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STRADE

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Attracting mineral investors: The fundamentals of investor decisions

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STRADE is an EU-funded research project focusing on the development of dialogue-based, innovative policy recommendations for a European strategy on future raw materials supplies. In a series of policy briefs and reports, the project will offer critical analysis and recommendations on EU raw material engagement policy.

This policy brief considers the mining company's view of how investment decisions are made and what is considered an attractive mineral investment destination. The brief considers where a host government can take actions conducive to attracting mineral investment and where market forces limit the effectiveness of government interventions.

1. Introduction

Finding and developing a resource to full production is a high-risk, capital-intensive activity. It can span many years and requires investments from mining and exploration companies and financiers. To understand how the EU can increase the inward flow of mineral investments, it is important to understand how these investments are made. The mining industry is complex, with different actors (see Table 1) involved in investment decisions, across the mining value chain. Investment decisions in each segment of the mining chain are impacted by different variables. This policy brief focuses on two main stages: exploration and mining operations.

Exploration: At the exploration stage, particularly greenfield projects, the geological potential and access to this data are key considerations. On par with geological potential is the legal and regulatory regime of a country. Exploration is mostly conducted by Junior companies, and they are likely to invest in jurisdictions where a) they believe there is the potential of identifying an economically viable project and b) where the risk of being unable to transfer their find to a mining company, due to regulations, is low.

Mining: A mining company, whether an

Table 1 - Mining companies by size (2017)

Category	Mining revenues/ year	Approx. no. companies	Comment
Majors	>USD 5 billion	10	Large multi-national companies
	>USD 500 million	140	
Intermediates	>USD 50-500 million	250	Includes locally-owned, private companies with low visibility
Juniors	>USD 1-50 million	400	Includes locally-owned, private companies with low visibility
	Below USD 1 million	3 000	Includes locally-owned, private companies with low visibility
Gov't/Others	various	200	Gov't includes commercially-oriented, state-owned enterprises; 'Other' includes enterprises significantly involved in non-mining industries, as well as significant, vertically-integrated steel companies. Most of the Other category would have revenues putting them in the Majors realm.

Source: S&P Global Market Intelligence (2017)

Intermediate or a Major, seeks jurisdictions where the risk of losing the 'right to mine' is minimum. The right refers to a rules-based system, where a company meeting the legal and regulatory requirements, has the first right to proceed with mining. Jurisdictions that heavily rely on discretionary authority to award this right, increase the risk for investors.

Junior, Intermediates and Majors are involved in exploration, while Intermediates and Majors are involved in the extraction stage. All three firms will seek financiers to fund part or all of their activities. This policy brief does not specifically address State Owned Enterprises involved in the mining sector. These companies are likely to follow a marginally different investment decision procedure than discussed here, but the fundamentals will be applicable to them as well.

The objective of this brief is as follows: to present an overview of the factors that influence investment decisions in the mining sector, and present some examples of how EU member states fare. In later policy briefs and reports, the STRADE team will develop a strategy for increasing mineral investments in the EU.

The brief presents the basics of three factors that will influence an investment decision: geology, regulatory environment, projected costs and revenue flows, which can include access to downstream processing. The conclusion comments on the role the EU could consider to promote its jurisdiction an attractive mineral investment destination.

The brief also makes the distinction of areas where governments can intervene to encourage investments, and those that are more likely to be outside their scope of influence. For example, geology can limit any action taken by a host government and global metal market conditions will determine the majority of decisions taken by investors. This brief also emphasises the importance of 'portfolios' where investment choices are made 'in comparison' to other available projects, rather than on a stand-alone basis.

1.1 How investment decisions are made

Typically, exploration and mining companies have a large portfolio of potential investments. A number of these projects have been on the company's portfolio for many years, sometimes even decades. Geological potential and the regulatory environment will be the first factors that influence the inclusion of a project in a company's portfolio.

