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Item 6 of the provisional agenda*

MAINSTREAMING OF BIODIVERSITY INTO THE ENERGY AND MINING SECTORS

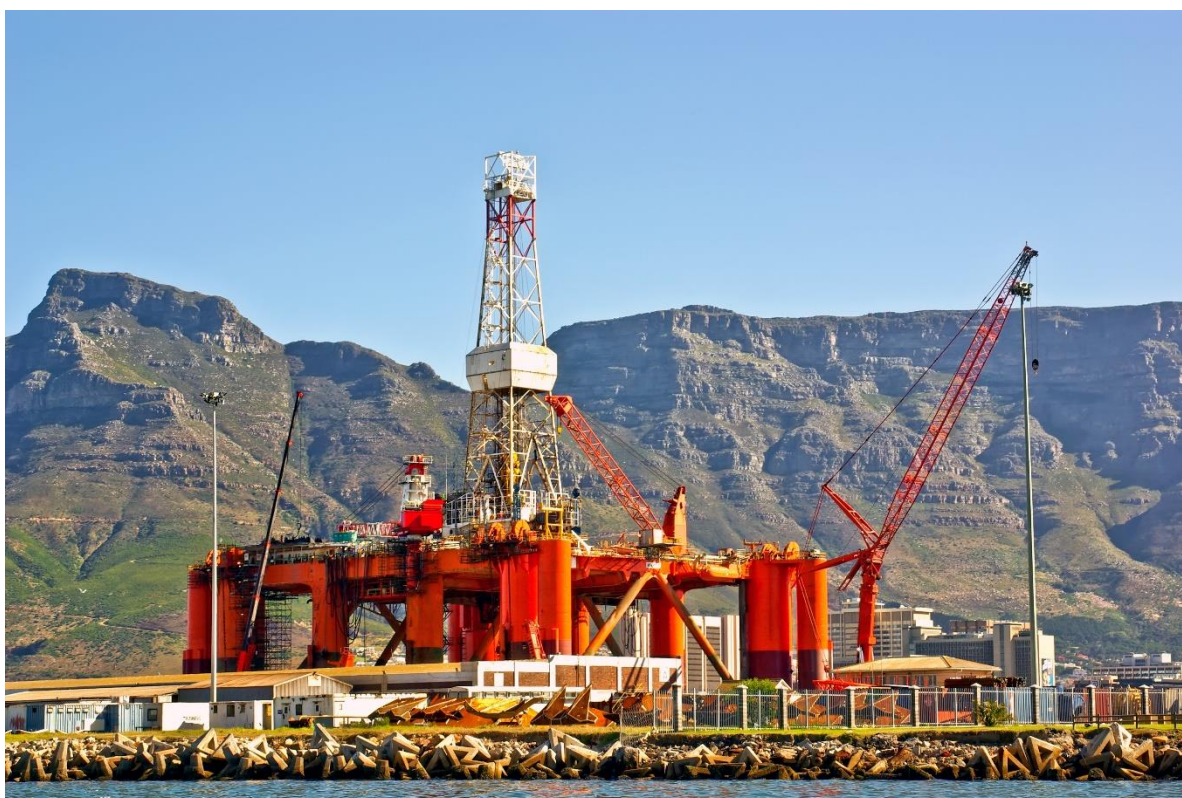
Note by the Executive Secretary

1. In decision XIII/3, paragraph 109, the Conference of the Parties decided to consider the mainstreaming of biodiversity into the sectors of energy and mining, infrastructure, manufacturing and processing, and health at its fourteenth meeting. To assist the Secretariat in preparing the foundation for these discussions, the Executive Secretary has partnered with the UN Environment World Conservation Monitoring Centre (UNEP-WCMC) to work on the relationship between biodiversity and the energy and mining and infrastructure sectors. UNEP-WCMC conducted this study in collaboration with the UN Environment which also supported the preparation of the document. This partnership is made possible by the generous financial support of the European Union.
2. The Executive Secretary is circulating herewith, for the information of participants in the twenty-first meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, a document entitled “mainstreaming of biodiversity into the energy and mining sectors” prepared by UNEP-WCMC. The document is being circulated in the form and language in which it was submitted to the Secretariat.
3. The document provides information regarding sectors and trends, biodiversity dependencies and impacts, tools, approaches and policy drivers as well as opportunities and challenges in mainstreaming biodiversity. It explores future directions in terms of transparency and accountability, best practice and standard setting, national policy considerations, integrated, cross-sectoral and multi-stakeholder approaches, natural capital, strategic environmental and social impact assessment, capacity and funding. The document is presented under agenda item 6 on mainstreaming of biodiversity into the sectors of energy and mining, infrastructure, manufacturing and processing industry, and health: scientific and technical considerations and use of the programmes of work of the Convention.

* CBD/SBSTTA/21/1.

Mainstreaming of Biodiversity into the Energy and Mining Sectors

An Information Document for the 21st Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-21)



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1 Executive Summary

Mainstreaming biodiversity into the energy and mining sectors will be a main agenda item at the 14th Conference of the Parties (COP-14) to the Convention on Biological Diversity in Egypt in November 2018.

This document forms part of an ongoing consultative process to engage stakeholders in discussions around mainstreaming biodiversity into the energy and mining sectors in preparation for the 14th Conference of the Parties to the Convention on Biological Diversity. It is based upon both desk based research and the outputs of a multi-stakeholder workshop held in London in October 2017 (Annex A and B).

The document provides:

- an overview of the energy and mining sectors, along with key trends;
- an outline of the biodiversity and ecosystem service dependencies and impacts of energy and mining activities;
- a summary of the current tools, approaches and policy drivers for mainstreaming biodiversity into the energy and mining sectors;
- the challenges and opportunities relating to mainstreaming biodiversity; and
- potential future directions for consideration by the Parties to the Convention on Biological Diversity.

The energy and mining sectors encompass a range of activities and economic sectors involved in the exploration, extraction, processing and distribution of oil, gas, coal, minerals and metals and the generation, distribution and delivery of energy from fossil and non-fossil resources. These activities show strong links to biodiversity and ecosystem services, in terms of both impacts and dependencies. There is growing recognition from a wide set of stakeholders, including government, industry and finance institutions, that biodiversity needs to be integrated into government, financial and corporate policies and the operations of companies within these sectors. This is illustrated by the growing number of initiatives, tools and guides developed both by and for the sector.

The move towards mainstreaming biodiversity is driven by factors including legislative external drivers (e.g. national and international legislation, agreements and policy), non-legislative external drivers (e.g. requirements of finance standards and non-governmental organisation campaigns) and internal drivers (e.g. corporate standards, policies, governance and disclosure).

Examples of good practice relating to biodiversity and the energy and mining sectors exist, but challenges remain around how to scale them up beyond project level and across these sectors. These challenges include:

- differences between national and international legislation, policies and standards, which can disadvantage some companies whilst benefiting others;
- technical, data and cultural barriers to valuing nature;
- misunderstanding or misapplication of concepts and tools;
- a lack of progress around Strategic Environmental Assessment and limitations associated with Environmental Impact Assessment;
- difficulties associated with engaging all stakeholders in mainstreaming activities; and
- managing unknowns relating to the long term nature of many energy and mining projects.

Future discussions around mainstreaming biodiversity into the energy and mining sectors could include the following three topic areas:

- building capacity of government, industry and other stakeholders on good practice for biodiversity management by the energy and mining sectors;
- strengthening legislation and policy to better align with internationally accepted standards for good practice; and
- building better understanding around the value of nature so that biodiversity can be better integrated into decision-making.

Specific areas to explore include:

- supporting the development of governance, monitoring and reporting procedures for biodiversity mainstreaming into the energy and mining sectors;
- identifying and supporting the integration of international good practices into national policy and legislation;
- supporting the development of business and biodiversity platforms aimed at engaging these industries and financial institutions to adopt good practice (particularly where these sectors are a significant current or future contributor to the national economy);
- supporting natural capital approaches to better integrate biodiversity into decision-making in the energy and mining sectors;
- encouraging the widespread use of impact assessments (strategic, environmental and social) and integrated, cross sectoral and multi-stakeholder approaches to better address biodiversity at the landscape scale and address cumulative impacts; and
- developing capacity between developed oil and gas economies and emerging economies through public-private partnerships and by sharing information and experiences.

2 Introduction

'The Conference of the Parties...

*Decides that the Conference of the Parties should consider, at its fourteenth meeting, the mainstreaming of biodiversity into the following sectors: **energy and mining**; infrastructure; manufacturing and processing industry; and health...'*

Paragraph 103 of decision XIII/3 of the Conference of the Parties to the Convention on Biological Diversity [1].

This document provides an introduction to industry approaches to mainstreaming biodiversity into the energy and mining sectors for consideration by the Parties at the 21st meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-21) to the Convention on Biological Diversity. It forms part of the collaboration between the Secretariat of the Convention on Biological Diversity, the UN Environment World Conservation Monitoring Centre (UNEP-WCMC) and UN Environment relating to the mainstreaming of biodiversity into the energy, mining and infrastructure sectors leading up to the 14th Conference of the Parties (COP-14).

This document is based upon both desk based research (Section 8 - References) and the outputs of a multi-stakeholder workshop (which included representatives from industry), held in London in October 2017 (Annex A and B). The workshop aimed to integrate the perspectives of stakeholders with a technical understanding of the current landscape for mainstreaming biodiversity into the energy and mining sectors. The document provides:

- an overview of the energy and mining sectors, including key sectoral trends (Section 3);
- an exploration of the relationship between the energy and mining sectors and biodiversity in terms of impacts and dependencies (Section 4);
- a summary of the tools and approaches that can be adopted to mainstream biodiversity into energy and mining operations (Section 5);
- key challenges and opportunities for driving uptake of these approaches (Section 6); and
- future directions (Section 7).

Key points from the workshop are highlighted in the 'Workshop Perspectives' boxes included throughout the document and summarised in Annex A and B. A brief summary of the recent history of mainstreaming biodiversity into the energy and mining sectors in relation to the Convention on Biological Diversity is provided in Annex C. Examples of relevant tools and initiatives are presented in Annex D.

¹ Convention on Biological Diversity (2016) Conference of the Parties to the Convention on Biological Diversity Decision XIII/3 Paragraph 103 (CBD/COP/DEC/XIII/3) [Online] Available from: <https://www.cbd.int/decisions/cop/?m=cop-13> [Accessed November 2017].

3 Sectors and Trends

3.1 Sectors

Energy [2] and mining encompass a range of activities and economic sectors involved in the exploration, extraction, processing and distribution of oil, gas, coal, minerals and metals and the generation, distribution and delivery of energy from fossil and non-fossil resources.

Some of the key sectors and activities are listed below.

- **Renewables:** biofuel production, geothermal, wind farms, hydroelectric power, hydropower and large dams, nuclear energy, solar energy;
- **Oil and gas:** unconventional, conventional, onshore, offshore and deep sea exploration;
- **Mining:** surface, sub-surface, onshore, offshore and deep sea exploration, artisanal and small-scale mining (ASM);
- **Associated activities:** ancillary developments (e.g. worker camps, waste facilities, access roads), services (e.g. waste, energy), infrastructure (roads, railways, offshore, pipelines, power stations, pylons, energy transmission) and transport (e.g. shipping).

The energy and mining sectors are closely interrelated. Materials and fuels may be extracted by mining, before being used to generate energy or as component parts in energy generation (e.g. photovoltaic cells) or storage equipment (e.g. batteries). They are also closely linked to other sectors, such as infrastructure. Infrastructure is both required for, and often funded by revenues from, the energy and mining sectors.

Box 1: Workshop Perspectives – Priority Sectors

Workshop participants noted that sectors (including sub-sectors and development phases) could not be prioritised, at least at the global level, by importance and impact on biodiversity, as this will differ geographically and over time. Instead prioritisation of sectors for action should reflect national development priorities and location specific biodiversity and ecosystem service impacts and dependencies.

3.2 Energy

It is estimated that global energy demand will increase by 30% by 2040. This increase is due to an expanding global economy, an increasing human population and greater urbanisation. However, the growth in energy demand is likely to be tempered by improvements in energy production and efficiency [3]. Global energy demand will be led by strong increases from countries outside of the Organisation for Economic Co-operation and Development (OECD), particularly India, and in Southeast Asia. Demand for electricity is growing, accounting for 40% of the estimated increase in energy consumption by 2040.

² Please note, as forestry is considered as a separate sector, we are not considering energy from wood within this document.

³ International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

The sources of energy are also expected to change over time. In the International Energy Agency's New Policies Scenario [4], the role of natural gas is considered likely to grow to be the second largest fuel globally by 2040 (after oil), coupled with a rapid increase in renewable energy.

The United Nations Sustainable Development Goals [5] including energy-related targets such as action on climate change, universal access to modern energy, and reductions in air pollution. Attention is therefore being given to specific actions that could change the existing trajectories of energy development to meet these goals. In recognition of this, the International Energy Agency has produced a Sustainable Development Scenario as part of the World Energy Outlook 2017. This scenario *'outlines an integrated approach to achieve the energy-related aspects of the UN Sustainable Development Goals'* [6].

The sections below identify anticipated key trends in the conventional and renewable energy markets over the coming years and decades.

3.2.1 Renewable Energy

Renewables are forecast to *'capture two-thirds of global investment in power plants to 2040'* and account for 40% of all power generation by 2040 [7].

In 2016, the top five countries by annual investment and capacity additions for renewables (excluding large hydropower) were the People's Republic of China (China), the United States, the United Kingdom, Japan and Germany [8]. Global investments in renewable energy production in 2015 were more than double the \$130 billion (United States Dollars) that were invested in new coal and gas power plants, with the developing world (including China, India and Brazil) contributing a total of \$156 billion (United States Dollars) (a 19% rise from 2014) [9].

The way that renewables are used is also forecast to change, with increasing use of renewable sources to provide heat and mobility. Globally, it is anticipated that *'the share of direct and indirect renewable use in final energy consumption'* will rise from 9% in 2017 to 16% in 2040 [10].

Much of the rise in renewable energy production can be attributed to policy changes, subsidies and the decreasing cost of technology. The growth in renewable energy capacity could contribute towards achieving energy-related United Nations Sustainable Development Goals, which may in turn result in more supportive policy frameworks for renewables.

Wind

Wind energy is experiencing steady global growth, mainly owing to markets in Asia, North America and Europe [11].

4 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

5 United Nations (no date) Sustainable Development Goals [Online] Available from: <http://www.un.org/sustainabledevelopment/> [Accessed November 2017].

6 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

7 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

8 Ren21 (2017) Renewables 2017 - Global status report [Online] Available from: http://www.ren21.net/wp-content/uploads/2017/06/17-8399_GSR_2017_Full_Report_0621_Opt.pdf [Accessed November 2017].

9 Frankfurt School – UNEP Collaborating Centre for Climate & Sustainable Energy Finance (2016) Global Trends in Renewable Energy Investment 2016 [Online] Available from: http://fs-unep-centre.org/sites/default/files/publications/globaltrendsrenewableenergyinvestment2016lowres_0.pdf [Accessed November 2017].

10 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

11 UNEP (2016) Green Energy Choices: The benefits, risks and trade-offs of low-carbon technologies for electricity production. Report of the International Resource Panel. E. G. Hertwich, J. Aloisi de Larderel, A. Arvesen, P. Bayer, J. Bergesen, E. Bouman, T. Gibon, G. Heath, C. Peña, P. Purohit, A. Ramirez, S. Suh, (eds.).

In 2016, the trend towards increased wind power capacity continued, albeit at a slower rate than was observed in 2015 [12]. Despite a decline compared to 2015, China remained the global leader in new wind installations in 2016. In the United States, a quarter of newly installed power-generating capacity was from wind in 2016 [13].

Forecasts indicate that wind energy is likely to significantly contribute to the fulfilment of energy demands by 2040. It is anticipated that wind power (both onshore and offshore) could become *'the leading source of electricity soon after 2030'* in the European Union [14].

Hydropower

Hydropower is currently the world's most important source of renewable electricity, providing 6.1% of total energy supply [15]. The Renewables 2017 – Global Status Report identifies China, Brazil, the United States, Canada, the Russian Federation, India and Norway as the *'top countries for hydropower capacity'* [16]. After China (which remains at the forefront of commissioning new hydropower capacity) Brazil, Ecuador, Ethiopia, Vietnam, Peru, Turkey, Loa PDR, Malaysia and India were *'the countries adding the most capacity in 2016'* [17]. It is anticipated that hydropower will continue to lead renewable energy generation to at least 2022 [18].

Solar

Concentrated solar and photovoltaic power is increasing as technology advances allow for production in less sunny conditions. In 2016, solar accounted for approximately 18% of the total renewable energy produced but contributed nearly a third of the increase in renewables that year. By 2040, solar energy is anticipated to become the largest source of *'low-carbon capacity'*, led by the expansion of solar photovoltaics (PV) in China and India [19].

Geothermal

Geothermal power remains a geographically limited energy resource, but has also shown a steady increase over recent decades.

Biofuels

Biofuels (broadly defined as fuels in liquid or gaseous form made from organic matter [20]) are generally categorised as first generation (primarily food crops processed into biofuels such as bioethanol, biodiesel and biogas) or second generation (biofuels created from by-products, wastes or dedicated non-food/energy feedstocks [21]). Generation of energy from second generation biofuels, such as algae, is seen as offering a potentially low impact source of renewable energy, in contrast to

12 Ren21 (2017) Renewables 2017 - Global status report [Online] Available from: http://www.ren21.net/wp-content/uploads/2017/06/17-8399_GSR_2017_Full_Report_0621_Opt.pdf [Accessed November 2017].

13 Ren21 (2017) Renewables 2017 - Global status report [Online] Available from: http://www.ren21.net/wp-content/uploads/2017/06/17-8399_GSR_2017_Full_Report_0621_Opt.pdf [Accessed November 2017].

14 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

15 UNEP (2016) Green Energy Choices: The benefits, risks and trade-offs of low-carbon technologies for electricity production. Report of the International Resource Panel. E. G. Hertwich, J. Aloisi de Lardere, A. Arvesen, P. Bayer, J. Bergesen, E. Bouman, T. Gibon, G. Heath, C. Peña, P. Purohit, A. Ramirez, S. Suh, (eds.).

16 Ren21 (2017) Renewables 2017 - Global status report [Online] Available from: http://www.ren21.net/wp-content/uploads/2017/06/17-8399_GSR_2017_Full_Report_0621_Opt.pdf [Accessed November 2017].

17 Ren21 (2017) Renewables 2017 - Global status report [Online] Available from: http://www.ren21.net/wp-content/uploads/2017/06/17-8399_GSR_2017_Full_Report_0621_Opt.pdf [Accessed November 2017].

18 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

19 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

20 International Energy Agency (2011) Technology Roadmap Biofuels for Transport [Online] Available from: http://www.iea.org/publications/freepublications/publication/Biofuels_Roadmap_WEB.pdf [Accessed November 2017].

21 Sims, R.E.H., Mabee, W., Saddler, J.N. and Taylor, M. (2010) An overview of second generation biofuel technologies. Bioresource Technology 101(6) 1570-1580.

first generation biofuels, such as soya and palm oil [22]. Although these first generation biofuels are significant sources of bioenergy, they are recognised as having significant potential biodiversity impacts [23] and potentially lack effectiveness in reducing net greenhouse gas emissions [24].

Global biofuel production has grown relatively slowly since 2010. In 2016, decreases in annual growth rate of biofuel production in South and Central America and in Europe and Eurasia were offset by increases in biofuel production in North America and Asia Pacific, leading to a worldwide increase of 2.6% [25]. However, biofuel production is likely to increase over the coming years (some forecasts estimate an increase in biofuel production globally of 16% to 2022) as countries seek to increase energy from sustainable sources [26].

Microgeneration

Interest in renewable microgeneration, or the production of relatively small quantities of energy mostly for domestic (local) consumption, has grown in recent years. Advances in small-scale renewable energy technologies, coupled with increasing interest in more sustainable energy, security of supply and wider policy support for renewable energy, means it is now feasible and increasingly common for individual buildings or communities to install, for example, a small wind turbines or a number of solar panels. There are also indications that such approaches could be more favourable in terms of overall social, economic and environmental effectiveness than large-scale energy generation in certain contexts, with growing policy support as a result (e.g. [27]).

3.2.2 Fossil Fuels

A lot of current exploration and production activities in the oil and gas sector are taking place in countries which are members of the Organization of the Petroleum Exporting Countries (OPEC) and the United States, but other regions may also play a key role in the coming years. For instance, in Latin America, the regulatory environment for the extractive sector is increasingly enabling private investments. Offshore Egypt is another 'hotspot' for hydrocarbon [28], and there are a number of other emerging oil nations in Africa. Unconventional oil (such as *'oil shale, oil sands-based extra heavy oil and bitumen, derivatives such as synthetic crude products, and liquids derived from natural gas – gas-to-liquid (GTL) or coal-to-liquid (CTL)'* [29]) and gas (*'sources of gas trapped deep underground by impermeable rocks, such as coal, sandstone and shale'* [30] e.g. shale gas, coalbed methane and tight gas) production methods are increasingly being used due to the increasing scarcity of conventional resources. The United States remains a key player in shale gas production [31].

22 Correa, D.F., Beyer, H.L., Possingham, H.P., Thomas-Hall, S.R. and Schenk, P.M. (2017) Biodiversity impacts of bioenergy production: Microalgae vs. first generation biofuels. *Renewable and Sustainable Energy Reviews* 74, 1131–1146.

23 Gasparatos, A., Stromberg, P., and Takeuchi, K. (2013) Sustainability impacts of first-generation biofuels. *Animal Frontiers*, 3(2) 12-26.

