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## **A Biodiversity and Ecosystem Services Management Framework for the Oil and Gas Sector**

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### **Abstract**

IPIECA, the global oil and gas industry association for environmental and social issues, provides the forum for the oil and gas sector to share knowledge and build capacity on challenging topics such as the management of issues relating to biodiversity and ecosystem services (BES) within the oil and gas industry. In the effort described here, the joint IPIECA-OGP Biodiversity and Ecosystem Services Working Group (BESWG) outlines a framework including six areas of practice that are foundational for the effective integration of BES considerations into oil and gas business processes and operations in any environment.

The development and application of this BES management framework by member representatives on the BESWG aligns with IPIECA and OGP's commitment to share knowledge and promote good practices that will help the oil and gas sector continually improve its environmental and social performance. This BES management framework provides a systematic approach enabling progression in the development of BES management practices within oil and gas companies. The BES management framework identifies and elaborates on six oil and gas company practices that contribute to the integration of BES Management in their activities:

- Build BES into their governance and business processes
- Engage stakeholders and understand their expectations around BES
- Understand BES baseline
- Assess BES dependencies and potential impacts
- Mitigate and manage BES impacts and identify BES opportunities
- Select, measure and report BES indicators

For each area of management practice, the framework provides guidance on the management approach, content, scale and timing of activity, and types of resources employed. An ultimate outcome for this framework will be to connect specific areas of management practice to existing tools and resources provided by IPIECA and OGP to assist companies in development, integration and continual improvement of BES management into their processes. The BES management framework will also be used to inform the IPIECA-OGP BESWG's strategic direction and future work products so that gaps in knowledge can be effectively addressed.

### **Advancing the integration of BES considerations within the oil and gas industry**

Biodiversity as an issue for consideration in the oil and gas sector and elsewhere began emerging as early as the 1970s. Biodiversity has come into increasing focus with the advent of World Bank and International Finance Corporation (IFC) expectations for project performance in the 1980s, the Convention on Biological Diversity in the 1990s, and the Millennium Ecosystem Assessment in the 2000s (Springer et al. 2012). Members of the oil and gas industry partnered with leading environmental conservation non-governmental organizations from 2001 to 2003 under the auspices of the Energy and Biodiversity Initiative (EBI) to develop and promote biodiversity conservation practices within the industry, and develop

some key guidance documents (EBI, 2003). IPIECA and OGP convened their joint Biodiversity Working Group, the predecessor to the BESWG, in 2002

The Millennium Ecosystem Assessment (2005) focused on biodiversity and introduced the term “ecosystem services” to an audience of policy makers, industry scientists and others beyond academic circles where the concept had been incubating for some two decades. Since then, publications on ecosystem services have increased exponentially (Springer et al. 2012). The concept of ecosystem services is increasingly being integrated into national legislation, finance standards, and consumer and stakeholder expectations, driving business to better understand the implications of the ecosystem services concept for environmental management practices in oil and gas activities. Recent research conducted by Business for Social Responsibility highlighted the finding that “*thirty-five global companies state in publically available materials that they are working on ecosystem services*” (BSR, 2013, p. 6). The business case for integrating BES considerations are based on expectations from investors and NGOs, national governments’ interest in the issue and internal corporate culture and values.

Across the oil and gas sector there is increasing awareness of dependencies and potential impacts that operations have on the biodiversity and ecosystem services (IPIECA-OGP BESWG 2011). A timely identification and appropriate management of these potential dependencies and impacts are important for effective mitigation of associated business risks and for capturing conservation opportunities. As a result, the IPIECA-OGP BESWG has developed several guidance documents, tools and resources to facilitate and improve the integration of BES management into oil and gas activities.

### **The BES Management Framework**

The IPIECA-OGP BES Management Framework provides a systematic structure enabling progression in the development and continual improvement of BES management practices within oil and gas companies. Developed by the IPIECA-OGP BESWG members, the framework emerged from a facilitated workshop convened in 2012 and subsequent iteration and refinement. As a part of continual improvement, it is anticipated that the framework will be updated over time to reflect new developments in BES science and management practices. The framework was initially developed by the BESWG as a “knowledge management” tool and is being used to inform the BESWG’s strategic direction, aid priority-setting and identify what future products should be developed. For example, IPIECA and OGP member companies can identify gaps in the availability of guidance for any given topic related to BES management for potential future development by the working group or other organisations. It can also be used by members to guide application of the BES management within their companies, in alignment with IPIECA’s aim of sharing knowledge and promoting good practices within the oil and gas sector.

