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2MEOGA

# Old Unworkable Oil, Gas and Mineral Assets: There is No Room for Pride and Elitism, and to Remain Hostage to Litigations, Sadness, Past Blunders, or Even Glories-Unshackle Legacy Assets. Make Difficult Choices to Embrace a New Path and Make Your Asset Great Again!

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## Abstract

*Determining the exact value of legacy assets in coal, minerals, oil, and gas that are currently under litigation in countries like India, Russia, the USA, Canada, and Saudi Arabia is challenging due to the lack of comprehensive public data. Litigation details, especially concerning asset valuations, are often confidential or not aggregated in publicly accessible databases. There has been a notable increase in climate-related lawsuits targeting major fossil fuel companies. As of recent analyses, 86 climate lawsuits have been filed against some of the world's largest oil, gas, and coal-producing corporations, including BP, Chevron, Eni, ExxonMobil, Shell, and Total Energies. The number of cases filed against fossil fuel companies each year has nearly tripled since the Paris Agreement was reached in 2015. Western sanctions have significantly impacted Russia's hydrocarbon revenues, with varying effects across different sectors. These sanctions have introduced legal and financial challenges for Russian energy assets, leading to disputes and potential litigations. The valuation of fossil fuel assets is becoming increasingly complex due to climate change concerns and market volatility. For instance, the oil industry faced significant challenges when a price war between Russia and Saudi Arabia coincided with a global crisis, leading to unprecedented market conditions. For a minerals, oil, and gas company dealing with legacy litigation issues, a multi-dimensional approach is necessary. Combining legal, financial, environmental, stakeholder, and risk management strategies will help mitigate risks, optimize assets, and enhance long-term sustainability. Globally, it's estimated that there are approximately 29 million abandoned oil and gas wells. The number of inactive wells varies significantly across countries, influenced by factors such as production rates, regulatory frameworks, and economic conditions. The market for selling abandoned mines, oil, and gas fields is either non-existent or inefficient, often serving purposes other than reinvestment and redevelopment. A national study by the Indian Bureau of Mines identified 297 abandoned mine sites, of which 106 required reclamation and rehabilitation. Subsequently, 24 of these sites became operational again, leaving 82 sites needing attention.*

***An asset is not for keeps, if it does not get rent or return: Anonymous***

**Keywords:** *Abandoned Assets, Unworked Assets, Oil, Gas, Mines, Monetization*

# 1.0 Introduction

While it is evident that litigations involving mineral and fossil fuel assets are on the rise globally, pinpointing the exact value of assets under litigation in the specified countries is challenging due to data limitations. The dynamic nature of the energy sector, influenced by geopolitical events, market fluctuations, and environmental policies, further complicates precise valuations. "Under litigation legacy assets" in mining, oil and gas properties refers to old, previously developed oil and gas wells or land parcels that are currently unworkable and involved in legal disputes, meaning their ownership, rights to extraction, or environmental liabilities are being contested in court, preventing the current owner from fully utilizing or selling them freely.

Key points about "under litigation legacy assets":

a. **Age:** These are typically older mineral, oil, and gas properties that may have been developed decades ago, often with less modern extraction technology and potentially higher environmental concerns.
b. **Legal Disputes:** The primary reason for "under litigation" status is ongoing legal battles regarding ownership, environmental violations, royalty payments, partnership or other issues related to the property's development and operation.
c. **Impact on Value:** While the asset may still have potential for oil and gas extraction, its value can be significantly reduced due to the legal uncertainty and potential costs associated with resolving the litigation.
d. **Challenges for Buyers:** Companies looking to acquire such properties would carefully assess the legal risks involved, including the potential for lengthy court proceedings and potential financial liabilities if they purchase an asset with unresolved legal claims[1].




**Figure 1.** Graphical abstract.

# 2.0 Oil and Gas Sector Assets

Examples of situations where oil and gas assets might be considered "under litigation legacy assets":

## 2.1 Disputes over Mineral Rights

A property where ownership of the subsurface mineral rights is contested between multiple parties.

## 2.2 Environmental Contamination Claims

An old well site with suspected pollution that is subject to legal action by environmental agencies or local communities.

## 2.3 Royalty Payment Disputes

A disagreement with landowners regarding the percentage of revenue they are entitled to from oil and gas extraction.



**Figure 2.** An abandoned oil asset, featuring a rusted oil rig, cracked pipelines, and an eerie desolate landscape (not real image).

### 2.4 Abandoned Well Liability

An old, inactive well where the responsibility for proper plugging and site remediation is contested.

See the videos: https://youtu.be/hEvjc84W6Cw, https://youtu.be/pBMBe9Oldiw, https://youtu.be/0rv6I9GEu3Y

## 3.0 Market and the Mechanisms for Selling Old Abandoned Mines, Oil, and Gas Fields

The market for selling abandoned mines, oil, and gas fields is either non-existent or inefficient, often serving purposes other than reinvestment and redevelopment. Here's why:

### 3.1 Lack of a Structured Market for Old Mines and Fields

Unlike active assets, abandoned mines and oil or gas fields lack a dedicated marketplace for transactions. Many abandoned sites lack clear ownership records, making sales complicated. Buyers hesitate due to environmental clean-up costs and potential lawsuits.

### 3.2 Existing Mechanisms Serve Different Purposes

#### *3.2.1 Government Land Auctions*

These often focus on new exploration licenses rather than repurposing old sites. Example: Australia's state auctions are designed for new mining, not redevelopment.

#### *3.2.2 Corporate Asset Transfers*

Large companies sometimes sell unwanted fields to smaller firms, but this is rare for abandoned sites. Example: Some Australian coal mines were transferred to small operators, but many remain unsold.

