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Discussion-Opinion-Editorial



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Many Governments Fail to Develop their Countries' Mining Potential Because of the Choices they Make. Data Suggests Exploration-Based Mine Licensing is More Successful than Separate Exploration and Mine Auctions Scheme

Abstract

Exploration-based mine licensing provides a sustainable model for attracting investment and increasing mine openings. It supports geological research, financial viability, and long-term resource development, whereas auction-based systems often prioritize short-term revenue at the cost of long-term industry growth. In Australia, an "exploration-based mine licensing" refers to the process of obtaining an "exploration license" which allows a company to investigate and search for potential mineral deposits within a designated area before applying for a full mining lease, essentially giving them the exclusive right to explore for minerals without the ability to mine until further approvals are secured through a more advanced license stage. Critical raw materials form the backbone of high-tech products, renewable energy technologies, and other industrial applications. This means that for any green transition to be successful, there has to be a corresponding availability of critical raw materials. Particularly for the European Union (EU), this is becoming a worsening headache as these vital resources are sourced overwhelmingly from outside, leaving the bloc vulnerable to price volatility, supply disruptions, strategic dependence, and even environmental concerns related to sourcing critical raw materials from countries with less stringent environmental regulations.

Keywords: *Auction, Exploration License, Gas, License, Minerals, Mines, Mining, Mining License, Oil*

1.0 The Background

National and federal/state governments worldwide generally adopt either of the two methods for mining investment from exploration to project development: exploration-based mine licensing (Figure 1) and mine auctions.

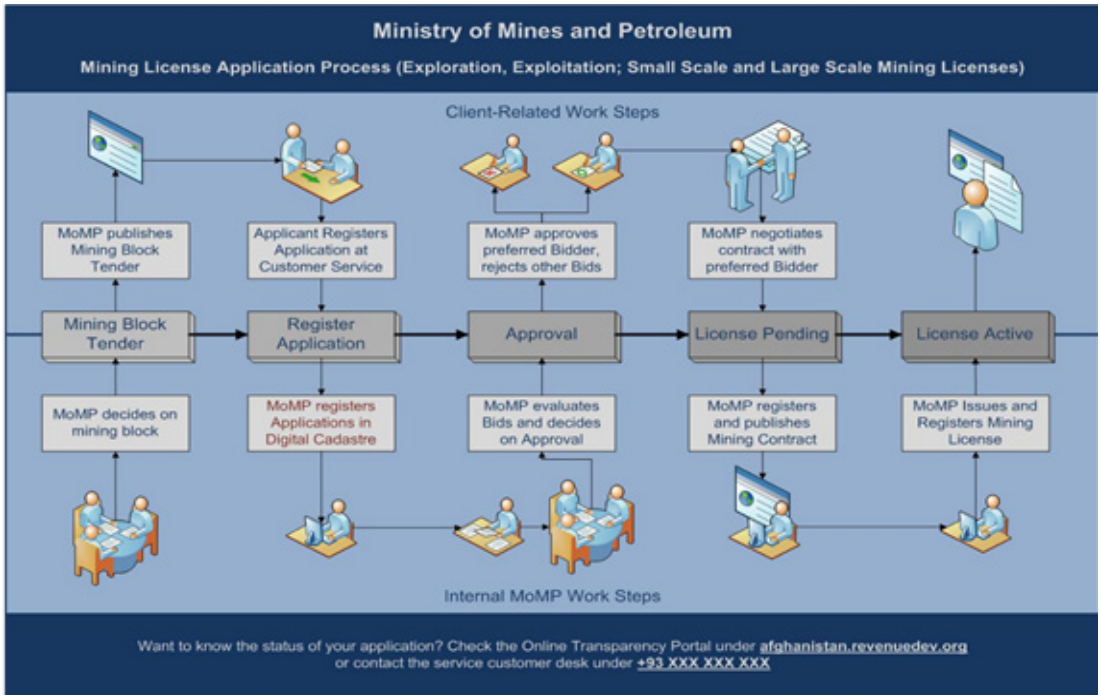




Figure 1. Mine exploration license application process – Ministry of Mines and Petroleum, Australia.