### **Six BES Management Practices**

The six areas of management practice are discrete, but related; categories of activity that together comprise the full range of activities representing good practice for BES management across the asset lifecycle in the oil and gas industry. Within each area of management practice, the framework identifies the approach including key business drivers, the content or what is included in the area of management practice, the geographic scale of activity, timing in the project or programme lifecycle, and types of resources that may be deployed. The following provides a description of each area of management practice along with practical examples illustrating their importance and inter-relationships with one another.

#### *Companies build BES into their governance and business processes*

The integration of BES into a company’s governance and business processes is the key means by which individual practices for managing BES become systematized, assuring discipline and consistency in a company’s drive to continually improve its performance around BES. This involves integration of BES into company standards, procedures and tools. Initially, this will be achieved through more explicit consideration of BES within a company’s Environmental Management System (EMS), thereby consolidating and enhancing company good practice on BES issues within an organizational framework based on ISO 14001 or similar structure (EBI, 2003). Through this approach, application of BES good practice moves from being a matter of local regulation or individual business unit discretion to become an expected and auditable means of systematically addressing BES issues in all stages of the asset life cycle. Such integration may coincide with an oil and gas company’s move toward public commitments to managing BES risks, as it steps out beyond a primarily regulatory-driven and narrow (e.g., project, asset or local) focus to engage a broader range of stakeholders. Consideration of at least basic ecosystem services such as cultural and provisioning also characterizes this stage of maturity (IPIECA-OGP, 2011).

Yet more robust management is achieved when the consideration of BES extends beyond the EMS and begins to enrich other organizational governance frameworks. This reflects the general trend toward integrating EMS within the broader suite

of corporate management systems (Asif et al, 2010; Karapetrovic and Casadesus, 2009; Bernado et al, 2009). OGP has recently developed guidance for companies seeking to develop an Operating Management System - an integrated framework intended to address a broad range of potential risks in oil and gas operations, including those arising in the areas of occupational safety and health, environment and social responsibility, process safe and quality and security (OGP, pending). BES is a critical issue to be taken up within these systems. There is also an opportunity to more broadly integrate BES by adopting a system-by-system review and adaptation of a company's individual governance frameworks, such as those for supply chain (Whatling et al, 2010) and project management, among others.

Corporate requirements for risk-based practices for managing BES issues will be firmly in place for the most mature organizations. At this stage, accountability is likely to be established through the adoption of targets and continual improvement processes, and consideration of ecosystem services will have moved beyond a limited focus on cultural and provisioning services to consideration of the entire range of ecosystem services.

#### *Companies engage stakeholders and understand their expectations around BES*

Stakeholder engagement is a conversation that enables the oil and gas sector to communicate effectively with all of those that may be affected by a project and allows the companies to better understand stakeholders' expectations around BES. Stakeholder engagement is one of the key elements of business sustainability. The effective mitigation of business risks and the identification of opportunities to make a positive contribution to the conservation of BES at the local level rely on constructive stakeholder relationships which is fundamental to achieve better outcomes on the ground for BES management. It is an important step in understanding how stakeholders, in particular local communities, value and use the natural resources and in assessing operational dependencies and potential impacts on BES. Stakeholder engagement on biodiversity can be driven by regulatory compliance or crisis or can be considered when making business decisions for anticipated BES issues. Like many of the other practices described, stakeholder engagement early in a project's life typically is essential for good environmental performance. Engagement may be continued throughout the lifecycle of an asset. Stakeholder engagement may be considered at the site/project/asset and landscape/regional levels where driven by a government and/or stakeholder demands. It may also be considered as part of the company's decision-making at the corporate/strategic level. Stakeholders are typically identified for each project or project phase and may include the local community, which may also comprise business peers, government, NGOs, the scientific community. The IPIECA-OGP BESWG has developed a few guidance documents that included stakeholder engagement considerations for BES issues (IPIECA-OGP, 2007; IPIECA-OGP, 2012; IPIECA, 2012). However, this evolving area of practice was identified as one that could benefit from more guidance to enable IPIECA member companies to continually improve their environmental performance. As more guidance is developed around the concept of ecosystem services, the ability to further improve on stakeholder engagement on BES issues will grow. This is because a number of ecosystem services are provided to people through biodiversity, which underpins a healthy ecosystem.

#### *Companies understand BES baseline*

The foundation of good environmental management is an understanding of the baseline conditions before the start of a project, as well as a good understanding of how this baseline may change over time. Biodiversity data is essential to inform all relevant phases of the full asset lifecycle to help in decision-making for impact assessments, selection mitigation measures, and the identification of potential dependencies of a project on biodiversity and ecosystem services. A good biodiversity baseline assessment also forms the basis for a Biodiversity Action Plan (BAP) (IPIECA-OGP 2005) and the monitoring programme for a project. For example, during the early stages of a new project, it's important to have sufficiently detailed BES baseline to inform the selection of facility locations, which helps a project to understand the potential risks. With a good BES baseline, projects can reduce or avoid potential impacts and integrate BES sensitivities into the design of the facility (such as re-routing a pipeline to avoid a sensitive area) - a top tip for success in managing biodiversity impacts (IPIECA-OGP, 2010). This approach can then prevent unnecessary delays later on in the project. It's important to take a wider landscape-approach to managing BES, especially when considering both the impacts and dependencies of a project on BES. The management ladder introduces different levels of BES baseline data needs to inform a company's planned activities. These range from site-based data collection driven by regulatory requirements to a comprehensive, landscape approach to knowing BES baseline.