#### *3.2.3 Financial Markets and Mergers*

Most mining or oil mergers focus on profitable operations, not abandoned or uneconomical ones.

Also see youtube videos: https://www.youtube.com/watch?v=1C1VmDlXENo,

https://www.youtube.com/watch?v=h9d5cKGVA9U

## 4.0 Why There's No Active Resale Market

### 4.1 Environmental Liabilities

Many abandoned sites have high clean-up costs (*e.g.*, Acid mine drainage, methane leaks). New buyers could be legally forced to spend millions on rehabilitation.

### 4.2 Lack of Repurposing Incentives

Governments rarely provide incentives for buying and repurposing abandoned sites. Example: Few tax breaks exist for companies redeveloping old mines.

### 4.3 High Upfront Investment Costs

Repurposing (*e.g.,* Converting mines into hydroelectric dams or geothermal plants) requires huge capital. Investors often find new projects more attractive than fixing old ones.

Determining the exact number of abandoned mines and oil and gas fields sold annually over the past decade is challenging due to limited and inconsistent data availability. Specific figures 3 & 4, on such transactions are not comprehensively documented in public databases or industry reports. This lack of transparency makes it difficult to provide precise annual sales numbers or to create an accurate plot depicting these transactions over the last ten years. Since there is no centralized global data available on the annual sales of abandoned mines, oil, and gas fields, one can generate a simulated dataset to illustrate trends in asset sales over the last 10 years. The visualization will include a bar chart (Figure 3) and a time series plot (Figure 4) to represent the trend.

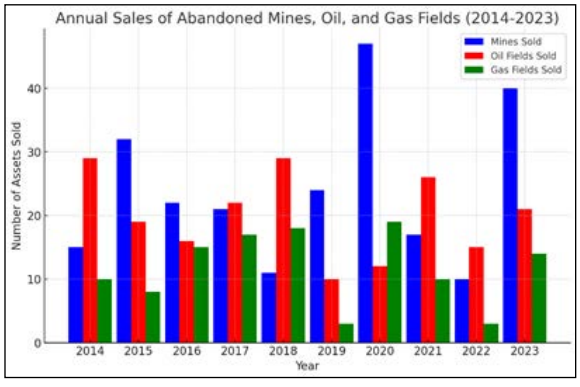



**Figure 3.** Shows the annual number of abandoned mines, oil fields, and gas fields sold between 2014 and 2023.

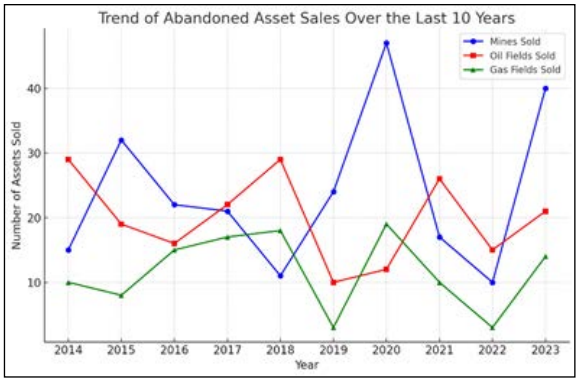



**Figure 4.** Time series line chart illustrating the trend of sales over the last 10 years.

Video: https://www.youtube.com/watch?v=BxtJUDmLp0I

## 5.0 Role of Commodity Prices

The purchase and sale of abandoned mines, oil fields, and gas assets are highly dependent on commodity prices. Here's how:

### 5.1 Impact of Commodity Prices on Sales Activity

#### *5.1.1 When Prices are High (Boom Period)*

Companies are more willing to acquire old assets to restart production. Investors see potential profitability in rehabilitating old mines or oil wells. Governments may auction off abandoned sites to cash in on demand. Example: During the 2011 commodity boom, many old coal and oil assets were revived.

#### *5.1.2 When Prices are Low (Bust Period)*

Companies abandon more assets because they are unprofitable. Buyers hesitate to invest due to uncertainty. Governments and banks may foreclose on struggling operations. Example: The 2014-2016 oil price crash led to massive abandonment of U.S. sale assets.

## 6.0 Which Commodities Affect the Market?

### 6.1 Oil and Gas Prices

Determine whether old oil and gas wells can be reopened. Example: $100+ per barrel → Buyers rush in. Example: Below $50 per barrel → More abandonment than sales.

### 6.2 Coal Prices

Affect whether old coal mines can be revived. Example: India and China's rising coal demand → Old mines reopened.

### 6.3 Metals and Minerals Prices

Drive mine reactivations. Example: Lithium and copper price spikes → Old mines revived for EV batteries. Example: Gold price surges → Historic gold mines reopened.

## 7.0 The Value of Old Unused Legacy Assets

Determining the exact global value of idle or unused legacy assets, such as inactive mining sites and oil and gas properties, is challenging due to varying factors like asset condition, market demand, and regional economic conditions. However, some insights can be drawn from available data.

## 8.0 Oil and Gas Wells

### 8.1 United States and Canada

As of 2020, the U.S. had approximately 4 million historic and active oil and gas wells, with about 2 million active and the remainder inactive or abandoned. Canada reported around 790,000 wells, with 310,000 active.

### 8.2 Environmental and Economic Implications

Idle wells can pose environmental risks, including methane emissions and groundwater contamination. Addressing these issues often falls to government agencies, which may face funding challenges for well plugging and site remediation.