24 Crutzen P.J., Mosier A.R., Smith K.A., Winiwarter W. (2016) N₂O Release from Agro-biofuel Production Negates Global Warming Reduction by Replacing Fossil Fuels. In: Crutzen P., Brauch H. (eds) Paul J. Crutzen: A Pioneer on Atmospheric Chemistry and Climate Change in the Anthropocene. SpringerBriefs on Pioneers in Science and Practice, vol 50. Springer, Cham.

25 BP (2017) BP Statistical Review of World Energy 2017 [Online] Available from: <https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf> [Accessed November 2017].

26 International Energy Agency (2017) Renewables 2017 – Analysis and Forecasts to 2022 [Online] Available from: <https://www.iea.org/renewables/> [Accessed November 2017].

27 Burton, J. and Hubacek, K. (2007) Is small beautiful? A multicriteria assessment of small-scale energy technology applications in local governments. *Energy Policy* 35, 6402–6412.

28 PwC (2017) 2017 Oil and Gas Trends – Adjusting business models to a period of recovery. Strategy& PwC.

29 International Energy Agency (no date) Glossary [Online] Available from: <http://www.iea.org/about/glossary/> [Accessed November 2017].

30 International Energy Agency (no date) Glossary [Online] Available from: <http://www.iea.org/about/glossary/> [Accessed November 2017].

31 International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

Oil and gas rents are particularly important to national revenue in many countries including Kuwait, Iraq, and South Sudan [32], and there are expectations that oil revenues can stimulate economic growth across Sub-Saharan Africa [33]. The long-term socio-economic impact of oil and gas wealth varies considerably across countries, based on factors including revenue management and social and environmental impacts.

The oil and gas market share is dominated by large publically owned companies, often called 'supermajors', which can withstand the volatility in oil prices. However, there are also a number of national private and public companies. For example, there are over 500 different oil and gas companies operating contract blocks (the areas licensed to companies) across Africa [34]. The smaller and state owned companies, which showed a high incidence of occurrence in areas of biodiversity importance in Africa [34] will have an important role to play if biodiversity is to be effectively mainstreamed across the energy and mining sectors.

The 2014 oil price collapse has however led to cost reduction strategies among upstream businesses and scaling back exploration, particularly in high risk areas such as the Arctic.

Under a business as usual scenario, fossil fuels may still play a significant role in energy generation to 2040, with natural gas anticipated to be the fastest-growing fossil fuel driven by demand in developing economies [35].

A move towards more sustainable energy sources is however resulting in current and likely future changes to fossil fuel markets and consumption, particularly as countries work towards achieving the energy-related United Nations Sustainable Development Goals. Drives towards fuel-efficiency measures could see a reduction in demand for oil in some areas, whilst the use of coal may decrease with a move towards 'cleaner' fuels [36]. However, even under more carbon-constrained future energy scenarios (such as the International Energy Agency's Sustainable Development Scenario), *'upstream oil and gas investment remains a major component of a secure energy system'* [37].

3.3 Metals and Minerals

There are a number of types of mining activities: surface mining whereby minerals or metals are separated from other rocks as they are removed from the mining pit; underground mining whereby the surface remains largely intact and minerals and metals are removed through shafts or tunnels; and dredge mining whereby rocks and sediments are removed from the floor of a body of water.

Artisanal and small-scale mining (ASM) is a practice performed by individuals, groups or communities in an informal manner, often characterised by the minimal use of technology and machinery, the lack of legal titles, low productivity and poor safety and environmental safeguards. It can take the form of either surface or underground mining. It is however an important and increasingly popular livelihood for tens of millions of people around the world. Artisanal and small-scale miners work in more than 80 countries and produce some 10% of the world's mined gold, 15-

³² World Bank (no date) World Bank Open Data [Online] Available from: <http://data.worldbank.org/> [Accessed November 2017].

³³ Cooke, J.G. and Goldwyn, D.L. (2015) New Energy Producers – Making the Most of Emerging Opportunities. Centre for Strategic and International Studies, Washington DC.

³⁴ Leach, K. Brooks, S.E., Blyth, S. (2016) Potential threat to areas of biodiversity importance from current and emerging oil and gas activities in Africa. UNEP World Conservation Monitoring Centre, Cambridge, U.K.

³⁵ International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

³⁶ International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

³⁷ International Energy Agency (2017) World Energy Outlook 2017 [Online] Available from: <http://www.iea.org/weo2017/> [Accessed November 2017].

20% of mined diamonds, approximately 20-25% of mined tin and tantalum, and 80% of coloured gemstones [38].

Mining for metals and minerals plays a vital role in the economic development of many countries and can be an important contributor to employment and income generation, particularly in countries such as South Africa, Australia, Chile and China [39].

Over the past decade global demand for mined commodities has been driven by growth of the Chinese economy. China accounts for more than 70% of the global demand for iron ore. There has however been a recent slowdown in demand with an associated fall in commodity prices. Global demand for certain metals is predicted to increase by up to 90% by 2030 (e.g. 90% for steel, 80% for copper, 50% for aluminium, nickel and zinc) [40].

38 Villegas, C., Weinberg, R., Levin, E., and Hund, K. (2012) Artisanal and Small-scale Mining in Protected Areas and Critical Ecosystems Programme (ASM-PACE) - A Global Solutions Study 2012 [Online] Available from: <http://www.levinsources.com/assets/pages/Global-Solutions-Study.pdf> [Accessed November 2017].

39 PwC (2016) Mine 2016 [Online] Available from: <https://www.pwc.com/gx/en/mining/pdf/mine-2016.pdf> [Accessed November 2017].

40 Chatham House (2013) Natural Resources in 2020, 2030 and 2040: Implications for the United States. National Intelligence Council Report [Online] Available from: <https://www.dni.gov/files/documents/NICR%202013-05%20US%20Nat%20Resources%202020.%202030%202040.pdf> [Accessed November 2017].

4 Biodiversity Dependencies and Impacts

4.1 Dependencies

The energy and mining sectors depend on biodiversity and ecosystem services in a number of different ways. Some examples of these dependencies are outlined below.

At the operational level oil and gas and mining are dependent on various ecosystem services, the most prominent being water used throughout operations. Many renewable sectors also have a strong dependency on a water supply. For example, wet-cooled concentrated solar power plants require significant water for cooling [41] and hydropower relies on the flow regime of natural river systems, many of which are part of watersheds protected by national parks.

The significant infrastructure required for these structures, particularly on land (e.g. roads, pipelines, dams, operational structures) are often dependant on erosion control, soil and slope stabilisation through vegetation and the protection afforded by ecosystems against natural disasters such as flooding and storm surges [42]. Ecosystems are relied upon for remediation of wastes and pollution from discharges and spills.

The production of feedstocks for biofuels is however perhaps the sector with the greatest dependency on biodiversity for services such as pollination, disease control, and water supply.

Under future climate change scenarios, factors such as increased water scarcity and frequency of extreme weather events are likely to amplify these dependencies.

4.2 Impacts

When considering the impacts of the energy and mining sectors on biodiversity and ecosystem services, the focus is largely on the exploration and production of oil and gas, generation of renewable energy, and mining of coal, minerals and metals where there is potential for a significant environmental footprint and associated impact on biodiversity. It should be noted however that the transportation, processing and marketing of extracted materials and energy generation from non-renewables also has an impact on biodiversity. Impacts on biodiversity vary throughout the lifecycle of the project, including exploration, development, production, transportation, and decommissioning and post-closure (restoration/ rehabilitation of habitats and biodiversity). Each stage needs to be individually assessed and planned for. Many mining and energy projects have long lifespans and impacts can occur over time periods that exceed the life time and geographical limits of a mine or energy project.

Many measures needed to improve the efficiency of material and energy use will need to be developed in line with a whole life-cycle approach. The Cross Sector Biodiversity Initiative (a partnership between Equator Principles finance institutions, IPIECA - the global oil and gas association for environmental and social issues, the International Council on Mining and Metals and a number of development banks) has developed a timeline tool that illustrates the timeline of biodiversity impacts and considerations, alongside financing and project development timeframes (Figure 1).

⁴¹ UNEP (2016) Green Energy Choices: The benefits, risks and trade-offs of low-carbon technologies for electricity production. Report of the International Resource Panel. E. G. Hertwich, J. Aloisi de Larderel, A. Arvesen, P. Bayer, J. Bergesen, E. Bouman, T. Gibon, G. Heath, C. Peña, P. Purohit, A. Ramirez, S. Suh, (eds.).

⁴² ACCA, Flora & Fauna International and KPMG LLP (2012) Is natural capital a material issue? [Online] Available from: <http://www.accaglobal.com/content/dam/acca/global/PDF-technical/environmental-publications/natural-capital.pdf> [Accessed November 2017].



Figure 1: Cross Sector Biodiversity Initiative Timeline Tool [43]

The locations of extraction of energy and materials, their subsequent processing and use, the ultimate consumption of the products, and the disposal of wastes, are typically separated over large distances, such that control of impacts may require cooperation across international boundaries.

Impacts (and dependencies) differ across the various sectors at different stages of projects and will depend on the nature of the activity, the sensitivity of the environment in which it occurs, and other activities taking place in the area (amongst other considerations). Prioritisation should therefore be conducted at national level, taking into consideration the following impact types.

4.2.1 Climate Change Impacts

The burning of fossil fuels is widely known to be a major cause of climate change, presenting a significant impact on biodiversity globally [44]. Energy-related activities contribute approximately 70% of global greenhouse gas (GHG) emissions; oil and gas together represent approximately 60% of those energy-related emissions through their extraction, processing and subsequent combustion [45]. Deforestation associated with clearing for the production of biofuel is also a significant contributor to climate change. Climate change is recognised as a very serious threat to biodiversity and ecosystem services at the global scale [46]. The transition away from fossil fuel based energy sources is key to mitigating this threat. The trend towards renewable sources of energy is likely to strengthen the dependence of the sector on ecosystem services, particularly for those focusing on biofuels.

43 Cross-Sector Biodiversity Initiative (no date) Timeline Tool [Online] Available from: <http://www.csbi.org.uk/tools-and-guidance/timeline-tool/> [Accessed November 2017].

44 Intergovernmental Panel on Climate Change (2002) Climate Change and Biodiversity. Intergovernmental Panel on Climate Change Technical Paper V [Online] Available from: <https://www.ipcc.ch/pdf/technical-papers/climate-changes-biodiversity-en.pdf> [Accessed November 2017].

45 Institutional Investors Group on Climate Change (2010) Global climate disclosure framework for oil and gas companies. http://www.iigcc.org/files/publication-files/Global_Climate_OG_DisclosureFramework.pdf [Accessed November 2017].

46 Intergovernmental Panel on Climate Change (2002) Climate Change and Biodiversity. Intergovernmental Panel on Climate Change Technical Paper V [Online] Available from: <https://www.ipcc.ch/pdf/technical-papers/climate-changes-biodiversity-en.pdf> [Accessed November 2017].

4.2.2 Direct Impacts

The direct impacts [47] on biodiversity associated with the production and distribution of energy and mined resources relate to the footprint of the operations, their inputs in terms of water use, the use of land and the outputs in terms of waste, contaminated water and emissions. These activities can lead to habitat loss, degradation, and fragmentation, and population declines of impacted species, among other impacts. Acoustic disturbance and electromagnetic fields during the construction and operational phases (for example wind farms) can also have direct negative impacts on biodiversity [48].

Operations include both direct infrastructure (e.g. oil rigs, mines, fields of solar panels, or wind turbines) and ancillary developments (e.g. worker camps, waste facilities, and access roads). Distribution and processing operations (power lines, pipelines, power stations, processing plants etc.) can also have large direct impacts on biodiversity and ecosystem services. The extent of these impacts varies between the sectors. For example unconventional oil and gas is thought to have a far greater footprint than conventional operations due to the greater number of wells required, increasing the potential for habitat loss and fragmentation, as well as the high water consumption of this industry (e.g. hydraulic fracturing [49]). The potential impacts and management of newer technologies and techniques, such as deep seabed mining, are still being reviewed [50]. Distinctions can also be made between different mining techniques in terms of their environmental impact. For example, open-pit mining is considered to be one of the most environmentally destructive types of mining (due to large-scale removal of vegetation), whereas underground mining has a much smaller impact on the environment [51]. The impacts of distribution networks (roads, pipelines, pylons, cables etc.) can also vary depending on the environment they traverse.

While artisanal and small-scale mining brings in needed income for rural communities, it is also a serious and growing threat to biodiversity and the integrity of protected areas. Furthermore it can have significant social issues e.g. health impacts. For example artisanal gold mining typically uses mercury with severe implications for biodiversity and human health. The environmental impacts relate to the mining methods – clear-cutting forests, river dredging, frequent use of toxic chemicals. Environmental degradation associated with artisanal mining is, in part, exacerbated by the political marginalization of the artisanal and small-scale mining sector. This is coupled with the lack of appropriate incentives to mine in a more environmentally sensitive manner [52].

Impacts on biodiversity may directly impact on communities and indigenous people's rights, limiting access to traditional sites or natural resources used for food, fuel or medicine. Free Prior Informed Consent processes [53] are seen as an important tool for communities to accept, decline or amend

47 An outcome directly attributable to a defined action or project activity e.g. the impact a mine site has through its use of water, the land footprint that it occupies (Business and Biodiversity Offsets Programme (BBOP). 2012. Glossary. BBOP, Washington, D.C. 2nd updated edition [Online] Available from http://bbop.forest-trends.org/guidelines/Updated_Glossary [Accessed October 2017].

48 Wilhelmsson, D. *et al* (eds.) (2010). Greening Blue Energy: Identifying and managing the biodiversity risks and opportunities of off shore renewable energy. Gland, Switzerland: IUCN. 102pp.

49 European Commission (no date) Science for environmental policy. Unconventional shale gas and oil: overview of ecological impacts [Online] Available from: http://ec.europa.eu/environment/integration/research/newsalert/pdf/overview_of_environmental_impacts_of_shale_gas_and_oil_398na1_en.pdf [Accessed November 2017].

50 Levin, L. Mengerink, K., Gjerde, K.M., Rowden, A.A., Van Dover, K.L., Clark, M.R., Ramirez-Llodra, E., Currie, B., Smith, C.R., Sato, K.N., Gallo, N., Sweetman, A.K., Lily, H., Armstrong, C.W., Bridger, J. (2016) Defining "serious harm" to the marine environment in the context of deep-seabed mining. *Marine Policy*, Volume 74, Pages 245-259.

51 Environmental Law Alliance Worldwide (2010) Guidebook for Evaluating Mining Project EIAs [Online] Available from: <https://www.elaw.org/files/mining-eia-guidebook/Chapter1.pdf> [Accessed November 2017].

52 Villegas, C., Weinberg, R., Levin, E., and Hund, K. (2012) Artisanal and Small-scale Mining in Protected Areas and Critical Ecosystems Programme (ASM-PACE) - A Global Solutions Study 2012 [Online] Available from: <http://www.levinsources.com/assets/pages/Global-Solutions-Study.pdf> [Accessed November 2017].

53 'Processes in which communities decide whether or not to allow projects affecting their land or resources to go ahead, and on what terms. The requirement for prior informed consent (PIC) to be 'free' responds to experiences where indigenous peoples have been coerced into giving their consent, rather than being allowed to give it freely or deny consent' (International Institute for Environment and Development (IIED) (2012) Biodiversity and culture: exploring community protocols, rights and consent. Participatory Learning and Action 65. IIED).

proposals that may impact their land or resources that they rely upon [54]. When community-led, such processes can provide a vital mechanism both for the preservation of human rights in relation to energy and mining projects, and the sustainable use of biodiversity and ecosystem services.

Renewable energy sources also have a number of direct potential impacts on biodiversity, as outlined in Figure 2. While the transition to renewable energy sources is essential for a sustainable future and the mitigation of severe climate change impacts, the biodiversity impacts associated with renewable technologies need to be acknowledged and addressed.

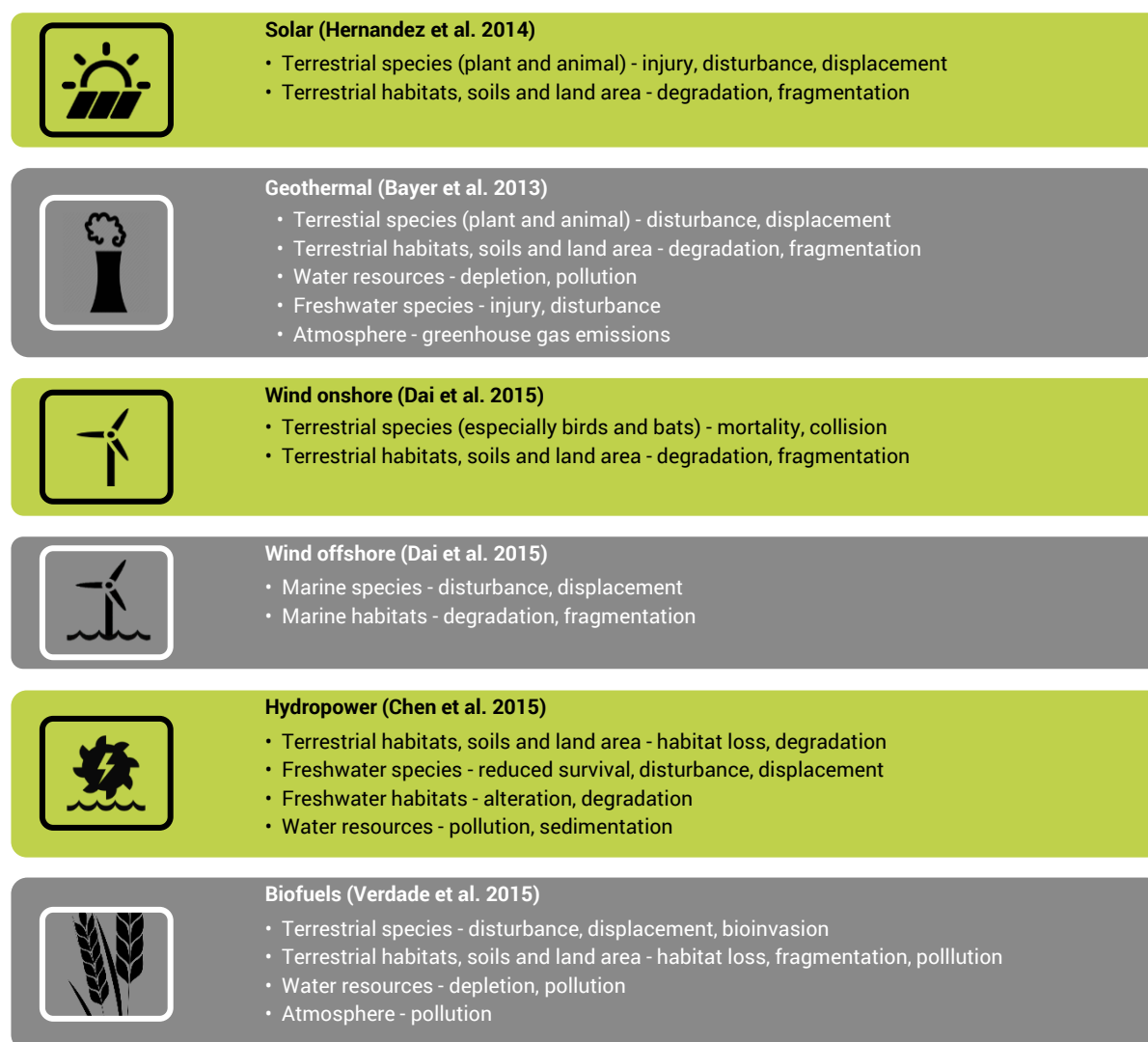


Figure 2: Summary of Direct Impacts of Renewable Energy on Biodiversity and Ecosystem Services [55]

⁵⁴ International Institute for Environment and Development (IIED) (2012) Biodiversity and culture: exploring community protocols, rights and consent. Participatory Learning and Action 65. IIED.

⁵⁵ Hernandez, R.R., Easter, S.B., Murphy-Mariscal, M.L., Maestre, F.T., Tavassoli, M., Allen, E.B., Barrows, C.W., Belnap, J., Ochoa-Hueso, R., Ravi, S. and Allen, M.F. (2014) Environmental impacts of utility-scale solar energy. *Renewable and Sustainable Energy Reviews*, 29, 766-779. Bayer, P., Ryback, L., Blum, P. and Brauchler, R. (2013) Review on life cycle environmental effects of geothermal power generation. *Renewable and Sustainable Energy Reviews*, 26, 446-463. Dai, K., Bergot, A., Liang, C., Xiang, W.-N. and Huang, Z. (2015) Environmental issues associated with wind energy – A review. *Renewable Energy*, 75, 911-921. Chen, S., Chen, B. and Fath, B.D. (2015) Assessing the cumulative environmental impact of hydropower construction on river systems based on energy network model. *Renewable and Sustainable Energy Reviews*, 42, 78-92. Verdade, L.M., Piña, C.I., and Rosalino, L.M. (2015) Biofuels and biodiversity: Challenges and opportunities. *Environmental Development*, 15, 64-78.

Energy and mining operations can also have direct impacts on local communities, through changes to the availability, abundance or quality of previously free and accessible natural resources. Such interactions highlight the importance of the consideration of linkages between biodiversity, human rights, and other social values.

4.2.3 *Unplanned Impacts*

In addition to those that can be anticipated, direct impacts can arise from unplanned incidents with far reaching implications. For example, the Deep Water Horizon oil spill in 2010 affected more than 2100 kilometres of shoreline, impacting coastal habitats and a large number of marine species [56].

Equally the tailings dam failure at Samarco, Brazil not only had local and immediate impacts but led to contamination of a 600 kilometre stretch of riverine habitat extending to the Atlantic Ocean [57]. The impacts of this event were wide reaching, with impacts on the entire ecosystem, loss of biodiversity (plants, animals, microorganisms, etc.) and the return of yellow fever to the area, with serious health implications for both wildlife and humans.

