HUMAN CENTERED BUSINESS MODEL
ENVIRONMENTAL PRINCIPLES and INDICATORS PAPER

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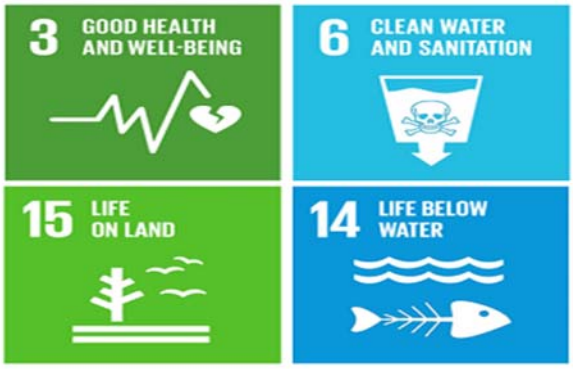

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I. The Purpose of the Paper

Present key governmental and corporate developments, trends and best practices in environmental sustainability relevant to the **Human Centered Business Model (HCBM)** Environmental principles; and highlight HCBM's principles alignment with key environment international agreements and conventions, voluntary instruments, initiatives and tools.

Provide a research paper for consultation on the HCBM environment principles and corresponding environment performance indicators, including an improved list of Environmental Sustainability Principles (following on the HCBM Principles Matrix developed in 2017) with detailed descriptions of the principles and an initial proposal for Environmental Sustainability Indicators.

Present an analysis of the linkages between each of the HCBM Environment principles and the most widely used and globally accepted voluntary sustainability initiatives for identification of the most commonly used indicators.

Identify best practices, guides, tools and other practical instruments that will help Human Centered Enterprises (HECs) to implement the HCBM Environment Principles.

Select examples and cases of companies that have begun incorporating these environmental principles into their business culture and organizational performance.

In HCBM Social and Environment papers, we use a typology, adapted and modified from International Labour Organization (ILO) and Organisation for Economic Co-operation and Development (OECD) publications (ILO 2008; OECD 2009; OECD 2014) and other classifications, that organizes the Corporate Social Responsibility (CSR) and sustainability instruments in three major levels and a number of categories, representing the elements of the architecture of an **emerging global system of instruments for sustainable business**:

Global Architecture of Agreements and Instruments in Environment

Normative Level I: International Norms-setting Agreements – agreements, conventions and declarations that reflect agreed by governments international normative principles, directed to government for domestic implementation, can help business understand what to do (ILO 2008; OECD 2009), for example:

> **Overarching,** across all sustainability dimensions: SDGs, Agenda 2030, Agenda 21,
>
> **Environmental:** The Paris Agreement (2015), Montreal Protocol on Substances that Deplete the Ozone Layer (1987) and Vienna Convention for the Protection of the Ozone Layer (1985), etc.
>
> **Social:** Universal Declaration of Human Rights, ILO Conventions, ILO Declaration on Fundamental Principles and Rights at Work, etc.
>
> **Ethical/integrity:** OECD Convention on Combating Bribery of Foreign Officials in International Business Transaction, etc.

Functional/Operative Level II: International Instruments - principles, codes, guidelines, frameworks, standards and tools that are linked to the international norms-setting agreements and directed to the business sector and in some cases to business and civil society:

> **Category 1. Instruments Developed by Intergovernmental Bodies –** originating from the UN and other intergovernmental organizations, officially-agreed and/or recognised by governments principles and frameworks that offer authoritative guidance to the business sector on expectations of behavior and help understand what to do, and sometimes also how, for example: UN Global Compact Principles, International Finance Corporation Performance Standards, etc.

Category 2. Private International Instruments with Government Recognition- developed privately and officially agreed or/and recognized by governments frameworks, guidelines and standards, developed with participation of business/civil society, that offer guidance on expectations of behavior and provide guidance on how to implement such standards: ISO standards (e.g. 14000 environment series) or GRI Sustainability Reporting Guidelines and the GRI Standards for example.

Category 3. Private Instruments - codes, frameworks, guidelines, standards and tools, linked to business initiatives and sometimes aligned with international norms, developed by business and other private entities to address specific business needs, predominantly sectoral: Responsible Care Guidelines, ISEAL or the Greenhouse Gas Protocol.

Regulatory Level III: National and International Regulatory Instruments and Initiatives – regulations, policies, principles, codes, guidelines on national level put in place by governments, governmental institutions, stock exchanges, market regulators, or other national organizations and initiatives:

Category 4. Mandatory Initiated by Governments – regulations, policies and mandatory requirements put in place by governments or governmental implementation institutions concerning sustainability performance and reporting of companies. Some requirements focus on a given sector, topic or region. For example the EU **Directive on disclosure of non-financial and diversity information by certain large companies** (European Commission.2014).

Category 5. Mandatory Initiated by Market Regulators (Stock Exchange) – sustainability policies and mandatory requirements put in place by stock exchanges and market regulators address the sustainability performance and reporting of companies. Some requirements focus on a given sector, topic or region. For example, the Johannesburg Stock Exchange mandates all listed companies to disclose ESG practices (http://www.sseinitiative.org/fact-sheet/jse/) and because of the level of authority possessed by the exchange, it is considered a Strong Exchange Self-Regulatory Organisation (SRO) Model; mandatory corporate governance regulation for the securities market, issued by The Securities Regulator (SUGEVAL) impacts the National Stock Exchange of Costa Rica Bolsa Nacional de Valores S.A. and its signatory companies, etc.

Category 6. Voluntary Guidance Initiated by Governments or Other Regulators - guidance and recommendations put in place by governments, governmental implementation institutions, stock exchanges and market regulators that address the sustainability performance and reporting of companies. Some focus on a specific sector, topic or region. For example, the EU **Flagship Initiatives**[1] that will help SMEs achieve sustainable growth; Guide to Sustainability Reporting for Listed Companies issued by the Singapore Exchange, etc.

This paper focuses on Level II International Instruments and their alignment with HCBM Environmental Principles. It examines principles, codes, guidelines, frameworks, standards and tools that are linked to the international norms-setting agreements for use by the business sector and in some cases to business and civil society. Since the first World Summit on Sustainable Development a growing number of organizations and initiatives as well as governments have focused on bringing the environment and sustainability in the business agenda.

[1] Europe Strategy 2020 has identified new engines to boost growth and jobs. Three priority areas are addressed by **7 flagship initiatives**: **Smart growth (**Digital agenda for Europe; Innovation Union; Youth on the move), **Sustainable growth (**Resource efficient Europe; An industrial policy for the globalisation era), **Inclusive growth (**An agenda for new skills and jobs; European platform against poverty)

Currently, the private sector not only adhere to national, state and multilateral environmental policies, laws and agreements; business also utilize standards, certifications and ecolabels to show consumers their use of environmentally friendly ingredients and processes. The International Organization for Standardisation (ISO) has identified three broad types of **voluntary labels**, with ecolabelling fitting under the strongest Type 1 designation.