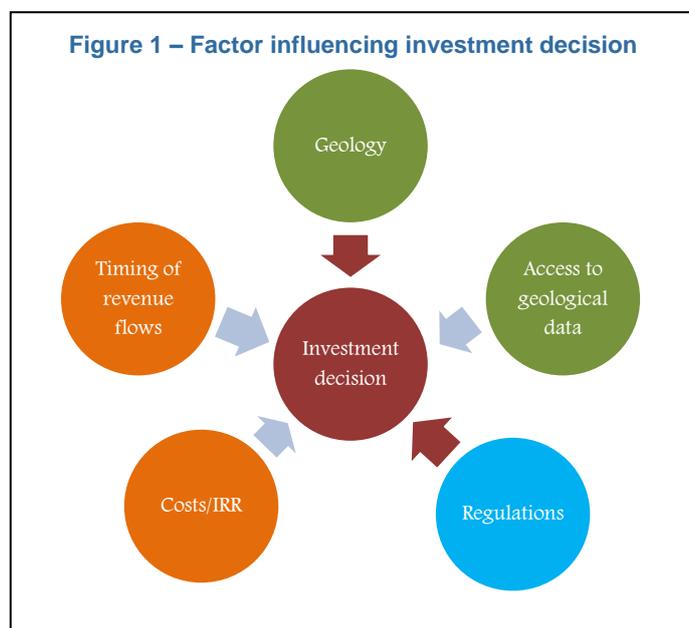
The preferred ranking of these projects will change over time, influenced by market conditions, increased knowledge of the deposit, improved processing technologies and with political events impacting the political risk of a project.

Exploration and mining companies, as well as financiers, will rank projects in terms of investment attractiveness. The variables that contribute to this ranking are typically geological potential (or inferred resources, if area does not have confirmed resources), the legislative and policy landscape and associated political risk, investment returns based on IRR (Internal Rate of Return) and timing of revenue flows (see Figure 1).

It is important to note that the consideration of these factors are is not always linear, and investment decisions will consider regulation alongside geological attractiveness and vice versa.

From an investor's perspective, the more clear and predictive a regulatory and policy landscape is, the more risk is removed from a project, thus making a jurisdiction attractive. Conversely, a poor or uncertain policy landscape can make a project less attractive to investors, even when it has strong geological potential. As with regulations, the more information an investor has, the more precise their project costs and revenue projection can be. Therefore access to up-to-date, detailed geological data as well as the fiscal environment of a country can contribute to a higher ranking within the portfolio for a potential project. Weak and opaque regulations, and lack of information can negatively influence investment decisions.

In the following sections, the three factors within investment decisions; geology, regulatory environment and cost and revenue flow aspects are explored.



2. Geology

2.1. Geological potential

The most important (and obvious) factor for attracting mineral investment is geology. This element is of greater interest at the exploration stage. Geology has two elements: whether there is geological potential within a country and how geological information is made accessible to mining and exploration companies.

Europe has a long mining history, with mining activity having taken place in some regions for as long as 2 500 years. Many known deposits have been exploited to great depths, near surface mining having largely been fully exploited. This impacts the geological potential of the region, as future mining activity is likely to involve deep deposit mining, which can often be capital intensive and require advanced technologies.

In comparison, other mining investment destinations such as Africa (excluding South Africa and Ghana), have only had mining on an industrial scale within the last 100 years. Their deposits tend to be near-surface and many operations are open-pit. Open-pit operations tend to be less capital intensive and use simpler mining techniques. They also tend to have a smaller time lag between construction and operations, relative to underground mines, as less complicated mine-site infrastructure is required. Thus on 'geological potential' European member states are competing with other regions.

The European deposits of the metals covered under the STRADE project tend to be in vein-type deposits that are more difficult to extract¹. Smaller deposits at a greater depth are more difficult and capital intensive to explore and exploit. For some mining companies, deposits of this nature may be typical of their portfolio of potential projects. For others, especially Majors, this type of project may be of little interest due to smaller profit margins.