There are also risks to biodiversity associated with the potential introduction of invasive species to an area as a result of energy and mining activities, particularly the expansion of biofuel crops [58].

4.2.4 *Indirect Impacts* [59]

Induced Impacts

There are often a host of potential induced impacts related to energy and mining activities. Biodiversity impacts linked to the in-migration of people to an area can be very significant. In-migration can lead to further encroachment of natural habitats and increased exploitation of natural resources, including forests, wildlife and fish, to unsustainable levels.

As mineral and petroleum reserves become depleted, exploration for resources is moving into more remote and challenging environments, including areas of the Amazon and Congo forests. This can lead to increased access to pristine areas, and increased pressures from a range of activities including logging and bush meat hunting [60].

New technologies (e.g. fracking) and potential operation locations (e.g. seabed mining) will present new induced impacts on biodiversity and ecosystem services.

Supply Chain Impacts

There are often biodiversity impacts associated with the supply chain for energy and mining activities.

For example, the likely increase in the adoption of green energy technologies would result in a concurrent increase in demand for the mined resources required to produce, distribute, install and run them. Photovoltaic power cells require a significant amount of metals such as copper and

⁵⁶ Beyer, J., Trannum, H.C., Bakke, T., Hodson, P.V., Collier, T.K. (2016) Environmental effects of the Deepwater Horizon oil spill: A review. *Marine Pollution Bulletin* 110(1) 28-51.

⁵⁷ Schoenberger, E. (2016) Environmentally sustainable mining: The case of tailings storage facilities. *Resources Policy*, 49, 119-128.

⁵⁸ International Union for Conservation of Nature (2009) *Guidelines on Biofuels and Invasive Species*. Gland, Switzerland: IUCN. 20pp.

⁵⁹ Impacts triggered in response to the presence of the project, rather than being directly caused by the project's own operations such as inward migration of people. An outcome directly attributable to a defined action or project activity e.g. the impact a mine site has through its use of water, the land footprint that it occupies (Business and Biodiversity Offsets Programme (BBOP). 2012. Glossary. BBOP, Washington, D.C. 2nd updated edition [Online] Available from http://bbop-forest-trends.org/guidelines/Updated_Glossary [Accessed October 2017].

⁶⁰ Energy and Biodiversity Initiative (no date) *Negative Secondary Impacts from Oil and Gas Development* [Online] Available from: <http://www.theebi.org/pdfs/impacts.pdf> [Accessed November 2017].

aluminium in their production. However, as technology and material efficiency improves, supply chain impacts are expected to decrease [61].

Impacts Associated with Revenue Flows

Natural resources play a central role in the economies of all nations, and there are great opportunities for revenues from natural resources to support sustainable development. However resource wealth does not always filter down and support poverty alleviation and the local economy, and is not always invested to support long term sustainability objectives. Revenue from energy and mining activities may be used to fund infrastructure or other development projects which, if not planned appropriately, can further impact biodiversity and ecosystem services.

4.2.5 Cumulative Impacts

There are very often a number of other actors present in any landscape. Therefore, project impacts need to be considered relative to existing threats to assess the cumulative impacts [62] in any given landscape.

Cumulative impacts can affect biodiversity and ecosystem services in many ways, from site to landscape level. Impacts can also accumulate over time. The habitat loss impacts on a species at site level could be compounded by stress induced by operation noise. Chemicals or heavy metals can (bio) accumulate in environments over time. Habitat fragmentation caused by a pipeline can be compounded by land use change associated with agricultural operations.

In many instances cumulative impacts are taken to relate to other mining or energy related projects in the vicinity. However, consideration should also be given to the interactions between mining or energy and other sectors within an area.

A recent study found that mining, oil and gas and renewable energy activities (categorised collectively as energy production) posed a threat to 913 threatened or near-threatened species from comprehensively assessed species groups on the International Union for Conservation of Nature Red List [63]. The activities that were identified as the most prevalent threat to the species considered were (in descending order of threat level) overexploitation, agriculture, urban development, invasions and disease, pollution, system modification (including fire and dams), climate change, human disturbance and transport. Many such activities are likely to be associated with, or found within, the same areas as energy and mining activities.

4.3 Location Considerations

When considering the impact of energy and mining activities on biodiversity, the siting of a project (including ancillary and subsequent development) is of critical importance. Whilst by no means a complete review, the bullet points below provide some illustrative examples of the importance of considering location in relation to direct, cumulative and indirect/induced biodiversity impacts.

- A study of the potential threat posed by oil and gas operations across Africa showed that 20% of oil and gas contract blocks overlap with protected areas and Key Biodiversity Areas

⁶¹ United Nations Environment Programme (2016) Green Energy Choices: The benefits, risks and trade-offs of low-carbon technologies for electricity production. Report of the International Resource Panel. E. G. Hertwich, J. Aloisi de Lardere, A. Arvesen, P. Bayer, J. Bergesen, E. Bouman, T. Gibon, G. Heath, C. Peña, P. Purohit, A. Ramirez, S. Suh, (eds.).

⁶² Impacts arising not only from the project itself, but other activities and background pressures or trends (Business and Biodiversity Offsets Programme (BBOP). 2012. Glossary. BBOP, Washington, D.C. 2nd updated edition [Online] Available from http://bbop.forestry-trends.org/guidelines/Updated_Glossary [Accessed October 2017]).

⁶³ Maxwell, S.L., Fuller, R.A., Brooks, T.M. and Watson, J.E.M. (2016) Biodiversity: The ravages of guns, nets and bulldozers. *Nature* 536, 143–145.

[64]. For example, a large proportion of Alliance for Zero Extinction sites [65] overlap with existing contract blocks. These areas represent the last refuge for species threatened with global extinction, and so potential operations within them are of concern.

- Analysis of 306 reported tailings dam failures indicates that 24 have occurred within a legally protected area, and a further 158 occurred within 10km of a protected area. In addition to the consequences of such failures for loss of human life, the impacts of these tailings dam failures on biodiversity are immediate in terms of smothering habitats and contaminating waterways. They also result in persistent changes to the ecosystem functions and the services they provide to people [66].
- Hydroelectric dams that are developed in ecologically sensitive locations can have severe implications for the surrounding area as a result of changing and diverting the flow of rivers and flooding. For example the proposed Belo Monte dam on the Amazon's Xingá river has been widely criticised for its predicted social and environmental impacts associated with inundating large expanses of ecologically rich forest and reduced water flows along stretches of the river [67]. Such impacts would also prevent the attainment of Sustainable Development Goals.
- Wind energy developments present a risk to migratory birds, causing direct mortality from turbine collisions and altering migratory routes through avoidance behaviour. These impacts could however be reduced if facilities avoid major migration stopovers and flyways, or if turbine operations are reduced in these areas during peak migration [68].
- Solar energy is a very promising source of sustainable energy. However, solar installations often require large areas of land. If not sited appropriately, solar installations can therefore impact biodiversity through land use change and fragmentation [69]. Factors such as distance from existing transmission infrastructure and the type of land the solar facilities are installed on can increase potential impacts on biodiversity [70].

4.4 Impact Changes Over Time

Impacts associated with the energy and mining sectors are likely to change over time as a result of, for example, technological advances and climate change. There are also likely to be changes in demand due to increasing affluence in high population countries such as China and India, and increasing demand for metals.

As easily accessible oil, gas and other mined resources are depleted, exploration is moving into more challenging and often sensitive environments. The Arctic, for example, is thought to contain around 20% of the world's remaining undiscovered oil and gas resources [71]. This will likely amplify the

⁶⁴ Leach, K. Brooks, S.E., Blyth, S. (2016) Potential threat to areas of biodiversity importance from current and emerging oil and gas activities in Africa. UNEP World Conservation Monitoring Centre, Cambridge, U.K.

⁶⁵ Sites identified by the Alliance for Zero Extinction ('a joint initiative of biodiversity conservation organizations from around the world') as 'the last remaining refuge of one or more Endangered or Critically Endangered species' (as listed on the IUCN Red List), irreplaceable and discrete in area (Alliance for Zero Extinction (no date) [Online] Available from: <http://www.zeroextinction.org/overviewofaze.htm> [Accessed November 2017]).

⁶⁶ United Nations Environment Programme and GRID ARENDAL (2017) Mine tailings storage: Safety is no accident. A rapid response assessment [Online] Available from: <http://www.grida.no/publications/383> [Accessed November 2017].

⁶⁷ Ritter, C.D., McCrate, G., Nilsson, R.H., Fearnside, P.M., Palme, U., Antonelli, A. (2017) Environmental impact assessment in Brazilian Amazonia: Challenges and prospects to assess biodiversity. *Biological Conservation*, 206, 161-168.

⁶⁸ Pocewicz, A., Estes-Zumpf, W.A., Andersen, M.D., Copeland, H.E., Keinath, D.A., et al. (2013) Modelling the Distribution of Migratory Bird Stopovers to Inform Landscape-Scale Siting of Wind Development. *PLOS ONE* 8(10).

⁶⁹ Hernandez, R.R., Hoffacker, M.K., Murphy-Mariscal, M.L., Wud, G.C. and Allen, M.F.I (2015) Solar energy development impacts on land cover change and protected areas. *PNAS*, 112 (44).

⁷⁰ Carnegie Science (2015) Solar Energy's Land-Use Impact [Online] Available from: <https://carnegiescience.edu/news/solar-energy%E2%80%99s-land-use-impact> [Accessed November 2017].

⁷¹ European Parliament (no date) European Parliament resolution of 9 October 2008 on Arctic governance [Online] Available from: <http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P6-TA-2008-0474&language=EN> [Accessed November 2017].

threat posed to biodiversity by these sectors in certain regions. Research on current and future fossil fuel extraction predicts that future exploitation will show an increased proportional overlap with protected areas, particularly with more strictly protected areas (International Union for Conservation of Nature management categories 1-4 protected areas) which are deemed less compatible with oil development [72]. Where activities move into more remote locations there is also an increased threat from associated infrastructure and increased access for multiple users.

Shifts in the energy mix will also lead to a change in the nature of impacts and dependencies of the energy and mining sectors. The transition to a low carbon economy may lead to some oil and gas industry assets being made redundant in the future. However, increased production of biofuels and other forms of renewables may also have significant impacts on biodiversity. While a transition to renewable energy is welcome to mitigate the impacts of climate change, those impacts associated with renewable technologies can be expected to become more significant.

Studies have highlighted the impacts of low carbon energy policies on biodiversity, notably in the United Kingdom [73] and on the Natura 2000 network in the European Union [74]. The United Kingdom study identified challenges associated with determining impacts on biodiversity, such as whether to assess for selected species or all taxa, the geographical extent to consider and how impacts might change over time. A new methodology for assessing biodiversity impacts of energy technologies was developed as a result. The Natura 2000 study looked at the biodiversity impacts of specific existing and potential future renewable energy technologies, focusing on onshore and offshore wind farms, hydro-energy dams and marine energy (particularly tidal barrages).

The impact profiles of renewables differ to some extent from that of oil and gas. For example, wind energy (currently the most developed and affordable form of renewable energy technology [75]) can impact on biodiversity through direct collisions, displacement from feeding and nesting areas, habitat fragmentation, degradation and/or loss [76]. A recent study investigating the potential impacts of wind energy on birds and bats found that collisions are more likely to occur at larger turbines and for more mobile species (i.e. migratory birds and far-ranging bat species) [75].

Box 2: Workshop Perspectives – Impacts

Prioritisation of activities targeted for mainstreaming should be based on the **severity of impact or degree of dependency** and therefore needs to be carried out at the **national level**.

All sub-sectors and development phases need to be addressed. In terms of research and evaluation of impacts, specific attention should be given to some activities such as **artisanal and small-scale mining, the unconventional oil and gas sector, biofuels and hydro energy**. It was also raised that the focus should be on **new developments** (i.e. new mining or energy production locations) where there are greater opportunities for impact mitigation.

[72] Harfoot, M.B.J., Tittensor, D.P., Knight, S., Arnell, A.P., Blyth, S., Brooks, S., Butchart, S.H.M., Hutton, J., Jones, M.I., Kapos, V., Scharlemann, J.P.W., and Burgess, N.D. (In Prep) Present and future biodiversity risks from fossil fuel exploitation.

[73] BIO by Deloitte, IEEP and CEH (2014) Towards integration of low carbon energy and biodiversity policies. BIO by Deloitte (BIO), Institute for European Environmental Policy (IEEP) and the Centre for Ecology and Hydrology (CEH). Report prepared for Defra, Project Code WC1012, UK.

[74] Bertzky, M., B. Dickson, R. Galt, E. Glen, M. Harley, N. Hodgson, G. Keder, I. Lysenko, M. Pooley, C. Ravilious, T. Sajwaj, R. Schiopu, Y. de Soye & G. Tucker (2010) Impacts of climate change and selected renewable energy infrastructures on EU biodiversity and the Natura 2000 network: Summary Report. European Commission and International Union for Conservation of Nature, Brussels.

[75] Thaxter, C.B., Buchanan, G.M., Carr, J., Butchart, S.H.M., Newbold, T., Green, R.E., Tobias, J.A., Foden, W.B., O'Brien, S. & Pearce-Higgins, J.W. (2017). Bird and bat species' global vulnerability to collision mortality at wind farms revealed through a trait-based assessment. *Proceedings of the Royal Society B*, 284(1862).

[76] Schuster, E., Bulling, L., and Köppel, J. (2015). Consolidating the state of knowledge: a synoptical review of wind energy's wildlife effects. *Environmental management*, 56(2), 300-331. Thaxter, C.B., Buchanan, G.M., Carr, J., Butchart, S.H.M., Newbold, T., Green, R.E., Tobias, J.A., Foden, W.B., O'Brien, S. & Pearce-Higgins, J.W. (2017). Bird and bat species' global vulnerability to collision mortality at wind farms revealed through a trait-based assessment. *Proceedings of the Royal Society B*, 284(1862).

Direct impacts of energy and mining activities, which result in land conversion, water use, pollution and emissions, were considered an ongoing challenge. However, while there remains a need to **upscale good practice**, good progress is being made by these sectors to address direct impacts.

Greater focus is needed on indirect, cumulative and transboundary impacts, requiring cross-sectoral collaboration and coordination.

It was also highlighted that **impacts have different timeframes** (lower impacts over long time periods versus higher impacts over a short timeframe). **Priorities were considered likely to change over time** as a result of, for example, a move towards renewable energy and changes to the energy and mining sectors in the future. Similarly, it was identified that there was a need to consider what **advances in technology** and **climate change** might mean for land use change and biodiversity.

The role of **extractive revenue in driving large scale** infrastructure development and growth in other economic sectors has significant implications for biodiversity at the broader landscape scale and there is a need to focus attention there, rather than starting with project level biodiversity impacts and dependencies.

4.5 Potential Positive Contributions of Energy and Mining Sectors

In considering the mainstreaming of biodiversity into the energy and mining sectors, opportunities for the activities of these sectors to provide positive contributions to biodiversity conservation should also be considered. Whether a positive contribution can be made will depend on a number of factors, including the status of the area prior to commencement activities, the planning of the project, the careful management of the project throughout its entire lifecycle and the criteria by which 'positive impact' is assessed. Many other considerations such as cost, awareness, willingness and legal frameworks may also have an impact on the uptake of positive contribution projects.

These interventions may prove most successful in environments that have already been subject to negative impacts. For example, the careful restoration of habitat upon completion of mining activities that were undertaken in an already depleted environment could result in benefits both for biodiversity and local communities [77].

Some activities may have unintended positive consequences for biodiversity. For example, the restriction of trawlers within offshore wind farms in areas where they previously operated can essentially create 'no take zones' over relatively large areas [78]. If not discouraged from the area by noise or other disturbance associated with the wind farm, the reduction in physical disturbance could positively affect fish stocks. There are also opportunities for industry to benefit biodiversity conservation through support (technical and/or financial) of, for example, protected area conservation or creation, scientific research and analysis, education and awareness raising or conservation campaigns [79].

Further studies are needed to understand the potential positive impacts of such actions. However, the consideration of these opportunities aligns with an increasing trend towards 'net positive impact' commitments by companies and requirements from lenders (net gain in critical habitat required for lending under the International Finance Corporation's Performance Standard 6). Such commitments

⁷⁷ International Council on Mining and Metals (2006) Good Practice Guidance for Mining and Biodiversity. International Council on Mining and Metals (ICMM), London, UK.

⁷⁸ Wilhelmsson, D. *et al* (eds.) (2010). Greening Blue Energy: Identifying and managing the biodiversity risks and opportunities of offshore renewable energy. Gland, Switzerland: IUCN. 102pp.

⁷⁹ Energy and Biodiversity Initiative (no date) Opportunities for Benefiting Biodiversity Conservation [Online] Available from: <http://www.theebi.org/pdfs/opportunities.pdf> [Accessed November 2017].

and requirements are discussed further in 'Section 5 - Mainstreaming Biodiversity: Tools, Approaches and Policy Drivers' below.

4.6 Implications for Stakeholders

The biodiversity impacts and dependencies of the energy and mining sector have a number of implications for stakeholders.

At a national level, sustainable management of biodiversity and ecosystem services (amongst other factors) is important for governments to meet national and international sustainability targets, such as the Sustainable Development Goals. This is particularly important in those countries where energy and mining provide large contributions to the national economy. Furthermore, efficient management and sustainable use of biodiversity and ecosystem services could help reduce government costs associated with environmental externalities such as increased occurrence of floods.

There are also clear benefits to business from mainstreaming biodiversity into the energy and mining sectors leading to enhanced reputation, preferred development partner status, preferential access to finance and faster development times. Many businesses recognise the reputational issues related to poor management of biodiversity and ecosystem services. Equally financial institutions are increasingly incorporating standards on biodiversity that will restrict finance to projects that do not effectively assess and mitigate threats. Mainstreaming biodiversity into the energy and mining sectors could lead to sector wide change that does not disadvantage responsible business action on biodiversity to address the range of potential threats posed by these sectors (e.g. climate change) and foster positive outcomes for local communities.

5 Mainstreaming Biodiversity: Tools, Approaches and Policy Drivers

5.1 Introduction

There are opportunities for a greater contribution from the private sector and other stakeholders to the effective implementation of the Convention on Biological Diversity and the Sustainable Development Goals through mainstreaming biodiversity into the energy and mining sectors.

There are a number of tools, approaches and policy instruments that can be used to ensure that the biodiversity impacts and dependencies of energy and mining developments are planned for, their impacts effectively mitigated, and that such developments result in long term benefits to biodiversity and society.

This section provides some examples of the tools, approaches and policy drivers relevant to mainstreaming biodiversity into the energy and mining sectors. Further information on specific tools can be found in Annex B and D.

5.2 Examples of Good Practice

The biodiversity impacts of energy and mining activities often depend on the location of project (i.e. the ecological sensitivity of the project site and surrounding area), the ways activities are carried out, and other existing activities and pressures in the area. Strategies to mainstream biodiversity therefore include those that support effective planning for development to safeguard ecologically sensitive areas from direct/indirect and cumulative impacts, as well as those that manage operations to reduce the direct, induced and cumulative impacts and deliver benefits to biodiversity and society.

Central to effective impact mitigation are:

- Area-based planning at the landscape/seascape level that works across sectors, integrates biodiversity values and links into national and sub-national planning mechanisms and policies. Central to this is the role of Strategic Environmental Assessments and awarding of concessions in a manner consistent to the country's commitments under the Convention on Biological Diversity;
- Environmental and Social Impact Assessment at both the landscape/seascape level and project level;
- Application of the mitigation hierarchy (and associated goals of no net loss ^[80] or a net gain ^[81] of biodiversity) (see Figure 3) – an impact mitigation process that prioritises strategies to avoid impacts, followed by those that minimise, restore and finally offset or compensate for impacts and deliver gains. Strategies to avoid or minimise impacts should be prioritised

⁸⁰ The goal that the biodiversity (and ecosystem services) impacts of a project are balanced so that no net loss occurs. This is done through the mitigation hierarchy, where steps are taken (in order) to avoid, minimise, restore and then offset any remaining impacts (Business and Biodiversity Offsets Programme (BBOP). 2012. Glossary. BBOP, Washington, D.C. 2nd updated edition [Online] Available from http://bbop.forest-trends.org/guidelines/Updated_Glossary [Accessed November 2017]).

⁸¹ Where, through the application of the mitigation hierarchy process described above, there is an overall gain for biodiversity (and ecosystem services) as a result of a project, the term 'net gain' may be used (Business and Biodiversity Offsets Programme (BBOP). 2012. Glossary. BBOP, Washington, D.C. 2nd updated edition [Online] Available from http://bbop.forest-trends.org/guidelines/Updated_Glossary [Accessed November 2017]).

over remediation through restoration and offsetting where there is greater uncertainty and time lags associated with biodiversity outcomes [82].