TYPE I:

- A voluntary, multiple-criteria based, *third party* program that awards a license that authorises the use of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life cycle considerations

TYPE II:

- Informative environmental *self-declaration* claims

TYPE III:

- Voluntary programs that provide quantified environmental data of a product, under pre-set categories of parameters set by a qualified third party and based on life cycle assessment and verified by that or another qualified third party.[2]

Environmental management standards for business management and operation need to be Independent, third-party, and verifiable set of specifications (such as ISO 14001 or Greenhouse Gas Protocol) which provide publicly recognized means to an organization to demonstrate its commitment to maintaining and enhancing the quality of environment.

II. Historical Background and Overview of Recent Environmental Developments and Trends

Private sector environmental requirements first came in the form of policy and regulations. As early as the mid-18th century, the Industrial Revolution resulted in the rapid urbanisation \workers moved to settlements around mechanised industrial centres. Economic success also came social and environmental impacts, and UK environmental law is therefore rooted in a response to industrialisation. Many would say that the current approach to environmental policies, laws and regulations and the national level that were directed at the private sector began in the 1960s', early 1970s' and the national and federal in Europe and North America, then further developed in other countries globally.

The modern concept of sustainable development was a topic of discussion at the 1972 United Nations Conference on the Human Environment (Stockholm Conference), and the driving force behind the 1983 World Commission on Environment and Development (WCED, or Bruntland Commission). In 1992, the first UN Earth Summit resulted in the Rio Declaration, Principle 3 of which reads: "The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations." Sustainable development has been a core concept of international environmental discussion ever since, including at the World Summit on Sustainable Development (Earth Summit 2002), and the United Nations Conference on Sustainable Development (Earth Summit 2012, or Rio+20).

Throughout the last 50 years the trend has been not only to increase environmental sustainability but to begin integrating environment into business as one of the pillars of sustainable development, building a more wholistic approach that includes social, economic, inclusive business, human rights, integrity and ethical consideration and insuring that policy and practice leads to more inclusive, equitable business for the benefit of all.

[2] https://www.globalecolabelling.net/what-is-eco-labelling/

Many enterprises are now involved in global supply chains, as a result, the contributions of smaller businesses and industries, central to the economies of rural areas in developing countries, are frequently overlooked. The constraints smaller businesses and industries operate under, such as limited human and financial resources, restrict their ability to participate in global policy processes.[3] This has also given rise to an array of International Treaties, private codes and labels, sustainability reporting, tools and process to help business reduce impacts and maximize benefits. Environmental issues addressed by businesses are no longer just air, water, waste and chemical pollution impacts, but include greenhouse gas management, biodiversity, phytosanitary standards for food protection to creating a green and circular economy.

It has been argued that, the global corporate social responsibility agenda is shaped largely by northern agendas and has been understood to include 'voluntary actions' of large enterprises as well as compliance with national environmental laws and international environmental agreements. Multi-national and larger businesses are not only reporting on their corporate social responsibility and environmental conservation, but on how their operations align with Sustainable Development Goals (SDGs) and contribute to community social development and environmental protection along their supply chains. Small to medium enterprise (SME) plays an important role in these supply chains and as part of the global business ecosystem for products and services have also begun adopting a range of business models that address sustainable development, which include economic, social and environmental, rights-based principles and provide a more sustainable way of doing business than current practice and may be voluntarily adopted by entrepreneurs. Annex A, HCBM Environmental Literature Review and Annotated Bibliography provides a more in-depth review of this development in Europe, North America and Brazil.

III. Challenges for Business and Environment Looking Forward

The SDGs and the Agenda 2030 are challenging enterprises, governments and the other stakeholders to engage in a broad collaborative effort for sustainable development. But most of the existing initiatives that offer sustainability, ESG and CSR instruments, including guiding principles and best practices on corporate governance, or provide "socially- and environmentally-sensitive" financial instruments, are focusing predominantly on the company. They do not offer any sort of holistic, comprehensive approach, that incorporates internal corporate governance solutions and company performance policies together with external ecosystem of fiscal policies, financial mechanisms, procurement policies, and other elements enabling sustainable business development. At present, there is no effective mechanism for individual investors, civil society and governments to hold companies to account for investing in and promoting good corporate performance on sustainable development.

Currently, insufficient alignment among the diverse CSR initiatives and instruments, combined with siloed mentality and lack of incentives and coordination, both within the companies and externally among their stakeholders in the external "business ecosystem," are still allowing "business as usual" and continue to limit the collective impacts and progress towards the SDGs. In addition, within the realm of environment there is emergence of new business and community ecosystem approaches to make business production, products and services more environmentally sensitive or "green".

The "**Circular Economy"** is an industrial system in which the potential use of goods and materials is optimized, and their elements returned to the system at the end of their viable life cycles. Supply chain sustainability and product life cycle sustainability are integral to the circular economy. Materials and products have a closed-loop life cycle and, ideally, all elements that go into the creation of a product are reused, recycled or remanufactured rather than discarded. The philosophy is based on a holistic perspective

[3]Stephens, Anthea, Private sector involvement in implementing multilateral environmental agreements (MEAs): A closer look at the natural products industry, World Conservation Union (IUCN), South Africa

of processes and technologies that goes beyond the focus of delivery, inventory and traditional views of cost. The underlying principle is that responsible products and practices are not only good for the environment but are also important for long-term profitability.[4] In a circular economy, economic activity builds and rebuilds overall system health. The concept recognizes the importance of the economy needing to work effectively at all scales – for large and small businesses, for organizations and individuals, globally and locally. Transitioning to a circular economy does not only amount to adjustments aimed at reducing the negative impacts of the linear economy. Rather, it represents a systemic shift that builds long-term resilience, generates business and economic opportunities, and provides environmental and societal benefits.[5]

The **"Green Eonomy"** is defined as an economy that aims at reducing environmental risks and ecological scarcities, and that aims for sustainable development without degrading the environment. It is closely related with ecological economics but has a more politically applied focus. The 2011 UNEP Green Economy Report argues "that to be green, an economy must not only be efficient, but also fair.

> *"A green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive."*[6]

An inclusive green economy is an alternative to today's dominant economic model, which exacerbates inequalities, encourages waste, triggers resource scarcities, and generates widespread threats to the environment and human health. Over the past decade, the concept of the green economy has emerged as a strategic priority for many governments.[7]

While, **"Green Growth"** means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.[8] It focuses on the synergies and trade-offs between the environmental and economic pillars of sustainable development. Importantly, green growth does not neglect the social pillar; on the contrary, without good governance, transparency, and equity, no transformative growth strategy can succeed. Moreover, there is no one-size-fits-all strategy for implementing green growth; rather, specific policies and actions need to respond to national priorities and circumstances.[9] Green growth is not a replacement for sustainable development. Rather, it provides a practical and flexible approach for achieving concrete, measurable progress across its economic and environmental pillars, while taking full account of the social consequences. Importantly, green growth does not neglect the social pillar; on the contrary, without good governance, transparency, and equity, no transformative growth strategy can succeed. It is closely related with Green Economy.