#### *Companies assess BES dependencies and potential impacts*

The fourth area of BES management practice is for companies to assess their dependencies on and potential impacts to BES. Such assessments would typically take place as a part of an environmental, social and health impact assessment process, such as that outlined in the EBI or the more recent OGP eSHRIMP (OGP 2007) in the development of projects. The assessment of BES dependencies and potential impacts begins early in the development of a project, preferably at the concept stage, and considers activities across the lifecycle of the asset. The overall objective of such assessments is to understand how a project potentially may positively or negatively affect BES within the area of consideration, and to inform the area of practice management in which companies mitigate and manage BES impacts and identify BES opportunities. The earlier this information is developed in a project, the greater opportunity there is to influence siting and design decisions to avoid potential impacts. With respect to ecosystem services, this analysis would identify those ecosystem services on which a project will depend as well as those that it may impact (IPIECA-OGP, 2011). For example, a project may require water, which would have to be obtained from a particular source(s). The assessment would identify the source(s) of the water and consider the reliability of the supply as a factor in understanding potential risks related to the project dependency on this ecosystem service. Similarly, the siting of a project may have the potential to affect a local community's access to fishing grounds or a cultural resource. The assessment, informed by engaging stakeholder engagement in the community and understanding their expectations around BES, would identify potential impacts to ecosystem services important to the potentially affected community.

#### *Companies mitigate and manage BES impacts and identify BES opportunities*

Based on the information gathered from all the areas of practice described above, companies can develop strategies and plans to mitigate and manage potential risks associated with ecosystem services dependencies and potential BES impacts, as well as identify opportunities for BES enhancements. This set of activities should be guided by the mitigation hierarchy, which follows a progression of developing actions to avoid, reduce and mitigate potentially significant impacts (CSBI 2013). Identified actions should be incorporated into the appropriate management plans for construction and operations, which in some cases may be a Biodiversity Action Plan (IPIECA-OGP 2005; OGP 2007). Examples of avoidance and reduction of potential impacts to BES in the siting of facilities may include locating a coastal facility where it would have the least potential impact to mangroves, where fish reproduce and rear, in a region where the local population depends on fish for a substantial amount of the protein in their diet. An example of an opportunity to enhance ecosystem services may include restoring habitat connectivity to promote recovery of game species for subsistence or recreational hunting. Examples of indirect mitigation may include providing funding to conservation organizations, such as governmental agencies, protected areas management, scientific researchers or non-governmental organizations to advance the conservation of a species potentially affected by a project.

#### *Companies select measure and report BES indicators*

The sixth area of BES management practice deals with the selection and use of appropriate indicators for BES. These enable companies to measure and report, both internally and externally, on the strategies and plans put in place, companywide and at asset level, to mitigate operational dependencies and potential impacts on BES, as well as to capture opportunities for BES enhancements.

Ideally, good practice would be to develop and implement an integrated system of third-party verified company-level and site-level indicators. The former would be used to measure the company's global performance, set company targets for continuous improvement in BES management, inform strategic decisions and report externally to stakeholders or against financial benchmarking criteria. The latter would be used to quantitatively measure and monitor activity effects and BAP outcomes at site level, systematically improve operational practices, set targets for continuous improvement in BES management, and inform the system of company-level indicators.

In practice, selecting appropriate and widely accepted company- and site-level BES indicators is still a significant challenge. To this end, it is important to bear in mind what purposes indicators should serve and which criteria indicators should meet. The Energy and Biodiversity Initiative defines indicators as “*a way of presenting and managing complex information in a simple, clear manner that can form the basis for future action and can be readily communicated to internal or external stakeholders as appropriate*” (EBI 2003).

Examples of company-level indicators include the qualitative description of the management approach on BES, how these issues are incorporated into environmental management systems, the quantitative measure of the company's global

performance as percentage of operations where action plans have been implemented in sites exposed to BES risk or the location and size of land owned, leased, managed in, or adjacent to protected areas (IPIECA-OGP-API, 2011; GRI 2012)

Generally, site-level indicators quantitatively measure the state, potential impacts (pressures) and responses of key components of biodiversity (e.g. species, habitats) and ecosystem services in relation to company activities and to other human pressures in the same area. They are selected from the BES baseline following the SMART principle (specific, measurable, achievable, relevant and timely) and are used as part of the BAP monitoring programme throughout the full asset lifecycle.

