UK Minerals FORUM

Future minerals scenarios for the UK

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The UK Minerals Forum

- Funded by the CBI Minerals Group
- Brings together
  - representatives of the UK's onshore extractive industries
  - NGOs with a particular interest in the environmental impacts of mineral extraction
  - the sector's research organisation
  - local government planners
  - observers from central government, the territorial administrations and the main statutory regulators
- Provides an opportunity to consider matters of common interest in a neutral space
- Sponsors Working Groups to look in detail at matters of particular interest or concern and to report their findings to UKMF and to the wider public

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THE UKMF Working Group on Future mineral scenarios for the UK

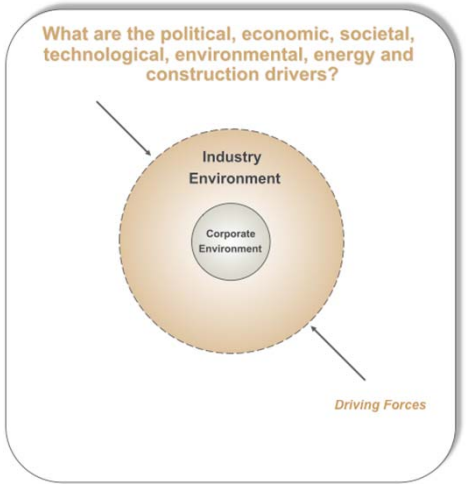
- Examining the possible impacts of alternative futures on UK mineral supply out to 2050
  - how demand, sourcing and supply of minerals might vary in different scenarios
  - how different scenarios might impact on current and future perspectives of the sector held by industry, policy makers, regulators and NGOs
  - what the potential drivers of future minerals demand and supply might be.
- A mix of
  - desk research tracking past trends in minerals production in the UK
  - selected interviews with different minerals sectors
  - the Future Minerals Scenarios Workshop

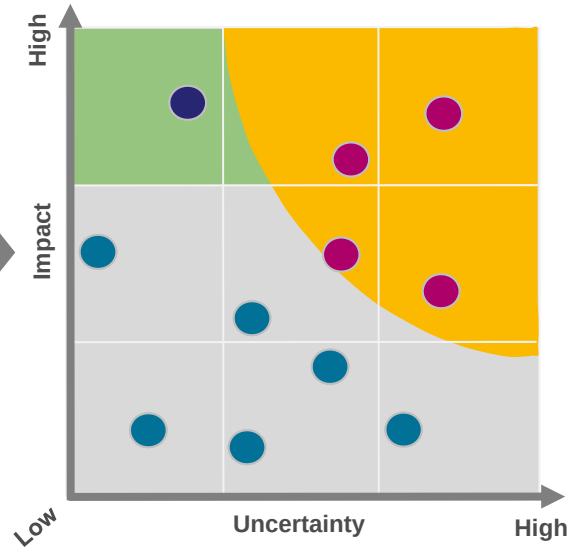
Scenarios…

- Stories that describe how the world might look in the future
  - what's different from today
  - what we need to do to be successful
- Based on an analysis of change drivers
- Allow predetermined elements and critical uncertainties to be separated
- Not predictions or forecasts
- Help leaders and decision makers imagine and manage the future better
  - identify what's in their control
  - identify what isn't
  - identify what needs to change to ensure future success
- Simplify some of the apparent complexity in the world

The UKMF scenarios

- The UKMF scenarios build on and extend the WEF *Mining and Metals: Scenarios to 2030*
  - 200 leaders from the private sector, government, academia and international and non-governmental organizations involved in a strategic dialogue
  - Focussed on the question: *How will the environment for the global mining and metals sector look in 2030?*
  - Developing strategic options to contribute to the sustainability of the global mining and metals sector in economic, social and environmental terms
- The UKMF scenarios ask *How will the environment for UK minerals supply look in 2050?*
- …and explore the UK sector's future in detail