These emerging concepts, alongside the array of Level 1, 2 and 3 environmental initiatives, standards and ecolabels are often difficult for business to navigate and incorporate into their corporate culture and operations. Clients and consumers are often confused by these overlapping approaches and tools.

The **Human Centered Business Model (HCBM)** addresses the above challenges by creating an alternative approach to doing business, one that is based on globally accepted sustainability principles and addresses not only the Human- Centered Enterprise (HCE) but also the "business ecosystem" in which the Human Centered Enterprise (HCE) operates. A harmonized set of fundamental principles for doing business in a

[4] http://whatis.techtarget.com/definition/circular-economy
[5] https://www.ellenmacarthurfoundation.org/circular-economy/overview/concept
[6] http://whygreeneconomy.org/information/unep-green-economy-report/
[7] https://www.unenvironment.org/explore-topics/green-economy/about-green-economy
[8] http://www.oecd.org/greengrowth/
[9] http://www.greengrowthknowledge.org/about-us

socially-environmentally sustainable, and ethically responsible way, applied to both companies and their "business ecosystem" can scale up the multi-stakeholder collaboration and multiply the business contribution to the SDGs on both local and global levels.

IV. Introduction of the Human-Centered Business Model (HCBM)

The HCBM is centered on human beings and the environment in which we live and brings sustainable value and long-term benefits to the company and its shareholders and to the broader communities. This is achieved first through shifting company's social and environmental interests from "tertiary" or "external" interests to primary corporate goals that stand alongside the drive for profit. The HCBM approach is based on the idea that there are no trade-offs between economic, financial, environmental social and ethical goals, and that supporting the latter will bolster the former.

The HCBM represents in practical terms the concept of integrated sustainability at the company level as it entails putting profit on the same priority level as social, environmental and ethical principles. The HCEs are expected to address all main dimensions of sustainability simultaneously: the economic dimension, in terms of ensuring long term economic and financial performance; the Social dimension, by creating value for the society; the Environmental dimension, through a responsible management and re-construction of natural resources; and the so called Ethical/Integrity dimension that represents ethical and legal compliance and impacts of the HCEs.

Furthermore, The HCBM takes a holistic approach, that addresses not only the internal systems within the Human- Centered Enterprise (HCE) but also the external context, by creating an enabling, sustainable and competitive "business ecosystem" that includes also legal, financial, fiscal, procurement elements , and collaborative stakeholder relationships.

In this respect, the HCBM applies the integrated sustainability approach to a model that is stakeholder-centric (and not shareholder-centric) where the enterprise stakeholders and the external "business ecosystem" are partners in pursuing Social, Environmental and Ethical/Integrity principles.

The HCBM differs from all the existing initiatives (e.g. Social Enterprises, Cooperatives, Benefit Corporations, etc.) for doing business in a more sustainable way and from the range of Corporate Social Responsibility practices for the following elements:

- Differently from Social Enterprises the HC Enterprises will have - as common denominator - a "core of principles and corporate objectives" that will create a very strong identity;
- Differently from CSR policies, the HCB Enterprises will embed - in their bylaws - a common set of corporate goals covering economic, social and environmental sustainability;
- Differently from the Benefit Corporations the HCBM is not a new legal form but a coherent "business ecosystem".

This ecosystem presents a complete policy and regulatory framework for sustainable businesses, structured around six pillars:

(1) **Guiding Principles** that sets the core social, environmental and ethical/integrity principles that must be fulfilled to allow a business to acquire the Human-Cantered Enterprise (HCE) status (plus some optional ones to make the model flexible to different economic and social realities), together with corresponding performance indicators;

(2) **Legal Framework and Corporate Governance** that focuses on adapting existing corporate governance mechanisms and/or developing new ones, to allow companies to exercise their businesses in coherence with the guiding principles. This pillar will build on relevant practices from different legal systems;

(3) **Financial** that consists of adapted existing financial instruments (like the Green Bonds, social bonds, etc.) or innovative financial mechanisms, developed to attract sensitive investors who share the same social and environmental values. Thus, the HCE is expected to be able to survive economically without any assistance from the public sector.

(4) **Fiscal** will be "levelling the playing field" by establishing incentives and disincentives (penalties) based on the HCE performance measured by indicators against the targets established for each guiding principle;

(5) **Procurement** will develop new or adapt existing corporate and public procurement mechanisms, with a particular attention to the entire supply chain.

(6) **Stakeholders relationship – the** last HCBM pillar aims to identify the stakeholders of the HCEs and to guide the development of collaborative relationships between the enterprises and their stakeholders.

The HCBM is not developed in isolation, instead it builds upon important work being done by other valuable initiatives, leveraging their contributions into a comprehensive business ecosystem . The HCBM Principles are the result of an extensive research to build a global inventory of normative regulatory and voluntary sustainability frameworks addressing sustainability business practices.

The HCBM Principles

The HCBM principles are in line with existing relevant social, environmental, ethical and economic international and regional legal instruments and principles for sustainable development, with CSR policies, and principles voluntarily adopted by the private sector largely agreed upon by the international community to regulate business conduct.

The HCBM Principles are structured in the following categories:

a. **Essential (core, mandatory) Principles** – all HCE are required to embed these principles in their bylaws

   i. **Essential Principles of Immediate Realization** – mandatory principles that will require immediate implementation by HCEs - these are most widely used principles by companies; recommended by a large number of frameworks, guidelines, instruments; with defined measurement methodology and metrics; often policy-shaping and linked to key parameters monitoring and reporting on company's performance and impacts, for example: principles addressing waste generation and management;

   ii. **Essential Principles of Progressive Realization** - other essential principles may be implemented progressively over time or sequentially, they usually require more complex measurement and data collection systems, predominantly measuring operational and technical parameters, for example: principles for participation in circular economy;

b. **Optional Principles** – these include additional principles that are still in testing phase, sector-specific principles and other principles that are proposed for voluntary adoption by the HCE, for example: some principles addressing the impact on biodiversity are not relevant for certain enterprises in certain sectors, such as small accounting firms or IT developers.

HCBM performance indicators and corresponding goals and targets are assigned to each HCBM principle. Indicators help the HCEs to translate their commitments to the principles into tangible and concrete "deliverables." At the same time, they communicate to the outside world and to company's internal and external stakeholders the responsibilities the company is willing to fulfill and in what way.

The HCBM indicators, selected from a pool of standards and best practice indicators and metrics, will be used by the HCEs and their stakeholders to measure performance progress towards corresponding targets,

based on HCBM benchmark research of global best practices. The HCBM pays special attention and tailored solutions to Micro, Small and Medium Enterprises (MSMEs).

Most of governments and international organizations lead, participate and/or recognize several initiatives as the main global initiatives in sustainable business and CSR (environment, social, economic). The instruments developed by the main global initiatives and organizations, listed below, are often addressed as building blocks of the emerging global Corporate Social Responsibility (CSR) architecture and the HCBM Environmental Principles have been aligned with these instruments:

Organisation for Economic Co-operation and Development (OECD)

Environmental policy tools and evaluation, Ensuring policies are economically efficient and environmentally effective.