Major mining companies have traditionally looked at 'Tier 1' assets, as these have a greater profit potential, while requiring investments at a level not achievable by medium sized firms. Tier 1 assets are defined as those with the potential to significantly increase global production, for that particular mineral, by between two and four percent. Europe's long mining history, where the most profitable deposits have been identified and exploited, has resulted in a lack of identified Tier 1 assets. Save for a few larger deposits in Eastern Europe, the European continent no longer boasts such Tier 1 assets. The majority of these have already been mined. However, a Tier 1 asset is likely to occupy a higher project preference for Major companies.

This leaves medium to small projects likely to be available in the future. On the one hand, EU member states have the potential to attract all sizes of exploration and mining firms. On the other hand, these jurisdictions would be competing with other non-EU countries that can also offer the same size of projects².

The geological potential therefore can determine the size of exploration and mining companies that invest in a region: deposits may be of interest to some companies while not to others. Similarly, European geology contains a wide range of different metals. Whilst, the geological formations for some of these ore deposits may not be attractive to major companies; they may be attractive to other mining companies.

2.2. Geological data accessibility

Geological potential is an offering of nature, and governments can do little to enhance their potential mineral resources. However, to increase the attractiveness of a country for investors, governments can improve the accessibility and availability of geological data. Typically, geological maps and previous exploration data are held by the National Geological Survey and, in most cases, are made available to prospecting companies upon request.

The most common way of presenting this information is via an online mining cadastre. This portal presents the known geology of a country and can also include information on the current license areas. It can facilitate the online application for prospecting and exploration licenses. The portal acts as a 'one stop shop' through which potential exploration companies can generate information for ranking projects to be pursued.

The availability of EU member state data on this front is weak. As Table 2 shows, the EU is now

Table 2 - EU member states & African countries with online mining portals

Operating online mining portal		Online mining portal in development	
Europe	Africa		
France	Kenya	Namibia	Zimbabwe
Sweden	DRC	Mozambique	Republic of Guinea
Spain	Nigeria	Rwanda	Cote D'Ivoire
Bulgaria	Ethiopia	Tanzania	Cameroon
	Liberia	South Sudan	Malawi
	Sierra Leone	Uganda	
		Zambia	

Source- SNL research 2017

¹ This is not the case of the many industrial minerals mined in Europe, potash, gypsum, salt, magnesite, clays which are not covered under the STRADE project

² STRADE reports to be published in 2018 will fully explore strategies for the EU to attract more exploration and medium sized companies.

lagging behind the African continent in terms of digitized geological data. There are more African countries with online digitized mining cadastres than EU Member States. This discrepancy is significant as potential investors see online mining cadastres as a positive indication of a country looking to attract investment. Various international donors, including the EU, have funded the setting up and management of many developing countries' online mining cadastres to aid these countries in attracting mineral investment and the associated economic benefits.

3. The importance of rules-based regulation

The Fraser Institute's annual survey of mining companies provides an annual index of 'Policy Perception'³ for the jurisdictions it reviews. In the 2017 report, the Republic of Ireland is ranked as the highest, and Sweden is ranked third. Although EU member states do appear at the top of end of the index, many, including Greece (91st out of 144), feature in the bottom third. This shows the disparity between regulatory and policy regimes across the EU.

The regulatory landscape is determined at three levels: law (which is binding), regulations (set usually at the ministry level, which are binding but can be changed at the ministry level) and policy (a statement of the goals of a government/ministry). Laws and regulations will typically address licensing conditions, taxation regimes, environmental regulations, land use policies and community development conditions. Here we consider legislation and regulations.

Laws and regulations can dictate how an exploration and mining license is granted; governing the interaction between a mining/exploration company and the government. A clear system often assigns responsibilities and rules for decision-making at each stage of the interaction. Regulations guide all invested parties from exploration through to granting a mining license, as well as tax and royalty payments. Mining law and regulation may even stipulate the shape and form of community relations. Here is discussed four sub-sectors within the regulatory space, which interviews with mining industry executives, are suggested to have important relevance in the decision making stage.