Geo-Economic Landscape
Free markets and open borders

Environmental outlook
Reactive and incremental

Geo-Political Landscape
Stable and ideologically convergent

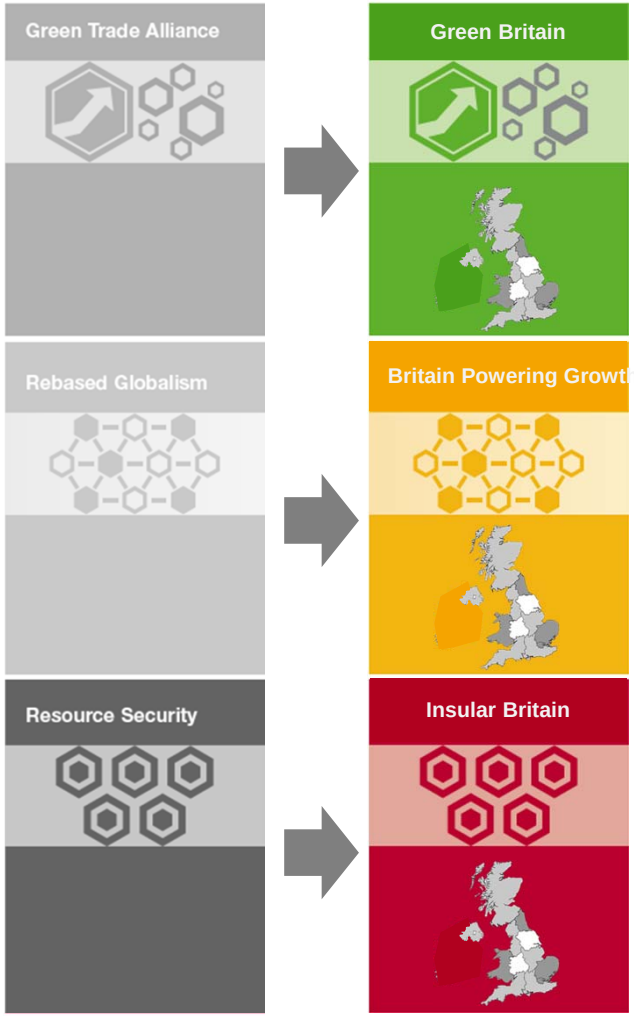
Economic outlook
Stagnation and volatility

Economic outlook
Strong cyclical growth

Geo-Political Landscape
Unstable and ideologically divergent

Environmental outlook
Strong cyclical growth

Geo-Economic Landscape
Controlled markets and closed borders




DRIVERS FOR FUTURE UK MINERAL SUPPLY
Politics
Policy
Sustainability agenda
Legislation/regulation
Geopolitics
Economic instruments
UK/EU
Short term vs long term planning
Society
Place protection
Demographics
Population growth
Migration
Consumer behaviour
Competition for land
Environment
Climate change
Mitigation
Adaptation
Emissions reduction
Impact of weather patterns
Awareness of contribution to CO2
Access to water
Biodiversity
Energy
Cost
Infrastructure
Mix
Security
Construction & Infrastructure
Investment
Resource efficency
Transport network changes
Ethical sourcing
Economics
Industry structure
Value of the £
Indigenous vs imports
Shift in markets
New resource consuming countries
Economic shocks
Land values
Monetary vs non-monetary valuation
Technology
Costs of production - effects of emerging technology
Alternative materials/mineral substitution
New uses for materials
Improve recycling
Energy innovation (incl low carbon technologies)
Increased automationEnergy

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Predetermined elements

- **Global population growth** will continue to increase demand for minerals
- **The number of people living in cities** and consuming a higher share of resources will continue to place pressure on the demand for resources
- **Meeting demand** for some minerals will remain challenging as access to resources and other supply side issues become increasingly difficult
- **UK population will increase significantly** - more than elsewhere in Europe – due to higher birth rates and working age immigration
- **Higher population will drive up demand** for minerals and energy (even in a more resource efficient world)