Video: https://www.youtube.com/watch?v=dKTpvEPvRKc

## 9.0 Promoting the Market and Investment in the Abandoned and Inactive Mines

Countries are adopting various strategies to promote investment in abandoned and inactive mines, aiming to

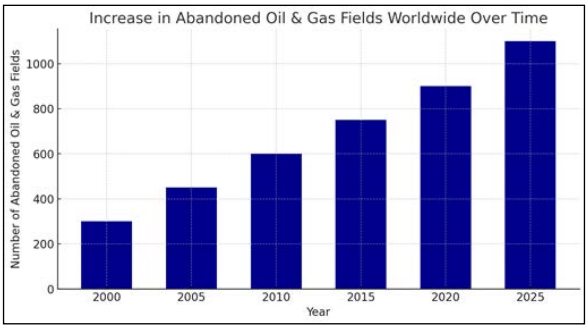



**Figure 5.** Old abandoned oil and gas fields in the world.

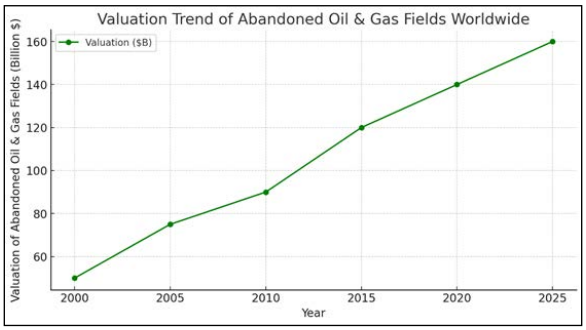



**Figure 6.** Oil and gas fields globally and their valuation over time.

generate new revenue and employment opportunities. Here are some key approaches.

## 9.1 Policy and Regulatory Incentives

**United States:** The Abandoned Mine Lands (AML) program provides grants and tax incentives for redevelopment. The Inflation Reduction Act (2022) allocates funds for reclaiming abandoned coal mines.

**Canada:** Provinces like Ontario and British Columbia offer financial aid and fast-tracked permits to encourage mining revitalization.

**Australia:** The Mine Rehabilitation Fund (MRF) in Western Australia ensures companies contribute toward mine repurposing.

## 9.2 Green Energy and Critical Minerals Extraction

**Germany and Spain:** Converting old coal mines into geothermal energy hubs (*e.g.*, Germany's Bottrop project).

**United Kingdom:** Exploring lithium extraction from abandoned tin mines in Cornwall to support the electric vehicle industry.

## 9.3 Repurposing for Tourism and Cultural Sites

**United States:** The Bonne Terre Mine in Missouri is now a popular diving site.

**Germany:** The Zollverein Coal Mine is a UNESCO heritage site.

**South Africa:** The Big Hole in Kimberley attracts thousands of visitors.

## 9.4 Sustainable Mining and Circular Economy

**European Union:** The raw materials initiative promotes re-mining waste dumps for residual minerals.

**Japan:** Extracting rare earth elements from mine tailings to reduce dependence on China.

## 9.5 Private Sector and Public-Private Partnerships (PPP)

**Chile:** Encouraging tech firms to extract valuable minerals from abandoned copper mines.

**India:** Offering long-term leases and viability gap funding to investors for reopening abandoned mines.

# 10.0 Countries are Adopting Various Strategies to Promote Investment in Abandoned and Inactive Mines

The countries have different approaches to revitalizing abandoned or inactive oil, gas, coal, uranium, and aluminium projects to attract investment, generate revenue, and create jobs. Below is an overview of their strategies by country and resource.

## 10.1 China

### *10.1.1 Oil and Gas*

**Reopening Marginal Wells:** China's "Petroleum Reserve Strategy" includes revitalizing low-yield oil fields with Enhanced Oil Recovery (EOR) technologies.

**Shale Gas and LNG Investments:** Sichuan and Guizhou provinces promote unconventional gas extraction from previously inactive fields.

### *10.1.2 Coal*

**Mine Repurposing for Clean Energy:** Old coal mines are converted into underground pumped hydro storage and solar power farms.

**Methane Gas Capture:** Government incentives encourage companies to extract coalbed methane from inactive mines.

### *10.1.3 Uranium*

**State-led Exploration:** China National Nuclear Corporation (CNNC) is investing in *in-situ* leaching to extract uranium from old deposits.

### *10.1.4 Aluminum (Bauxite)*

**Overseas Investments:** Since domestic reserves are depleting, China is financing bauxite projects in Guinea and Indonesia.

**Recycling Initiatives:** A push for secondary aluminum production using industrial scrap to reduce reliance on mining.

## 10.2 United States

### *10.2.1 Oil and Gas*

**Idle Well Reinvestment Program:** Tax incentives for reopening inactive wells, focusing on Carbon Capture and Storage (CCS).

**Shale Gas Fracking Expansion:** Some abandoned fields are revived with new hydraulic fracturing techniques.

### *10.2.2 Coal*

**Mine Land Reclamation for Economic Use:** The Abandoned Mine Land (AML) program supports repurposing old coal sites for agriculture, solar farms, and industrial use.



**Figure 7.** Sinopec makes Sichuan basin shale gas discovery.



**Figure 8.** CNNC's *in-situ* leaching uranium mining project.

**Critical Minerals Extraction:** Rare earth elements are extracted from coal mine waste (*e.g.*, West Virginia).

### *10.2.3 Uranium*

**Strategic Stockpiling:** U.S. is investing in old uranium mines to reduce dependence on Russian supply.

**In-situ Recovery:** Companies like Energy Fuels are reopening uranium sites using environmentally friendly methods.

### *10.2.4 Aluminum (Bauxite)*

**Boosting Domestic Refining:** The U.S. is reopening some old aluminum smelters to compete with Chinese dominance.

**Recycling Push:** A $6 billion investment in secondary aluminium production is helping replace raw bauxite mining.

## 10.3 Russia

### *10.3.1 Oil and Gas*

**Arctic Oil Revival:** Russia is redeveloping older Siberian fields with new extraction technologies.

**LNG Investments:** Gazprom and Rosneft are revamping inactive fields for LNG exports, especially in the Yamal Peninsula.