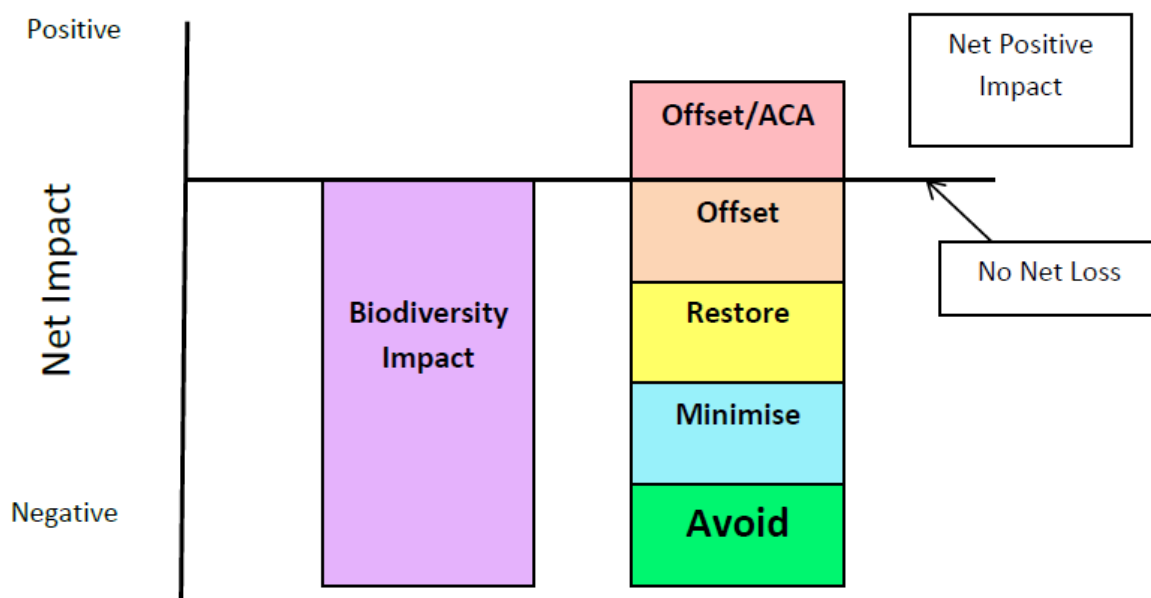


Figure 3: Illustration of the Mitigation Hierarchy in relation to Biodiversity No Net Loss or Net Positive Impact (Source: Cambridge Conservation Initiative (2015) Adapted from: The Biodiversity Consultancy (2013) [83])

While impact mitigation is an ongoing iterative process throughout the project life cycle, opportunities for impact avoidance are far greater at the planning phase of development where it can influence siting and design. This approach necessitates quantification of losses and gains to biodiversity and extends to indirect and induced impacts where these can be reliably predicted to occur.

In addition to planning and managing energy and mining developments with biodiversity in mind, there is an opportunity for mainstreaming biodiversity in investment decisions relating to, and that arise from, the energy and mining sector. The path to sustainable development requires finance that is lacking in many countries. Revenue from energy and mining is therefore an opportunity to generate capital that can be wisely invested in options for more sustainable and diverse future economies. Key to achieving this is transparency of revenue flows.

⁸² Cambridge Conservation Initiative (2015) Strengthening implementation of the mitigation hierarchy: managing biodiversity risk for conservation gains. A Cambridge Conservation Initiative – Collaborative Fund Project Report compiled by: BirdLife International, UNEP-WCMC, RSPB, FFI and the University of Cambridge.

⁸³ Cambridge Conservation Initiative (2015) Strengthening implementation of the mitigation hierarchy: managing biodiversity risk for conservation gains. A Cambridge Conservation Initiative – Collaborative Fund Project Report compiled by: BirdLife International, UNEP-WCMC, RSPB, FFI and the University of Cambridge. Adapted from: The Biodiversity Consultancy (2013) Private Sector No Net Loss commitments [Online] Available from: <http://www.thebiodiversityconsultancy.com/wp-content/uploads/2013/07/Private-Sector-No-Net-Loss-commitments2.pdf> [Accessed November 2017].

| | |
|---|--|
| Multilateral Environmental Agreements | <ul style="list-style-type: none"> • e.g. Convention on the Conservation of Migratory Species, Ramsar Convention, World Heritage Convention, United Nations Convention on the Law of the Sea, Protocol on Environmental Protection to the Antarctic Treaty |
| National and Regional Policies and Strategies | <ul style="list-style-type: none"> • e.g. Biodiversity focused (National Biodiversity Strategies and Action Plans, land use planning policies, policies for 'No Net Loss' or 'Net Gain' of biodiversity) and development / climate focused (e.g. Nationally Defined Contributions, development plans, regional initiatives such as the African Mining Vision, Gaborone Declaration, area based planning, environmental governance models (human rights), integrated planning) |
| National Legislation and its Implementation | <ul style="list-style-type: none"> • e.g. Constitutional provisions, sectoral codes, environmental laws and regulations, environmental impact assessment and Strategic Environmental Assessment Regulations, no-go and no-development policies (red-lining), net gain outcomes, national sustainable development plans, river basin / water catchment management plans, natural capital accounting, revenue management for sustainable development |
| Non-legislative External Drivers | <ul style="list-style-type: none"> • e.g. International Finance Standards (e.g. International Finance Corporation Performance Standard 6 (IFC PS6), the Environmental and Social Framework of the World Bank), voluntary standards / certification (e.g. ResponsibleSteel, Equitable Origin), industry-wide standards and guidance, pressure from society and investors (e.g. pension holders/ ethical investment), education |
| Corporate Policies and Standards | <ul style="list-style-type: none"> • e.g. Risk based approaches, codes of conduct, company policies and commitments (e.g. no-go or net positive impact on biodiversity to deliver net gain outcomes), company biodiversity action plans (BAPs), implementation of the mitigation hierarchy, natural capital accounting, ecosystem based approaches |

Figure 4: Drivers and Mechanisms

5.3 Mechanisms to Mainstream Good Practice

Multilateral environmental agreements (including the Convention on Biological Diversity) and the Sustainable Development Goals play a role in setting the agenda on mainstreaming biodiversity into the energy and mining sectors and can be a key driver for positive policy change.

Key mechanisms that exist to mainstream good practices include national policies and laws; corporate policies and standards; requirements set by financial institutions; and voluntary schemes such as certification. Some of these mechanisms are outlined below.

5.3.1 *The 2030 Agenda for Sustainable Development*

The three key pillars of sustainable development - economic, social and environmental sustainability - are largely complementary and need to be addressed coherently. The economic importance of mining and oil and gas operations very often leads to huge investments in infrastructure and can provide jobs and wealth creation in local areas, stimulating growth across a number of other sectors. Well managed operations with effective revenue distribution therefore have the potential to contribute to sustainable development and the achievement of the Sustainable Development Goals, as set out in The 2030 Agenda for Sustainable Development.

Among the factors that allow resource wealth to contribute to sustainable development is the transparency around transactions. However exploitation of natural resources, particularly in countries with limited history and experience in these sectors has frequently been associated with what is termed the “resource curse”. Regions with an abundance of natural resources may experience sluggish economic growth, and benefits which flow to individuals rather than the national economy as a whole. There is therefore a need for addressing transparency in revenue flows to foster more equitable and sustainable investments. The Extractives Industry Transparency Initiative – an international standard to promote open and accountable management of natural resources – encourages governments, extractive companies, civil society and the public to engage in discourse around transparency of the extractives sector and it aims to facilitate the management of a country’s natural resource wealth to benefit all its citizens. This initiative helps to build accountable and transparent institutions (Sustainable Development Goal 16.6), widen the political space for stakeholder participation (Sustainable Development Goal 16.7), improve tax systems (Sustainable Development Goal 17.1) and increase the availability of timely and reliable data (Sustainable Development Goal 17.18) [84].

If properly managed, the mining and energy sectors can also be pathways for sustainable development. Transformative policies can drive sustainable development. The Africa Mining Vision, for example, provides a framework for ensuring that Africa utilizes its mineral resources strategically for broad-based, inclusive development. Supported by the African Minerals Development Centre, United Nations Development Programme, African Development Bank, United Nations Economic Commission for Africa, and other continental institutions, the African Mining Vision encourages the alignment of mineral sector laws, policies and institutions with its provisions and derivative policy instruments. Companies operating in Africa’s mineral sector should consider instituting policies that comply with the provisions of the Africa Mining Vision on human rights, corporate accountability, gender justice, social and environmental impacts, as stakeholders in its implementation, and parties to the Africa Mining Vision Compact.

Initiatives such as the Gaborone Declaration for Sustainability in Africa whose membership includes 10 African countries (Botswana, Gabon, Ghana, Kenya, Liberia, Mozambique, Namibia, Rwanda, South Africa and Tanzania) offers a framework for integrating natural capital into sustainable

⁸⁴ Extractive Industries Transparency Initiative (2016) How the EITI contributes towards meeting the Sustainable Development Goals [Online] Available from: <https://eiti.org/document/how-eiti-contributes-towards-meeting-sustainable-development-goals> [Accessed November 2017].

economic growth, maintenance and improvement of social capital and human well-being and integration into development and business practice.

Sustainable Development Goal 7 refers to access to affordable, reliable, sustainable and modern energy for all, and the energy sector contributes to Sustainable Development Goal 7 in many ways. For example, investments in photovoltaics are directly relevant to Sustainable Development Goal 7 on energy, are highly relevant to the environmental dimension of sustainable development, and substantial energy investments has been put forward as an enabler for both social and economic development. The mining and energy sector can also contribute to Sustainable Development Goal 14 and 15 by, for example, preventing marine pollution from mine-related activities and implementing policies and practices to reduce the degradation of natural habitats and halt the loss of biodiversity within the impact area. Implementing responsible policies and methodologies in energy and mining on water use and pollution control can also contribute towards Sustainable Development Goal 6 to ensure availability and sustainable management of water and sanitation for all. As many energy and mining sectors have a dependency on water, this is particularly pertinent.



Figure 5: Major Issue Areas for Mining and the Sustainable Development Goals (Source: World Economic Forum 2016 [85])

5.3.2 Multilateral Environmental Agreements

Intergovernmental conventions play a role in setting the agenda for international policy that can influence national policies and legislation. A number of multilateral environmental agreements have identified energy and mining activities as relevant for their objectives and have been working on solutions and decisions. Some noteworthy examples include those summarised below. The Paris

85 World Economic Forum (2016) Mapping Mining and the Sustainable Development Goals: An Atlas. WEF, Geneva, Switzerland.

Agreement^[86], under the United Nations Framework Convention on Climate Change, is of particular importance in driving the need to reduce demand for fossil fuels and uptake of cleaner energy sources to mitigate the threat of climate change.

Table 1: Example Multilateral Environmental Agreements Relevant to Biodiversity, Energy and Mining

| Convention | Summary |
|---|---|
| Convention on the Conservation of Migratory Species of Wild Animals (CMS) ^[87] | The Convention on the Conservation of Migratory Species of Wild Animals has worked towards reconciling renewable energy development with conservation of migratory species. This work led to Resolutions 7.5; Resolution 10.19; Resolution 11.27; and the development of relevant guidelines and technical documents. This work was undertaken jointly with the Agreement on the Conservation of African-Eurasian Migratory Waterbird Agreement (AEWA) under which resolutions Resolution 5.16 and 6.11 were adopted. Further decisions were taken at the 12 th Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals relating to support to the Energy Task Force. |
| Minamata Convention on Mercury ^[88] | The Minamata Convention on Mercury, entered into force in 2017, aims for a ban on new mercury mines, phase-out of existing ones and regulation of the informal sector of artisanal and small-scale gold-mining. |
| Protocol on Environmental Protection to the Antarctic Treaty ^[89] | The Protocol on Environmental Protection to the Antarctic Treaty, also known as the Antarctic-Environmental Protocol or Madrid Protocol, prohibits all activities relating to Antarctic mineral resources, except for scientific research. |
| Ramsar Convention ^[90] | Under the Ramsar Convention, Resolution XI.10 on Guidance for Addressing the Implications for Wetlands of Policies, Plans and Activities in the Energy Sector (2012) was adopted. At the last meeting of the Conference of the Parties, the use of peatlands was addressed. |
| United Nations Convention on the Law Of the Sea (UNCLOS) ^[91] | Under United Nations Convention on the Law Of the Sea, a regulatory framework for deep-sea mining activities has been established. The International Seabed Authority (ISA) (established to implement Part XI of the United Nations Convention on the Law Of the Sea) is charged with creating and enforcing rules for all seabed mining that takes place in areas beyond national jurisdiction. |

⁸⁶ United Nations Framework Convention on Climate Change (no date) The Paris Agreement [Online] Available from: http://unfccc.int/paris_agreement/items/9485.php [Accessed November 2017].

⁸⁷ United Nations Environment Programme / Convention on Migratory Species Secretariat (no date) [Online] Available from: <http://www.cms.int/> [Accessed November 2017].

⁸⁸ United Nations Environment Programme (no date) Minmata Convention on Mercury [Online] Available from: <http://mercuryconvention.org/> [Accessed November 2017].

⁸⁹ Secretariat of the Antarctic Treaty (no date) The Protocol on Environmental Protection to the Antarctic Treaty [Online] Available from: <http://www.ats.aq/e/ep.htm> [Accessed November 2017].

⁹⁰ Ramsar Convention Secretariat (no date) Ramsar [Online] Available from: <https://www.ramsar.org/> [Accessed November 2017].

⁹¹ United Nations (no date) United Nations Convention on the Law of the Sea of 10 December 1982 Overview and full text [Online] Available from: http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm [Accessed November 2017].

| Convention | Summary |
|--|--|
| United Nations Framework Convention on Climate Change (UNFCCC) [92] | The United Nations Framework Convention on Climate Change is an international agreement aimed at addressing the challenges presented by climate change. A key purpose of this forum is to agree upon appropriate mitigation activities, such as carbon offsetting, ecosystem based adaptation and land based carbon mitigation. The Paris agreement, which entered into force in 2016, is a key milestone under this convention. |
| Convention concerning the Protection of the World Cultural and Natural Heritage [93] | The World Heritage Committee Decision 37 COM 7: 37th session in 2013, in line with Article 6 of the Convention, notes with concern the growing impact of the extractive industries on World Heritage properties, and urges all States Parties to the Convention and leading industry stakeholders, to respect the “No-go” commitment by not permitting extractives activities within World Heritage properties, and by making every effort to ensure that extractives companies located in their territory cause no damage to World Heritage properties, in line with Article 6 of the Convention. |

5.3.3 National Policies and Strategies

There is an array of national policies that are critical for setting the agenda for responsible energy and mining. Some relate specifically to energy and mining operations, whilst others relate more broadly to sustainability. It is important to recognise that there is a mix of policy instruments, including both regulatory measures and incentives. Equally there is a need to acknowledge that policy gaps and conflicts at national level can impede implementation.

National Biodiversity Strategies and Action Plans (NBSAPs) can provide frameworks for managing biodiversity opportunities and impacts of the mining and energy sector as well as strategically planning the contribution of biodiversity and ecosystem services to the sector. A quick review of the revised National Biodiversity Strategies and Action Plans submitted to the Secretariat of the Convention of Biological Diversity shows that 35 National Biodiversity Strategies and Action Plans have specific actions on energy and 17 have actions on mining. Additionally, many revised National Biodiversity Strategies and Action Plans have specific actions on the energy and mining sectors. Examples of specific actions on energy, mining and/or the energy and mining sectors include:

- promoting wind energy;
- conducting Strategic Environmental Assessments for all energy-related industries (coal, gas, uranium and thermal electrical power production);
- addressing individual and cumulative impacts on biodiversity; and
- promoting the integration of biodiversity concerns into mining.

Land use planning policies are of critical importance given the effect of location on the biodiversity impacts that can result from energy, mining and associated activities. National Development Plans and policies that promote or require land-use planning that integrates biodiversity considerations are important to mainstreaming biodiversity into the energy and mining sectors.

⁹² United Nations Framework Convention on Climate Change (no date) United Nations Framework Convention on Climate Change [Online] Available from: <http://unfccc.int/2860.php> [Accessed November 2017].

⁹³ United Nations Educational, Scientific and Cultural Organisation (no date) Convention Concerning the Protection of the World Cultural and Natural Heritage [Online] Available from: <http://whc.unesco.org/en/conventiontext/> [Accessed November 2017].

There are a number of national **policies that promote or require implementation of no net loss [94] or net gain [95]** in biodiversity strategies, based on the concepts of the mitigation hierarchy and biodiversity offsets.

Local content policies [96] are also a consideration. Many large energy and mining projects can drive social influx to an area and raise expectations of income generation. If these expectations are not met, and the wealth and benefits of extractives do not trickle down and create opportunities for local people, this can create conflict and act as a catalyst for further environmental damage (e.g. [97]). Increasingly, resource-rich countries are searching for durable solutions to open up their extractive sector, notably by developing and deepening economic linkages between the extractive sector and the rest of the economy. In this regard, an increasing number of countries introduced or reinforced local content policies that stipulate the use of local labour, skills, goods and services to create value in the domestic economy, and hence expand the industrial sector [98].

5.3.4 National Legislation

Legally binding instruments are important for implementing policies as they create the need for compliance and enable enforcement. Aichi Biodiversity Target 17 requests that Parties adopt their National Biodiversity Strategies and Action Plans as policy instruments.

Almost all resource-rich countries have promulgated laws and established institutions to regulate and monitor the extraction of petroleum and mineral resources and their impacts on the environment and people. Where new sectors arise in countries there is often a process of legal reform to accommodate the needs of the sector. This needs to be based on overarching policies for that sector and require expertise of the sector which may be lacking in some cases. The emergence of the oil and gas sector in many African countries is creating a challenge in this regard due to the technical specificities of this sector and the need to build in country expertise [99]. Progress around governance and the development of regulations has been made in countries such as Kenya and Uganda in response to their emerging oil sectors [100]. However, the level of implementation, compliance and enforcement of those laws varies across the different regions of resource-rich countries and in some cases legal gaps exist [101].

⁹⁴ The goal that the biodiversity (and ecosystem services) impacts of a project are balanced so that no net loss occurs. This is done through the mitigation hierarchy, where steps are taken (in order) to avoid, minimise, restore and then offset any remaining impacts (Business and Biodiversity Offsets Programme (BBOP). 2012. Glossary. BBOP, Washington, D.C. 2nd updated edition [Online] Available from http://bbop.forest-trends.org/guidelines/Updated_Glossary [Accessed November 2017]).

⁹⁵ Where, through the application of the mitigation hierarchy process described above, there is an overall gain for biodiversity (and ecosystem services) as a result of a project, the term 'net gain' may be used (Business and Biodiversity Offsets Programme (BBOP). 2012. Glossary. BBOP, Washington, D.C. 2nd updated edition [Online] Available from http://bbop.forest-trends.org/guidelines/Updated_Glossary [Accessed November 2017]).

⁹⁶ The definition of local content policies vary. In relation to the oil and gas sector, one definition of local content is '*the share of employment—or of sales to the sector—locally supplied at each stage of [the supply] chain*' (Tordo, S., Warner, M., Manzano, O.E. and Anouti, Y (2013) Local Content Policies in the Oil and Gas Sector. World Bank Study. Washington, DC: World Bank. doi:10.1596/978-0-8213-9931-6. License: Creative Commons Attribution CC BY 3.0). Local content policies relating to oil, gas and mining aim to: '*leverage the extractive value chain to generate sustained and inclusive growth through economic diversification and employment opportunities*' and '*generate opportunities for regional integration and international trade and can gradually reduce countries' dependence on external aid*' (World Bank (2016) Local Content in Oil, Gas, and Mining [Online] Available from: <http://www.worldbank.org/en/topic/extractiveindustries/brief/local-content-in-oil-gas-and-mining> [Accessed November 2017]).

⁹⁷ United Nations Environment Programme (2011) Environmental assessment of Ogoniland [Online] Available from: http://postconflict.unep.ch/publications/OEA/UNEP_OEA.pdf [Accessed November 2017].

⁹⁸ Environmental Law Alliance Worldwide (2010) Guidebook for Evaluating Mining Project EIAs [Online] Available from: <https://www.elaw.org/files/mining-eia-guidebook/Chapter1.pdf> [Accessed November 2017].

⁹⁹ Brooks, S. E. and Wright, M. A. P. (2016) Strengthening governance of the oil sector with respect to biodiversity: Country situation analysis for Uganda and Kenya. UNEP World Conservation Monitoring Centre, Cambridge, UK.

¹⁰⁰ Brooks, S. E. and Wright, M. A. P. (2016) Strengthening governance of the oil sector with respect to biodiversity: Country situation analysis for Uganda and Kenya. UNEP World Conservation Monitoring Centre, Cambridge, UK.

¹⁰¹ United Nations Environment (in Preparation) Guidebook for drafting laws on sustainable and responsible exploitation of petroleum and mineral resources.

There are a number of legal approaches that are adopted, including:

- Constitutional provisions and distribution of powers at the national and sub-national levels;
- Mining codes (concession, permitting process, environmental obligations, state oversight etc.);
- Environmental laws and regulations, which may include definition of no-development areas or specific provisions within protected and sensitive areas (e.g. the South African National Environmental Management Protected Areas Act (No. 57 of 2003)) prohibits mining and prospecting in protected areas [102];
- Human rights laws and regulations, supported by frameworks such as the United Nations Guiding Principles on Business and Human Rights [103] and associated projects (e.g. IPIECA's Business and Human Rights Project and literature [104]);
- Environmental Impact Assessment regulations (project level) that recognise the importance of duly considering biodiversity and ecosystem services when assessing planned activities/projects, including implementation of the mitigation hierarchy and offset policies;
- Strategic Environmental Assessment regulations (policies, plans and programmes) to ensure a comprehensive assessment of alternatives and cumulative impacts of different policy scenarios, thus also setting the framework and guidelines for Environmental Impact Assessment processes; and
- Liability for environmental damage and access to courts.

Research in 2016 identified 100 countries that are developing or starting to discuss national government policies and legislation that require, encourage, guide or enable the use of offsets and this number is increasing [105].

Links between biodiversity and other environmental and human rights considerations play a potentially important role in mainstreaming biodiversity into the energy and mining sectors. The implantation of the Paris agreement, for example, may have profound impacts on the way we produce energy and sources of energy in the future, particularly if Sustainable Development Goals are to be met.