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Critical uncertainties

- **Geo-economic landscape**
  - *Will economic power be shared equally or unequally?*
  - *Will cross-border flows be more open or more closed?*
  - *Will markets be free or controlled?*
- **Geopolitical landscape**
  - *Will the geopolitical landscape be stable or unstable?*
  - *Will there be ideological convergence or divergence between regions?*
- **Economic outlook**
  - *Will change be more predictably cyclical or more extreme and unpredictable?*
  - *Will average global GDP grow rapidly or stagnate?*
- **Environmental outlook**
  - *Will the response to climate change be decisive and ambitious or reactive and incremental?*

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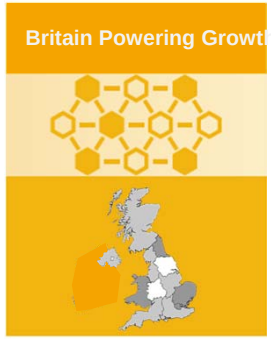
Overview of the scenarios

- *Low cyclical growth with some stagnation*
- *Decisive and ambitious approach to the environment*
- *Push for free markets and open borders - but some political instability*
- *Environmental issues are of overriding importance to the UK*

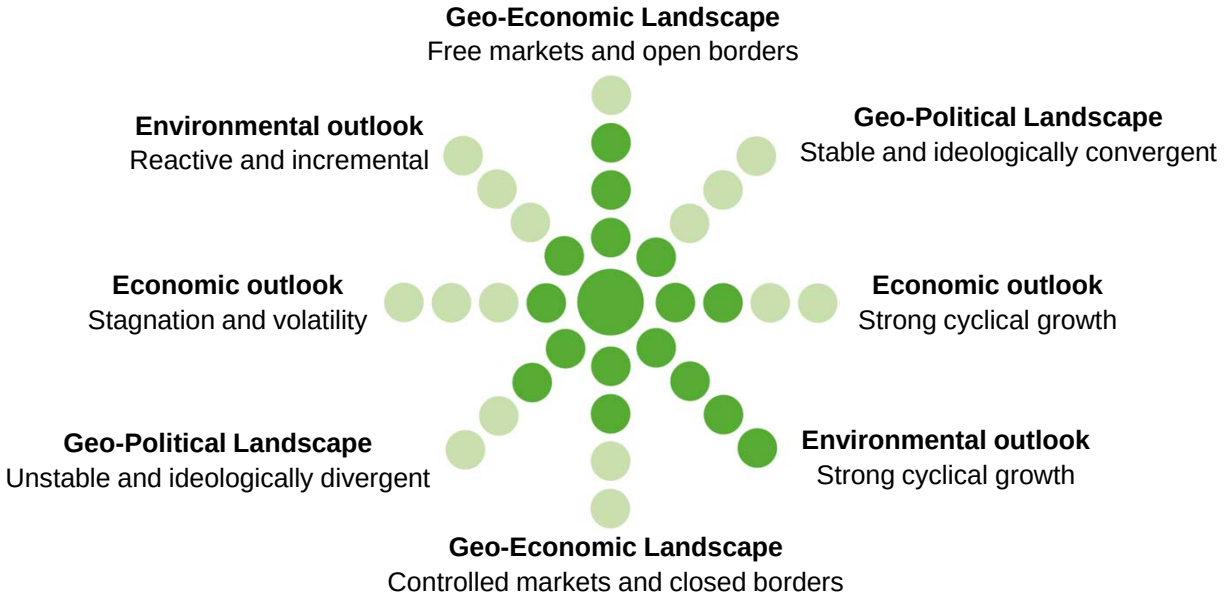


- *Free markets and open borders generate strong cyclical growth*
- *Geopolitically stable*
- *Reactive and incremental approach to the environment*
- *The UK economy is strong and the largest in Europe*

- *Economic stagnation and volatility*
- *Geopolitically unstable, with controlled markets and closed borders*
- *Reactive and incremental approach to the environment*
- *Resource security in the UK overrides other issues and the state maximizes use of domestic resources*