Key areas of work:

- Behavioural Economics for Environmental Policy (BEEP)
- Carbon pricing
- Cost-benefit analysis
- Emission trading systems
- Environmental taxation
- Mortality impacts
- Morbidity impacts
- Policy reform
- Spatial Planning Instrument and the Environment (SPINE)

OECD, *Resource productivity and waste* OECD is promoting the sustainable use of materials to reduce their negative environmental impacts, encouraging resource efficiency and the transition towards a circular economy. Key areas of work:

- Circular economy (RE-CIRCLE)
- Cost of inaction and resource scarcity (CIRCLE)
- Extended Producer Responsibility
- Resource efficiency
- Sustainable material management
- Transboundary movements of waste
- Waste and nanomaterials
- Waste prevention and minimisation

International Finance Corporation (IFC) and The World Bank Group

IFC's Environmental and Social Performance Standards define IFC's responsibilities for managing their environmental and social risks. The 2012 edition of IFC's Sustainability Framework, which includes the Performance Standards, applies to all investment and advisory services whose projects go through IFC's initial credit review process after January 1, 2012.

- *2012 Performance Standards*
- *2012 Guidance Notes*.

IFC Sustainability Framework, Policy and Performance Standards on environmental and Social Sustainability, 2012. This Performance Standard applies to business activities with environmental and/or social risks and/ or impacts. For the purposes of this Performance Standard, the term "project" refers to a defined set of business activities, including those where specific physical elements, aspects, and facilities likely to generate risks and impacts, have yet to be identified.6 where applicable, this could include aspects from the early developmental stages through the entire life cycle (design, construction, commissioning, operation, decommissioning, closure or, where applicable, post-closure) of a physical asset. OECD

Guidelines for Multinational Enterprises (principles and guidance on policy and management) are also included in this alignment.

The *World Bank Environmental and Social Framework (ESF)*, formerly known as "safeguards", was approved in 2016 (going into effect in October 2018). Although not directly applied to enterprises, ESF is a globally recognized key instrument that is expected to strengthen the national systems in borrowing countries and thus will have influence on the potential for development of HCBM ecosystems in these countries. The framework brings the World Bank's environmental and social protections into closer harmony with those of other development institutions, and makes important advances in areas such as transparency, non-discrimination, social inclusion, public participation, and accountability – including expanded roles for grievance redress mechanisms. It places greater emphasis on the use of borrower sustainability frameworks and capacity building, with the aim of constructing sustainable borrower institutions and increasing efficiency. The ESF introduces comprehensive labor and working condition protection; an over-arching non-discrimination principle; community health and safety measures that address road safety, emergency response and disaster mitigation; and a responsibility to include stakeholder engagement throughout the project cycle. It concludes nearly four years of analysis and engagement around the world with governments, development experts, and civil society groups, reaching nearly 8,000 stakeholders in 63 countries. The framework is part of a far-reaching effort by the World Bank Group to streamline its work and to boost development outcomes in Bank projects by placing strong emphasis on sustainability, responsible use of resources, and monitoring and evaluation.

United Nations Global Compact Principles

The UN Global Compact (UNGC) Mission states: "*By committing to sustainability, business can take shared responsibility for achieving a better world.*" Corporate sustainability starts with a company's value system and a principles-based approach to doing business. This means operating in ways that, at a minimum, meet fundamental responsibilities in the areas of human rights, labor, environment and anti-corruption. Responsible businesses enact the same values and principles wherever they have a presence and know that good practices in one area do not offset harm in another. By incorporating the Ten Principles of the UN Global Compact into strategies, policies and procedures, and establishing a culture of integrity, companies are not only upholding their basic responsibilities to people and planet, but also setting the stage for long-term success. The Ten Principles of the United Nations Global Compact are derived from: the Universal Declaration of Human Rights, the International Labour Organization's Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development, and the United Nations Convention Against Corruption.

Environment:

Principle 7: Businesses should support a precautionary approach to environmental challenges;

Principle 8: undertake initiatives to promote greater environmental responsibility; and

Principle 9: encourage the development and diffusion of environmentally friendly technologies.

ISO 14000 Series of Standards and Guidance for Environment

International Standards Organisation (ISO) is an independent, non-governmental international organization with a membership of 161 national standards bodies.[i] The ISO 14000 family of standards provides practical tools for companies and organizations of all kinds looking to manage their environmental responsibilities. ISO 14001:2015 and its supporting standards such as ISO 14006:2011 focus on environmental systems to achieve this. The other standards in the family focus on specific approaches such as audits, communications, labelling and life cycle analysis, as well as environmental challenges such as climate change. This International Standard helps an organization achieve the intended outcomes of its environmental

management system, which provides value for the environment, the organization itself and interested parties. Consistent with the organization's environmental policy, the intended outcomes of an environmental management system include:

- enhancement of environmental performance;
- fulfilment of compliance obligations;
- achievement of environmental objectives.

In addition to ISO 14000, there is specific guidance for Small to Medium Enterprise (SME) in 14001:2015 and ISO 14046 for water footprint. ISO 20400 is a standard for sustainable procurement; ISO 20121 for sustainable Events and ISO 37101 for Sustainable Development in Communities. ISO Guidance documents related to ISO 14000, and other mentioned, range from free to those for sale. All documents are found below:

- Environmental labels and declarations
- Environmental management - The ISO 14000 family of International Standards
- GHG schemes addressing climate change
- Introduction to ISO 14001:2015
- ISO 14001 - Key benefits
- ISO 14001:2015 - Environmental management systems - A practical guide for SMEs
- ISO 14046 - Environmental management - Water footprint - A practical guide for SMEs
- ISO 20400 - Sustainable Procurement
- ISO 37101 - Sustainable development in communities
- ISO and agriculture
- ISO and water
- Practical tools for addressing climate change
- Sustainable events with ISO 20121

The guidance in these International Standards can help an organization to enhance its environmental performance and enables the elements of the environmental management system to be integrated into its core business process.

ISEAL Alliance

(ISEAL Alliance) represents the global movement of sustainability standards. Businesses and governments increasingly recognize that sustainability standards deliver better social and environmental outcomes and long-term commercial results. Credible sustainability standards, exemplified by ISEAL members, continue to be the leading tools for driving sustainability at scale. ISEAL developed the Credibility Principles through a year-long global consultation with a diverse group of more than 400 stakeholders. Our goal was to pinpoint the fundamental qualities that make standards most likely to achieve positive impacts. The principles provide a guide for any standard that assesses sustainability. Companies, governments and NGOs can also use them as a reference point for benchmarking or internal audits.

The goal of all ISEAL Codes of Good Practice is to support standards systems to deliver positive social and environmental impact. ISEAL Codes of Good Practice complement each other to achieve this:

- The ISEAL Code of Good Practice for Setting Social and Environmental Standards (Standard-Setting Code) supports the development of standards that are relevant and transparent and that reflect a balance of stakeholder interests;
- The ISEAL Code of Good Practice for Assuring Compliance with Social and Environmental Standards (Assurance Code) helps to ensure accurate results from assessments of compliance and to encourage the use of assurance to support learning; and

- The ISEAL Code of Good Practice for Assessing the Impacts of Social and Environmental Standards Systems (Impacts Code) supports standards systems to measure and improve the results of their work and to ensure that standards are delivering their desired impact.

