

# FUTURE ISSUES FOR SUSTAINABLE MINERAL EXTRACTION

- There is a need to ensure that the way we use our natural resources today does not mean that there will be insufficient supplies for tomorrow. We need to conserve all our natural resources, both renewable, such as air and surface water, and non-renewable, such as minerals, while maintaining adequate supplies required for economic growth. We also need to protect the natural environment from damage, so that the biodiversity of the planet is not reduced and that future generations are not burdened with contaminated areas. It is a particular concern that continuing development in the western world is putting excessive pressure on the natural resources of our planet; we are in effect using resources, that may be needed by future generations, to maintain our current standards of living.

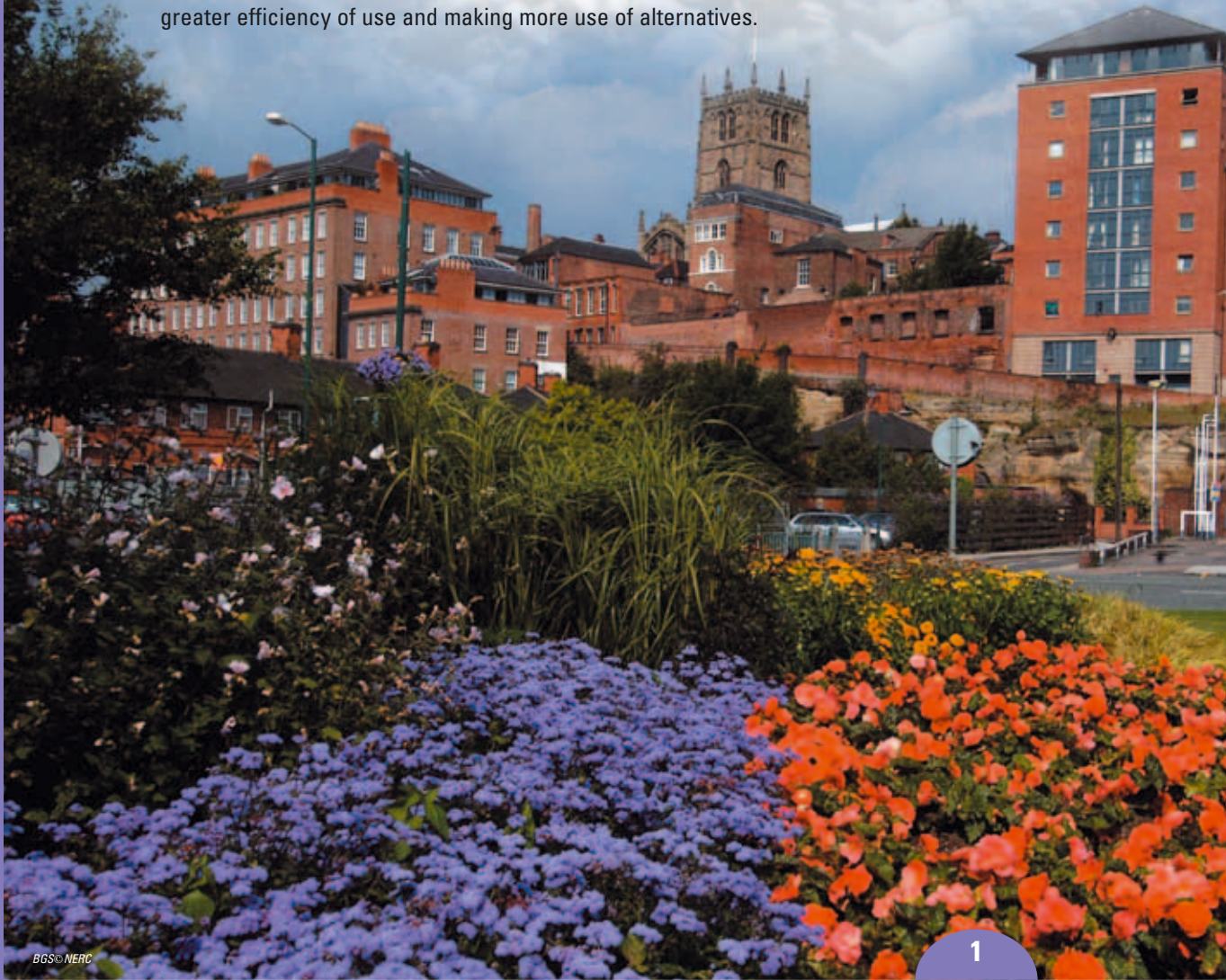
Historically, exploitation of mineral resources has been central to economic development. Aggregate minerals are needed for construction projects such as roads and housing; energy minerals are needed to fuel industry; and other minerals are required for manufacturing products as diverse as computers, fertilisers and bricks. A key aim of sustainable development is to decrease the amounts of minerals used by society without slowing economic growth, by greater efficiency of use and making more use of alternatives.