Green Britain

- *Low cyclical growth with some stagnation*
- *Decisive and ambitious approach to the environment*
- *Push for free markets and open borders – but global instability leads to protectionist tendencies*
- *Environmental issues are of overriding importance to the UK*



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Overview

- *The Green Trade Alliance was formed in 2020 by EU member states, the US, Canada and Mexico to promote green growth – a mix of environmental sustainability and economic competitiveness*
- *The measure of green growth is GDP⁺ which balances environmental impact, economic sustainability and social wellbeing. GDP⁺ drives all Alliance members' policy making*
- *After a slow start - the transition to GDP⁺ required significant changes in lifestyle that had to be driven through - Alliance countries are now enjoying stability and some growth. Innovation is key to their success*
- *Countries outside the Alliance performed better through the 20s and 30s but have declined in the last decade as resource constraints have kicked in*
- *The future feels a little uncertain. More countries want to join the Alliance but existing members are cautious about expanding too rapidly. Encouraging more sustainable behaviours is, however, essential*

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The UK

- *The environment lies at the heart of economic and social policy - economic growth remains important, but only if it is achieved within environmental limits*
- *Cities are the engines of growth, creating centres of knowledge, commerce and industry*
- *The UK is performing well overall – but there are some significant regional differences*
- *Distributed power generation is commonplace*
- *Recycling is an economic as well as an environmental necessity*
- *Land use is geared towards food, energy production and some mineral production*

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Society

- *Society has wholly adopted sustainable development practices. There is a strong sense of community and shared purpose*
- *People value low carbon lifestyles and live close to where they work. Cities are vibrant and growing*
- *Long distance travel is harder and more expensive than it once was*
- *Consumption is reduced – and is ethical as far as possible. Goods (and many services) are required to provide environmental footprint labels*
- *The UK is a zero waste society. Waste management policy is fully integrated into - and a key contributor to - energy policy*
- *Planning rules ensure that all developments maximise reuse during construction*

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Business

- *Businesses are eco-efficient. Energy production is from renewable sources and CO_2 emissions are low. Water use is efficient and companies strive to achieve zero waste*
- *Product longevity is important. Design and production are focussed on achieving sustainability. Businesses innovate continuously to minimise resource use and maximise product life*
- *Product leasing is popular. Producers lease metals for their use in end-products and consumers lease the end-products, giving manufacturers a reason to think about the product life cycle*
- *Companies constantly innovate and build value through extensive technology and knowledge sharing. Business and knowledge networks are popular mechanisms for boosting trade and strengthening innovation*

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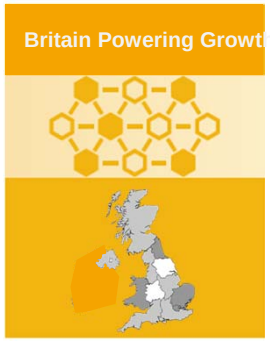
Minerals: International context

- *National and regional governments have significant autonomy in setting fiscal and regulatory regimes to support the Alliance's objectives*
- *Targeted taxation and carbon pricing schemes are in place throughout the Alliance and are set nationally*
- *Mineral recycling is extensive. There is heavy investment in the development and use of new materials*
- *Renewable energy production has increased; coal and oil have limited use*
- *Cradle to cradle metals and minerals stewardship allows decision-makers to base decisions about resource use on a product's footprint along the value chain throughout its life cycle*
- *Carbon Capture and Storage is widely deployed*