Individually, each Code is useful in strengthening a component of a standards system. However, users of standards and other stakeholders will have a higher level of confidence in the effectiveness of a standards system when the Codes are implemented together.

The Global Reporting Initiative (GRI)

Guidance on sustainability reporting and disclosures). Global Reporting Initiative (GRI) 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. This enables real action to create social, environmental and economic benefits for everyone. The GRI Sustainability Reporting Standards are developed with true multi-stakeholder contributions and rooted in the public interest. GRI Secretariat, *Consolidated Set of GRI Standards*, This Standard is issued by the Global Sustainability Standards Board (GSSB) in October 2016. The consolidated GRI Standards includes the three Universal Standards – *GRI 101*, *102* and *103* – and the three series of topic-specific Standards: 200 (Economic topics), 300 (Environmental topics) and 400 (Social topics). GRI Secretariat, *Linking GRI Standards and the EU Directive on non-financial and diversity disclosure*, GRI, Global Sustainability Board, February, 2017. This linkage document shows how the GRI Standards can be used to comply with all aspects of the European Directive on the disclosure of non-financial and diversity information. SDG Compass, GRI, WBCSD, *Linking the SDGs and GRI*, January 2017. The following table links the Sustainable Development Goals (SDGs) to the relevant indicators and disclosures in the GRI Standards and Sector Disclosures. These linkages are based on a more detailed analysis available on the SDG Compass website: www.sdgcompass.org.

The existing research data (OECD, UN, IFC, ISO, ISEAL and GRI) and our own literature review, show that the system of main instruments (above) is in line with the key global international agreements, declarations, conventions and norms and utilize a multi-stakeholder consultative approach to develop these instruments. Our literature review of CSR, Corporate Governance (CG), Sustainability Reporting analysis and other sustainability publications (EU 2011, 2014; OECD 2008, 2014, 2017, 2018; UNCTAD 2008; KPMG 2017; PwC 2017; E&Y 2017; SustainAbility; etc.) and review of good business practices in sustainability, show these main instruments receive the highest degree of global recognition by business and governments and the other stakeholders. These key international instruments, together with the key agreements and conventions were used as initial resources for creation of the HCBM Principles and the draft HCBM Principles Matrix. One of the goals of this research is to apply the main sustainability instruments, backed up by the latest legal developments and identified good business practices in social sustainability, for further improvement and elaboration of the HCBM principles and as a base for selection of proposed HCBM indicators.

V. Overview of HCBM Environment Sustainability Principles (ESP) and their relevance to the emerging architecture of globally accepted and applied main initiatives and instruments addressing environmental sustainability

Within a Human-Centered Business Model (HCBM), there are ten groups of environmental principles to pursue environmental sustainability. Each of the ten groups HCBM principles is described below and the

relevance of the HCBM principles to the six main environmental sustainability instruments is shown in tables.

Use of the Precautionary Principle

The precautionary principle, a guideline in environmental decision making, has four central components: taking preventive action in the face of uncertainty; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making.[10]

Table 1

Environmental Sustainability Principles ES-1: PRECAUTIONARY PRINCIPLE (A) Essential Immediate		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-1.1.	**Businesses should support a precautionary approach to environmental challenges**	**X**	**X**	**X**	**X**	**X**	**X**

The Precautionary Principle is a generally accepted concept embedded in most environmental policies, tools and practice. It is the cornerstone of environmental decision-making. As shown in Table 1 above, the HCBM Precautionary Principle (ES-1.1.) is aligned with the six main environmental sustainability instruments.

Compliance with Environmental Laws and Agreements

Environmental Compliance means conforming to environmental laws, regulations, standards and other requirements such as site permits to operate. In recent years, environmental concerns have led to a significant increase in the number and scope of compliance imperatives across all global regulatory environments. Enterprises must comply not only with national, subnational, regional, and local environmental regulations and laws, but also with the voluntary environmental agreements with regulating authorities that are considered binding and developed as a substitute for implementing new regulations. Enterprises must respond to cases brought against them through the use of international dispute mechanisms or national dispute mechanisms supervised by government authorities, such as cases of non-compliance related to spills, etc. Adherence and compliance with existing local, national and international environmental policies, laws and regulations is considered by most countries, multilateral institutions and voluntary instruments as baseline requirement for enterprises operating in one location or globally.

Table 2

Environmental Sustainability Principles ES-2: ENVIRONMENTAL COMPILANCE (B) Essential Immediate		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-2.1.	**Compliance with national, sub-national, regional, and local environmental laws and regulations**	**X**	**X**	**X**	**X**	**X**	**X**
ES-2.2.	**Compliance with the international environmental conventions and agreements and promotion of greater environmental responsibility**	**X**	**X**	**X**	**X**	**X**	**X**

[10] D Kriebel, J Tickner, P Epstein, J Lemons, R Levins, E L Loechler, M Quinn, R Rudel, T Schettler, and M Stoto, *The precautionary principle in environmental science,* Lowell Center for Sustainable Production, Department of Work Environment, University of Massachusetts-Lowell, Lowell, Massachusetts 01854, USA

As shown in Table 2, the HCBM Environmental Compliance Principles (ES-2.1. and ES-2.1.) also align with the following conventions and policies: Paris Agreement on Climate Change; UN Framework Convention on Climate Change (UNFCCC); North American Agreement on Environmental Cooperation (NAAEC) (implements environment portion of NAFTA); Convention on Wetlands of International Importance (Ramsar Convention); Rio Declaration on Human Environment, principle 4. Non-compliance within an organization indicates the inability of management to ensure that operations conform to certain environmental performance and impact requirements and parameters.

Responsibility and Actions to Mitigate Environmental Liability

Environmental liability is an obligation based on the "polluter pays principle" that a polluting party should pay for all damage caused to the environment by its activities. In some countries, this is a strict liability if the damage can be attributed to a specific party.[11] Enterprises should prevent and bear the cost of preventing environmental damage and should bear the costs of damage repair, such as pollution clean-up, etc.

Table 3

Environmental Sustainability Principles ES-3: POLLUTER PAYS AND ENVIRONMENTAL LIABILITY (C) – Essential Immediate		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-3.1.	**ES-3.1. Enterprises should prevent environmental damage and ensure damage repair. Enterprises are subject to the polluter pays principle and to the principle of environmental liability**	**X**		**X**	**X**	**X**	**X**

Businesses should identify and assess their environmental risks and manage them to prevent undesirable effects. In case of damage to the environment, enterprises should repair it by restoring previous conditions and if not possible, compensate the community for the loss with an equivalent area/space or ecosystem. The above table shows the HCBM Environmental Liability Principle (ES-3.1.) alignment with the main environmental sustainability instruments. It also aligns with the policies of Stockholm Declaration on Human and Environment International Convention for the Prevention of Pollution from Ships (MARPOL) + Directive (EC) nº 2004/35 on environmental liability Stockholm Declaration on Human Environment, principle 9 International Convention on Civil Liability for Oil Pollution Damage (CLC), among others.