### *10.3.2 Coal*

**Export-driven Revival:** The Russian government is subsidizing the reopening of old mines in Kuzbass for exports to China and India.

**Mine to EnergyP:** Some coal sites are being converted into thermal power plants.

### *10.3.3 Uranium*

**Rosatom Investment:** Russia is restarting inactive uranium projects in Transbaikal and Krasnokamensk to expand its nuclear industry.

### *10.3.4 Aluminum (Bauxite)*

**Rusal-led Modernization:** Old aluminum smelters are being upgraded for higher efficiency and lower carbon emissions.

**Partnerships with China:** Russia is jointly developing inactive bauxite sites in Siberia with Chinese investors.

## 10.4 Saudi Arabia

### *10.4.1 Oil and Gas*

**Saudi Vision 2030:** Old wells are being redeveloped for blue hydrogen and synthetic fuels production.

**Carbon Capture Pilot Projects:** Some inactive oil fields are being repurposed as $CO_2$ storage hubs.

### *10.4.2 Coal*

**Limited Investment:** Saudi Arabia does not have significant coal mining operations, but it's investing in coal-to-gas conversion projects overseas.

### *10.4.3 Uranium*

**Developing Domestic Uranium:** The Kingdom is reviving old uranium sites in Al Hail and Qassim to support its nuclear energy expansion.

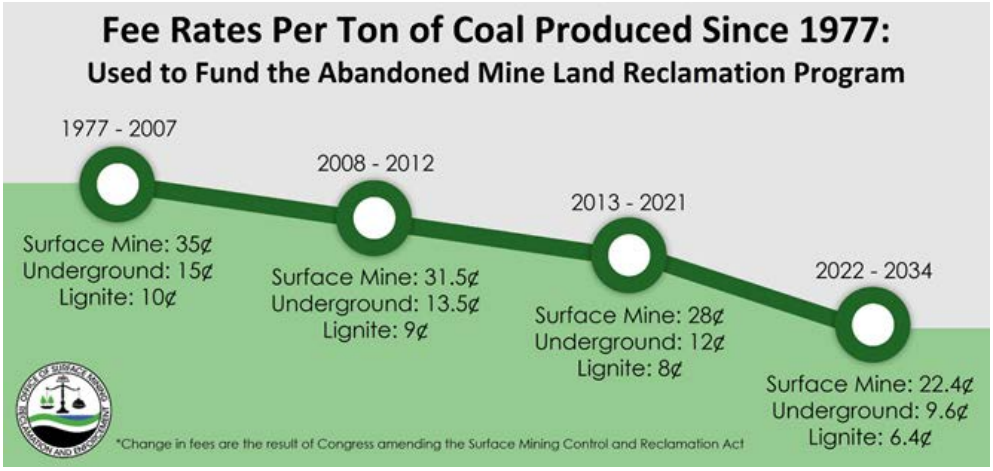



**Figure 9.** Reclaiming abandoned mine land from AMLRP fund.



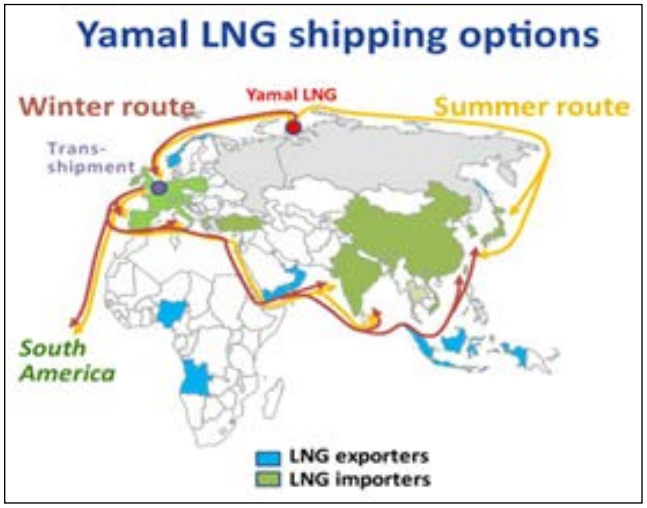



**Figure 10.** Russia to export 100m tons of LNG by 2030.



**Figure 11.** Coal mines of Kuzbass region.

### *10.4.4 Aluminum (Bauxite)*

**Saudi Arabian Mining Company (Ma'aden) Expansion:** Old mines are being reopened to increase domestic aluminum production for EV and aerospace industries.

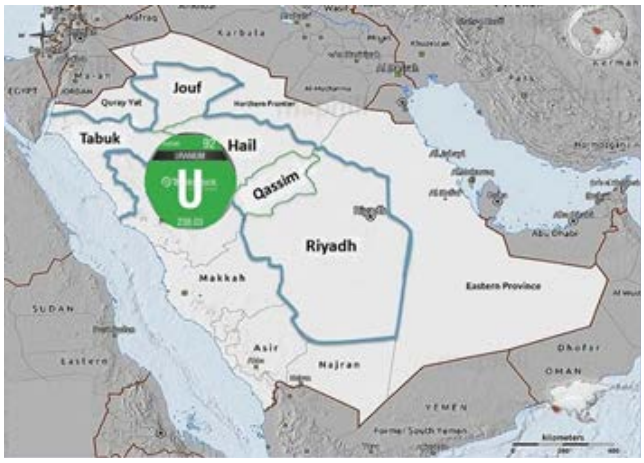



**Figure 12.** Saudi's prospect for Uranium, Thorium.

**Industrial Recycling:** The kingdom is investing in aluminum scrap processing to reduce imports.

## 10.5 Brazil

### *10.5.1 Oil and Gas*

**Petrobras revival projects:** Abandoned offshore fields are being reopened with deep-sea drilling technology. **Green hydrogen integration:** Some old oil refineries are being converted into hydrogen production hubs.