Britain Powering Growth



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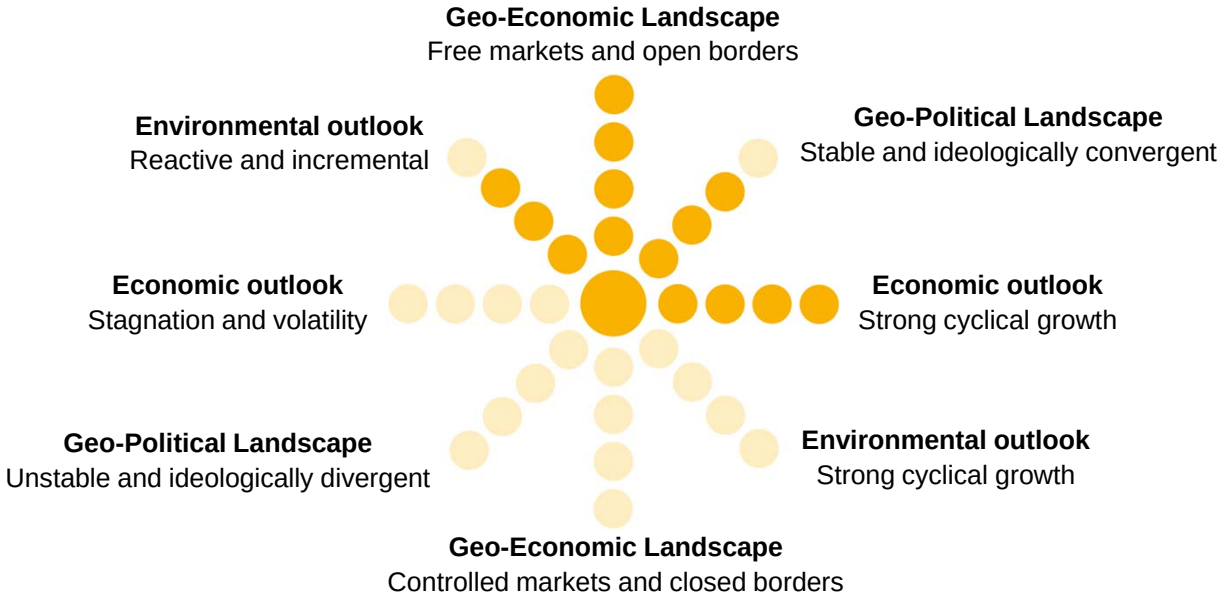

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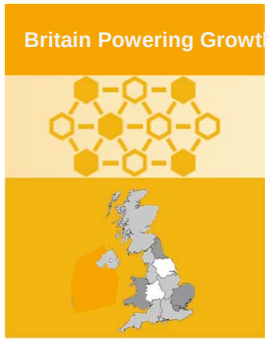
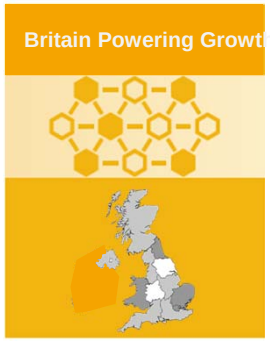
Overview



- *The world enjoys continued economic growth, driven by free markets, open borders and financial liberalisation. Consumption is high across the developed economies.*
- *Global GDP growth averages 4% annually. Wealth is concentrated in privatised industries and in nations that control strategically important mineral resources*
- *The emerging economies are growing stronger and are performing particularly well in the mining and minerals sector*
- *Short termism and the pursuit of growth means that the environment has taken a back seat. International effort to tackle climate change and environmental sustainability has been limited – but concern over the world's ability to adapt is now growing*
- *Concerns are increasing over land use, rising water scarcity and power outages. Insufficient investment in energy efficiencies and renewables means that serious disruption cannot be ruled out*

The UK



- *Britain is powering growth. The UK economy is strong and the largest in Europe*
- *UK success is built on its knowledge industries: financial services, science and technology, education, leisure and the creative and design industries. The UK is regarded as one of the most progressive societies in which to live and work*
- *Knowledge workers travel constantly around the world, creating value and opening markets. The UK is a 24/7 society and demand for travel, goods and services is high*
- *The UK's wealth creators are supported by an army of service providers who also have to work long hours to meet the needs of a demanding client group*
- *Increasing consumption of goods and high-impact services means that society's waste footprint is growing inexorably and – it now seems – unsustainably*
- *Britain's nuclear industry is thriving*