Right to mine: Typically, the most important factor that an investor will look for, is the assurance of the 'right to mine'. A 'right to mine' is essentially the right of the company, who has held the exploration license, to have a 'first right of refusal' for mining rights. If a country does not have a right to mine guarantee within the mining law, this exposes the exploration company (usually a Junior or Intermediate mining company) to a degree of risk by potentially allowing another company to outbid the explorer. If a 'right to mine' is not guaranteed under the rules, it increases the risk for an exploration/mining company to profit from its find. Discretion, on part of the government in awarding this right, instead of a rules-based system the investor can understand, increases the risk of a project. This is likely to lead to a lower preference ranking of the project within the company's portfolio.

Best practice⁵ in this area is that the exploration company is awarded mining rights when resources have been proven and the Environmental Impact Assessment (EIA) has been completed and approved. The legislation also sets out clear timelines and objectives for potential court appeals if this process is disputed by either party at any stage.

A recent study under the STRADE project⁶ revealed that none of 12 EU Member States studied, were rated in the top tier for best practice for having a 'right to mine' clause within their mining law. Austria, Bulgaria, Czech Republic, Finland, France, Germany, Ireland, Spain and Sweden all sit in the mid-tier for best practice, whilst Poland, Portugal and Romania are placed in the bottom third. Non-EU jurisdictions with a large number of Tier 1 assets, such as Australia and Canada, subscribe to the right to mine in their legislation.

It is notable that, although Poland, Portugal and Romania are rated amongst the lowest for guaranteeing the 'right to mine', all three countries have Tier 1 assets⁷ either producing or in development stages. The nature of a Tier 1 asset, therefore can compensate for a weak regulatory environment, as the asset itself is valuable enough for companies to accept the increased risk to the project. As noted in the second section, geology is the primary variable for investment attractiveness. If investors forecast that profit will far outweigh potential risk from infrastructure and/or the regulatory landscape, these concerns may be overlooked by investors.

³ <https://www.fraserinstitute.org/resource-file?nid=11080&fid=5818>. The index includes uncertainty concerning the administration of current regulations, environmental regulations, regulatory duplication, the legal system and taxation regime, uncertainty concerning protected areas and disputed land claims, infrastructure, socioeconomic and community development conditions, trade barriers, political stability, labour regulations, quality of the geological database, security, and labour and skills availability.

⁵ There is lively debate about what constitutes best practise in this area. There is also a view that a host government should implement a merit based system, alongside a rules based system.

⁶ Forthcoming report available on <http://stradeproject.eu/index.php?id=7>

⁷ A Tier One asset is a mine that once in full production will affect global production of that commodity by two to four percent.

There are cases where positive investment decisions have been made in Europe, even in non-conducive regulatory environments within Europe. The most well-known include; KGHM's Rudna mine in Poland and Gabriel Resources' Rosia Montana gold project in Romania. While KGHM has been able to proceed to production, the Rosia Montana project remains marred in arbitration at this time.

Poland is Europe's largest producer of copper. In the country's mining legislation, the holder of the exploration license is not given certainty that it will also be able to gain an exploitation license. The explorer is given a 'right of priority' over the concession through a mining usufruct for a period of three years. If the explorer does not start the application process within this time, then the explorer will lose this priority. Within the three years, from when the explorers begins the application process for the right to mine, if the agreement is not reached with the government within three months, the right of priority is, again, lost. There are long lead times for bringing a mine online. Although three months for a mining license appears to be sufficient time, there are numerous studies that are completed during this time and will need to be approved. This would also include an Environmental Impact Assessment, which is a prerequisite of a mining or extraction license.

Environmental and social (E&S) regulations: Another factor affecting investment attractiveness is the perception of strict environmental and social regulations and how these may impact the permitting and production timeline. Typically mining companies want stringent social and environment regulation to decrease E&S risk and the risk of arbitration. Unclear regulations tend to discourage companies from investing. This aspect will be explored in other publications under STRADE.