### *10.5.2 Coal*

**Coal Mine Repurposing:** Old mines in southern Brazil are being converted into agriculture and tourism sites.

**Coal Gasification Trials:** The government is exploring cleaner coal-to-energy technologies.

### *10.5.3 Uranium*

**State-led Uranium Revival:** Brazil is investing in reopening old uranium mines in Bahia and Ceara to reduce dependence on imports.

### *10.5.4 Aluminum (Bauxite)*

**Vale-led Initiatives:** Old bauxite mines in the Amazon are being reopened with stricter environmental regulations.

**Sustainable Extraction:** New investments in green aluminum production are pushing for lower-emission refining processes.

A summary of the strategies by different countries can be seen in the table.

Each country tailors its strategy to its resources and economic priorities.

## 11.0 Inactive Oil and Gas Wells

Globally, it's estimated that there are approximately 29 million abandoned oil and gas wells. The number of inactive wells varies significantly across countries, influenced by factors such as production rates, regulatory frameworks, and economic conditions.

a. **Canada:** In 2023, Alberta, Canada's primary fossil fuel-producing province, reported a 5% reduction in inactive oil and gas wells, decreasing from staggering 83,000 in 2022 to 79,000 in 2023.
b. **United States:** As of 2020, the U.S. had approximately 4 million historic and active oil and gas wells, with about 2 million active and the remainder inactive or abandoned.
c. **India:** In 2015, the Indian government identified 69 small and marginal oil and gas blocks, previously surrendered by state-owned companies, holding an estimated 89 million tonnes of oil and gas resources.
d. **Saudi Arabia:** A 2020 Reuters investigation highlighted the lack of reliable estimates for abandoned wells in major oil-producing nations like Saudi Arabia. However, specific figures for Saudi Arabia remain undisclosed.
e. **Qatar**: Specific data on the number of abandoned natural gas wells in Qatar is not publicly available. However, information from the Dukhan field, Qatar's sole onshore oil and gas field, indicates that out of 605 wells, some are categorized as shut-in, observational, or abandoned.

The exact count of abandoned wells within this field is not specified.

## 12.0 Oil and Gas Sector in India

Assessing the precise value of idle or unused legacy assets in India's mining and oil and gas sectors is complex due to factors such as asset condition, market demand, and regulatory frameworks. However, available data provides some insights:

1. **Idle Gas-based Power Plants:** As of early 2023, approximately 25 gigawatts (GW) of gas-based power plant capacity in India remained underutilized, primarily due to price fluctuations in natural gas.
2. **Marginal Oil and Gas Fields:** In 2015, the Indian government identified 69 small and marginal oil and gas blocks, previously surrendered by state-owned companies, holding an estimated 89 million tonnes of oil and gas resources valued at around ₹70,000 crore (approximately $9.3 billion USD at that time).

## 13.0 Other Mining Sectors

**Reactivation of Abandoned Mines:** In response to increasing demand for minerals like copper, companies are revitalizing abandoned mines to quickly boost supply. This approach offers a faster and potentially more feasible option compared to developing new mines.

**Asset Valuation Considerations:** The value of these idle assets depends on several factors:

**Table 1.** Strategies to promote investment in abandoned and inactive mines

| Country | Oil and Gas | Coal | Uranium | Aluminum (Bauxite) |
|---|---|---|---|---|
| **China** | Reviving old fields, shale gas push | Repurposing for energy, methane extraction | Expanding *in-situ* uranium recovery | Overseas bauxite investments, aluminum recycling |
| **USA** | Idle well program, CCS incentives | AML repurposing, rare earths extraction | Uranium stockpile, *in-situ* mining | Smelter reopening, secondary aluminum production |
| **Russia** | Arctic oil redevelopment, LNG expansion | Export-driven coal mining | Rosatom-led uranium expansion | Rusal modernization, China partnerships |
| **Saudi Arabia** | Blue hydrogen, carbon storage in wells | Minimal coal investment | Developing uranium for nuclear power | Ma'aden expansion, aluminum recycling |
| **Brazil** | Deep-sea drilling, hydrogen projects | Mine-to-agriculture conversion | Reopening uranium mines for domestic use | Sustainable bauxite mining, green aluminum |

1) **Market Demand:** Fluctuations in commodity prices can render previously uneconomical sites viable again.
2) **Environmental Liabilities:** The costs associated with environmental remediation can significantly impact the net value of these assets.
3) **Regulatory Changes:** Evolving environmental regulations and policies can affect the feasibility and cost of reactivating or repurposing idle sites.

In summary, while specific global valuations are difficult to ascertain, idle legacy assets in the oil, gas, and mining sectors represent both potential opportunities and challenges. Their value is influenced by market conditions, environmental considerations, and regulatory frameworks.

**Abandoned Mine Sites:** A national study by the Indian Bureau of Mines identified 297 abandoned mine sites, with 106 requiring reclamation and rehabilitation. Subsequently, 24 of these sites became operational again, leaving 82 sites in need of attention.

## 13.1 Coal India Limited

Coal India Limited (CIL) has identified approximately 225 closed and abandoned coal mines across India. In a strategic move to harness residual coal reserves, CIL has awarded 23 of these discontinued underground mines to private operators under a revenue-sharing model. These mines collectively possess an estimated extractable reserve of 635 million tonnes, with a peak rated capacity of 34.14 million tonnes per year. The number of abandoned mines has been increasing due to factors such as resource depletion, economic non-viability, and operational challenges. For instance, in Jharkhand, over 50% of the 144 coal mines are either closed or abandoned, highlighting a significant trend in mine closures within the region.