Exploration-based mine licensing and mine auctions (including their variants) differ fundamentally in their approach to allocating mineral rights, risk allocation, revenue generation, and criteria for selection. Here's a structured comparison[1-4]:

i. Allocation Method

- Exploration-Based Licensing:
  - Rights are granted based on merit, such as technical expertise, financial capacity, and environmental/social plans.
  - Often involves a "first-come, first-served" or competitive application process assessed by regulators.
- Auctions:
  - Rights are awarded to the highest bidder (e.g., upfront payment, royalty share, or profit percentage).
  - Variants may include hybrid criteria (e.g., environmental commitments), but financial bids dominate.

ii. Risk Allocation

- In exploration licensing companies bear the risk of exploration failure (no guaranteed discovery). Governments avoid upfront exploration costs but may receive delayed revenue.
- Auctions are typically used for known

deposits with assessed value, reducing geological risk. Companies bid based on estimated resource value, transferring revenue risk to the bidder.

iii. Revenue Timing

- Exploration Licensing allows the governments to earn revenue later (e.g., royalties, taxes) after successful exploration and production.
- On the contrary, Auctions allow immediate revenue via upfront payments or bids, especially for high-value, explored deposits.

iv. Transparency and Corruption Risks

- Exploration Licensing:
  - Subjective evaluations may lead to bureaucratic discretion or corruption without safeguards.
- Auctions:
  - Perceived as more transparent due to competitive bidding, though design flaws (e.g., bid rigging) can undermine fairness.

v. Suitability and Resource Knowledge

- Exploration Licensing:
  - Used for underexplored regions where mineral potential is uncertain.
  - Encourages grassroots exploration and new discoveries.
- Auctions:
  - Applied to well-explored deposits with quantifiable reserves.
  - Maximizes value capture for known resources.

vi. Market Competition

Exploration Licensing may favor smaller firms with technical expertise over financial muscle. This also creates entrepreneurship. Auctions often are advantageous to large companies with capital to submit aggressive bids, potentially crowding out smaller players.

vii. Exploration Incentives

- Exploration Licensing:
  - Incentivizes companies to invest in exploration, driving long-term resource discovery.
- Auctions:
  - Focuses on rapid exploitation of known resources, with less emphasis on new exploration.

viii. Variant Hybrid Models

- Some systems combine both:
  - Two-stage processes: Exploration licenses grant preferential rights in subsequent auctions.
  - Royalty/Revenue Sharing: Auctions with terms tied to production success (e.g., sliding-scale royalties).

2.0 The Reasons for Success

Exploration-based mine licensing tends to be more successful than mine auctions in terms of investment and mine openings for mineral, oil, and gas sectors due to several key reasons:

i. Long-Term Investment Security

Exploration-based licensing grants exclusive rights to companies for exploration and subsequent mining, providing investment security.In contrast, mine auctions often prioritize short-term revenue maximization for governments, discouraging investors who seek long-term stability.

ii. Risk-Reward Balance

Exploration-based licensing allows companies to discover and develop deposits at their own pace, balancing risk and reward. In auction-based systems, companies often overpay for licenses without knowing the exact resource potential, leading to financial strain or abandonment of projects.

iii. Encouragement of Greenfield Exploration

Governments encourage new mineral discoveries by granting exploration rights, leading to more mines in the long run. Auctions favor already-discovered deposits,

limiting exploration efforts and reducing the pipeline of future mines.

iv. Lower Upfront Costs for Investors

Exploration licensing has low upfront costs, as investors only need to pay small fees until they establish a viable resource. Auctions require high upfront payments, discouraging mid-sized and junior miners who lack large capital reserves.

v. Faster Mine Openings and Development

Companies engaged in exploration-based licensing can progress from exploration to production smoothly. Auction-based mines often face delays due to legal disputes, overbidding issues, and financial difficulties.

vi. Greater Geological Understanding

Companies involved in exploration-based licensing conduct detailed geological studies, leading to better mine planning and efficiency. Mine auctions often result in less investment in geological assessment, increasing operational risks.

vii. Lower Financial Burden for Companies

Exploration-based licensing allows phased investment as companies spend based on their discoveries. Auctions demand full payment upfront, leading to financial stress and potential project failures.

viii. Alignment with Global Best Practices

Countries like Canada, Australia, and the USA follow exploration-based licensing, fostering strong mineral, oil, and gas industries (Figure 2). Nations that rely heavily on auctions often experience lower mine openings due to lack of sustained investment.