Governance: An issue that will be taken into consideration by investors when ranking projects is governance. While governance can be distinguished from legislation and regulations, the implementation of the latter have a strong influence on the former. A jurisdiction with a strong governance record (i.e. adherence to its own laws) indicates that although the mining company may have to operate within tighter parameters, governance structures will be transparent and therefore navigable. It indicates that public bodies, such as government departments, are held accountable to follow processes when making decisions. Particularly for companies operating in a new or unfamiliar jurisdiction, stronger governance will lower its risk of being exposed to corruption, bribery and elite capture. Indications of good governance would be the host government ratifying corruption and bribery laws and being compliant with the Extractive Industries Transparency Initiative (EITI). The EITI stipulates transparent management of natural resource payments made and received by a host government. Of the EU28, currently only the United Kingdom and Norway are signatory to the EITI, with France and Germany having indicated their intentions to do so.

Certainty and stability: As one mining company executive narrated; 'Strong regulations do not scare us, we are happy in such places. We know what is coming. We can plan for it. But if the government is going to keep changing its mind every three years, we don't like that'.⁸ Mining companies and investors favour certainty of the regulatory framework and assurance that the framework will not change abruptly. In addition, that changes in governments, will not result in a major regulatory change. Frequent changes can increase the company's non-compliance risks. This can lead to production delays, or the mining company and the government engaging in arbitration.

Arbitration, not only incurs production and financial risk, but also potential reputational risk. This is why mining companies and investors seek certainty in the regulatory and fiscal regimes in which they operate. As a mining analyst said, "If a country promotes its mining industry, creating a regulatory regime conducive to investment and mining development, it will attract investment and create employment opportunities, and economic growth will follow, that will benefit the country and strengthen its economy through foreign exchange earnings. But if the regulatory regime is unfavourable, you are going to kill the goose that lays the golden eggs"⁹.

4. Costs and revenue flows

Once exploration or mining companies have assessed a potential deposit and the regulatory risk, they will look at the costs and revenues associated with the project, to determine project ranking within their portfolio.

The basic calculation for costs and revenues are covered under the internal rate of return (IRR). The IRR calculates the profitability of the potential project. This is usually undertaken after significant exploration work has been carried out to define the ore deposit. Therefore IRR tends to be of greater interest to Intermediates and Major companies, rather than Junior's who will rarely mine or develop any deposits they find.

The cost and revenue flows are also of interest to financiers. These are investors who will provide capital to exploration and mining companies and are focused on the returns from the project. In general, two groups of

⁸ Confidential Source, Canadian Mining Company Executive. Addis Ababa., Ethiopia. 2016.

⁹ Patrick Cains, "Regulatory Certainty in mining remains elusive" <https://www.moneyweb.co.za/mineweb/mining-indaba/regulatory-certainty-in-mining-remains-elusive/> Accessed 09/05/17.

financiers exist; debt and equity investors, although there may be other groups emerging (see box). These groups have different expectations for their investments returns, and timing of revenue flows from the project. Mining projects tend to differ in their investment structures, depending on the company involved. Mining project financing will be distributed between debt and equity. This ratio will differ depending on the size of the mining company, and the predicted Life of Mine (LOM). Mid-tier companies will often require a mixture of debt and equity and are likely to have project level finance. Only small and mid-tiers will raise finance through share issuance. Majors are more likely to use their operational cash flow supplemented by debt at a corporate level.

In addition to the IRR, investors also differ on the accepted degree of risk associated with the investment. Some investors will be partial to higher risk investments (less assured resources, less politically stable operating environment). The investment will be attractive because of the potential higher rate of return. Other investors will be inclined to take on lower risk projects (potentially brownfield projects in more politically stable countries).