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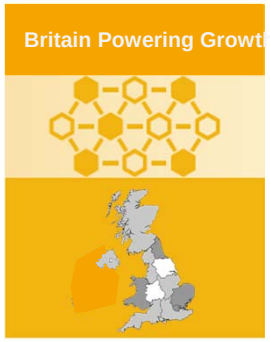
Society



- *The long hours culture has prevailed for decades and has meant that people have limited time to invest in their physical communities*
- *Urban centres have enjoyed significant investment in transport infrastructure. They have also grown significantly putting increasing pressure on the Green Belt and other environmentally protected areas. Population density increases*
- *Telepresencing and distributed computing mean that more people live in peri-urban environments or in smaller market towns*
- *Globalisation, technology and communications have created new communities of interest online*
- *UK society is less concerned about environmental degradation than other (less well off or more aware) nations – though pressure is beginning to build from outside*

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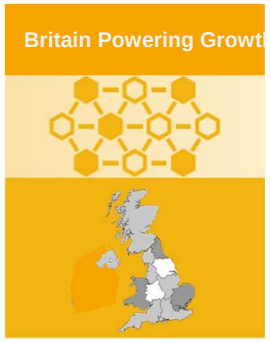
Business



- *Knowledge based industries and high value knowledge workers drive and maintain economic growth. Virtual business models that promote fluidity, connectivity and creative partnerships thrive*
- *Business is highly focussed on international opportunities and markets. People constantly seek out new opportunities and staff turnover is high – a positive way to build creative energy and value*
- *Resource based industries are less culturally valued. Those that remain in the UK focus on scale and profitability. Foreign ownership in the sector is high*
- *Land use and agricultural production is managed by large corporate multinationals. Decades of limited investment following removal of the Common Agricultural Policy mean that land is less productive than it could be*

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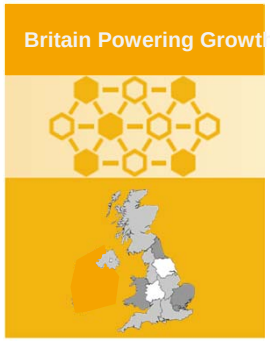
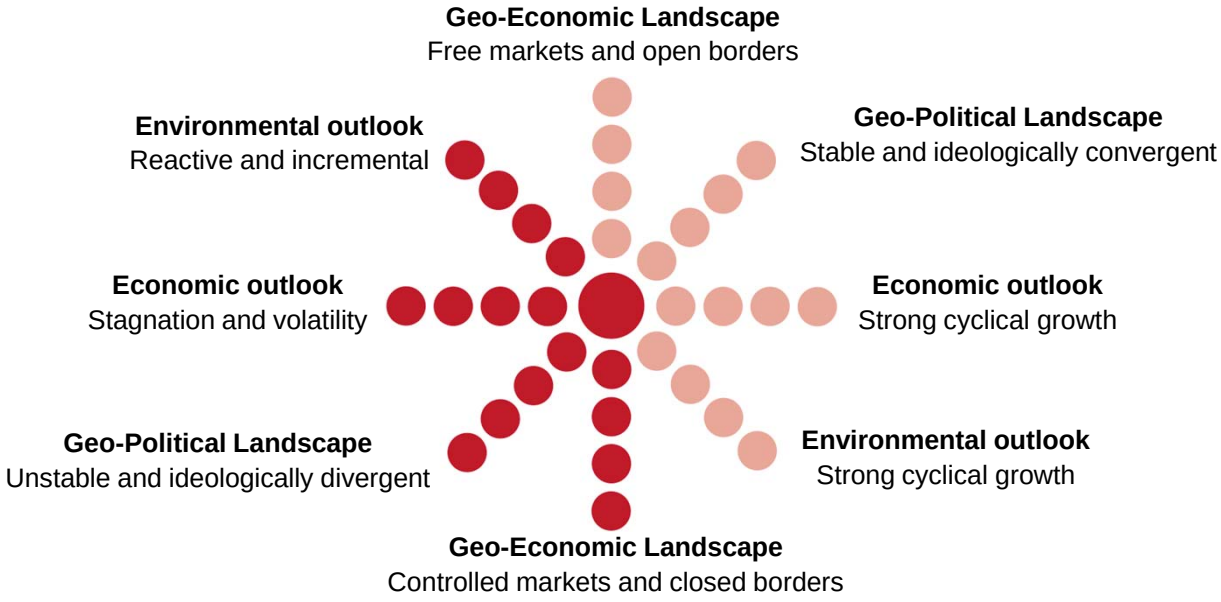
Minerals: international context