3.0 Exploration-Based Mine Licensing: Australian Case

In Australia, an "exploration-based mine licensing" refers to the process of obtaining an "exploration licence" which allows a company to investigate and search for potential mineral deposits within a designated area before applying for a full mining lease, essentially giving them the exclusive right to explore for minerals without the ability to mine until further approvals are secured

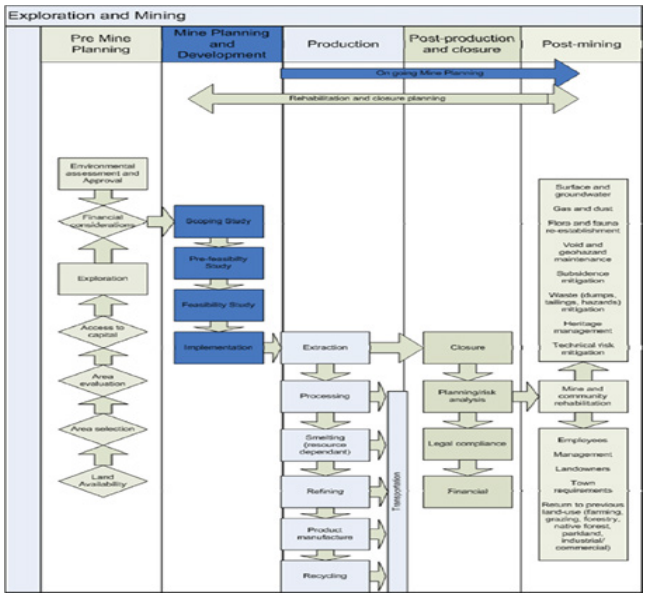


Figure 2. Generic exploration and mining process flow chart.

through a more advanced license stage[2,3] .

The exploration-based mine licensing process typically involves applying for an "Exploration Licence" (EL) from the relevant state government agency, which grants the holder the exclusive right to explore for minerals within a designated area, followed by further applications for a mining lease if economically viable mineral deposits are discovered during exploration, requiring detailed exploration plans, environmental assessments, and demonstrating the viability of the proposed mining operation; the process varies slightly between states but generally involves initial application, assessment of the applicant's technical capabilities and proposed exploration program, public notification, and potential conditions attached to the licence depending on the area and proposed activities.

4.0 Key Points About Exploration-Based Mine Licensing in Australia

The primary license for exploration is called an "Exploration Licence" (EL). An EL allows the holder to conduct activities like geological surveys, drilling, and sampling to determine the presence, quantity, and quality of minerals within the designated area. An

exploration license does not permit any mining activities. To obtain an EL, a company must apply to the relevant state government agency, including details of the proposed exploration area, targeted minerals, and a work program. Exploration licenses are subject to specific conditions, such as reporting requirements, timeframes for exploration activities, and environmental considerations.

5.0 Progression to Mining

- **Assessment lease:** If exploration results are promising, a company may apply for an "assessment lease" which allows for further evaluation and detailed analysis before progressing to a full mining lease application.
- **Mining lease:** Once the viability of a mineral deposit is confirmed, a company can apply for a "mining lease" to commence extraction operations.

5.1 Important Factors to Consider

a. State regulations: Mining regulations and licensing processes can vary slightly between Australian states.

b. Land access: Securing land access agreements with landowners is crucial for exploration activities.

c. Environmental approvals: Environmental impact assessments are often required during the exploration and mining lease application stages.