In addition to risk appetites, another variable is the length of the investment. Investing in a mining company is usually a long term investment. This is due to the lead times between exploration and a mine being operational. Given the capital investment at the start of the project, profits are likely to be delayed after operations begin as the company recoups its invested capital first. Investors will differ over their preference for time delay in revenue flows.

The IRR can be affected by certain variables, which host governments may be able to have some control over. For example, access to a cheap and reliable source of power and tax regimes will ensure that a company has a higher IRR. However, there is a limit to how much external influences can affect an IRR. If a project is not economically viable or the company is being poorly managed, tax regimes and infrastructure are not going to be significant factors in an investment decision.

4.1. Costs and competitiveness

In addition to regulation and laws, investors will look at the 'business' costs of the jurisdiction. Energy costs (including any government subsidies) will come into consideration. Regulations can make a difference in this category. For example, owing to high levels of energy consumption in mine operations; energy subsidies are typically attractive. Decision makers will also look at labour legislation such as laws concerning minimum wage, pensions and insurance. In some circumstances, labour laws are helpful in providing a sound framework from which a company can negotiate wage rates. However, weak labour laws will mean that company can face a higher risk of wage and other labour disputes.

Previous research under STRADE illustrated EU-based mines are cost competitive with other global producers¹⁰. In considering unit costs for operating mines, analysis indicates that the EU's mining operations are, and can continue to be, competitive compared to mines in other countries.

The only consistently less competitive component of operating costs at EU28 mines is the labour cost. This is a result of high wage rates in the EU Member States compared to less developed countries. Labour costs within the EU do compare, often favourably, with those in other developed countries such as Australia, Canada, Chile and USA.

With the exception of copper in Poland, royalty and tax costs within the EU28 are generally more competitive than other countries. Other cost elements in EU28 mines are also generally similar to the average costs from other regions of the world. Mines operating within the EU28 benefit from having access to good infrastructure.

Debt or Equity

Debt investor: These are usually long term investment institutions, such as pension funds and international financial institutions etc. Investment is in the form of a loan to the company, with an agreed payback schedule and interest rate. The financier makes its money through the interest payments. The financier is typically uninterested in share price fluctuations and will only intervene if the company defaults on its loan repayment. Debt investors will look at when the revenue flows from the project start, meaning when the company starts to make a profit. Debt investors will look at the company's previous projects and whether the company has defaulted on any loans. These investors will have a low risk appetite and are seeking long term investments.

Equity investor: These investors can include investment firms, specialised funds and private companies and individuals. They will buy shares for a portion of the ownership in the company. Their primary metric for assessment is the value of the company shares. Equity investors will therefore look at revenue flows to pinpoint where share prices are expected to increase significantly. Equity investors can be split between those seeking shorter term investment (2 to 3 years) and those seeking longer term investment (5 to 10 years). These investors are more likely to have a higher risk appetite.

It is important to note that financiers can fall under both categories, for example the International Financial Corporation can be a debt or equity financier, depending on the project.

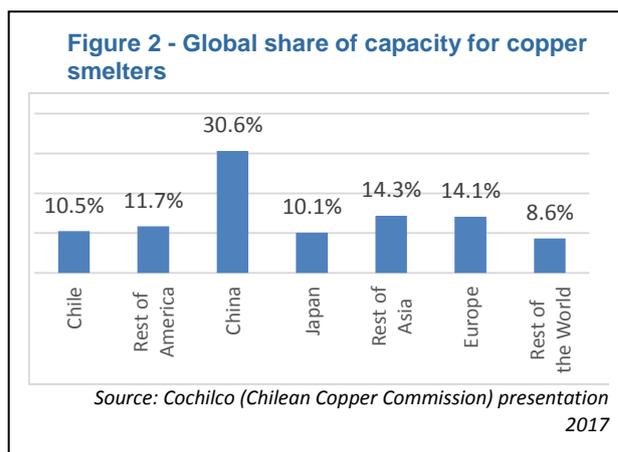
¹⁰ http://stradeproject.eu/fileadmin/user_upload/pdf/PolicyBrief_08-2016_Nov2016_FINAL.pdf

4.2. Proximity to smelters

An additional factor that can make a project profitable is the proximity to the downstream sector, such as smelters. The role of transport infrastructure is a heavy consideration here. The EU is well known for its sophisticated infrastructure, in the form of paved road and motorways, passenger and haulage railways, and deep sea ports. Many metals require refining processes that in most cases, exist away from the mine site. Therefore, in addition to good infrastructure, a region hosting smelting and refining capacities nearby, increases the attractiveness of the project for the company¹¹.