As already mentioned, the mapping exercise the BESWG performed on existing guidance, tools and products developed by IPIECA-OGP and other entities highlighted the selection, measure and reporting of BES performance indicators as one of the main gaps in the area of BES management practice that need to be addressed by future efforts of the BESWG.

### **Facilitating and enhancing the integration of BES**

The BES Management Framework identifies six BES areas of management practice that can be developed by companies within their own management systems. For each of the areas of practice, the BESWG has mapped what existing guidance, tools and products have been developed by the IPIECA-OGP BESWG as well as independent entities such as WBCSD/WRI and UNEP-WCMC. Based on this mapping, the BESWG has identified gaps in existing guidance, tools and products where the BESWG will consider focusing future attention and efforts. This exercise has shown that BES guidance, tools and related resources for the oil and gas sector are needed in the following three areas of management practice for companies to continue to:

- Build BES into their governance and business processes
- Engage stakeholders and understand their expectations around BES
- Select measure and report BES performance indicators

The IPIECA-OGP BESWG provides an important forum for companies to understand the complex issues surrounding BES whilst also developing the guidance for good practices, tools and resources to support companies in advancing the integration of BES considerations into their own business practices. As a part of IPIECA's mission to promote uptake of materials developed by its working groups, over the next four years the working group will be conducting a peer-to-peer BES workshop series with the purpose of disseminating the knowledge on BES concepts and their relevance and at promoting the adoption and implementation of BES management approaches across the member companies. The BES Management Framework will be a key product that will be promoted as part of this workshop series as it is an important resource in advancing the integration of BES Management approaches across the oil and gas sector. Finally, the IPIECA-OGP BES Working Group process for developing the BES Management Framework, along with the resultant structure, offers a model for other entities, including IPIECA and OGP working groups, to address certain aspects of their knowledge management challenges as well as to provide an assessment that can inform strategic planning in such organizations.

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### **References**

- Asif, M., Fisscher, O.A.M., Joost de Bruijn, E., and Pagell, M. (2010), Integration of management systems: A methodology for operational excellence and strategic flexibility, *Operations Management Research*, **3**: 146-160
- Bernado, M., Casadesus, M., Karapetrovic, S., and Heras, I. (2009), How integrated are environmental quality and other standardized management systems? An empirical study, *Journal of Cleaner Production*, **17**: 742-750
- BSR, 2013, *Private Sector Uptake of Ecosystem Services Concepts and Frameworks*
- Cross-Sector Biodiversity Initiative (CSBI), 2013, *CSBI Charter*
- Energy and Biodiversity Initiative (EBI), 2007, [www.theebi.org/products.html](http://www.theebi.org/products.html)

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- Energy and Biodiversity Initiative (EBI), 2003, *Biodiversity Indicators for Monitoring Impacts and Conservation Actions*
- GRI, 2012, *Sustainability Reporting Guidelines & Oil and Gas Sector Supplement*
- IPIECA, 2012, *Indigenous Peoples and the oil and gas industry*
- IPIECA-OGP-API, 2011, *Oil and gas industry guidance on voluntary sustainability reporting*
- IPIECA-OGP, 2005, *A guide to developing biodiversity action plans (BAPs) for the oil and gas sector*
- IPIECA-OGP, 2007, *A guide to the Convention of Biological Diversity for the oil and gas industry*
- IPIECA-OGP, 2010, *Managing biodiversity impact: 10 tips for success in the oil and gas industry*
- IPIECA-OGP, 2011, *Ecosystem services guidance: Biodiversity and ecosystem services guide*
- IPIECA-OGP, 2012, *Managing oil and gas activities in coastal areas*
- Karapatovic, S., and Casadesus, M., (2009), Implementing environmental with other standardized management systems: Scope, sequence, time and integration, *Journal of Cleaner Production*, **17**: 533-544.
- Millennium Ecosystem Assessment, 2005, [www.millenniumassessment.org/en/index.html](http://www.millenniumassessment.org/en/index.html)
- OGP, 2007, *Environmental-Social-Health Risk and Impact Assessment Process*, Report 389. <http://www.ogp.org.uk/pubs/389.pdf>
- OGP, pending, *Operating Management Systems Framework*
- Springer, Nina, Lucie N'Guessan and Russell D. Tait, 2012, *The Promise and Challenge of Ecosystem Services from an Industry Perspective*. SPE/APPEA International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production, 2012. Perth, Australia
- Whatling, D.R., Hedges, R.B and Fermor, P., (2010), Corporate responsibility reporting of biodiversity in the supply chain, *International Journal of Innovation and Sustainable Development*, **5**: 51-64