6.0 Surface and Mining Rights Legislation in Canada: A Summary

Mining legislation and related property law concepts in each jurisdiction address the respective rights and interests and any conflicts between the holders of surface and mining rights. Where there is a conflict, the mining right may typically be exercised upon adequate compensation to the surface rights holders. Where compensation cannot be agreed upon, most jurisdictions provide for the determination of appropriate compensation, and where compensation cannot be determined or is not a sufficient remedy, for the holder of the mining right to acquire the surface rights for prescribed consideration[4,5].

To explore for minerals in Canada, one needs to obtain an exploration license from the relevant provincial or territorial government. The process involves:

- Applying for a license: One can apply for a license to prospect through the Mining Lands Administration System (MLAS).
- Recording a mineral claim: After completing exploration programs, one can record a mineral claim with the local authority.
- Obtaining a mining lease: Once you've identified mineral reserves, one can apply for a mining lease.
- Obtaining environmental and other permits: One needs to obtain environmental and other permits to construct a mine.
- Consulting with Aboriginal communities: The ministry will notify Aboriginal communities of proposed exploration activities.

7.0 Comparison of Mine Auctions vs. New Operating Mines (India, Australia, Canada, USA)

7.1 India

In India, the exploration mining license process involves obtaining an "Exploration Licence" through an auction

Mining rights in Canada broadly fall into two categories: a first-stage mineral right (typically a mineral claim or an exploration license) that allows for the conduct of exploration work on an exclusive basis over a specified area over a defined period (typically several years) and a subsequent mineral right (typically a mining lease) allowing for the continuation of exploration work, while allowing its holder to carry out extraction and processing on a commercial basis, which typically has a longer term.

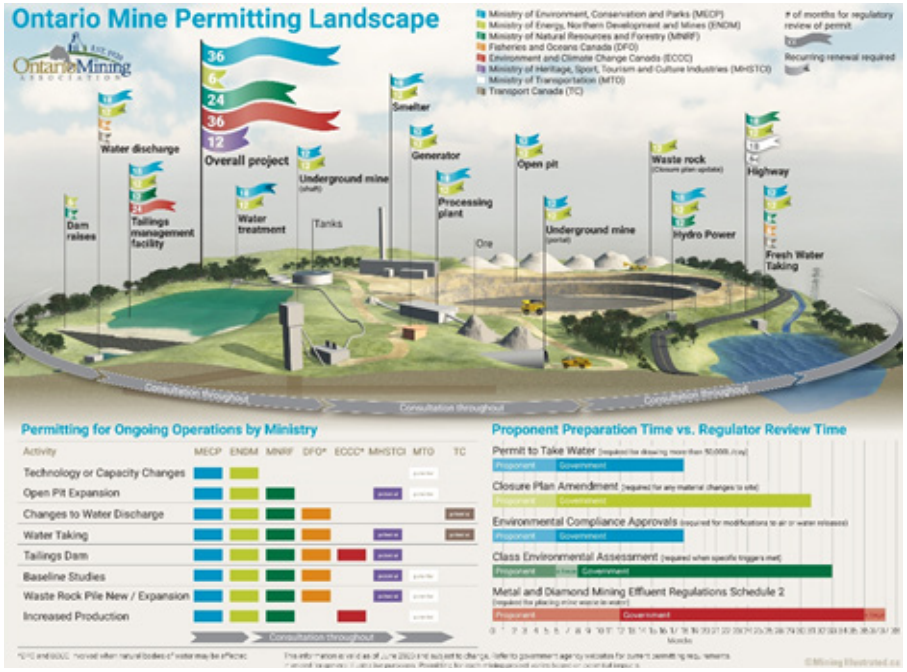


Figure 3. Ontario mine permitting landscape.

conducted by the state government, where the successful bidder is granted the right to explore a designated area for specific minerals, and then subsequently auctioning identified viable blocks for a Mining Lease to extract the minerals; critical and strategic minerals are auctioned at the central government level under the Mines and Minerals (Development and Regulation) Act, 1957 .The Mines and Minerals (Development and Regulation) Act has been amended to further promote exploration of critical minerals through the Exploration Licence mechanism. The provisions of the Act related to exploration licence were made on 21st January, 2024. And whereas, the exploration licence permits the licencee to undertake reconnaissance and prospecting operations. The blocks explored by the exploration licence holder shall be auctioned for mining lease.

a) Mine Auctions: India adopted auction-based mineral allocation under the MMDR Act (2015) to increase transparency and revenue.

