driving customers and material selection can help to inform the environmental initiatives of companies.

Market development/preferential selection of materials

The trend for de-selecting certain materials is also accompanied by a trend to preferentially select certain producers of materials that can demonstrate more responsible production and use. Future markets will favour materials with superior sustainability performance. Population growth, economic development in markets such as India and China, and the rise in worldwide industrial output all point to a continued and growing market for minerals and metals and other materials. However, the environmental and socio-economic consequences of these trends also point to an increasing need for materials that are harvested, extracted, produced, used, recovered and reused with minimal negative impacts on the environment and society.

Pressure from NGOs and key opinion formers

Market access trends for products can also be influenced by the opinions and perceptions of end-users of products. One emerging example is the influence of the 'No Dirty Gold' NGO campaign,¹ which, over the course of several years, has targeted high profile jewellery chains around unsustainable gold mining, particularly around Valentine's Day. This was a major contributing factor to the development of the Responsible Jewellery

¹ <http://www.nodirtygold.org/home.cfm>.

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