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### Sustainability and legislation in the minerals sector

The European Union (EU) has published a thematic strategy for the sustainable use of all natural resources. The underlying philosophy of the strategy is to ensure

*“that the consumption of resources and their associated impacts do not exceed the carrying capacity of the environment and breaking the linkages between economic growth and resource use”.*

The policies pursuant to this strategy will aim to provide a framework to ensure the promotion of the objectives of sustainable development. This is likely to lead to new legislation for all areas of society, some of which may affect the minerals industry. Although the minerals industry is already highly regulated, new legislation aimed at decoupling development from mineral exploitation may be required.

### Sources of mineral supplies

Within Europe, there has been an increasing trend to import energy minerals, such as coal and gas, metals, such as copper and iron, and industrial minerals, such as barytes and fluorspar. One reason is that costs of mining in Europe reflect strict environmental legislation. Some developing countries may have less stringent environmental regulations thus making exploitation of natural resources cheaper but at the expense of greater environmental damage. A key part of the draft European thematic strategy on the sustainable use of natural resources is to ensure that, although the EU may import minerals from elsewhere in the world, the environmental and socio-economic impacts of mining overseas are minimised.

It is also important to note that some mineral imports come from sources that cannot be relied upon in the longer term. For example, China is an important exporter of many minerals but is now undergoing rapid economic growth and making more use of its own resources. It is possible that its demand for certain minerals might outstrip supply, leaving less for export to Europe.

### Minimising impacts during and after mineral production

In the UK, the planning system, coupled with other environmental regulation, aims to mitigate environmental impacts of mineral operations through control of emissions into the air and water and by limiting traffic, noise and vibration. There may be a need for more improvements in mining and processing techniques to further reduce environmental affects. For example, it could become more desirable to restrict extraction of high-quality crushed rock to underground workings, rather than allow more large-scale open quarrying. However this would significantly increase the cost of the product and could only be justified if it offset the environmental costs of operational impacts more effectively.



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Plans for restoration and aftercare of a site when mineral extraction is complete are integrated into the planning consent from the outset. Many exhausted sites are now turned over to recreational and nature conservation use or, sometimes, built development, with associated benefits for biodiversity and local communities. The Eden project in Cornwall, built in a former china clay pit, is a good example: it is now a major international tourist attraction, local employer and national educational facility. In the future it is likely that truly sustainable solutions of this type, combining minimal negative environmental and social impacts with real resource benefits, will be favoured.

### Reducing waste

During extraction and processing of a mineral, waste material is produced. New techniques to reduce the amount of waste might involve improved methods for delineating resources, and changes in mining and processing technologies. In addition, more research is required to establish mineral wastes as new sources of construction and industrial minerals.

Additionally, improved metallurgical processes are required to refine metals more efficiently, and novel methods of separating and recycling metals and minerals from products that have reached the end of their useful lives should be developed. Currently construction minerals are recycled in their manufactured form such as concrete or brick. Waste products from industrial processes, such as blast-furnace slag, are also an important source of secondary aggregate. In contrast, glass and metals are recycled simply by melting and reforming with savings in both energy and raw materials consumption. New, cheap and efficient ways are being developed to enhance recovery of minerals. For example, new sorting processes can significantly increase the proportion of motor vehicles that can be recycled.

### Doing more with less

In order to break the established link between development and mineral resource exploitation, more efficient approaches are needed. These may include the development of:

- New technologies to maximise the proportion of minerals that can be recycled or re-used.
- New materials that use fewer natural resources during production or are more efficient than those they replace.
- New technologies that are cleaner and more energy efficient.
- Innovative product design to make it is easier to use alternative materials and to recycle the raw materials used in their manufacture.



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*Future resources — striking the right balance*

Sustainable development requires that we should leave sufficient mineral resources for future generations, without slowing or reversing global economic development. Consequently, we need to strike a balance between the different factors that contribute to our overall prosperity and quality of life. We need to reach a proper compromise between environmental legislation and competitiveness of the economy. It is essential that we get this right, in the interests of our children and grandchildren.



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