- *7 of the top 10 global mining corporations are majority-owned in China, India or Brazil*
- *Resource-rich countries have become real powers in their own right*
- *Generally they work to a (loosely agreed) strategy to develop skills and boost employment in processing and manufacturing activities*
- *Workers in these countries increasingly demand more social and economic benefits and higher protection of local environments*
- *Non-resource rich countries need to consider whether they have strong enough relationships to maintain future supply*

Insular Britain

- *Economic stagnation and volatility*
- *Geopolitically unstable, with controlled markets and closed borders*
- *Reactive and incremental approach to the environment*
- *Resource security in the UK overrides other issues and the state maximizes use of domestic resources*



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Overview

- *Globalisation has failed*
- *Nations form cartels based on regional, ideological or resource interests. Trade is defined by a complex web of protectionist barriers and preferential agreements*
- *Cross-border flows of products, labour and capital are limited. Nations hoard domestic mineral resources for their own use*
- *State intervention is high; supranational bodies have faded into irrelevance*
- *Resource constraints lead to extremely volatile prices; access to mineral resources is more important than environmental protection*

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The UK

- *The UK is no longer part of the EU. Its economy is weak*
- *The UK still produces some oil and gas and has expanded its renewables sector but it struggles to achieve self sufficiency. The price and availability of imported energy cannot be guaranteed*
- *The government exercises strong control. Energy is rationed and travel is restricted*
- *The UK can no longer rely on migrant labour and citizens work long past historical “retirement ages”*
- *Land is worked intensively to produce food and energy. Rural communities have grown significantly*
- *Global warming continues to create unpredictable weather that affects both energy supply and food crops*

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Society

- *British society is introspective. The economy and society feel insecure and resilience and self reliance are valued personal attributes*
- *Energy can no longer be taken for granted. Society accepts that everything must be done to maximise production*
- *Population is more dispersed as many people move out of cities to work on food, biofuel and mineral production. The UK is zoned according to production*
- *Cities suffer from old and poorly maintained infrastructure. Industrial scale recovery and recycling creates work and drives what innovation there is*
- *Local food production and food micro-businesses have increased and anyone with a plot of land grows what they can. Barter schemes are popular*
- *Community and family relationships are important. People can be cautious, even tribal, in their approach to outsiders*

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Business

- *Large scale production of food, biofuel and minerals is mainly nationalised. So is engineering and what heavy industry remains*
- *UK legislation promotes hoarding of the natural resources required for national development. International trade is limited and heavily taxed*
- *Investment in new technology – such as genetic modification of food and energy crops and opening access to new mineral resources – is a national priority*
- *Energy efficient construction – primarily focussed on making existing buildings energy and waste efficient - is a growing business. So is recovery and recycling*
- *The small business sector is dominated by personal services and small scale food production. The creative and design sector are reasonably strong and focussed on supporting national production*

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Minerals: international context

- *Resources are scarce and protectionism is high. Nations work hard to optimise their own resources*
- *States that have an abundance of natural resources have formed cartels that control access and price. Less developed and less militarised producers tend to form alliances with militarised powers*
- *What access there is tends to be unpredictable. Pricing is volatile. Many non producers feel held to ransom*