Efficient Consumption of Resources

According to the Department of Agricultural Economics at Michigan State University, efficient resource allocation means that there is efficiency in the production and consumption systems. "**Production Efficiency"** involves producing the best value of goods and services with given resources.[12] **"Eco-efficiency"** is the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with Earth's estimated carrying capacity. Eco-efficiency and reducing waste and waste disposal are closely linked in business operations. The type and amount of materials the organization uses indicate its dependence on natural resources, the impacts it has on their availability and on the environment. The organization's contribution to resource conservation can be indicated through its approach to recycling, reusing and reclaiming materials, products, and packaging. The waste management hierarchy--reduce, reuse, recycle--expresses the order of importance of these ideas.

An enterprise must identify products and services with large environmental impacts or those of which it procures in substantial amounts. Then the enterprise must work to identify environmentally and socially

[11] www.businessdictionary.com/definition/environmental-liability.html
[12] www.reference.com/world-view/efficient-resource-allocation-ecbb8260eb1181f7

preferable alternatives. Reducing the environmental impact of materials by minimizing consumption and preferring recycled content and rapidly renewable choices ensures resources are available for future generations. An enterprise should track its purchases and give priority to procuring from environmentally friendly suppliers. Businesses should use their purchasing power to choose environmentally friendly goods and services as this action can make an important contribution to sustainable consumption and production along the whole value chain.

Table 4

Environmental Sustainability Principles ES-4: CONSUMPTION OF MATERIALS AND WATER RESOURCES (D) – Essential Progressive		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-4.1.	**Enterprises should optimize the use of resources. Materials used by an enterprise should be minimized.**	**X**	**X**	**X**	**X**	**X**	**X**
ES-4.2.	**Recycle input materials used/Reclaimed products and their packaging materials must be maximized.**	**X**	**X**	**X**	**X**	**X**	**X**
ES-4.3.	**Enterprises must minimize their consumption of water and water withdrawal.**	**X**	**X**	**X**	**X**	**X**	**X**
ES-4.4.	**Enterprises must avoid environmental damage to water sources significantly affected by withdrawal of water**	**X**	**X**	**X**	**X**	**X**	**X**
ES-4.5.	**Water recycled and reused must be increased**	**X**	**X**	**X**	**X**	**X**	**X**

Likewise, Access to fresh water is essential for human life and health. An enterprise should be conscious of and minimize its impact on water resources through its withdrawal and consumption of water. Enterprises are expected to ensure continuing improvement in their environmental performance and minimization of the negative environmental impacts on water resources through water consumption from their own and their suppliers' activities, services and products. Withdrawals reduce the volume of water available for use by local communities and wildlife, usually altering the surrounding ecosystem to perform its functions.

Therefore, if an enterprise or its intermediaries must withdraw water, it should minimize the overall withdrawal, and be aware of the overall impact of withdrawal based on the particular type of water source as well as the overall economic, social, and environmental risks and consequences. An enterprise should measure the significance of its water withdrawal determined by the overall size of the water source, whether the source is a protected area, the biodiversity value, and the value or importance of the water source to local communities and indigenous peoples. If a water source is determined to be a significant water source, withdrawal should only happen if the benefits of the withdrawal substantially outweigh the environmental damage (Precautionary Principle). An enterprise should strive to use recycled and reused water to increase water efficiency and reduce total water withdrawals and discharge.

An enterprise's contribution to resource and water conservation can be indicated by the organization's approach to recycling, reusing and reclaiming water and materials, products, and packaging (Table 4). The HCBM Consumption of Resources Principles align with Stockholm Declaration on Human Environment, principle 9; UN Global Compact Principles, GRI, ISEAL, ISO 14000, IFC and OECD policies and guidance.

Reduction of Energy Consumption

Efficient energy use, sometimes simply called **energy efficiency**, is the goal to reduce the amount of energy required to provide products and services. Energy consumption refers to the amount of energy consumed by an individual or organization, or to the process or system of such consumption**.** Nearly every modern convenience, provided through late 20th century/early 21st century life style, results in increases in the amount of energy consumed.[13]

The purchase and use of energy can have various impacts because of the extraction of materials from the earth's crust and the production of persistent toxic emissions from the combustion of fuels. Various forms of energy are available for consumption, including fuel, electricity, heating, cooling or steam. Energy can be self-generated or purchased and can come from renewable or nonrenewable sources. Using energy more efficiently and opting for renewable energy sources is essential for combating climate change and for lowering an organization's overall environmental footprint. Energy consumption can occur throughout the upstream and downstream activities connected with an enterprise's operations. This can include consumers' use of products the organization sells, and the end-of-life treatment of these products.

The types of energy consumed by an enterprise as well as the percentage of renewable energy used can display an organization's environmental values and its impacts on climate change. For example, non-renewable fuel consumption is often the primary contributor to greenhouse gas emissions. Companies should select energy sources based on (i) whether the energy is renewable (ii) the amount and type of energy consumed, (iii) the amount and type of energy sold.

Energy consumption can occur outside an enterprise, the enterprise must monitor its value chain, both upstream and downstream, operations, and influence/reduce energy consumption. Upstream categories include purchased goods and services, fuel-energy related activities, transportation and distribution, waste generated in operations business travel, employee commuting, etc. Downstream categories include transportation and distribution, processing of sold products, use of sold products, end-of-life treatment of sold products, leased assets, franchises and investments.

Table 5

Environmental Sustainability Principles ESP 5: ENERGY CONSUMPTION (E) – Essential Progressive		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-5.1.	**Enterprises should increase the proportion of renewable energy used for energy consumption within the organization**	**X**	**X**	**X**	**X**	**X**	**X**
ES-5.2.	**Enterprises should increase the proportion of renewable energy used for energy consumption outside the organization**	**X**	**X**	**X**	**X**	**X**	**X**
ES- 5.3.	**An enterprise must improve energy efficiency and maximize reduction of energy consumption through reduction initiatives in its operations**	**X**	**X**	**X**	**X**	**X**	**X**
ES-5.4.	**Reduction in energy requirements of products and services should be made whenever possible**	**X**	**X**	**X**	**X**	**X**	**X**

[13] www.reference.com/science/energy-consumption-a687ac74c2cac2ee

The HCBM Energy Consumption Principles are aligned with the UN Global Compact Principles, GRI, ISEAL, ISO 14000, IFC and OECD policies and guidance (Table 5). They require long-term commitment and investments for technological and operational improvements and are expected to be implemented in a period of time in different stages by the HCEs.

Reduce, Reuse and Recycle, Waste Generation and Disposal

The waste management hierarchy--reduce, reuse, recycle--expresses the order of importance of these ideas:

- Reduce needless consumption and the generation of waste.
- Reuse any item that can be reused or give it to a person or charity that can reuse it.
- Recycle whatever discards remain if you can and only dispose what you must.