Environmental Impact Assessments and Strategic Environmental Assessments are two of the chief mechanisms by which development projects undergo a structured, mandated analysis to inform the process for approvals and mitigation. Assessment of cumulative impacts should be undertaken as part of Environmental Impact Assessments to address impacts derived from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones [106]. While the application of Environmental Impact Assessments is normally mandated for major developments, the uptake of Strategic

¹⁰² South African National Biodiversity Institute (no date) Mining-relevant legislation [Online] Available from: <http://biodiversityadvisor.sanbi.org/industry-and-conservation/conservation-and-mining/understand-2/mining-relevant-legislation/> [Accessed November 2017].

¹⁰³ United Nations (2011) Guiding Principles on Business and Human Rights. United Nations Human Rights Office of the High Commissioner. New York and Geneva.

¹⁰⁴ IPIECA (no date) Human Rights [Online] Available from: <http://www.ipieca.org/our-work/social/human-rights/> [Accessed November 2017].

¹⁰⁵ The Biodiversity Consultancy (2016) Government policies on biodiversity offsets [Online] Available from: <http://www.thebiodiversityconsultancy.com/es/wp-content/uploads/2013/07/Government-policy-2.pdf> [Accessed November 2017].

¹⁰⁶ International Finance Corporation (2012) Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets [Online] Available from: https://www.ifc.org/wps/wcm/connect/3aebf50041c11f8383ba8700caa2aa08/IFC_GoodPracticeHandbook_CumulativeImpactAssessment.pdf?MOD=AJPERES [Accessed November 2017].

Environmental Assessment and the inclusion of cumulative impacts is not universal, presenting challenges for the adoption of an ecosystem approach to biodiversity management.

There are a number of challenges related to implementation of legislation. In particular the capacity to monitor compliance. For example in countries with emerging oil and gas sectors there is often lack of capacity in terms of staff numbers, resources and capabilities to understand and regulate the sector [107]. Equally there can be issues of local resources and capacity to develop local level legislation that complements national laws in federal systems that only cover minimum standards.

5.3.5 *Corporate Policies and Standards*

A significant driver of company performance is compliance with the corporate standards of individual operators. The energy and mining sectors are heavily reliant on engineering standards which strictly manage technical specifications and safety requirements. As such, many leading companies have translated this good practice approach to other areas of their business, including management of environmental issues.

Coupled with the significant potential for impact on biodiversity, this has given rise to corporate policies and standards which address biodiversity management and impact mitigation. Corporate policies often follow industry trends and practices, such that where leading companies demonstrate good practice, these may incentivise improved performance in peers. This effect is compounded by the work of industry trade associations in addressing environmental issues and providing sector-level technical guidance (e.g. the International Council on Metal and Mining and the global oil and gas association for environmental and social issues (IPIECA)).

Corporate policy on biodiversity in the energy and mining sectors largely focusses on accurately assessing the impacts and dependencies of projects on biodiversity and ecosystem services through application of the mitigation hierarchy: avoid, minimise, restore, offset. Central to the principle of the hierarchy is its sequential nature, and the importance of avoidance as the first step. The implementation of the mitigation hierarchy can become challenging in scenarios where national legislation is weak, absent or conflicting.

Some companies apply a structured and systematic assessment of the potential impact of operations on biodiversity, starting by screening and scoping at sites to inform their subsequent responses. This allows the company to tailor their response to the known and identified on-ground values, irrespective of whether areas have been formally protected or otherwise designated as important for biodiversity.

Dependant on the outcome of these assessments, company policy may dictate more senior approvals and sign-off, additional mitigation measures, further research, or result in de facto no-go in certain areas based on biodiversity values. An inherent component of the risk-based process is the landscape level approach whereby the boundaries of the process will extend beyond the project site.

While corporate policy may be public, or supported by a public statement, such policies are likely to be underpinned by specific standards and defined practices/protocols to be followed which are not disclosed externally. Some studies have shown a significant gap between what was reported publically in terms of biodiversity management and the activities that were underway, with often more management activities underway than apparent from public disclosures [108]. Corporate policies are revised infrequently, but are responsive to external drivers. Clear signals from governments and the international community can result in policy shifts. Examples would include

¹⁰⁷ Brooks, S. E. and Wright, M. A. P. (2016) Strengthening governance of the oil sector with respect to biodiversity: Country situation analysis for Uganda and Kenya. UNEP World Conservation Monitoring Centre, Cambridge, UK.

¹⁰⁸ Natural Value Initiative (2011) Tread lightly: Biodiversity and ecosystem services risk and opportunity management within the extractive industry [Online] Available from: http://www.fauna-flora.org/wp-content/uploads/NVI_extractive_industry_benchmark_summary.pdf [Accessed November 2017].

the implementation of no-go policy by SOCO International [109] in and around the Virunga National Park in the Democratic Republic of Congo, followed by no-go commitments towards World Heritage sites from TOTAL and Shell, TOTAL's commitment to not drill for oil in the Arctic, adoption of Critical Habitat as a corporate measure for screening biodiversity by Shell [110], and the response to the Sustainable Development Goals through trade associations [111].

There are many examples of robust and detailed corporate policies across the energy and mining sectors. However given the importance of these policies in dictating company performance, it is essential that any missing, weak or ineffective policies are addressed. Policy commitments are only likely to be effective if supported by strong organisational capacity, resources and the ability to monitor impact. Lack of metrics to monitor effectiveness can be a key limitation.

5.3.6 Corporate Governance and Disclosure

Broader trends towards incorporating social, environmental and governance risk into business models is leading to the integration of these issues into corporate governance and disclosure requirements. This presents opportunities for integration of biodiversity and ecosystem services into such developments. There has also been a substantial increase in recent years in Corporate Social Responsibility reporting, particularly in globally active or publicly listed corporations.

Key initiatives include the Global Reporting Initiative framework and sector supplements on oil and gas and mining (both of which require indicators specific to biodiversity), IPIECA's reporting guidance [112], United Nations Global Compact's communication on progress [113] that promotes responsible corporate citizenship, and the Extractive Industry Transparency Initiative that promotes transparency of payments and is aimed at both governments and corporates.

Tools such as the Natural Capital Protocol and other nature valuation tools are increasingly being explored by companies to consider biodiversity and ecosystem services within financial and other accounting.

Reporting and communication is valuable within companies to further explore the linkages between their activities and social/environmental issues. Disclosure between companies can also lead to sharing of experience and progress towards higher industry standards.

5.3.7 Non-legislative External Drivers

Finance Standards

Finance standards play an important and growing role in influencing company behaviour. The finance sector is increasingly engaged on the issue of biodiversity. Access to finance (and insurance) remains a key driver to management environmental impacts. For example, the International Finance Corporation (IFC) Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources is applied to all International Finance Corporation lending, and is also adopted by the Equator Principle Finance Institutions (EPFIs).

There are currently 91 Equator Principle Finance Institutions in 37 countries covering over 70% of international project finance debt in emerging markets. The standard enshrines the concepts of Critical Habitat and the mitigation hierarchy. The Environmental and Social Framework of the World Bank affects lending to governments, many of which play an integral role in planning, financing and

¹⁰⁹ SOCO International (2014) Joint Statement by SOCO International plc ('SOCO') and WWF [Online] Available from: <https://www.socointernational.com/joint-statement> [Accessed November 2017].

¹¹⁰ Shell (no date) Sensitive Areas and Oceans [Online] Available from: <http://reports.shell.com/sustainability-report/2016/our-performance/environment/sensitive-areas-and-oceans.html> [Accessed November 2017].

¹¹¹ World Economic Forum (2016) Mapping Mining and the Sustainable Development Goals: An Atlas. WEF, Geneva, Switzerland.

¹¹² IPIECA, API and International Association of Oil and Gas Producers (2015) Oil and gas industry guidance on voluntary sustainability reporting (3rd Edition) [Online] Available from: <http://www.ipieca.org/resources/good-practice/oil-and-gas-industry-guidance-on-voluntary-sustainability-reporting-3rd-edition/> [ACCESSED November 2017].

¹¹³ United Nations Global Compact (no date) The Communication on Progress (COP) in Brief [Online] Available from: <https://www.unglobalcompact.org/participation/report/cop> [Accessed November 2017].

executing major energy and mining projects, particularly through state-owned companies. In doing so, the Framework's requirements on biodiversity are passed down through the lending requirements.

Other multilateral development banks, including regional development banks, set their own safeguards. These are frequently similar, but not identical to each other. In particular, the standards set by regional development banks are likely have a more regionally-specific focus and impact.

Non-governmental Organisation Campaigns

A number of non-governmental organisations have launched campaigns, partnerships or initiatives in recent years to encourage the mainstreaming of biodiversity into energy and mining and related activities.

Several partnerships between corporate companies and non-governmental organisations have been set up to build capacity around the consideration of biodiversity in energy and mining operations. Such partnerships include: Fauna & Flora International's partnerships with Anglo American and eni's exploration & production division; Proteus (a collaboration between UNEP-WCMC and leading extractive companies); the International Union for Conservation of Nature's partnership with Shell; and the Conservation International – BHP Alliance.

Many non-governmental organisations have led campaigns to influence change in the energy and mining sector in relation to biodiversity (e.g. WWF's campaign against conducting operations within World Heritage Sites and Greenpeace's campaign against opening up new areas in the Arctic to oil drilling operations).

Other campaigns have targeted specific sectors within mining and energy, such as finance institutions. These campaigns include those run by the Natural Capital Finance Alliance and the United Nations Environment Programme (UNEP) Inquiry into the Design of a Sustainable Financial System (which focused on the environmental elements of a financial system that was aligned with sustainable development principles). The WWF 'Seize your Power Campaign' aimed to discourage investment support of coal projects, targeted at the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD), to discourage their support of coal projects. It resulted in the adoption of measures to phase out financial support for coal plants by both organisations.

Voluntary Standards and Certification

Voluntary standards and certification initiatives have traditionally been a key mechanism in other commodities – particularly in the agriculture sector – for managing environmental and social issues, including biodiversity. Many of these manifest through certification schemes for products aimed at consumers, such as Rainforest Alliance or Fairtrade. However, this concept does not naturally translate to the products of the energy or mining sectors.

Responsible sourcing of commodities in energy and mining has typically focussed on specific issues, for example the Kimberly Process for mining diamonds. This has led to broader certification, such as those developed by the Responsible Jewellery Council and the Alliance for Responsible Mining, which include biodiversity as one of several elements.

Recent developments include the ResponsibleSteel™ standards and certification programme, the Aluminium Stewardship Initiative and the Initiative for Responsible Mining Assurance, which make provisions for biodiversity. In oil and gas, there is a single international certification scheme known as Equitable Origin. Certification schemes exist for renewables, such as the Roundtable on Sustainable Biofuels. As renewables become a prominent part of energy generation, and recognising significant direct and indirect impacts on biodiversity associated with footprint, local communities and direct impacts on biodiversity, there may be a future or current need for further renewable certification.

Industry wide standards and guidance developed by the International Council on Mining and Metals and IPIECA, include good practice codes and guidance material (for example Biodiversity and Ecosystem Service Fundamentals [114]), Cross-Sector Biodiversity Initiative guidance on the mitigation hierarchy and the Business and Biodiversity Offsets Programme Standard on biodiversity offsets. The International Council on Mining and Metals has also developed a series of principles (including one on biodiversity) which members are required to report on and also commits its members not to operate in World Heritage Sites [115].

Box 3: Workshop Perspectives – Mechanisms to Mainstream Good Practice

Different mechanisms act to ensure energy and mining developments are planned for, their impacts effectively mitigated, and that they result in long term benefits to biodiversity and society.

Tools that support mainstreaming can be implemented at different levels. For example, **no-go approaches** for certain types of areas can form part of corporate, financial, certification and national policies for these sectors. **Impact Assessments** can be both part of the corporate level risk based approach as well as included within national legislation.

Key mechanisms highlighted were:

Strategic Environmental Assessments or Strategic Environmental and Social Assessments (which cover both environmental and social considerations) for guiding overarching development strategies, which includes energy and mining if implemented prior to project development

Landscape/sea-scape level area based planning

The integration of biodiversity into development planning policies through tools such as National (Sustainable) Development Plans

The linkages between biodiversity and Environmental Governance Models, particularly in relation to human rights.

Corporate partnerships with non-governmental organisations (e.g. Proteus, Fauna & Flora International and Anglo-American, International Union for Conservation of Nature and Shell) to build capacity and good practice.

5.4 Stakeholders

Mainstreaming biodiversity into the energy and mining sectors requires an understanding of who the stakeholders are (both in terms of the sectors themselves and biodiversity) and what their needs and interests are. This information is required to identify strategies, and the participation and engagement of various stakeholder groups to implement those strategies.

Governments, industry and the private sector, the United Nations system and other intergovernmental organizations, non-governmental organizations and civil society, indigenous peoples and local community organizations, scientific and technical assessment bodies, academia and research institutes, and children and youth organizations all play an important role as stakeholder groups. It is important to note that different stakeholders will have different roles in the process of mainstreaming biodiversity into the energy and mining sectors, and will have different needs and expectations.

The role of governments is of paramount importance in creating sector wide change through the development and implementation of policies, laws and regulations, establishing mechanisms for

¹¹⁴ IPIECA and International Association of Oil and Gas Producers (2016) Biodiversity and Ecosystem Fundamentals Guidance Document for the Oil and Gas Industry [Online] Available from: <http://www.ipieca.org/resources/good-practice/biodiversity-and-ecosystem-services-fundamentals> [Accessed November 2017].

¹¹⁵ International Council on Mining and Metals (no date) Mining and Protected Areas [Online] Available from: <http://www.icmm.com/en-gb/environment/biodiversity/mining-and-protected-areas> [Accessed November 2017].

public participation and enhancing the availability of environmental data and information. Governments are however comprised of a number of ministries, departments and agencies with differing roles and responsibilities and therefore the coordination of these respective institutions is crucial.

Industry plays a role in not only complying with national policies and laws but also in implementing and driving forward good practice, innovating through research and technology, and building capacity of civil society and governments on biodiversity management strategies.

The broader international community and national non-governmental organisations play an important role in the development and promotion of biodiversity management strategies, policies to drive their uptake, capacity building and monitoring compliance with both national and international requirements.

Biodiversity mainstreaming experiences have shown that proactive and constructive engagement of key stakeholders is crucial for developing capacity, strengthening partnerships, sharing knowledge and overcoming barriers.

Box 4: Workshop Perspectives - Stakeholders

There is a need to **engage ALL stakeholders within the sector**, including artisanal and small-scale mining, state owned enterprises, companies of all sizes, the finance sector and the donor community, in order to mainstream biodiversity.

Workshop participants were those already engaged in the mainstreaming agenda and the question was raised around how to bring other actors in the sector to the table. A single approach is unlikely to work for all these actors.

6 Challenges and Opportunities

6.1 Introduction

Progress has been made in the energy and mining sectors regarding sustainable management of ecosystems and biodiversity, yet challenges remain in replicating and upscaling the application of good practice. These challenges have key linkages to other important considerations such as human rights and climate change. There remains a need for larger policy shifts that support a transition from fossil fuels towards cleaner sources of energy to tackle the global threat posed by climate change.

Whilst large corporations play an important role in overcoming challenges to mainstreaming biodiversity into the energy and mining sectors, the influence and engagement of artisanal and small-scale mining, small and medium sized companies and stated owned businesses is vital to this process.

6.2 Challenges

The process of mainstreaming biodiversity into economic sectors has begun, particularly through the National Biodiversity Strategies and Action Plans (NBSAPs). However, progress to date has been slow [116] and it is recognised that mainstreaming biodiversity is a complex and long-term process [117].

Challenges exist at different political, policy and technical levels. A number of perceived and evidenced challenges to the mainstreaming of biodiversity relevant to the energy and mining sectors have been identified, including those listed below [118].

National and International Legislation and Policies

- **An inconsistent policy and legislative environment** for the energy and mining sectors. This is created by differences in requirements at the national level compared to the requirements of international lenders, corporate commitments, or those expected by the international public.
- **Variation in national policies and legislation**, creating different requirements where companies are working on projects in more than one country and/or on cross-border projects (e.g. pipelines).
- **Conflicting policies and legislation at the national level**. For example, conflicts between sectoral legislation, the licensing process and environmental regulations such as those related to protected areas.

Valuing Nature and Business Case

- **Lack of clarity on how biodiversity and ecosystem services underpin other social and environmental issues**, making it difficult for companies and governments to develop a business case for mainstreaming biodiversity into the energy and mining sectors.

¹¹⁶ Karlsson-Vinkhuyzen, S., T.J. Kok, M. Visseren-Hamakers, I.J. and Termeer, C. J.A.M. (2017) Mainstreaming biodiversity in economic sectors: An analytical framework. *Biological Conservation* 210 (2017) 145–156.

¹¹⁷ Huntley, B.J. and Redford, K.H. (2014) Mainstreaming biodiversity in Practice: a STAP advisory document. Global Environment Facility, Washington, DC.

¹¹⁸ This section draws on the key challenges and opportunities identified by stakeholders during the Mainstreaming Biodiversity into the Energy and Mining Sectors Workshop, amongst other events (such as the Collaborative Platform for Making Change) and resources. More details will be provided to the second meeting of the Subsidiary Body on Implementation (SBI-2) in July 2018, following further research and business engagement.

- **Data gaps leading to difficulties around valuing nature** (e.g. for natural capital assessments) so that such considerations can be incorporated into company and governmental decision-making processes.

Capacity and Leadership

- **Misunderstanding / misapplication of concepts and tools** relating to mainstreaming biodiversity into the energy and mining sectors by governments, such as biodiversity offsetting requirements and the mitigation hierarchy.
- **Lack of progress with, and investment in, Strategic Environmental Impact Assessments.** Ensuring government ownership of such assessments, and the need for them to take place prior to development in order to sufficiently influence planning for projects and associated activities is of critical importance.

Evidence base and measuring Progress

- **Requirement for an increased evidence base**, and engagement with academia to understand biodiversity impacts, emerging technologies and approaches (e.g. the effectiveness of habitat restoration), and to fill data gaps.
- **Lack of indicators** to measure the outcomes of different strategies to mainstream biodiversity.

Public / Political Concern

- **Insufficient public / political emphasis and concern.**

Timescales

- **Difficulties in accurately anticipating future changes** to: the energy and mining sectors (e.g. the move towards renewable energy generation); the potential impacts of emerging trends and new technologies; and the different and often long timescales of impacts involved in energy and mining operations.
- **Challenges of managing biodiversity impacts from activities funded by energy and mining revenues** (e.g. as a result of infrastructure development funded by extractive revenue and/or emissions from combustion of fossil fuels), mismatches between the timing of the impact and the revenue flow for development.

Financing

- **Biodiversity safeguards not always being applied throughout the project** from the very start to decommissioning, which is important given the long lifetime of many mining and energy projects. In particular biodiversity safeguards linked to financial lending requirements often cease at the end of the lending period, rather than at the end of the project
- **Finance sector that rewards short term profit** and incentivised externalisation of environmental costs.

Engagement and Communication

- **Requirement for engagement with all stakeholders**, including the informal extractives sub-sectors (e.g. artisanal and small-scale mining and energy) and the development of multi-stakeholder partnerships (e.g. business, academia and governments).
- **Disjointed approaches to multi-sector and multi-scale partnerships**, including lack of connection between biodiversity, human rights and climate change considerations.
- **Difficulties in communicating the value of nature** to stakeholders.

6.3 Opportunities

The sections below outline some key opportunities to mainstream biodiversity into the energy and mining sectors, grouped into three overarching categories [119]:

- building capacity;
- strengthening legislation and policy; and
- building better understanding around the value of nature.

6.3.1 Building Capacity

Countries have varying levels of experience with the energy and mining sectors and with the concept of mainstreaming biodiversity. As many countries face rapid growth in industrial-level mining and emerging oil and gas industries, there is therefore considerable opportunity for countries with greater experience in managing these industries and developing cleaner energy industries for positive biodiversity outcomes to share their experiences. This could be particularly useful for sharing information and experience among countries within the same region and contexts. Initiatives such as the Norwegian Oil for Development Programme, which offers assistance to developing countries to manage their petroleum resources in a sustainable manner [120], can play an important role in building institutional capacity in emerging oil nations.

The private sector could also support capacity building of civil society and government on good practice biodiversity management in energy and mining (e.g. developing guidance around biodiversity mainstreaming, sharing project experiences). Building mutual understanding of the industry, its impacts, the implications of biodiversity loss for other government policies and ways in which good practice guidance can be applied to avoid that loss is likely to improve the success of biodiversity mainstreaming projects. Lessons could be learned from existing initiatives such as the Skills for Oil and Gas Africa (SOGA) project that aims to build local capacity in East African countries to seize job opportunities in the oil and gas sector. Similar initiative are needed for developing local skills for environmental management.

Initiatives that engage different sectoral ministries, departments and agencies as well as cross country learning and transboundary cooperation among different governments (e.g. the African Leadership Group of the Mainstreaming Biodiversity into Development Policy and Planning Initiative [121]) have shown signs of success. Bringing business and other stakeholders into such initiatives could provide an excellent opportunity to develop wider structures of governance around mainstreaming [122].

There is also potential to build further capacity among corporate stakeholders. Companies and industry associations (e.g. International Council on Mining and Metals and IPIECA) are in an excellent position to develop capacity within the sector through peer-to-peer learning. Initiatives and tools focused on artisanal and small-scale mining could also play an important part in building capacity and engaging actors across the sector (e.g. Levin Sources' Biodiversity and Ecosystem

[119] Categorisations are based on stakeholder consultation at the Mainstreaming Biodiversity into the Energy and Mining Sectors Workshop (Annex A and B).

[120] Norad (2017) Oil for Development Programme [Online] Available from: <https://www.norad.no/en/front/thematic-areas/oil-for-development/oil-for-development-programme/> [Accessed November 2017].