**Figure 13.** An abandoned oil asset in Saudi Arabia, featuring a rusted oil rig in a vast desert landscape.

To address this issue, CIL is exploring innovative approaches, including the evaluation of more than 20 abandoned mines for potential pump storage projects. This initiative aims to repurpose defunct mines for energy storage solutions, aligning with sustainable energy objectives. These efforts reflect CIL's commitment to transforming non-productive assets into opportunities that contribute to energy security and environmental sustainability.

## 13.2 Policy and Industry Perspectives

- **Privatization of Idle Assets:** Industry leaders have advocated for the privatization of idle assets held by public sector enterprises like Coal India Limited (CIL) and Oil and Natural Gas Corporation (ONGC) to enhance efficiency and productivity.

In summary, while exact valuations are challenging to determine, India's idle legacy assets in the mining and oil and gas sectors represent significant potential. Addressing these idle assets requires comprehensive strategies that consider economic viability, environmental sustainability, and community welfare.

# 14.0 Abandoned Mines

Data on abandoned mines is less uniformly reported, but available information highlights the scale of the issue in certain countries.

- **India:** A national study by the Indian Bureau of Mines identified 297 abandoned mine sites, with 106 requiring reclamation and rehabilitation.
- **South Africa:** The country has numerous abandoned mines, particularly from its extensive gold mining operations, posing environmental and safety challenges.

Determining the exact number of mining companies that have failed due to unsuccessful oil and gas projects in

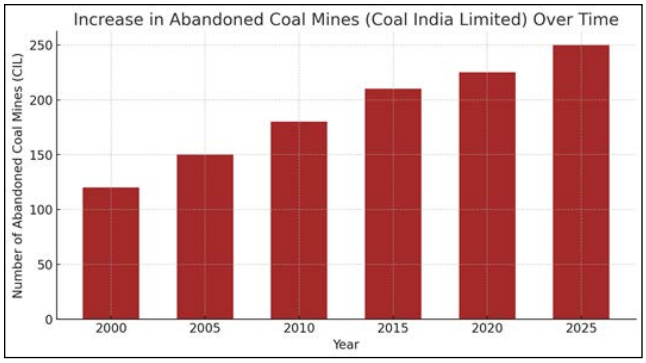



**Figure 14.** Abandoned coal mines under Coal India Limited.

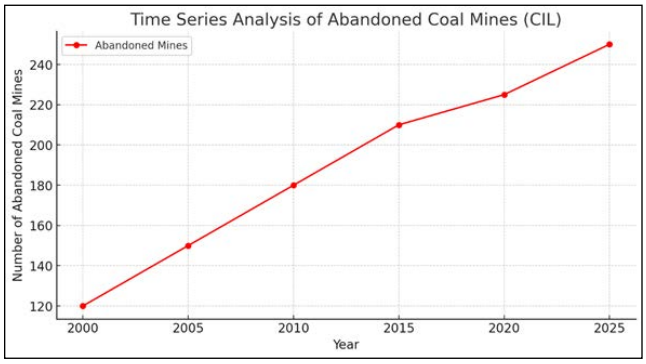



**Figure 15.** Time series plot showing the increase in abandoned coal mines under Coal India Limited (CIL) over time.

Australia, Canada, the USA, Russia, and South Africa is challenging, as comprehensive global data is not readily available. However, several notable instances illustrate the financial difficulties faced by mining companies in these regions:

**Australia:** Australia faces a significant challenge with abandoned and inactive mineral, oil, and gas sites. Estimates suggest there are between 60,000 to 80,000 such sites nationwide, with varying definitions and data collection methods contributing to this range. Despite the scale of the problem, rehabilitation efforts have been limited. A study highlighted that of the inactive mines, 68% are classified as neglected, while only 4% have been rehabilitated. These figures vary due to differing definitions and data collection methods. The number is increasing at a rate of 10-15% every year. The issue of abandoned and inactive mining sites in Australia is serious, with substantial environmental, safety, and socio-economic implications. Addressing this challenge requires comprehensive strategies, including accurate site inventories, effective rehabilitation programs, and community engagement to mitigate the adverse impacts on affected regions. Many mines are developed during high commodity prices but become uneconomical when prices drop.

Several coal and iron ore mines were abandoned after the 2015 commodity price crash. Declining demand for fossil fuels and global moves toward renewable energy have led to early closures of oil and gas wells. In many cases, companies declare bankruptcy or enter "care and maintenance" mode, leaving sites unrehabilitated. Australia has weak legal enforcement and state, provisioning to make mining companies fully restore abandoned sites. Some companies do not set aside enough funds for mine closure, leading to orphaned mines. Restoring a mine site can cost millions to billions of dollars, leading many companies to walk away instead. Some mines and wells remain abandoned for decades without proper cleanup.

## 14.1 Estimates over the Years

1. **2013:** Approximately 50,000 abandoned mines were reported.
2. **2015:** Estimates indicated around 60,000 abandoned mines.
3. **2020:** The number remained at about 60,000.
4. **2022:** Reports suggested approximately 80,000 inactive mines across the country.

## 14.2 A Few Cases

1. **Cloncurry Mine Closures (2024):** In Cloncurry, Queensland, three junior copper mines- Copper Resources Australia, True North Copper, and Chinova Resources-collapsed financially within a span of three months, leading to a loss of 400 jobs. These closures significantly impacted the local economy and raised concerns about the viability of junior mining ventures in the region.
2. **Arrium Limited (2016):** Formerly known as One Steel, Arrium was an Australian mining and materials company that went into voluntary administration in 2016 with debts exceeding $2 billion. The company's financial distress was attributed to various factors, including declining commodity prices and high debt levels.