The enterprise should keep in mind that recycling is the least preferred option. For there to be a complete cycle, the things that are sent to be recycled must come back to the enterprise. So, the enterprise must look for recycled content products whenever it buys, otherwise the enterprise is not truly recycling.[14]

Eco-efficiency is the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with Earth's estimated carrying capacity. Seven elements or steps companies can make to improve Eco-efficiency. Eco-efficiency and reducing waste and disposal are closely linked in business operations.

A company should minimize and manage water discharges, the generation, treatment and disposal of waste and spills of chemicals, oils, fuels, and other substances, in terms of quantity, quality, and destination of the discharge since the unmanaged discharge of effluents with a high chemical or nutrient load can affect aquatic habitats, the quality of available water supply, and the overall function of nearby communities.

Table 6

Environmental Sustainability Principles ESP 6: WASTE GENERATION AND DISPOSAL (F) - Essential Immediate		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-6.1.	**Enterprises should avoid generating waste and if this is not possible they should ensure efficient management of its waste and effluents**	**X**	**X**	**X**	**X**	**X**	**X**
ES-6.2.	**Enterprises should reduce its discharged waste. It should choose the eco-friendliest effluent and waste discharge method by quality and destination and the most efficient disposal method by type waste.**	**X**	**X**	**X**	**X**	**X**	**X**
ES-6.3.	**Significant spills must be dealt by the enterprise with the aim to minimize 1) the number of spills, and 2) their impact based on spill's location, volume, and material.**	**X**		**X**	**X**	**X**	**X**
ES-6.4.	**Transportation of hazardous waste should be minimized.**	**X**		**X**	**X**	**X**	**X**
ES-6.5.	**Water bodies affected by water discharges and/or runoff should be minimized and reduced.**	**X**		**X**	**X**	**X**	**X**

[14] http://www.calrecycle.ca.gov/ReduceWaste/Home/

An enterprise should reduce the total weight of discharged effluent and waste by following ecofriendly disposal methods (reuse, recycling, composting, etc.) as well as the total weight of all waste. A company should balance disposal options and uneven environmental impacts using waste minimization strategies. In addition to the six main environmental sustainability instruments (Table 6), the HCBM Waste Generation and Disposal Principles align also with Directive (EU) No 2008/98 waste, 1996 Protocol to the Convention on Prevention of Marine Pollution, and several multi-lateral environmental agreements.

Reduce or Eliminate Emissions into Air

Emissions is the term used to describe the gases and particles which are put into the air or emitted by various sources. There are many sources of emissions. These have been grouped into four categories: point, mobile, biogenic, and area. Steps to reducing air emissions include: reducing toxic emissions from industrial sources; reducing emissions from vehicles and engines through new stringent emission standards and cleaner burning gasoline; and addressing indoor air pollution though voluntary programs.

Reducing emissions into air is key to combatting climate change. Reduction in the emission of regulated pollutants leads to improved health conditions for workers and local communities and can enhance relations with affected stakeholders. It also opens economic opportunities for the enterprise as new climate change relevant technologies and markets are created. This is especially the case for enterprises that can use or produce energy and energy-efficient products more effectively with minimum GHG emissions.

Greenhouse Gas (GHG) emissions are a major contributor to climate change and are governed by the UN Framework Convention on Climate Change and the subsequent UN Kyoto Protocol. The gases include CO2, CH4, N2O, HFCs, and PFCs. Some GHG are also air pollutants that have significant adverse impacts on ecosystems, air quality, agriculture, and human and animal health.

Table 7

Environmental Sustainability Principles ES 7: EMISSIONS INTO AIR-(G)-Essential Progressive		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-7.1.	**Enterprises should reduce and minimize both direct and indirect greenhouse gas (GHG) emissions and their intensity including ozone-depleting substances (ODS), and nitrogen oxides (NOX) and sulfur oxides (SOX), and other significant air emissions**	**X**			**X**	**X**	**X**
ES- 7.3.	**If GHG emission is unavoidable, an enterprise should strive to undergo efforts efficiently mitigate and offset emissions.**				**X**		

Enterprises must continuously deepen their efforts to measure, reduce, offset, and report its GHG gas emissions. Enterprises can prioritize reduction initiatives that have the potential to contribute significantly to reduction, using a specific target. In addition to the OECD Guidelines, ISEAL, GRI and ISO 14064 (Table 7), the HCBM Emissions to Air Principles align with the UN Framework Convention on Climate Change; Paris Agreement on Climate Change; and with The Greenhouse Gas Protocol that represents another globally accepted framework offering a methodology for GHG measurement.

Minimize or Eliminate Impact on Biodiversity

Most biodiversity is threatened by multiple factors, but natural habitat loss is generally viewed as the largest single cause of biodiversity loss worldwide. When humans convert wild areas for agriculture, forestry, urban development, or water projects (including dams, hydropower, and irrigation), they reduce or eliminate its usefulness as a habitat for the other species that live there. Protecting biodiversity ensures the

survival of plant and animal species, genetic diversity, and natural ecosystems. Moreover, biodiversity impacts livelihoods, clean water supply, food security, and resilience to environmental disasters, particularly in rural areas. Therefore, special efforts must be made to preserve biodiversity.

Based on the Convention on Biological Diversity, enterprises should contribute to "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, considering all rights over those resources and to technologies, and by appropriate funding".

Wherever feasible, operational sites should be on already converted lands unless there are no feasible alternatives and comprehensive analysis demonstrates that overall benefits from the project substantially outweigh the environmental costs.

If the environmental assessment indicates that a project would significant convert or degrade natural habitats, the project must take mitigation biodiversity through its activities, products and/or services measures, including minimizing habitat loss, and establishing and maintaining an ecologically similar protected area.

The HCBM Impact on Biodiversity Principles are in line with the ISEAL and the GRI. The GRI have been harmonized with the UN Convention on Biological Diversity; the Rio Declaration on Human Environment, principle 4; the Ramsar Convention; the International Union for Conservation of Nature (IUCN) Guidelines for Applying Protected Area Management Categories, and other international agreements and instruments.

Table 8

Environmental Sustainability Principles ESP 8: IMPACT ON BIODIVERSITY (H)-Essential Progressive		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-8.1.	**Enterprises should limit the number of operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.**					**X**	**X**
ES- 8.2.	**Enterprises must avoid making significant negative impacts on biodiversity through its activities, products and/or services**					**X**	**X**
ES-8.3.	**Enterprise play major role regarding the protection of biodiversity by increasing the areas of habitats protected or restored by the enterprise alone or/and in partnership with a third party**					**X**	**X**
ES-8.4.	**Enterprises must identify endangered plant and animal UCN Red List species and national conservation list species with habitats in areas affected by operations and where its activities pose a threat to these species, and it must initiate appropriate steps to avoid harm and to prevent the extinction of species.**					**X**	**X**

Practice Environmentally Responsible Business

Running an environmentally friendly business helps reduce the impact on the environment and preserves natural resources. The enterprise can help the environment in many ways. For example, it can:

- use products that reduce the enterprise's reliance on natural resources (e.g. rainwater tanks, solar hot water systems)
- use products that are made from recycled material (e.g. office supplies made from recycled plastic, furniture made from recycled rubber)
- look at all business activities to see if anything can be done differently (e.g. reducing air travel by holding conference calls instead of interstate meetings).