[121] Members from eight African countries (Botswana, Ghana, Malawi, Namibia, Seychelles, Uganda, Zambia and Zimbabwe) which have been part of the Mainstreaming Biodiversity into Development Initiative facilitated by the International Institute for Environment and Development and UNEP-WCMC, plus independent members from across Africa who offer relevant mainstreaming expertise and experience (International Institute for Environment and Development (IIED) and UNEP-WCMC (2017) Mainstreaming biodiversity and development: guidance from African experience 2012-17. IIED, London.

[122] Karlsson-Vinkhuyzen, S., T.J. Kok, M. Visseren-Hamakers, I.J. and Termeer, C. J.A.M. (2017) Mainstreaming biodiversity in economic sectors: An analytical framework. *Biological Conservation* 210, 145–156.

Services Transformative Artisanal and Small-scale Mining ('BEST-ASM') Knowledge Hub [123] and the International Institute for Environment and Development's Artisanal and Small-scale Mining dialogues programme [124]).

Box 5: Workshop Perspectives – Opportunities for Building Capacity

Encourage collaboration within and among governments to develop government accountability and leadership.

Provide opportunities for engagement between industry and governments to facilitate training, capacity building and information exchange (e.g. public-private partnerships).

Improve transparency and accountability around biodiversity mainstreaming e.g. an Extractive Industry Transparency Initiative for biodiversity (a mechanism where infractions and correction plans can be registered and viewed) or an initiative to score management of biodiversity mainstreaming.

Support consistent approaches to protected areas and national legislation that reflect good international practice to develop a 'level playing field' (where all relevant stakeholders are required to do the same thing to comply with relevant legislation and policy).

Explore funding mechanisms to support government capacity building.

6.3.2 Legal and Policy Standards / Frameworks

Legal and policy standards and frameworks are likely to play a key role in mainstreaming biodiversity into the energy and mining sectors. Where they have not already done so, there is potential for governments to:

- develop and implement national policies and legislation that promote cleaner energy production, good business practice and increase integration of biodiversity and ecosystem services into other sectors;
- establish mechanisms for public participation and good governance (including through improved access to information, for example in Strategic Environmental Assessment and Environmental Impact Assessment processes);
- build capacity and coordinate governmental departments to provide oversight, monitoring and enforcement;
- support research to enhance the availability of environmental data and information;
- educate and raise awareness;
- remove perverse incentives; and
- promote positive incentives for biodiversity conservation and sustainable use.

By collaborating with those already working in the energy, mining and related sectors, governments can share experiences of, and help apply, good practice.

When working in the context of multilateral environmental agreements and their implementation, countries can also give further consideration to mainstreaming in the context of multiple international agendas. These agendas include not only biodiversity, but also development (Sustainable Development Goals), climate change (United Nations Framework Convention on

¹²³ Levin Sources (no date) Minerals and the Environment [Online] Available from: <http://www.levinsources.com/services/minerals-and-the-environment> [Accessed November 2017].

¹²⁴ International Institute for Environment and Development (no date) Delivering solutions through multi-stakeholder dialogue [Online] Available from: <https://www.iied.org/delivering-solutions-through-multi-stakeholder-dialogue> [Accessed November 2017].

Climate Change (UNFCCC) and the Paris Agreement), land degradation neutrality (United Nations Convention to Combat Desertification) and disaster risk reduction (Sendai Framework). Such agreements may have a transformative effect, guiding the transition towards sustainability (e.g. a reduction in demand for fossil fuels in line with the Paris Agreement).

Box 6: Workshop Perspectives – Opportunities to Strengthen Legal and Policy Standards / Frameworks

Bring national legislation in line with accepted good practice to create a consistent and harmonized policy and legislative framework (a 'level playing field'). This could include incorporating aspects of International Finance Corporations Performance Standard 6 or the World Bank Environmental and Social Safeguards into national policy and legislation.

Conduct a national level review and gap analysis of policies and laws for biodiversity management by all energy and mining sectors and sub-sectors.

Identify opportunities to incorporate biodiversity into all aspects of national policy, including energy and sustainable development, rather than a separate biodiversity policy. The starting point should be understanding how the development agenda might be impacted by biodiversity loss or conversely lead to biodiversity loss.

Place more emphasis on Strategic Environmental Assessment to address cumulative impacts and use this to develop a **sea-scape/landscape level planning approach** at national / sub-national level prior to development of individual projects.

Explore how good practice could be transferred between sectors and from sectors into national policy and legislation.

Develop public-private partnerships to assess and address impacts, including cumulative and induced impacts that occur across the land or sea-scape.

Examine potential synergies among multilateral environmental agreements [125] such as those relating to climate change (e.g. United Nations Framework Convention on Climate Change) and migratory species (e.g. Convention on the Conservation of Migratory Species of Wild Animals).

Remove perverse incentives (e.g. subsidies that encourage activities that have negative impacts on biodiversity).

6.3.3 Valuing Nature

Environmental threats can be better understood and addressed by understanding and accounting for natural capital. This emerging concept has the potential to provide a means by which sectors and governments improve their understanding of the true value of natural capital, leading to more informed decision-making and better measurement and management of environmental impacts. This underpins all other measures by providing the rationale to strengthen policy and build capacity to address the impact and dependencies of the sectors on biodiversity.

Valuing nature in this context falls broadly into three categories: accounting for natural capital; raising awareness of the value of nature; and integrating the value of nature into practice. By considering these aspects of valuing nature, both companies and governments can develop a better understanding of risk and opportunity.

Certain industries have more direct control over natural capital risks than others. For example the energy and mining sector are directly responsible for most of their impact (although not the carbon

¹²⁵ Treaties, conventions, protocols and other binding instruments related to the environment (UNEP Division of Environmental Law and Conventions (2007) Glossary of Terms for Negotiators of Multilateral Environmental Agreements [Online] Available from: <https://www.cbd.int/doc/guidelines/MEAs-negotiator-glossary-terms-en.pdf> [Accessed November 2017]).

impact of fossil fuel products). In comparison, many impacts of sectors such as the food and beverages relate to supply chain partners.

Where externalities are identified through natural capital accounts, these could theoretically give rise to greater application of the concept of Payments for Ecosystem Services. Having a clear idea of what natural assets exist, where they are and how the energy and mining sector may impact them could assist governments with strategic decision-making.

Box 7: Workshop Perspectives – Opportunities for Valuing Nature

Develop more effective communication of the narrative that nature has a value, including the need to understand the landscape of decision makers and tailor the narrative to match.

Use appropriate people and organisations to deliver the value of nature narrative.

Look to other areas for effective narrative lessons e.g. climate change.

Integrate the value of nature into macro-economic policies more effectively, including National Development Plans.

Encourage the integration of the value of nature into corporate practices.

Link biodiversity mainstreaming and climate change agendas.

Explore reporting on the implementation of natural capital accounting as part of progress reporting to the Convention on Biological Diversity as a mechanism to assess progress and mainstream biodiversity considerations.

7 Future Directions

There exist a number of interdependencies between biodiversity and energy and mining. There are also links to other key environmental and social issues that are the focus of the global policy agenda, such as climate change and human rights.

The energy and mining sectors have widely been understood to have a negative impact on biodiversity. However, there is an opportunity to harness the innovations that exist within these sectors so that operations are conducted responsibly to mitigate impacts and deliver positive contributions. Equally, technological advances provide opportunities for responsible operations, as well as solutions for a transition to cleaner energy sources and practices – an important consideration under the Paris Agreement.

A number of initiatives are recognizing and exploring innovative solutions to the challenges of mainstreaming biodiversity into the energy and mining sectors. The Convention on Biological Diversity is ideally placed to gather these initiatives and discuss them in the context of multilateral environmental governance. The Convention on Biological Diversity can promote solutions which contribute to the achievement of the objectives of the Convention or mitigating negative impacts which run counter the objectives of the Convention.

Besides informing a political discussion on mainstreaming biodiversity into energy and mining, ways of integrating the energy and mining sectors into deliberations under the Convention on Biological Diversity, and integration with other issues such as health, human rights and climate change, can be explored.

It is important for all sectors involved with energy and mining to engage with the process of mainstreaming biodiversity if it is to be successful. These include large, international corporations, small and medium sized companies, artisanal and small-scale mining and state owned business.

Further discussions on biodiversity and energy and mining could reflect considerations around the topics outlined below.

Transparency and Accountability: Supporting development of governance, monitoring and reporting procedures for biodiversity mainstreaming into the energy and mining sectors. Support of data collection, collation, and access to enable better understanding of impacts and effectiveness of policies and approaches. Considering the incorporation of natural capital into the Extractive Industry Transparency Initiative.

Good Practice and Standard Setting: Identification of good practice (e.g. elements from International Finance Corporation's Performance Standard 6, good practice guidance developed by the energy and mining sectors) and further promotion of such standards amongst companies, finance institutions and governments.

National Policy Considerations: Supporting the integration of international good practice into national policy and legislation (including those relating to energy, development, transport, climate, health and finance). Driving uptake across the energy and mining sectors. Encouraging cross government/ inter-ministerial policy approaches and dialogue that builds understanding of the value of nature and the potential impacts and opportunities associated with energy and mining.

Integrated, Cross Sector and Multi-stakeholder Approaches: Consider the development of business and biodiversity platforms that include stakeholders from government (including finance and energy ministers), academia, the private sector and non-governmental organisations, indigenous and local peoples. Learning from the successes of existing partnerships among non-governmental organisations and the private sector, and among governments (for example the Convention on Biological Diversity's Global Partnership for Business and Biodiversity).

Strategic Environmental and Social Impact Assessment: Encouraging the widespread use of strategic environmental and social impact assessment to better address biodiversity at the landscape scale, help address cumulative impacts, and allow a strategic approach to development that enables safeguarding of vital natural assets prior to the project development phase.

Natural Capital: Encouraging and supporting natural capital approaches to better integrate biodiversity into decision-making regarding the energy and mining sectors. Consideration of a requirement to use natural capital accounting for Parties' reporting on biodiversity mainstreaming to the Convention on Biological Diversity.

Developing Capacity: Seeking mechanisms to develop capacity around biodiversity mainstreaming. Sharing information and experiences between developed oil and gas economies and emerging economies. Encouraging public-private partnerships with businesses from the energy and mining sectors.

Funding: Exploring options for funding actions around mainstreaming biodiversity into the energy and mining sectors, such as support for capacity building.

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9 Annex

9.1 ANNEX A: Mainstreaming Biodiversity into the Energy and Mining Sectors Workshop

9.1.1 Introduction

An event entitled '*Mainstreaming biodiversity into the energy and mining sectors: workshop to provide stakeholder input to the 2018 Conference of the Parties to the Convention on Biological Diversity*' was held at the IPIECA Offices on 12th October 2017. The purpose of the workshop was to gather stakeholder input to the preparatory process for the 2018 Conference of the Parties to the Convention on Biological Diversity.

This workshop was the first in a series of activities on mainstreaming biodiversity into the energy and mining sectors by the UN Environment World Conservation Monitoring Centre, in cooperation with the Secretariat of the Convention on Biological Diversity and UN Environment, leading up to the 2018 Conference of the Parties to the Convention on Biological Diversity. The workshop was hosted and supported by IPIECA.

9.1.2 Workshop Objectives

- To engage industry and other stakeholders in the preparatory process for the 14th Conference of the Parties to the Convention on Biological Diversity (which will take decisions on mainstreaming biodiversity into several economic sectors, including the energy and mining sector) with a view to build stakeholder understanding and support for the decisions taken by the 14th Conference of the Parties to the Convention on Biological Diversity.
- To ensure that the information provided to the 196 Parties to the Conference on Biological Diversity is based on industry good practice and informed by engagement with key industry representatives, stakeholders, and experts in the field.

9.1.3 Workshop Format

An initial session provided an overview of the Convention on Biological Diversity, the agenda item on mainstreaming biodiversity into the energy and mining sectors, and the process through which industry and other stakeholders can engage in the run up to the 14th Conference of the Parties to the Convention on Biological Diversity and beyond. The remaining sessions of the workshop focused on the following three questions:

Q1. What energy and mining activities should be prioritised in these negotiations and what are the most significant impacts and / or dependencies?

Q2. What options exist to address these impacts and dependencies (mainstreaming tools and approaches) and what are the challenges and constraints in mainstreaming?

Q3. What are the opportunities and solutions to overcome these constraints?

Each of the three questions was introduced by a member of UNEP-WCMC staff. Participants were then asked to split into three groups to explore these questions, through a combination of discussion and prioritisation exercises (e.g. sticky dot exercises).

There was also opportunity for participants to outline examples from their work where policy and other in-country factors have acted as barriers or incentives for implementation of good practices. This was done through short talks from the floor, rather than formal presentations.

9.1.4 Workshop Participants

Representatives from the organisations listed in the table below were present at the workshop.

| Organisation |
|---|
| BirdLife International |
| BP plc |
| Chatham House |
| European Bank for Reconstruction and Development |
| eCountability |
| ENI |
| Fairfields Consulting |
| Fauna & Flora International |
| International Council on Mining and Metals |
| International Finance Corporation |
| IPIECA |
| JNCC |
| Judge Business School |
| Levin Sources |
| Natural Capital Coalition |
| Noble Energy |
| PTTEP |
| Secretariat of the Convention on Biological Diversity |
| Shell |
| The Biodiversity Consultancy |
| Total |
| UN Environment |
| UNEP-WCMC |

9.1.5 Key Messages

Examples of **good practice** in relation to mainstreaming biodiversity into the energy and mining sectors were identified during the workshop. However, they are not applied everywhere and by every operator and efforts will be required to **scale good practice up** across the sectors (including artisanal and small-scale mining (ASM) operations) and in all countries (i.e. into national policies).

The workshop identified a number of different sectors associated with energy and mining, all of which can have some impact on biodiversity. **Assessment of the direct, indirect, cumulative and transboundary impacts** associated with energy and mining developments, and the need for **government-led integrated area based planning** prior to development, were highlighted as key issues that deserve attention from national governments and other stakeholder groups, including industry.

Many governments require **greater inter-ministerial coordination and capacity** in terms of capability and resources to effectively mainstream biodiversity into the energy and mining sectors.

Opportunities exist for industry and other stakeholders to support national governments in this regard, and lessons could be learned from the way non-governmental organisations, charities, academia and other actors have **engaged with industry** on biodiversity issues to date. One option that was discussed was exploring **(funding) mechanisms** to support government capacity building.

The need for a **level playing field** (a consistent and harmonised approach) in terms of policy, legislation and implementation at all levels and over time was regularly raised as a key concern that often impedes the uptake and implementation of good practice for biodiversity management. A key suggestion that came out of the workshop was to **bring elements of good practice standards** (e.g. International Finance Corporation Performance Standard 6 (IFC PS6)) into national policy and legislation. Seeking ways to **incorporate biodiversity into all aspects of national policy** (e.g. energy policy), not just those specifically relating to biodiversity and the environment was discussed. **Public-private partnerships** to assess impacts, address cumulative impacts and mainstream biodiversity were also identified as a potential solution.

Accurately **assessing the value of nature** and **effectively communicating** this to decision makers was noted as a key challenge to mainstreaming biodiversity. Potential solutions to this challenge considered during the workshop included **learning from other effective narratives** (e.g. climate change), **effectively integrating the value of nature into macro-economic policies** and **removing perverse incentives** (e.g. subsidies that encourage activities that have negative impacts on biodiversity).

The workshop also raised the following specific questions regarding the role of the Convention on Biological Diversity in mainstreaming biodiversity into the energy and mining sectors: **What does success look like?** How could this be **measured?** What are the options for making the **decision text more accessible** and useful? **What is a 'good' decision?**

9.2 ANNEX B: Workshop Resources List

The importance of good resources and documentation in support of the implementation of mainstreaming of biodiversity into the energy and mining sectors is recognised by a number of stakeholders. For example, the 13th Conference of the Parties to the Convention on Biological Diversity Decision XIII/3, Paragraph 109 [126]:

'Requests the Executive Secretary, subject to the availability of resources...to make existing guidance and tools relevant to addressing biodiversity considerations in agriculture, forestry, fisheries and aquaculture, and tourism and also other relevant sectors, such as industries such as oil, gas, mining, energy and infrastructure available through the clearing house mechanism of the Convention...'

The Convention on Biological Diversity has taken steps to address this, collating tools and mechanisms that can provide guidance to Parties and businesses wishing to mainstream biodiversity into the private sector [127].

Participants at the Mainstreaming Biodiversity into the Energy and Mining Sectors Workshop highlighted a number of sources of recent guidance (see below). Please note, this is not an exhaustive list. It does, however, represent the resources and initiatives which the attendees at the workshop felt were particularly useful or important.

Box 8: Workshop Perspectives – Resources

DOCUMENTS AND GUIDANCE

BirdLife, Fauna & Flora International, International Union for Conservation of Nature and WWF (2014) Joint Briefing Paper on Extraction and Biodiversity in Limestone Areas'. Cambridge, UK [Online] Available from: <http://www.birdlife.org/sites/default/files/Extraction-and-Biodiversity-in-Limestone-Areas.pdf> [Accessed November 2017].

Birdlife International (2017) Sustainable deployment of renewable energy technologies and power lines: avoiding and mitigating negative impacts on biodiversity [Online] Available from: http://www.cms.int/sites/default/files/document/ETF2_Doc4_Draft%20Information%20Package.pdf [Accessed November 2017].

CEMEX (2013) The CEMEX approach to biodiversity conservation [Online] Available from: <https://www.cemex.com/documents/20143/0/cemex-biodiversity-action-plan.pdf> [Accessed November 2017].

Cross Sector Biodiversity Initiative (2015) A cross-sector guide for implementing the Mitigation Hierarchy. Prepared by the Biodiversity Consultancy on behalf of IPIECA, ICMM and the Equator Principles Association. Cambridge, UK.

Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute (2013) Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria. 100 pages.

Global Reporting Initiative (2000-2010) Sustainability Reporting Guidelines & Mining and Metals Sector Supplement. RG Version 3.0/MMSS Final Version [Online] Available from: <https://www.globalreporting.org/resource/library/G3-English-Mining-and-Metals-Sector-Supplement.pdf> [Accessed November 2017].

¹²⁶ Convention on Biological Diversity (2016) Conference of the Parties to the Convention on Biological Diversity Decision XIII/3 Paragraph 103 (CBD/COP/DEC/XIII/3 [Online] Available from: <https://www.cbd.int/decisions/cop/?m=cop-13> [Accessed November 2017].

¹²⁷ Convention on Biological Diversity (no date) Tools and Mechanisms [Online] Available from: <https://www.cbd.int/business/ressources/tools.shtml> [Accessed November 2017]

Global Reporting Initiative (2000-2010) Sustainability Reporting Guidelines & Oil and Gas Sector Supplement. Version 3.1/OGSS Final version [Online] Available from:

<https://www.globalreporting.org/resourcelibrary/G3-1-English-Oil-and-Gas-Sector-Supplement.pdf> [Accessed November 2017].

Gullison, R. E., J. Hardner, S. Anstee and M. Meyer (2015) Good Practices for the Collection of Biodiversity Baseline Data. Prepared for the Multilateral Financing Institutions Biodiversity Working Group and the Cross-Sector Biodiversity Initiative.

International Council on Mining and Metals and the International Union for Conservation of Nature (2012) Independent report on biodiversity offsets. Prepared by The Biodiversity Consultancy [Online] Available from: <http://www.icmm.com/en-gb/publications/biodiversity/independent-report-on-biodiversity-offsets> [Accessed November 2017].

IPIECA and International Association of Oil and Gas Producers (2016) Biodiversity and Ecosystem Fundamentals Guidance Document for the Oil and Gas Industry [Online] Available from: <http://www.ipieca.org/resources/good-practice/biodiversity-and-ecosystem-services-fundamentals> [Accessed November 2017].

IPIECA (2011) Ecosystem Services Guidance: Biodiversity and Ecosystem Services Guide [Online] Available from: <http://www.ipieca.org/resources/good-practice/ecosystem-services-guidance-biodiversity-and-ecosystem-services-guide/> [Accessed November 2017].

IPIECA (2015) Reporting Guidance on Sustainability Oil and gas industry guidance on voluntary sustainability reporting (3rd edition) [Online] Available from: <http://www.ipieca.org/resources/good-practice/oil-and-gas-industry-guidance-on-voluntary-sustainability-reporting-3rd-edition/> [Accessed November 2017].

Johnson, S. (2005) Good Practice Guidance for Mining and Biodiversity. International Council on Mining and Metals. International Council on Mining & Metals.

Lahn, G. and Bradley, S. (2016) Left Stranded? Extractives-Led Growth in a Carbon-Constrained World. Chatham House, London: Royal Institute of International Affairs [Online] Available from: <https://www.chathamhouse.org/sites/files/chathamhouse/publications/research/2016-06-17-left-stranded-extractives-bradley-lahn-final.pdf> [Accessed November 2017].

Prinsen, H.A.M., Smallie, J.J., Boere, G.C. & Pires, N. (Compilers), 2012. Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region. AEWA Conservation Guidelines No. 14, CMS Technical Series No. 29, AEWA Technical Series No. 50, CMS Raptors MOU Technical Series No. 3, Bonn, Germany.

South African Development Community (2015) Guidelines for Mainstreaming BES in the Extractives Industry [Online] Available from: <http://biopama.org/sites/default/files/SADC%20Extractive%20Industry%20and%20Biodiversity%20Guidelines%20%28English%29.pdf> [Accessed November 2017].

van der Winden, J., van Vliet, F., Patterson, A., Lane, B. (eds) (2015) Renewable Energy Technologies and Migratory Species: Guidelines for sustainable deployment [Online] Available from: http://www.cms.int/sites/default/files/document/ETF1_Inf.1.pdf [Accessed November 2017].

