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Mainstreaming in the energy and mining sector

Energy and mining encompass a range of activities and economic sectors involved in the exploration, extraction, processing and distribution of oil, gas, coal, materials such as sand and rock, minerals and metals; the generation, production, distribution and delivery of energy from fossil and non-fossil sources; and the disposal of associated waste products. The energy sector comprises oil and gas (including unconventional oil and gas), coal, geothermal energy, solar energy, wind power, hydropower, wave power, bioenergy, and nuclear energy.

The mining sector includes mining for minerals and metals, sand and aggregate quarrying, gemstones, seabed mining, and artisanal and small-scale mining. Energy and mining also often involve a great deal of associated infrastructure, such as pipelines and access routes.

With a rising population, an expanding global economy, and a trend towards urbanization, the demand for materials and energy is increasing, particularly in Asia, Africa and Latin America. Mining plays a vital role in the economic development of many countries and can be an important contributor to employment and income generation, particularly in low-income countries.

Impacts within these sectors arise from the exploration and production of oil and gas, generation of renewable energy, and mining of coal, minerals and metals, as well as the transportation, processing and marketing of the extracted materials. It is important to consider direct, indirect, induced and cumulative impacts on biodiversity and ecosystem services throughout the life cycle of a project, including exploration, construction, operation, closure and post closure (legacy).

The supply chain from mine to market and consumer should also be considered. Many mining and energy projects can have relatively long lifespans and impacts can occur over time periods that exceed the lifetime and geographical limits of a mine or energy project. Legacy waste issues related to closed projects remain a challenge.

Impacts on biodiversity and ecosystems

Direct impacts on biodiversity from these sectors include habitat loss, damage and fragmentation, disturbance, displacement or mortality of species, disruption of breeding and migration events for certain species, changes in water quality and flow, pollution of soil, air and water (including thermal pollution and noise), and the introduction of invasive species.

Indirect impacts from hydrocarbon-based energy include climate change resulting from greenhouse gas emissions. Renewable energy generation also has biodiversity impacts, including significant habitat conversion impacts associated with certain biofuels, impacts on migratory bird species from wind power, as well as the supply chain impacts associated with solar technology and energy storage. Nuclear energy has large impacts in terms of mining and disposal of hazardous materials.

Impacts can vary between the large-scale mining sector and artisanal and small-scale mining. However, larger-scale mining tends to be better regulated, which can lead to avoidance or reduction of impacts on biodiversity and ecosystem services. The use of mercury in artisanal and small-scale mining processes for gold is globally the largest single source of mercury pollution. This can lead to severe impacts on human health, biodiversity and ecosystem services, such as water and food provision.

The physical footprint of energy and mining operations can be relatively small compared to some other sectors (such as agriculture, forestry or urbanization). However, biodiversity impacts linked to the in-migration of people to an area as a result of energy and mining operations can be very significant, leading to further encroachment of natural habitats.

These sectors also have a number of dependencies on biodiversity and ecosystem services, such as supply of water, as well as protection of infrastructure (e.g. roads, pipelines, dams, operational structures) from erosion effects, landslides, and natural disasters, such as flooding and storm surges.

Approaches to mainstreaming biodiversity in the energy and mining sector

There are a number of points of intervention for improving biodiversity management and reducing impacts by the energy and mining sector, from addressing patterns of demand, to improving planning and regulation across all project value chain stages, including decommissioning.

Full implementation of the Paris Agreement on Climate Change would imply the urgent phase out of coal production and declining oil and gas production later this century, with remaining production combined with carbon capture and storage. Shorter-term methods for reducing the effects of this sector on biodiversity include siting restrictions and conditions, and spatial planning techniques to ensure that oil and gas activities do not negatively impact protected areas or biodiversity hotspots. Appropriate requirements to ensure the restoration of extraction sites also helps to reduce the long-term negative impacts on biodiversity. Requirements for the management of pollution resulting from extractive activities can also help to reduce the impacts on biodiversity.

There are good examples of work being done by large-scale mining and energy companies to encourage the protection of biodiversity and ecosystem services (for example, guidance and tools developed by ICMM, IPIECA and CSBI), as well as through strengthened regulation and enforcement. The challenge is how to scale these approaches up beyond the project level in all relevant countries and across the energy and mining sector. There are also some issues that are generally poorly addressed, including artisanal and small-scale mining, and challenges around engaging certain actors.

Several key themes and approaches to mainstream biodiversity into the energy and mining sector have been identified, including through:

- (a) National laws and policies: incentives and penalties;
- (b) Planning and assessment at the policy level: spatial planning and strategic environmental assessments;
- (c) Planning and assessment at the project level: environmental and social impact assessment;
- (d) Institutions: enforcement, transparency, accountability, inclusion, coordination and consultation;
- (e) Funding and environmental and social safeguards: innovative solutions to finance and investment;
- (f) Data and information;
- (g) Innovation: reducing demand, increasing efficiency and considering alternatives.

Questions to guide the discussions

- What are the main actions for an enabling environment to mainstream biodiversity in this sector?
- What are some specific positive examples of biodiversity mainstreaming in the energy and mining sectors?
- What are the biggest challenges and barriers to mainstreaming biodiversity into the energy and mining sectors? What are the biggest opportunities we have now?
- What additional actions are needed to enable and support biodiversity mainstreaming in these sectors? Budgetary measures, institutional frameworks and processes, legislation and policy actions?



- Who are the main actors that have a key role to play in achieving biodiversity mainstreaming in these sectors?