- Number of mines auctioned (2015–2025): Approximately 300+ (major and minor minerals).

b) New Operating Mines:

- Only about 30-40 % of auctioned mines are operational.
- Delays in clearances, infrastructure bottlenecks, and high auction premiums hinder operationalization.

c) Challenges: Bureaucracy, complex environmental approvals, and land acquisition issues[6,7] .

7.2 Australia

a. Mine Auctions: Australia does not primarily rely on auctions for allocating mining rights. Instead, licenses are granted based on exploration applications and subsequent approvals.

b. New Operating Mines:

- Over the past decade, several new mines have opened annually (e.g., lithium, coal, and iron ore projects).
- Efficient permitting systems and strong infrastructure facilitate rapid operationalization.

c. Challenges: Environmental activism and stricter

sustainability regulations can delay some projects.

7.3 Canada

i. Mine Auctions: Similar to Australia, Canada allocates mining rights through claim-staking processes rather than auctions.

ii. New Operating Mines:

- New mine openings are steady, with a focus on critical minerals (e.g., nickel, lithium).
- Significant government support for exploration and mining, especially in remote areas.

iii. Challenges: Indigenous land rights and environmental review processes can slow projects.

7.4 USA

a. Mine Auctions: Auctions are used for federal lands under the Bureau of Land Management (BLM) but are less frequent than in India.

b. New Operating Mines:

- The USA sees fewer new mines annually due to a focus on environmental protection.
- Critical minerals projects (lithium, rare earths) are gaining momentum with government incentives.

c. Challenges: Environmental opposition and permitting delays.

We can check the performance of the working systems on the basis of the conversion of permits to mines. A

Table 1. Mine auctions vs. new operating mines (2015–2025).

Country	Mines Auctioned	New Operating Mines	Key Factors
India	~300+	~120 (40%)	Bureaucratic delays, infrastructure gaps.
Australia	Not applicable	~250+	Strong infrastructure, efficient permitting.
Canada	Not applicable	~150+	Supportive policies, Indigenous land challenges.
USA	~50	~30	Environmental regulations focus on critical minerals.



Figure 4. All mines to be opened in Finland (EU) require a mining permit from Tukes.

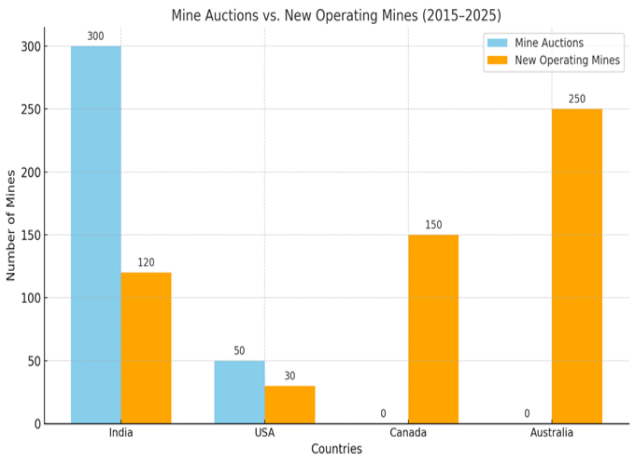


Figure 5. Mine auctions vs. new operating mines.

comparative table of Mine Auctions vs. New Operating Mines (2015–2025) can be seen in the Table 1.

India has the highest number of auctions but the lowest conversion to operational mines.Australia and Canada have steady growth in operating mines due to better governance and infrastructure. The USA lags in new mine development due to stringent environmental policies, though critical minerals are a growing focus. See the figure for more details.

In the USA Mine auctions have occurred annually (3–6 auctions per year). New operating mines show slower growth, with a lag following auction activity. This reflects challenges in permitting and regulatory hurdles. Others are as follows:

i. Australia:

- No auctions are held, as mining licenses are exploration-driven.
- A consistent increase in new operating mines reflects a robust system that supports mine development without auctions.

ii. Canada:

- Like Australia, Canada relies on exploration-based licensing.
- Growth in new operating mines is steady, driven by strong mining policies and government incentives.