Certain grades of raw material may require specialised refineries, for example because of the arsenic content in copper deposits. Therefore, the market viability of a deposit decreases significantly if the transportation costs to a specialised smelter are high. If a product has to be shipped large distances for processing, this can significantly increase the overall cost of the project.

In the case of copper, China has 16 smelters that process 30.6% of the world's supply of the metal; Europe (not EU28) has nine smelters that process 14.1% of the world's copper (Figure 2). Compared on a global scale, Europe has good refining capacity, placing second after China. Combined with access to good infrastructure, and a strong refining capacity, Europe is well positioned to refine and export raw materials.



5. Conclusion

This policy brief has provided a brief overview for some of the major factors influencing investor considerations for project rankings. It showed that typically the most important considerations for investments are geology and regulatory environments. The costs and the timing of revenue flows are of interest to financiers who invest in exploration and mining companies. In order to promote investment attractiveness, governments can address some of these factors. Others are outside their scope of influence (see Table 3).

While there is little that governments can do to improve the geological potential of their jurisdiction, they can increase accessibility to geological data. Therefore funding National Geological Surveys to carry out exploration activity, as well as increasing access through online portals can increase the potential to attract investors.

The areas in which governments have the most influence is over legislation and regulation. The assurance and certainty of processes and addressing the 'right to mine' are the most important. EU member states rank mediocly in this area compared to their global peers. Jurisdictions within Australia and Canada rank highly in this area and STRADE will present lessons that can be learnt from these jurisdictions, in later reports.

Issues that are outside the direct control of governments include the global commodity markets, and the costs of capital for exploration and mining companies. Although, through creating stable financial markets and contributing to stable commodity markets, these factors can be indirectly influenced.

The STRADE team acknowledges that mining legislation is under the remit of sovereign member states at this time and is not directed at the EU level. The team will be presenting recommendations that include the EU providing guidance for its member states that can potentially lead to more investment conducive changes to national legislation.

Table 3 - Factors host governments have control over

Factors host government have influence	Factors host governments cannot influence
Accessibility of geological data	Geological Potential
Regulatory landscape	Internal rate of return
Environmental law	Commodity prices
Mining law	Commodity markets
Infrastructure	Capital costs
Refining capacity	
Electricity subsidies	

¹¹ It is important to note this is not a 'defining' factor, as mining companies are accustomed to shipping concentrate over large distances.

Project Background

The Strategic Dialogue on Sustainable Raw Materials for Europe (STRADE) addresses the long-term security and sustainability of the European raw material supply from European and non-European countries.

Using a dialogue-based approach in a seven-member consortium, the project brings together governments, industry and civil society to deliver policy recommendations for an innovative European strategy on future EU mineral raw-material supplies.

The project holds environmental and social sustainability as its foundation in its approach to augmenting the security of the European Union mineral raw-material supply and enhancing competitiveness of the EU mining industry.

Over a three year period (2016-2018), STRADE shall bring together research, practical experience, legislation, best practice technologies and know-how in the following areas:

1. A European cooperation strategy with resource-rich countries
2. Internationally sustainable raw-material production & supply
3. Strengthening the European raw-materials sector

Project Identity

Project Name	Strategic Dialogue on Sustainable Raw Materials for Europe (STRADE)	
Coordinator	Oeko-Institute; Doris Schueler, Project Coordinator, d.schueler@oeko.de	
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Website	www.STRADEproject.eu	

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