3. **Canada: Bre-X Scandal (1997):** Bre-X Minerals Ltd., a Canadian company, became infamous for a gold mining fraud in Indonesia. The company's falsified gold resource estimates led to its bankruptcy in 1997, resulting in significant financial losses for investors and stakeholders.
4. **Russia: Coal Industry Crisis (2025):** Russia's coal industry faced a severe downturn due to international sanctions, leading to a significant decline in demand and financial instability. The government anticipated a wave of bankruptcies within the sector, highlighting the vulnerability of mining companies to geopolitical and economic pressures.
5. **United States: Coal Company Bankruptcies (2017-2019):** Between 2017 and 2019, eleven coal companies in the U.S. filed for bankruptcy, including Murray Energy in 2019. These bankruptcies were influenced by factors such as declining demand for coal, competition from alternative energy sources, and regulatory challenges.
6. **South Africa: Mining Sector Challenges:** While specific company failures are not detailed here, South Africa's mining industry has faced numerous challenges, including labor disputes, regulatory changes, and fluctuating commodity prices, which have led to financial difficulties for several mining operations.

These examples underscore the complex and often volatile nature of the mining industry, where companies are susceptible to a range of operational, financial, and geopolitical risks that can lead to project failures and, in severe cases, corporate insolvency.

## 15.0 Old Unused or Underutilized Mineral Oil Gas Assets

An abandoned well is a well that is no longer used to produce oil, gas, or water, and is either unplugged or in disrepair.

Types of abandoned wells

1. **Orphaned Wells:** Abandoned wells for which no operator or owner can be identified.
2. **Unplugged Wells:** Abandoned wells that have not been maintained or operated in accordance with regulations.
3. **Wells in Disrepair:** Abandoned wells that are in such poor condition that they could contaminate drinking water.

Determining the exact number of unused or underutilized mineral, oil, and gas assets across countries such as the USA, Australia, Canada, Russia, Saudi Arabia, Qatar, UAE, and India is challenging due to varying reporting standards and data availability. However, available data provides insights into the prevalence of abandoned oil and gas wells in some of these countries:

As of 2021, studies estimate that the U.S. has over 4 million abandoned oil and gas wells while Canada has at least 370,000 abandoned wells.

The Ministry of Water and Electricity has found 130,000 abandoned wells in Saudi Arabia.

### 15.1 Australia, Russia, Qatar, UAE, and India

Specific data on the number of abandoned or underutilized wells in these countries is not readily available from the provided sources.

## 16.0 Trends (2010-2024)

**United States**: The number of abandoned wells has increased over the years, with a significant rise from approximately 3.4 million in 2010 to over 4 million by 2021.

**Canada**: Similarly, Canada has seen growth in abandoned wells, from about 300,000 in 2010 to at least 370,000 by 2021.

The increase in abandoned wells can be attributed to factors such as declining production in aging wells, fluctuating oil and gas prices, and companies going out of business, leaving wells orphaned.The estimated number of abandoned wells in the U.S. and Canada over selected years are as in the table 1:

## 17.0 Litigation Aspects

To be able to locate any comprehensive, cross-country database or study that provides an exact count of old, unused, or underutilized mineral oil and gas assets-specifically those suffering from litigation issues-in the USA, Australia, Canada, Russia, Saudi Arabia, Qatar, UAE, and India, the data on abandoned or underutilized assets is already challenging to compile, and when it

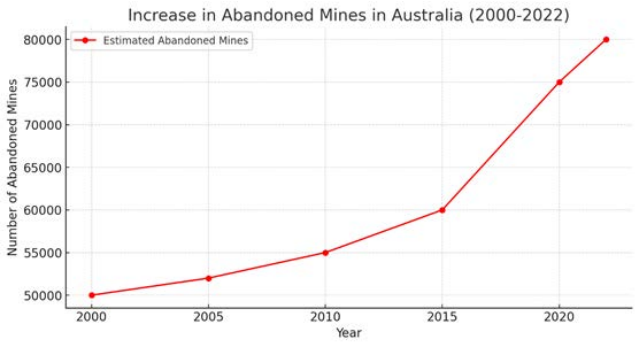



**Figure 16.** An exponential increase in the number of abandoned mines in Australia.



**Figure 17.** Australia has about 80,000 abandoned mines.

comes to legal entanglements, the picture becomes even more fragmented because.

## 18.0 Data Variability

Each country tracks abandoned or underutilized assets differently. For example, in the USA, estimates suggest there are over 4 million abandoned oil and gas wells, but only a subset of these are involved in litigation (*e.g.,* disputes over environmental liability or remediation responsibilities).

## 19.0 Scope of Litigatio

Litigation issues can range from environmental claims to disputes over ownership or legacy liabilities. In many regions, only a fraction of the abandoned assets are subject to such legal proceedings, and that fraction is not consistently reported.

## 20.0 Lack of Aggregated Studies

While some regional studies exist (especially for North America), there isn't an aggregated, internationally recognized figure that covers all the listed countries.

1. In the USA, although there are over 4 million abandoned wells, estimates regarding litigation vary widely-with only an estimated 5-10% of these wells potentially entangled in legal disputes over environmental remediation or liability. This rough estimate might imply between 200,000 to 400,000 cases, but it's not a definitive figure.
2. Canada has a similar challenge; while there are around 370,000 abandoned wells, only a subset faces litigation, and precise numbers are not publicly aggregated.
3. For Australia, Russia, Saudi Arabia, Qatar, UAE, and India, public data on underutilized assets and their legal status is even more limited or managed by local regulatory frameworks, making broad international comparisons difficult.