The USA's auction-based system results in fewer new operational mines compared to exploration-driven systems in Australia and Canada. Australia's and Canada's consistent policies and infrastructure support faster development of new mines.

Canada and Australia have been more successful than India and the USA in opening new mines due to a combination of policy frameworks, regulatory efficiency, natural resource governance, and socio-political factors. Here's a detailed breakdown of the key reasons**:**

i. Streamlined Regulatory Frameworks

- **Canada and Australia**

1) Predictable permitting processes: Clear timelines for environmental assessments and mining approvals (e.g., Canada's "one project, one review" system).

2) Decentralized decision-making: Provincial/state governments (e.g., Quebec, Western Australia) have authority over mining licenses, reducing federal bottlenecks.

3) Transparent criteria: Well-defined rules for environmental compliance, Indigenous consultation, and land access.

- **India and USA**

1) Bureaucratic delays: India's multi-layered approvals (central, state, and local) and the USA's lengthy NEPA (National Environmental Policy Act) reviews stall projects.

2) Legal challenges: Frequent litigation over environmental and land rights (e.g., U.S. projects like Pebble Mine in Alaska stalled for decades).

ii. Land Access and Resource Rights

- **Canada and Australia**

  - Sparse populations: Vast, remote areas with fewer competing land uses (e.g., Canadian Shield, Australian Outback).

- Structured Indigenous engagement: Legal frameworks (e.g., Canada's duty to consult First Nations, Australia's Native Title Act) balance Indigenous rights with project development.

- **India and USA**
  - Land scarcity: Dense populations in mineral-rich regions (e.g., India's Odisha, USA's Nevada) lead to conflicts over displacement and agriculture.
  - Complex land acquisition: India's Land Acquisition Act (2013) requires consent from 80% of landowners, causing delays. In the USA, federal vs. state land ownership complicates access**.**

iii. Investment-Friendly Policies

- **Canada and Australia**
  - Tax incentives: Australia's Exploration Development Incentive (tax credits for exploration) and Canada's Flow-Through Shares attract risk capital.
  - Stable fiscal regimes: Long-term royalty structures and low political interference reassure investors.
- **India and USA**
  - Uncertainty in India: Frequent changes in mining laws (e.g., coal nationalization, export bans) deter investors.
  - Shifting U.S. priorities: Policy swings between energy independence and environmental protection (e.g., federal leasing pauses under Biden).

iv. Infrastructure and Logistics

- **Canada and Australia**
  - Built for mining: Rail, port, and energy infrastructure in remote regions (e.g., Australia's Pilbara railways, Canada's Ring of Fire access projects).
  - Export-oriented economies: Strategic focus on global mineral markets (e.g., Canada's critical minerals partnerships with allies).
- **India and USA**
  - Infrastructure gaps: India's remote mining areas lack roads and power. U.S. critical mineral projects face logistical hurdles (e.g., rare earth processing).

v. Social License to Operate

- **Canada and Australia**
  - Community engagement: Proactive benefit-sharing (e.g., jobs, revenue-sharing agreements with Indigenous communities).
  - Public acceptance: Mining is seen as vital to the economy (e.g., 8% of Australia's GDP).
- **India and USA**
  - Opposition in India: Protests over displacement (e.g., Vedanta's bauxite mine in Odisha) and environmental damage.
  - U.S. environmental activism: Strong NGO opposition to mining (e.g., lithium mines in Nevada face lawsuits from conservation groups).

vi. Geological Surveys and Exploration Support

- Canada and Australia
  - Public geoscience data: Governments fund detailed geological surveys (e.g., Geoscience Australia) to de-risk exploration.
  - Junior mining ecosystem: Thriving small exploration firms backed by venture capital (e.g., TSX Venture Exchange in Canada).
- India and USA
  - Underfunded surveys: India's Geological Survey of India (GSI) lacks modern data. The USGS focuses less on minerals compared to energy.

vii. Global Market Integration

- Canada and Australia
    - Export dominance: Australia supplies ~50% of global iron ore; Canada is a top potash and uranium producer.
    - Trade alliances: Membership in critical mineral alliances (e.g., Canada in the Minerals Security Partnership).
- India and USA
    - Domestic focus: U.S. mines often serve internal markets, while India struggles with export competitiveness due to high logistics costs.