INITIATIVES

Leadership for Conservation in Africa: <https://lcafrica.org/> [Accessed November 2017].

The South African Mining and Biodiversity Forum: <http://biodiversityadvisor.sanbi.org/industry-and-conservation/conservation-and-mining/connect-2/south-african-mining-and-biodiversity-forum-sambf/>

SOURCES

Cross Sector Biodiversity Initiative: <http://www.csbi.org.uk/tools-and-guidance/>

Convention on Migratory Species: <http://www.cms.int/>

International Council on Mining and Metals: <https://www.icmm.com/> including <http://www.icmm.com/en-gb/environment/biodiversity/mining-and-protected-areas>

IPIECA: <http://www.ipieca.org/>

Mainstreaming biodiversity conservation into Russia's energy sector policies and operations: <http://www.bd-energy.ru/art.php?lan=en&id=140>

Migratory Soaring Birds: <http://migratorysoaringbirds.undp.birdlife.org/en/documents>

Various guidance material on reducing the impacts solar energy, wind energy (including shut-down-on-demand) and power lines on birds. Guidance is tailored to governments, donors and developers (dedicated factsheets for each sector).

CASE STUDIES

International investment in renewable energy: safeguarding migrating birds along the red sea/rift valley flyway [Online] Available from: http://datazone.birdlife.org/userfiles/images/Mainstreaming%20guides/BL_factsheet_IFI_final.pdf

Integrating protection of migratory soaring birds into Egypt's renewable energy sector [Online] Available from: http://datazone.birdlife.org/userfiles/images/Mainstreaming%20guides/BL_factsheet_ENERGY_final.pdf

The Renewables Grid Initiative in Europe: http://datazone.birdlife.org/userfiles/file/mainstreaming/BL_factsheet_RGI_PRINT_web.pdf

STANDARDS

International Finance Corporation (2012) Performance Standard 6 [Online] Available from http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps6 [Accessed November 2017].

World Bank (2016) Biodiversity Offsets: A User Guide [Online] Available from: <http://documents.worldbank.org/curated/en/344901481176051661/pdf/110820-WP-BiodiversityOffsetsUserGuideFinalWebRevised-PUBLIC.pdf> [Accessed November 2017].

TOOLS

Integrated Biodiversity Assessment Tool: <https://www.ibatforbusiness.org>

Natural Capital Protocol: <http://naturalcapitalcoalition.org/protocol/>

9.3 ANNEX C: Recent History of Mainstreaming Biodiversity into the Energy and Mining Sectors in Relation to the Convention on Biological Diversity

9.3.1 *Convention on Biological Diversity and Mainstreaming Biodiversity*

Biodiversity mainstreaming is the process of integrating considerations around biodiversity into sectoral and cross-sectoral priorities. One definition of biodiversity mainstreaming from the National Biodiversity Strategies and Action Plan (NBSAP) 2.0 project Africa Leadership Group is:

‘a process of getting biodiversity concerns – potentials, needs and risks – fully reflected in development policies, plans and activities in order to achieve sustainable outcomes for both biodiversity and development. It is more than applying ‘safeguards’ to make sure development processes do no harm to biodiversity. It is also about recognising the potential of biodiversity to achieve desirable development outcomes’ [128].

The Convention on Biological Diversity Mainstreaming Module states that mainstreaming biodiversity includes the integration of the conservation and sustainable use of biodiversity in both cross-sectoral plans and in sector-specific plans [129].

The current emphasis on mainstreaming biodiversity comes from a broad and growing policy base.

The overarching mandate for ‘mainstreaming’ under the Convention on Biological Diversity is Article 6(b) which calls for Parties to *‘integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies’* [130]. Article 10(a) calls on Parties to *‘integrate consideration of the conservation and sustainable use of biological resources into national decision-making’* [131]. Other articles of the Convention also promote ‘mainstreaming’ – or provide tools for it – notably the requirements to use impact assessment (Article 14), incentive measures (Article 11) and to identify and then regulate or manage processes and activities that have significant adverse impacts on biodiversity (Articles 7(c) and 8(l)).

The Strategic Plan for Biodiversity 2011-2020 (adopted by COP-10, decision X/2), includes a strong focus on mainstreaming, particularly in Goal A (Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society) and Goal B, (Reduce the direct pressures on biodiversity and promote sustainable use). It also calls for engagement with different sectors in order to mainstream biodiversity and to decrease the direct pressures on biodiversity.

Decision X/2 urges Parties to revise and update their National Biodiversity Strategies and Action Plans in line with the revised and updated Strategic Plan for Biodiversity and to *‘...use the revised and updated national biodiversity strategies and action plans as effective instruments for the integration of biodiversity targets into national development and poverty reduction policies and strategies...’* [132]. Decision X/6 recognises *‘the urgent need to improve capacity for mainstreaming the three objectives of*

¹²⁸ International Institute for Environment and Development (IIED) and UNEP-WCMC (2017) Mainstreaming biodiversity and development: guidance from African experience 2012-17. IIED, London.

¹²⁹ Convention on Biological Diversity, UNEP, Global Environment Facility (2007) Mainstreaming Biodiversity into Sectoral and Cross-Sectoral Strategies, Plans and Programmes Module B-3 [Online] Available from: <https://www.cbd.int/doc/training/nbsap/b3-train-mainstream-en.pdf> [Accessed November 2017].

¹³⁰ Convention on Biological Diversity (1992) Convention on Biological Diversity. Secretariat of the Convention on Biological Diversity, Montreal, Canada.

¹³¹ Convention on Biological Diversity (1992) Convention on Biological Diversity. Secretariat of the Convention on Biological Diversity, Montreal, Canada.

¹³² Convention on Biological Diversity (2010) Conference of the Parties to the Convention on Biological Diversity Decision X/2 (UNEP/CBD/COP/DEC/X/2) [Online] Available from: <https://www.cbd.int/decision/cop/?id=12268> [Accessed November 2017].

the Convention into poverty eradication strategies and plans (e.g., Poverty Reduction Strategy Papers, national development plans) and development processes' [133].

Aichi Biodiversity Target 4 requests that *'by 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits'* [134].

One general conclusion from the fourth edition of the Global Biodiversity Outlook was that *'partnerships at all levels are required for effective implementation of the Strategic Plan for Biodiversity 2011-2020, to leverage broad-scale actions, to garner the ownership necessary to ensure the mainstreaming of biodiversity across sectors of government, society and the economy and to enable synergies in the national implementation of the various multilateral environmental agreements'* [135]. Decision XII/1 recognised these conclusions and suggested further action based upon them.

In its decision XIII/3 [136], the Conference of the Parties reconfirmed the need for integrating biodiversity into other sectors and took decisions on sector-specific mainstreaming on agriculture, forests, fisheries and aquaculture, and tourism. It further decided that COP-14 should consider mainstreaming of biodiversity into the energy and mining, infrastructure, manufacturing and processing industry, and health sectors.

In preparation for consideration of this issue at COP-14 in November 2018, it will be discussed at the Convention's subsidiary body meetings in 2017 and 2018. Item 6 of the provisional agenda for the twenty-first meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-21) concerns:

'Mainstreaming of biodiversity into the sectors of energy and mining, infrastructure, manufacturing and processing industry, and health: scientific and technical considerations and use of the programmes of work of the Convention' [137]

Item 5 of the provisional agenda for the second meeting of the Subsidiary Body on Implementation (SBI-2) concerns *'Mainstreaming of biodiversity within and across sectors and other strategic actions to enhance implementation'* [138].

All efforts to mainstream biodiversity into the energy and mining sectors will contribute to the Sustainable Development Goal 7 *'Ensure access to affordable, reliable, sustainable, and modern energy for all'* as well as Goal 12 *'Ensure sustainable consumption and production patterns'* and Goals 14 and 15 [139].

¹³³ Convention on Biological Diversity (2010) Conference of the Parties to the Convention on Biological Diversity Decision X/6 (UNEP/CBD/COP/DEC/X/6) [Online] Available from: <https://www.cbd.int/decision/cop/?id=12268> [Accessed November 2017].

¹³⁴ Convention on Biological Diversity (no date) Aichi Biodiversity Targets [Online] Available from: <https://www.cbd.int/sp/targets/> [Accessed November 2017].

¹³⁵ Secretariat of the Convention on Biological Diversity (2014) Global Biodiversity Outlook 4 – Summary and Conclusions. Montréal, 20 pages.

¹³⁶ Convention on Biological Diversity (2016) Conference of the Parties to the Convention on Biological Diversity Decision XIII/3 (CBD/COP/DEC/XIII/3) [Online] Available from: <https://www.cbd.int/decisions/cop/?m=cop-13> [Accessed November 2017].

¹³⁷ Convention on Biological Diversity (2017) Subsidiary Body on Scientific, Technical and Technological Advice Twenty-first meeting Provisional Agenda (CBD/SBSTTA/21/1/Add.1) [Online] Available from: <https://www.cbd.int/meetings/SBSTTA-21> [Accessed November 2017].

¹³⁸ Convention on Biological Diversity (2017) Subsidiary Body on Implementation Second meeting Annotated Provisional Agenda (CBD/SBI/2/1) [Online] Available from: <https://www.cbd.int/meetings/SBI-02> [Accessed November 2017].

¹³⁹ United Nations (2015) Transforming Our World: The 2030 Agenda for Sustainable Development [Online] Available from: <https://sustainabledevelopment.un.org/sdgs> [Accessed November 2017].

9.3.2 Business Engagement

The role of the private sector has been repeatedly recognised by the Conference of the Parties [140], most recently through decision XII/10 on business engagement [141]. Decisions on business engagement date back to 1996, and the 3rd meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP-3) [142] in Buenos Aires, Argentina. Since this time there have been a number of activities to engage industry in the Convention on Biological Diversity, including the Business and Biodiversity Challenge meetings (at which the extractives sector was well represented, as a key focus of discussions) and the Global Partnership for Business and Biodiversity.

Another example is the 2016 Business and Biodiversity Forum which was held in the margins of the 13th Conference of the Parties and which brought together experts from business, governments and non-governmental organisations to discuss the concept of mainstreaming biodiversity from the business point of view. It included the launch of the Business and Biodiversity Pledge, which *'provides an opportunity for business leaders to call attention to the importance of biodiversity and ecosystem services for businesses and to reaffirm their commitment to take positive action in support of biodiversity'* [143]. It has now been signed by more than 100 businesses from a range of economic sectors. Building on similar pledges related to the United Nations Framework Convention on Climate Change, it emphasises the importance to businesses of biodiversity and the ecosystem services it provides, the key role that businesses can play in conservation and sustainable use of biodiversity and ecosystem services, and the urgency in addressing global biodiversity loss and ecosystem degradation [144].

9.3.3 References

Convention on Biological Diversity (no date) Aichi Biodiversity Targets [Online] Available from: <https://www.cbd.int/sp/targets/> [Accessed November 2017].

Convention on Biological Diversity (no date) Business and Biodiversity Pledge [Online] Available from: <https://www.cbd.int/business/pledges.shtml> [Accessed October 2017].

Convention on Biological Diversity (no date) Previous Business Decisions [Online] Available from: <https://www.cbd.int/business/bc/bd.shtml> [Accessed November 2017].

Convention on Biological Diversity (no date) Final Report from 2016 Business and Biodiversity Forum. December 2 - 3, 2016. Moon Palace Hotel, Cancun, Mexico [Online] Available from: <https://www.cbd.int/business/doc/2016-bbf-report-en.pdf> [Accessed October 2017]

Convention on Biological Diversity (1992) Convention on Biological Diversity. Secretariat of the Convention on Biological Diversity, Montreal, Canada.

Convention on Biological Diversity (1996) COP 3 Decisions Third Ordinary Meeting of the Conference of the Parties to the Convention on Biological Diversity, 4 - 15 November 1996 - Buenos Aires, Argentina Decision III/6 (UNEP/CBD/COP/3/38) [Online] Available from: <https://www.cbd.int/decisions/cop/?m=cop-03> [Accessed November 2017].

Convention on Biological Diversity (2010) Conference of the Parties to the Convention on Biological Diversity Decision X/2 (UNEP/CBD/COP/DEC/X/2) [Online] Available from: <https://www.cbd.int/decision/cop/?id=12268> [Accessed November 2017].

¹⁴⁰ Convention on Biological Diversity (no date) Previous Business Decisions [Online] Available from: <https://www.cbd.int/business/bc/bd.shtml> [Accessed November 2017].

¹⁴¹ Convention on Biological Diversity (2014) Conference of the Parties to the Convention on Biological Diversity Decision XII/10 (UNEP/CBD/COP/DEC/XII/10) [Online] Available from: <https://www.cbd.int/decision/cop/default.shtml?id=13373> [Accessed November 2017].

¹⁴² Convention on Biological Diversity (1996) COP 3 Decisions Third Ordinary Meeting of the Conference of the Parties to the Convention on Biological Diversity, 4 - 15 November 1996 - Buenos Aires, Argentina Decision III/6 (UNEP/CBD/COP/3/38) [Online] Available from: <https://www.cbd.int/decisions/cop/?m=cop-03> [Accessed November 2017].

¹⁴³ Convention on Biological Diversity (no date) Business and Biodiversity Pledge [Online] Available from: <https://www.cbd.int/business/pledges.shtml> [Accessed October 2017].

¹⁴⁴ Convention on Biological Diversity (no date) Final Report from 2016 Business and Biodiversity Forum. December 2 - 3, 2016. Moon Palace Hotel, Cancun, Mexico [Online] Available from: <https://www.cbd.int/business/doc/2016-bbf-report-en.pdf> [Accessed October 2017].

Convention on Biological Diversity (2010) Conference of the Parties to the Convention on Biological Diversity Decision X/6 (UNEP/CBD/COP/DEC/X/6) [Online] Available from: <https://www.cbd.int/decision/cop/?id=12268> [Accessed November 2017].

Convention on Biological Diversity (2014) Conference of the Parties to the Convention on Biological Diversity Decision XII/10 (UNEP/CBD/COP/DEC/XII/10) [Online] Available from: <https://www.cbd.int/decision/cop/default.shtml?id=13373> [Accessed November 2017].

Convention on Biological Diversity (2016) Conference of the Parties to the Convention on Biological Diversity Decision XIII/3 (CBD/COP/DEC/XIII/3) [Online] Available from: <https://www.cbd.int/decisions/cop/?m=cop-13> [Accessed November 2017].

Convention on Biological Diversity (2017) Subsidiary Body on Scientific, Technical and Technological Advice Twenty-first meeting Provisional Agenda (CBD/SBSTTA/21/1/Add.1) [Online] Available from: <https://www.cbd.int/meetings/SBSTTA-21> [Accessed November 2017].

Convention on Biological Diversity (2017) Subsidiary Body on Implementation Second meeting Annotated Provisional Agenda (CBD/SBI/2/1) [Online] Available from: <https://www.cbd.int/meetings/SBI-02> [Accessed November 2017].

Convention on Biological Diversity, UNEP, Global Environment Facility (2007) Mainstreaming Biodiversity into Sectoral and Cross-Sectoral Strategies, Plans and Programmes Module B-3 [Online] Available from: <https://www.cbd.int/doc/training/nbsap/b3-train-mainstream-en.pdf> [Accessed November 2017].

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Secretariat of the Convention on Biological Diversity (2014) Global Biodiversity Outlook 4 – Summary and Conclusions. Montréal, 20 pages.

United Nations (2015) Transforming Our World: The 2030 Agenda for Sustainable Development [Online] Available from: <https://sustainabledevelopment.un.org/sdgs> [Accessed November 2017].

9.4 ANNEX D: Tools for Mainstreaming Biodiversity

The sections below provide further information on some common tools for biodiversity mainstreaming, linked to those mentioned in this document and in addition to those identified in the workshop (see Annex B). **Please note, this is not an exhaustive review.**

9.4.1 Key Concepts

Some of the key biodiversity tool concepts mentioned in this document are summarised below.

Area-based planning: The geographic location of energy and mining developments is critical in determining the impact on biodiversity, both in terms of the direct footprint of operations but also the induced impacts of associated developments. Land-use and marine spatial planning that integrate biodiversity values are key instruments that work across economic sectors to achieve positive outcomes for biodiversity and society.

Environmental assessments: Environmental Impact Assessments and Strategic Environmental Assessments are two of the chief mechanisms by which development projects undergo a structured, mandated analysis to inform the process for approvals and mitigation. Assessment of cumulative impacts should be undertaken as part of Environmental Impact Assessments to address impacts derived from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. While the application of Environmental Impact Assessment is normally mandated for major developments, the uptake of Strategic Environmental Assessments, and the inclusion of cumulative impacts is not universal, presenting challenges for the adoption of an ecosystem approach to biodiversity management.

Natural capital accounting: Environmental threats can be better understood and addressed by accounting for natural capital. This emerging concept has the potential to provide a means by which sectors and governments improve their understanding of the true value of natural capital, leading to more informed decision-making and better measurement and management of environmental impacts and dependencies. Where externalities are identified through natural capital accounts, these could theoretically give rise to greater application of the concept of Payments for Ecosystem Services.

No-go and no-development scenarios: Across the energy and mining sector there are examples where policies result in so-called “Red-lining”. These include industry initiatives, such as the commitment by International Council on Mining and Metals member companies not to explore in World Heritage sites.

Risk-based approaches: Many companies apply a structured and systematic assessment of the potential impact of operations on biodiversity, starting by screening and scoping at sites to inform their subsequent responses. This allows the company to tailor their response to the known and identified on-ground values, irrespective of whether areas have been formally protected or otherwise designated as important for biodiversity. Depending on the outcome of these assessments, company policy may dictate more senior approvals and sign-off, additional mitigation measures, further research, or result in de facto no-go in certain areas based on biodiversity values. An inherent component of the risk based process is the landscape level approach whereby the boundaries of the process will extend beyond the project site.

The mitigation hierarchy and net gain outcomes: The energy and mining sectors are highly innovative. Progress is being made in developing and implementing strategies that address negative impacts and help ensure that these industries maximise opportunities to deliver positive outcomes for biodiversity. One of the key principles underlying industry good practice with regard to biodiversity management is the effective implementation of the mitigation hierarchy and associated goals of no net loss or a net gain of biodiversity. Quantifying potential impacts can drive early project stage decisions on siting and design to avoid or minimise impacts. The assessment and

mitigation of impacts should be extended to indirect and induced impacts (where these can be reliably predicted to occur).

Revenue management for sustainable development: Revenue from energy and mining presents an opportunity to invest in more sustainable and diverse future economies. However exploitation of natural resources, particularly in countries with limited history and experience in these sectors, has frequently been associated with what is termed the “resource curse”. Regions with an abundance of natural resources may experience sluggish economic growth, and benefits which flow to individuals rather than the national economy as a whole. There is therefore a need for transparency in revenue flows to foster more equitable and sustainable investments. Programmes such as the Extractives Industry Transparency Initiative (which supports governments in disclosure of tax and royalty revenues associated particularly with oil, gas, metals and minerals) can help ensure exploitation of natural resources flows to public benefits.

Green Finance: Green finance provides an opportunity to drive improved performance, lower risks and achieve better returns. An important part of this process would be building the capacity of the finance sector to engage with mining and energy sectors in relation to biodiversity and ecosystem services. Benchmarking of performance could be a part of this process.

9.4.2 Initiatives

Various initiatives exist that link biodiversity to the energy and mining sectors. Some examples (not exhaustive) are provided in the table below. This should be read in conjunction with the materials within the Convention on Biological Diversity website [145].

Table 2: Example Initiatives – Mainstreaming Biodiversity into the Energy and Mining Sectors

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|--|--|---|--|
| Artisanal and Small-scale Mining | | | |
| Artisanal and Small-scale Mining Dialogue - Ghana | Multi-stakeholder national dialogue supported by the International Institute for Environment and Development and Friends of the Nation | <ul style="list-style-type: none"> • <i>'To improve understanding and challenge perspectives amongst key stakeholders in the ASM sector in Ghana</i> • <i>To facilitate new collaborations and initiatives to implement changes across the sector and increase trust between stakeholders on how they can work together to drive change</i> • <i>To effect changes in policy and practice in line with a roadmap identified through dialogue'</i> [146]. | Dialogue reports: https://www.iied.org/delivering-solutions-through-multi-stakeholder-dialogue |
| Artisanal and Small-scale Mining in Protected Areas and Critical Ecosystems (ASM-PACE) | Levin Sources and WWF | <i>'ASM-PACE seeks to identify workable, sustainable solutions that constructively navigate the conservation and development trade-off presented by ASM in protected areas and critical ecosystems'</i> [147]. | Villegas, C., Weinberg, R., Levin, E., and Hund, K. (2012) Artisanal and Small-scale Mining in Protected Areas and Critical Ecosystems Programme (ASM-PACE) - A Global Solutions Study 2012 [Online] Available from: http://www.levinresources.com/assets/pages/Global-Solutions-Study.pdf [Accessed November 2017]. |

¹⁴⁵ Convention on Biological Diversity (no date) Tools and Mechanisms [Online] Available from: <https://www.cbd.int/business/ressources/tools.shtml> [Accessed November 2017].

¹⁴⁶ International Institute for Environment and Development (no date) ASM Dialogue Briefing and Agenda [Online] Available from: <http://pubs.iied.org/G04051/> [Accessed November 2017].