There is no definitive number available that quantifies how many old, unused, or underutilized oil and gas assets are suffering from litigation issues across all these countries. The numbers, if they exist in fragmented reports, would likely be highly variable and dependent on national reporting practices and the specific legal contexts within each jurisdiction.

## 21.0 Inheritance Issues

There is not a comprehensive, internationally aggregated figure on how many old, unused, or underutilized mineral oil and gas assets are suffering specifically from inheritance issues across the countries like USA, Australia, Canada, Russia, Saudi Arabia, Qatar, UAE, and India. Here are some key points to consider:

**a. Data Fragmentation**

Asset data is generally compiled by national or regional agencies, and most studies focus on environmental or operational aspects rather than the legal intricacies of inheritance.

**b. Nature of Inheritance Issues**

Inheritance issues typically arise in family-owned or privately held oil and gas rights, where disputes among heirs or unclear succession plans can delay or complicate asset management. These problems are often entangled

**Table 2.** The estimated number of abandoned wells in the U.S. and Canada

| Year | USA (in Millions) | Canada (in Thousands) |
|---|---|---|
| 2010 | 3.4 | 300 |
| 2015 | 3.7 | 320 |
| 2020 | 3.9 | 350 |
| 2021 | 4.0+ | 370+ |

Note: The "+" indicates that the numbers are estimates and may be higher.

with broader legal or litigational issues, making it difficult to isolate them as a separate category.

**c. Lack of Standard Reporting**

While there are estimates for the number of abandoned or underutilized assets (for example, millions of abandoned wells in the USA alone), there is no standard metric or database that tracks how many of these assets are specifically affected by inheritance disputes.

**d. Regional Variability**

In countries with a long history of privately or family-owned oil and gas operations, such as parts of the USA or India, anecdotal evidence suggests that inheritance disputes can contribute to asset underutilization. However, similar detailed data are scarce for other regions like Saudi Arabia, Qatar, UAE, and Russia where ownership structures and legal frameworks differ significantly.

## 21.1 Dealing with Inheritance Issues

At present, no reliable or unified dataset exists that quantifies the number of mineral oil and gas assets impacted by inheritance issues across these countries. The available information is largely anecdotal or embedded within broader studies on abandoned or underutilized assets. For a more detailed picture, one would need to examine localized legal and industry reports that address inheritance or succession disputes within the oil and gas sector.

For a minerals, oil, and gas company dealing with under-litigation legacy assets, the resolution strategy needs to be industry-specific, addressing legal, financial, environmental, and operational concerns. Below is a tailored approach for such companies.

### *21.1.1 Legal and Regulatory Strategy*

**1. Regulatory Compliance and Permitting**

Conduct a thorough compliance audit to ensure all permits and environmental regulations are met. Engage regulators proactively to negotiate settlements or amendments.

**2. Arbitration and Dispute Resolution**

Use international arbitration for cross-border disputes to avoid prolonged court battles. Seek settlement agreements with affected stakeholders to minimize legal costs and reputational damage.

**3. Contractual Risk Mitigation**

Renegotiate contracts with suppliers, governments, and stakeholders to clarify asset ownership and liabilities. Consider force majeure or other legal exit clauses in case of regulatory changes.

### *21.1.2 Financial and Asset Management*

**1. Divestment or Asset Optimization**

Sell off disputed assets to entities specializing in high-risk ventures. Convert disputed lands or assets into alternative revenue sources (*e.g.*, carbon credit offsets, land leasing).

**2. Litigation Reserves and Insurance Coverage**

Set up litigation reserves to cover potential liabilities. Leverage insurance policies (environmental, political risk, business interruption) to mitigate financial loss.

**3. Asset Write-Downs and Depreciation Adjustments**

Adjust financial statements to reflect the fair value of under-litigation assets, avoiding overstatement.

### *21.1.3 Environmental and Sustainability Transition*

**1. Site Remediation and Rehabilitation**

Invest in land reclamation, soil decontamination, and ecosystem restoration to comply with regulations. Use this as an opportunity to improve ESG (Environmental, Social, and Governance) ratings.

**2. Carbon Credits and Green Transition**

Offset carbon-heavy assets by investing in renewable projects. Partner with carbon credit initiatives to improve compliance with global climate agreements.

**3. Energy Diversification**

Shift investment toward natural gas (lower emissions) or renewable energy (solar, wind) to reduce reliance on controversial assets.

### *21.1.4 Stakeholder and Community Engagement*

**1. Government and Policy Engagement**

Collaborate with government agencies to negotiate favorable policies and seek amnesty for certain legacy issues. Engage in public-private partnerships for asset transformation (*e.g.*, turning old mining sites into renewable hubs).

**2. Community Compensation and Rehabilitation Programs**

Address local grievances with job creation, compensation plans, and development projects. Invest in social responsibility programs to reduce community-driven litigations.

**3. Investor Relations and Transparency**

Clearly communicate risk mitigation strategies to investors. Show commitment to sustainable practices and financial resilience.

### *21.1.5 Operational and Risk Management*

**1. Risk Assessment and Contingency Planning**

Conduct legal and financial risk modeling to predict worst-case scenarios. Develop exit strategies for high-risk assets in politically unstable regions.

**2. Enhanced Compliance Monitoring**

Implement AI-driven compliance tracking for regulatory changes. Strengthen internal governance policies to prevent future disputes.

**3. Technology and Digitalization**

Use blockchain for transparent mineral tracking to avoid disputes over resource ownership. Implement remote sensing and AI for environmental monitoring of disputed sites.

## Reference

1. Environ Sci Technol. 2021; 55(1):563-570. doi: 10.1021/acs.est.0c04265. Epub 2020 Dec 15.