8.0 Lessons for India and the USA

- India: Simplify land acquisition, modernize geological surveys, and adopt Canada-style Indigenous consultation models.
- USA: Streamline NEPA reviews, incentivize critical mineral exploration, and build infrastructure partnerships (e.g., rail for lithium projects).

Canada and Australia treat mining as a strategic economic pillar, while India and the USA often prioritize competing interests (e.g., agriculture, conservation), slowing progress.

9.0 The Situation in Europe

Over the past three decades, Europe's mining sector has faced significant challenges in granting mining licenses, primarily due to stringent environmental regulations, complex permitting processes, and evolving public perceptions. These factors have often led to delays or rejections of mining projects, impacting the industry's development.EU clean energy targets will need 35 times more lithium and seven to 26 times the amount of rare earth metals in 2050 compared with today[6,7].

10.0 Environmental Regulations and Permitting Processes

European Union (EU) member states have progressively updated their mining licensing procedures to incorporate comprehensive environmental protection measures. The objective has been to balance resource exploitation with environmental conservation. However, this has resulted in more complex and time-consuming approval processes. A study highlighted that obtaining permits for mineral extraction involves navigating through various authorizations, including mining rights, environmental permits, and land-use approvals, which can be intricate and prolonged.

11.0 Impact on Mining Activities

The stringent regulatory environment has contributed to a reduction in mining activities within Europe. In recent decades, there has been a trend towards exploiting smaller deposits with shorter lifespans, posing challenges for stakeholders. For instance, the average lifespan of mines has decreased to about 10–30 years, necessitating frequent permit applications and adjustments to operations. While specific data on license rejections over the entire 30-year period is limited, available statistics provide insight into the industry's trajectory:

- **Mineral Production**: In 2022, European mines accounted for over 6% of the global mineral output, ranking as the world's fourth-largest mineral-producing region.
- **Mine Distribution**: A global dataset covering the period from 2000 to 2021 includes 1,171 individual mines, reporting production for 80 different materials. This dataset offers a comprehensive view of mining activities, including those in Europe.

12.0 Performance of Oil and Gas Exploration and Mining Licenses in the USA (2003-2023)

i. Licensing Activity Over Time

- **Federal Leasing Trends**:
    - **2003–2008**: Steady leasing activity, with growing interest in shale plays. The Energy Policy Act (2005) exempted fracking from the Safe Drinking Water Act, boosting shale development.

- **2009–2016**: The shale boom accelerated federal and state leasing. Under Obama, offshore leasing expanded post-2010 Deepwater Horizon spill moratoriums, but onshore permits peaked (~3,000/year on federal lands).
- **2017–2020**: Trump administration prioritized "energy dominance," auctioning 25 million acres of federal land (2017–2020) and streamlining permits. Offshore lease sales included Arctic waters.
- **2021–2023**: Biden paused new federal leases (2021), but courts reinstated requirements. The Inflation Reduction Act (2022) tied renewables to continued oil/gas leasing, resulting in 2,600 permits issued in 2022[8,9] .

- **State-Level Activity**: States like Texas and North Dakota led shale leasing. New York banned fracking (2014), while California phased out drilling near communities.

ii. Production Trends

- **Oil**:
  - Production surged from 5.7 million bpd (2003) to a record 13 million bpd (2019, 2023), driven by Permian Basin and Bakken shale.
  - Price volatility: Oil peaked at $147/bbl (2008), crashed to $26/bbl (2016), and rebounded to $60–80/bbl post-2021. Now hovering between $60 and $70/bbl.
- **Natural Gas**:
  - Production doubled from 19 Tcf (2003) to 40 Tcf (2023), with Appalachia (Marcellus/Utica) dominating.
  - LNG exports grew to 12 Bcf/day by 2023, influencing leasing.