¹⁴⁷ Villegas, C., Weinberg, R., Levin, E., and Hund, K. (2012) Artisanal and Small-scale Mining in Protected Areas and Critical Ecosystems Programme (ASM-PACE) - A Global Solutions Study 2012 [Online] Available from: <http://www.levinresources.com/assets/pages/Global-Solutions-Study.pdf> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|---|---|---|--|
| Biodiversity and Ecosystem Services Transformative ASM ('BEST-ASM') Knowledge Hub | Levin Sources | <i>'BEST-ASM takes a practical and progressive, three-tiered approach to achieving positive environmental outcomes across all mineral sectors'</i> [148]. | The Frugal Rehabilitation Methodology. The ASM-PACE methodological toolkit. The GIFF Project Supply Chain Mapping Tool. Website: http://www.levinresources.com/services/minerals-and-the-environment |
| Associations | | | |
| IPIECA | Stakeholders involved with oil and gas activities. Collaboration with inter-governmental organizations, academia and Non-Governmental Organisations including UNEP-WCMC and CSBI. | <i>'IPIECA's vision is for an oil and gas industry whose operations and products meet society's environmental and social performance expectations'.</i> <ul style="list-style-type: none"> • <i>'Developing, sharing and promoting sound practices and solutions.</i> • <i>Enhancing and communicating knowledge and understanding.</i> • <i>Engaging members and others in the industry.</i> • <i>Working in partnership with key stakeholders'</i> [149]. | Biodiversity and ecosystem services (http://www.ipieca.org/our-work/environment/bes-issue-management/), human rights (http://www.ipieca.org/our-work/social/human-rights/) and sustainability reporting (http://www.ipieca.org/our-work/reporting/) guidance. |

¹⁴⁸ Levin Sources (no date) Minerals and the Environment [Online] Available from: <http://www.levinresources.com/services/minerals-and-the-environment> [Accessed November 2017].

¹⁴⁹ IPIECA (no date) Our Strategy [Online] Available from: <http://www.ipieca.org/about-us/our-strategy/> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|--|--|---|---|
| International Council on Mining and Metals | Mining and metals companies, national and regional associations. Collaboration with other organisations (e.g. International Union for the Conservation of Nature). | <p><i>'In collaboration with others, we will strengthen the social and environmental performance of the mining and metals industry and build recognition of its contribution to local communities and society at large' [150].</i></p> <p>The International Council on Mining and Metals commits to a set of sustainable development principles including one on biodiversity. Members commit not to operate within natural World Heritage Sites.</p> | <p>Biodiversity related principles (http://www.icmm.com/en-gb/members/member-commitments/icmm-10-principles/icmm-principle-7), position statements (http://www.icmm.com/en-gb/members/member-commitments/position-statements/mining-and-protected-areas-position-statement) and Guidance (e.g. http://www.icmm.com/en-gb/environment/biodiversity)</p> |
| Towards Sustainable Mining | Mining Association of Canada | <p>An initiative to encourage and assist members to improve performance and appropriately manage and minimise risk by providing tools and indicators. Has specific requirements on biodiversity.</p> | <p>Biodiversity Conservation Management Framework and Protocol (http://mining.ca/towards-sustainable-mining/protocols-frameworks/biodiversity-conservation-management)</p> |
| Certification Schemes and Standards | | | |

¹⁵⁰ International Council on Mining and Metals (no date) Our Organisation [Online] Available from: <http://www.icmm.com/en-gb/about-us/our-organisation/vision-and-values> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|--|--|--|---|
| Aluminium Stewardship Initiative | Associations, Civil Society, Downstream Supporters, General Supporters, Industrial Users and Production and Transformation | <ul style="list-style-type: none"> • <i>'To define globally applicable standards for sustainability performance and material chain-of-custody for the aluminium value chain</i> • <i>To promote measurable and continual improvements in the key environmental, social and governance impacts of aluminium production, use and recycling</i> • <i>To develop a credible assurance and certification system that both mitigates the risks of non-conformity with [Aluminium Stewardship Initiative] standards and minimises barriers to broad scale implementation'</i> [151]. | Aluminium Stewardship Initiative (in prep) Aluminium Stewardship Initiative Performance Standard: Principles and Criteria. DRAFT Version 2 [Online] Available from: https://aluminium-stewardship.org/asi-standards/asi-performance-standard/ [Accessed November 2017]. |
| Better Sugarcane Initiative (Bonsucro) | Over 480 members involved with sugar cane globally. | <i>'Bonsucro's vision is a sugarcane sector with thriving, sustainable producer communities and resilient, assured supply chains. [Its] mission is to ensure that responsible sugarcane production creates lasting value for the people, communities, businesses, economies and eco-systems in all cane-growing origins. Bonsucro's strategy builds a platform to accelerate change for the largest agricultural commodity in the world – sugarcane'</i> [152]. | Certification Scheme, Production Standard and Chain of Custody Standard: http://www.bonsucro.com/what-is-certification/ http://www.bonsucro.com/tools-and-resources/ |

¹⁵¹ Aluminium Stewardship Initiative (no date) ASI's Objectives [Online] Available from: <https://aluminium-stewardship.org/about-asi/> [Accessed November 2017].

¹⁵² Bonsucro (no date) A little more about us [Online] Available from: <http://www.bonsucro.com/what-is-bonsucro/> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|---|--|--|--|
| Business and Biodiversity Offsets Programme | <i>'Collaboration of more than 80 leading organizations and individuals including companies, financial institutions, government agencies and civil society organizations'</i> ^[153] | <ul style="list-style-type: none"> <i>'To provide a global forum for collective learning, the dissemination of biodiversity mitigation and offset concepts and the sharing of experience on implementation.</i> <i>To assist developers in designing and implementing mitigation measures including offsets that produce measurable and long term conservation outcomes in the widest range of countries and sectors possible.</i> <i>To support the development of institutional, legal and regulatory frameworks which support no net loss and preferably a net gain of biodiversity, including biodiversity offsets.</i> <i>To improve biodiversity offset concepts methods informed by practical experience and research and scientific practice.</i> <i>To promote development and adoption of biodiversity offset standards and methods for verification in the domain of no net loss and the mitigation hierarchy, such as the Standard on Biodiversity Offsets, with a view to ensuring that mitigation measures including offsets are applied when appropriate and to a high standard'</i> ^[153]. | Standards on Biodiversity Offsets and Associated Material: http://bbop.forest-trends.org/pages/guidelines Community of Practice: http://bbop.forest-trends.org/pages/community_of_practice |
| Global Reporting Initiative | Extensive network including governments and businesses. | <ul style="list-style-type: none"> The Global Reporting Initiative: <i>'helps businesses and governments worldwide understand and communicate their impact on critical sustainability issues such as climate change, human rights, governance and social well-being....The [Global Reporting Initiative] Sustainability Reporting Standards are developed with...multi-stakeholder contributions and rooted in the public interest'</i> ^[154]. | Global Reporting Initiative Standards, including Biodiversity: https://www.globalreporting.org/standards/gri-standards-download-center/ |

¹⁵³ Business and Biodiversity Offsets Programme (no date) Who we are: About BBOP [Online] Available from: http://bbop.forest-trends.org/pages/about_bbop [Accessed November 2017].

¹⁵⁴ Global Reporting Initiative (no date) About GRI [Online] Available from: <https://www.globalreporting.org/Information/about-gri/Pages/default.aspx> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|---|--|--|---|
| Initiative for Responsible Mining Assurance | Governed by representatives of mining companies, downstream users, non-governmental organizations, affected communities, and labour. | <i>'To establish a multi-stakeholder and independently verified responsible mining assurance system that improves social and environmental performance'</i> [155]. | Development of Standard for Responsible Mining: http://www.responsiblemining.net/irma-standard Launching a responsible mining assurance system in 2018: http://www.responsiblemining.net/certification/ |
| Responsible Jewellery Council | Organisations involved with diamond and gold jewellery including associations, mining companies and jewellers. | The Responsible Jewellery Council <i>'is a whole-of-supply chain standards initiative for the jewellery supply chain, from mine to retail. It is unique in its participation of organisations at every step in the value chain, each bringing a commitment to a responsible supply chain and implementation of responsible business practices'</i> [156]. | Certification (https://www.responsiblejewellery.com/rjc-certification/) and standards (https://www.responsiblejewellery.com/standards-development/). |
| ResponsibleSteel™ | Stakeholders from throughout the steel supply chain. | <i>'By establishing a collaborative global standard for the entire sector, we will ensure businesses and consumers can be confident that the steel they use has been sourced and produced responsibly at every stage. This will be achieved through discussion and collaboration between all stakeholders within the steel supply chain, along with their customers and other relevant parties'</i> [157]. | Draft standard and certification scheme: http://www.responsiblesteel.org/draft-standard/ |

¹⁵⁵ Initiative for Responsible Mining Assurance (no date) About IRMA [Online] Available from: <http://www.responsiblemining.net/about-irma/> [Accessed November 2017].

¹⁵⁶ Responsible Jewellery Council (no date) About [Online] Available from: <https://www.responsiblejewellery.com/about-rjc/> [Accessed November 2017].

¹⁵⁷ ResponsibleSteel™ (no date) About [Online] Available from: <http://www.responsiblesteel.org/about/> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|--|---|--|---|
| Round Table on Responsible Soy | Stakeholder representatives from companies, civil society and other organisations around the world. | <p><i>'Encourage current and future soybean is produced in a responsible manner to reduce social and environmental impacts while maintaining or improving the economic status for the producer. Through:</i></p> <ul style="list-style-type: none"> <i>The development, implementation and verification of a global standard</i> <i>The commitment of the stakeholders involved in the value chain of soybean'</i> [158]. | <p>Certification scheme: http://www.responsiblesoy.org/certification/nuestra-certificacion/?lang=en</p> |
| Roundtable on Sustainable Biomaterials | Businesses, non-governmental organisations, academics, government and United Nations organisations. | <p><i>'... a global, multi-stakeholder independent organisation that drives the development of a new world bioeconomy through sustainability solutions, certification, innovation and collaborative partnerships'</i> [159].</p> | <p>Certification scheme: http://rsb.org/certification/</p> |
| Round Table on Sustainable Palm Oil | Stakeholders including oil palm producers, processors or traders, consumer goods manufacturers, retailers, banks/investors, and environmental and social non-governmental organisations | <ul style="list-style-type: none"> <i>'Advance the production, procurement, finance and use of sustainable palm oil products</i> <i>Develop, implement, verify, assure and periodically review credible global standards for the entire supply chain of sustainable palm oil</i> <i>Monitor and evaluate the economic, environmental and social impacts of the uptake of sustainable palm oil in the market</i> <i>Engage and commit all stakeholders throughout the supply chain, including governments and consumers'</i> [160]. | <p>Certification Scheme: https://www.rspo.org/certification</p> |

¹⁵⁸ Round Table on Responsible Soy (no date) Mission and Vision [Online] Available from: <http://www.responsiblesoy.org/about-rtrs/mission-and-vision/?lang=en> [Accessed November 2017].

¹⁵⁹ Roundtable on Sustainable Biomaterials (no date) What we do [Online] Available from: <http://rsb.org/about/what-we-do/> [Accessed November 2017].

¹⁶⁰ Round Table on Sustainable Palm Oil (no date) About Us [Online] Available from: <https://www.rspo.org/about> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|--------------------------------------|--|--|--|
| Partnerships and Initiatives | | | |
| Business for Social Responsibility | A network of over 250 companies and other partners | Business for Social Responsibility's Mission is to: <i>'to work with business to create a just and sustainable world. We envision a world in which everyone can lead a prosperous and dignified life within the boundaries of the Earth's natural resources'</i> ^[161] . | Reports including: Business for Social Responsibility (2015) Making the Invisible Visible: Analytical Tools for Assessing Business Impacts and Dependencies Upon Ecosystem Services [Online] Available from: https://www.bsr.org/reports/BSR_Analytical_Tools_for_Ecosystem_Services_2015.pdf [Accessed November 2017]. |
| Cross Sector Biodiversity Initiative | IPIECA, The International Council on Mining and Metals, The Equator Principles Association, The European Bank for Reconstruction and Development, The International Finance Corporation, The Inter-American Development Bank | A partnership <i>'...to develop and share good practices related to biodiversity and ecosystem services in the extractive industries'</i> ^[162] . | Tools and guidance: implementing the mitigation hierarchy; good practices for the collection of biodiversity baseline data; and Timeline tool. Website: http://www.csbi.org.uk/our-work/tools-guidance/ |

¹⁶¹ Business for Social Responsibility (no date) About Us [Online] Available from: <https://www.bsr.org/en/about> [Accessed November 2017].

¹⁶² Cross Sector Biodiversity Initiative (no date) Who we are [Online] Available from: <http://www.csbi.org.uk/> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|---|---|---|--|
| Energy and Biodiversity Initiative (2001 to 2007) | BP, ChevronTexaco, Conservation International, Fauna & Flora International, International Union for Conservation of Nature, The Nature Conservancy, Shell, Smithsonian Institution, Statoil | The Energy and Biodiversity Initiative: <i>'produced practical guidelines, tools and models to improve the environmental performance of energy operations, minimize harm to biodiversity, and maximize opportunities for conservation wherever oil and gas resources are developed'</i> [163]. | A range of guides, discussion papers and resources relating to integrating biodiversity conservation into upstream oil and gas development: http://www.theebi.org/products.html |

¹⁶³ Energy and Biodiversity Initiative (no date) About the EBI [Online] Available from: <http://www.theebi.org/abouttheebi.html> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|--|---|---|---|
| Global Partnership for Business and Biodiversity | Convention on Biological Diversity, Biodiversity Partnership Mesoamerica, Brazilian Business and Biodiversity Platform, Canadian Business and Biodiversity Council, Chilean Business and Biodiversity Initiative, Biodiversidad y Empresas, Mexican Alliance for Business and Biodiversity, National Biodiversity and Business Network (South Africa), Association of South-East Asian Nations Centre for Biodiversity, Australian Business and Biodiversity Initiative, China Business and Biodiversity Partnership, India Business & Biodiversity Initiative, Japan Business and Biodiversity Partnership, Korea Business and Biodiversity Initiative, Sri Lanka Business and Biodiversity Platform, The EU Business @ Biodiversity Platform, FIBS (Finland), Plateforme de l'initiative française pour les entreprises et la biodiversité, Biodiversity in Good Company Initiative (Germany), Leaders for Nature (Netherlands), Polish Business and Biodiversity Platform, Iniciativa Española Empresa y Biodiversidad | <p>A partnership of national and regional business and biodiversity initiatives.</p> <p><i>'The Global Partnership allows for the sharing of information and best practices amongst the various member initiatives as well as their constituent organizations. In addition, the Partnership is involved in several [Conference of the Parties] mandated projects including on reporting and making the business case for the Aichi Biodiversity Targets. The Global Partnership also has several working groups looking at different issues including capacity building, communications, mainstreaming, and financial resources' [164].</i></p> | <p>Links to a range of tools, guidance and advice, including those specific to extractives (e.g. http://www.business-and-biodiversity.de/en/info-pool/business-and-management/sector-specific-information/#c8384)</p> |

¹⁶⁴ Convention on Biological Diversity (no date) Global Partnership for Business and Biodiversity [Online] Available from: <https://www.cbd.int/business/gp.shtml> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|---|---|---|--|
| The Exploration & Production Sound & Marine Life Joint Industry Programme | International Association of Oil and Gas Producers | <p><i>'1 Support planning of [Exploration & Production] projects and risk assessments.</i></p> <p><i>2 Provide the basis for appropriate operational measures that are protective of marine life.</i></p> <p><i>3 Inform policy and regulatory development'</i> [165].</p> | <p>Reports and publications funded by the initiative:</p> <p>http://www.soundandmarinelife.org/library.aspx</p> |
| Natural Capital Coalition | Nearly 250 organisations and initiatives involved in business and natural capital including conservation bodies and non-governmental organisations, science and academia and business. | <p>The Natural Capital Coalition's mission is:</p> <ul style="list-style-type: none"> <i>'To harmonize approaches to natural capital, getting solutions to scale quickly.</i> <i>To promote a shift in behaviour that enhances rather than depletes natural capital.</i> <i>To support the evolution of an enabling environment that both aids natural capital thinking and integrates it into other initiatives'</i> [166]. | <p>Natural Capital Protocol:</p> <p>http://naturalcapitalcoalition.org/protocol/</p> |
| Natural Value Initiative | Fauna & Flora International, the United Nations Environment Finance Initiative, Nyenrode Business University, Dutch Association of Investors for Sustainable Development, Brazilian Business School Fundação Getulio Vargas | <ul style="list-style-type: none"> <i>'Build awareness of corporate dependence on ecosystem services and impact on biodiversity and the links to corporate risk;</i> <i>Build expertise both in companies and investors on evaluating and managing biodiversity and ecosystem services...risks and opportunities;</i> <i>Stimulate improved performance within the private sector and encourage greater reward of responsible behaviour;</i> <i>Mainstream biodiversity and ecosystem services into investment analysis'</i> [167]. | <p>Natural Value Initiative (2011) Tread lightly: Biodiversity and ecosystem services risk and opportunity management within the extractive industry [Online] Available from: http://www.fauna-flora.org/wp-content/uploads/NVI_extractive_industry_benchmark_summary.pdf [Accessed November 2017]</p> |

¹⁶⁵ The Exploration & Production Sound & Marine Life Initiative (no date) Why does the JIP exist [Online] Available from: <http://www.soundandmarinelife.org/why-does-the-jip-exist.aspx> [Accessed November 2017].

¹⁶⁶ Natural Capital Coalition (no date) History, Vision and Mission [Online] Available from: <http://naturalcapitalcoalition.org/who/history-vision-mission/> [Accessed November 2017].

¹⁶⁷ Natural Value Initiative (2011) Tread lightly: Biodiversity and ecosystem services risk and opportunity management within the extractive industry [Online] Available from: http://www.fauna-flora.org/wp-content/uploads/NVI_extractive_industry_benchmark_summary.pdf [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|-----------------------|--|--|---|
| Nature After Minerals | Royal Society for the Protection of Birds, Natural England, The Mineral Products Association, The British Aggregates Association | <p><i>'1.To advise on the delivery of priority habitat and enhance endangered species populations on mineral sites</i></p> <p><i>2.To work with conservation, local authority and industry interests to achieve a strategic approach to restoration of priority habitats at a landscape scale</i></p> <p><i>3.To raise awareness of the benefits that high-quality restoration on mineral sites can offer people and wildlife' [168].</i></p> | <p>A series of advice notes relating to habitats and species:</p> <p>http://www.afterminerals.com/advice/</p> |
| Proteus | Extractive companies, UNEP-WCMC and other non-governmental organisations. | <ul style="list-style-type: none"> <i>'To improve significantly the accuracy, completeness and currency of information in the World Database on Protected Areas, focusing on data verification, quality assurance and enhancements in interoperability.</i> <i>To support integrated knowledge products that provide access to information on sites of global importance for biodiversity and increasingly feature sites that are considered national priorities.</i> <i>To compile globally consistent, comprehensive and validated datasets for important coastal and marine ecosystems, and develop a business-relevant baseline of biodiversity priorities in the marine realm.</i> <i>To share context and insights into the latest trends and developments in biodiversity and ecosystem policy, initiatives, data and tools of importance to business' [169].</i> | <p>Tools such as the Integrated Biodiversity Assessment Toolkit (https://www.ibatforbusiness.org) and Biodiversity A to Z (http://www.biodiversitya-z.org/)</p> <p>Resources around biodiversity and ecosystem services (http://www.proteuspartners.org/resources)</p> |

¹⁶⁸ Nature After Minerals (no date) About Us [Online] Available from: <http://www.afterminerals.com/about-us/> [Accessed November 2017].

¹⁶⁹ UNEP-WCMC (no date) About [Online] Available from: <http://www.proteuspartners.org/about> [Accessed November 2017].

| Initiative / Group | Organisation(s) / Members | Summary / Aims | Key Document, Tools or Sources |
|--|---|---|--|
| World Business Council for Sustainable Development | Global network of businesses and national business councils. | <p><i>'Our mission is to accelerate the transition to a sustainable world by making more sustainable businesses more successful.</i></p> <p><i>Our vision is to create a world where more than 9 billion people are all living well and within the boundaries of our planet, by 2050' [170].</i></p> | Guidance and tools (http://www.wbcsd.org/Overview/Resources) including Eco4Biz - Ecosystem services and biodiversity tools to support business decision-making (http://www.wbcsd.org/Clusters/Natural-Capital-and-Ecosystems/Resources/Eco4Biz) |
| Sources | | | |
| Global Inventory of Biodiversity Offset Policies (GIBOP) | International Union for Conservation of Nature and The Biodiversity Consultancy | <ul style="list-style-type: none"> • <i>'To permit to all stakeholders to have the same level of information on biodiversity offsets policies around the world.</i> • <i>To identify where further work, with governments, civil society and business partners, is needed to strengthen policies and the enabling environment for better business practices.</i> • <i>To have a continuous learning and exchange of information on biodiversity offsets policies' [171].</i> | Global Inventory of Biodiversity Offset Policies: https://portals.iucn.org/offsetpolicy/ |
| Oppla | Oppla (Supported by the European Commission under the Environment (including climate change) Theme of the 7th Framework Programme for Research and Technical Development) | <i>'Oppla is a new knowledge marketplace; a place where the latest thinking on ecosystem services, natural capital and nature-based solutions is brought together. Its purpose is to simplify how we share, obtain and create knowledge to better manage our environment' [172].</i> | Website: https://oppla.eu/ |

¹⁷⁰ World Business Council for Sustainable Development (no date) Overview [Online] Available from: <http://www.wbcsd.org/Overview/About-us> [Accessed November 2017].

¹⁷¹ International Union for Conservation of Nature (no date) Welcome to the Global Inventory of Biodiversity Offset Policies (GIBOP) [Online] Available from: <https://portals.iucn.org/offsetpolicy/> [Accessed November 2017].

¹⁷² Oppla (no date) About [Online] Available from: <https://oppla.eu/about> [Accessed November 2017].

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