iii. Economic Impact

- **Employment**: Supported 10 million jobs (direct/indirect) at peak (2014); dropped to 6.7 million post-COVID.
- **Energy Independence**: Net exporter since 2019, reducing imports from 60% (2005) to net-zero.
- **GDP Contribution**: Oil/gas contributed ~8% to U.S. GDP annually.

iv. Environmental and Regulatory Challenges

- **Climate Opposition**: Methane regulations tightened (e.g., Obama's 2016 rules, Biden's 2023 emissions tax). Over 1,000 lawsuits targeted federal leases (2010–2023).
- **Incidents**: Deepwater Horizon (2010) led to offshore moratoriums and stricter safety rules.
- **Water/Health Concerns**: Fracking-linked earthquakes and contamination spurred state bans (e.g., Maryland, Vermont).

v. Policy Shifts by administration

- **Obama**: Increased offshore access post-2010 spill but regulated fracking on federal lands.
- **Trump**: Rolled back environmental rules, expanded Arctic drilling, and fast-tracked permits.
- **Biden**: Paused new leases (later modified), prioritized renewables, but upheld IRA's leasing mandates.

vi. Future Outlook

- **Energy Transition**: Renewables growth and EV adoption may reduce demand, but IRA ensures continued leasing.
- **Technological Advances**: AI and automation improve drilling efficiency.
- **Global Factors**: OPEC+ decisions and geopolitical conflicts (e.g., Ukraine) influence prices and drilling incentives.

The U.S. oil/gas sector saw transformative growth via shale, regulatory pendulum swings, and economic resilience despite volatility. Future performance hinges on balancing energy security with climate goals, amid evolving policies and global markets.

13.0 Winds of Change

In first, the Ministry of Mines in India directly sanctioned exploration licences to five Notified Private Exploration

List of NPEAs alloted with the 17 mineral blocks

	State	No. of projects	Commodity
Gemcokati Exploration	Maharashtra	5	Iron ore
	Madhya Pradesh	1	PGE, Gold & REE
United Exploration India	Chhattisgarh	1	Graphite
Maheshwari Mining	Madhya Pradesh	1	Bauxite
	Chhattisgarh	1	Graphite
	Odisha	2	Graphite
Geovale Services	Gujarat	3	Nickel & PGE
Geoexpore	Karnataka	2	Nickel, Copper, PGE, & associated minerals
	Chhattisgarh	1	REE

Source: Ministry of Mines

Figure 6. List of NEPAs allotted with 17 mineral blocks.

Agencies (NPEAs) for critical and deep-seated mineral projects**. These licensees selected by the Centre sans any auction process would, however, be allowed to participate in the auction of the said minerals, a privilege that was previously not granted.**A total of 17 projects, including 11 of critical minerals, provided to the five NPEAs are in Maharashtra, Madhya Pradesh, Chhattisgarh, Odisha, Gujarat and Karnataka.Gemcokati Exploration, an NPEA in Maharashtra, acquired the highest six projects. Kolkata-based Maheshwari Mining secured four projects. Both Geovale Services and Geoexplore secured three projects each, while United Exploration received one project. The exploration blocks will contain a variety of minerals, including iron ore, graphite, platinum group elements (PGE), gold, bauxite, nickel, cobalt, and rare earth elements (REE). Please see the figure for more details[10,11].

NMET stands for National Mineral Exploration Trust. It is a not-for-profit organization in India that promotes mineral exploration. The Ministry of Mines established NMET in 2015 to speed up mineral exploration in the country. A total of Rs 15.88 crore has also been sanctioned from NMET funds, the ministry said. The government through NMET provides an incentive of 25 percent of the approved project cost to exploration agencies.

14.0 Last word

Minerals, oil, and gas with critical raw materials form the backbone of high-tech products, renewable energy technologies, and other industrial applications. This means that for any green transition to be successful, there has to be a corresponding availability of these minerals. While the mining sector needs to be more responsible, the government and the private sector must step up to clear the unusual uncertainties, plaguing the sector.

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