Making a business environmentally friendly not only benefits the environment but can also save money.[15] Businesses should adapt their business model and design and implement processes and practices that promote greater resource productivity aiming to reduce material and energy flows, waste and avoid pollution.

Based on the Aarhus Convention, enterprises should facilitate free access to environmental information on activities, products and services and about the environmental performance of the organization. The OECD Extended Responsibility Scheme applies this concept to all businesses and supply chains.

Table 9

Environmental Sustainability Principles ES-9: ENVIRONMENTALLY RESPONSIBLE BUSINESS (I)-Essential Progressive		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-9.1.	**Enterprises should provide environmental information and ensure transparency**	**X**	**X**	**X**	**X**	**X**	**X**
ES-9.2.	**Extension of UN Global Compact's Principles 7-9 through the value chain**		**X**				
ES -9.3.	**Minimization of the negative environmental impacts in the supply chain**	**X**			**X**	**X**	**X**
ES-9.4.	**Extended Producer Responsibility**	**X**				**X**	**X**

Transparency should lead to a maintained and open dialogue with interested parties, particularly staff, customers, the local community, public administrations and other relevant parts. In case or corporations and to ensure local accountability, an organization should provide environmental information related to each site.

The Human Centered Enterprise (HCE) is expected to initiate due diligence for supplier environmental impact as early as possible in the development of a new relationship with a supplier by applying screening based on environmental criteria. Through assessments, the organization must stay informed about the significant actual and potential negative environmental impacts in its supply chain and it should strive to minimize them through changing the organization's procurement practices, the adjustment of performance expectations, capacity building, training, and changes to processes.

[15] https://www.business.qld.gov.au/running-business/environment/environment-business/benefits

Adopt Circular Economy

A circular economy is an industrial system in which the potential use of goods and materials is optimized, and their elements returned to the system at the end of their viable life cycles. Supply chain sustainability and product life cycle sustainability are integral to the circular economy. Materials and products have a closed-loop life cycle and, ideally, all elements that go into the creation of a product are reused, recycled or remanufactured rather than discarded.[16]

The HCEs should determine their environmental aspects considering a Life Cycle perspective and all the associated direct and indirect impacts. Actions should be adopted to manage, control and reduce relevant environmental impacts, taking into account the organizations' capacity to influence third parties.

Beyond legal compliance, enterprises should undertake initiatives to promote greater environmental performance. Businesses should increase self-regulation, guided by appropriate codes, charters and initiatives integrated into all elements of business planning and decision-making. This is aligned with UN Agenda 21 and Stockholm Declaration on Human Environment, principle 9. Based on the Stockholm Declaration, businesses should adopt a data-driven improvement cycle and measure and monitor on a regular basis, the key characteristics of its operations, products and services that can have a significant environmental impact. Outputs of measurement and monitoring activities should be considered in decision making processes.

The HCEs should cooperate with and adhere to local and global programs and initiatives and be part of the solution when it comes to face environmental challenges.

Table 10

Environmental Sustainability Principles ES-10: ADOPT CIRCULAR ECONOMY (J)-Essential Progressive		**OECD**	**UNGC**	**IFC**	**ISO 14000**	**ISEAL**	**GRI**
ES-10.1.	**Enterprises should adopt a circular economy (CE) perspective and approach**	**X**	**X**	**X**	**X**	**X**	**X**
ES-10.2.	**Enterprises should adopt self-regulation and control**	**X**			**X**	**X**	**X**
ES-10.3.	**Enterprises should measure to improve.**	**X**	**X**		**X**	**X**	**X**
ES-10.4.	**Enterprises should consider the environmental needs and expectations of interested parties (stakeholders)**	**X**	**X**	**X**	**X**	**X**	**X**
ES-10.5.	**Enterprises should get involved in addressing the local and global environmental challenges**	**X**				**X**	**X**
ES-10.6.	**Businesses should encourage the development and diffusion of environmentally friendly technologies**		**X**				**X**

Based on the UN Global Compact #9, the HCEs should promote and work on the design, development, implementation and dissemination of environmentally friendly technologies, processes, activities, products and services, considering a life cycle perspective.

[16] https://www.ellenmacarthurfoundation.org/circular-economy/overview/concept

VI. Conclusions

From large corporations to small and medium enterprises, there is a move towards taking greater environmental responsibility in their operations, communities of operation, within supply chains crossing national borders, and towards a global view on climate change and their role in mitigating or innovating in a "Green Economy". The trend is towards an integrated approach that includes social, economic, integrity and ethical principles alongside environmental principles. Enterprises use a variety of existing voluntary and standards measurement tools and reporting methodologies to address these wide range of interrelated issues.

Business are more often working in an "ecosystem" composed of: businesses who supply raw material and inputs, technical services, marketing and logistics throughout the production cycle or supply chain; governments and other regulators creating legal and other requirements; institutions that . Larger market actors and regulators increasing seeks a wholistic approach to environment. The HCBM Human Centered Business Model and its Principles are designed not only as a framework for individual businesses to address diverse societal and business issues, but also for these associated businesses working in tandem within a framework for Human Centered Enterprises creating a "Business Ecosystem" that mutually supports environmental, social, integrity and ethical considers into business operations and stakeholder engagement alongside sounds economics and profitable business. HCEs DNA is composed of the key elements of social, environmental and ethical sustainability that make the enterprise ready for the social, environmental and ethical requirements that financial institutions are demanding, governments are requiring for public procurement, private sector is assessing in the selection of new suppliers, and tax systems are recognizing with favorable tax benefits. **The "costs" of setting and pursuing the principles set as common denominator of HCEs which enables Enterprises to access these benefits and prosper in their "enterprise ecosystem" with sustainable economic, social and environmental returns from their operations.**

Resources, tools and guidance related to Environmental Sustainability Principles utilized by business are found in theresearch paper HCBM Environmental Literature Review and Annotated Bibliography available separately from this paper.

VII. HCBM Environmental Sustainability Indicators

One of the purposes of this paper is to propose Environmental Sustainability Performance Indicators (ESI) for each of the HCBM Environmental Sustainability Principles (ESP), that can be used by the Human Centered Enterprises (HCEs) to measure and report on their environmental sustainability performance.

Sustainability reporting helps organizations to consider their impacts on a range of sustainability issues defined by the international reporting frameworks and through companies' stakeholder consultations. By enabling companies to measure, understand and communicate their economic, social, environmental, ethical and governance performance, and then set goals, the sustainability indicators are of critical importance to manage change more effectively. Sustainability reporting aims to provide the enterprise and its stakeholders with a holistic view of the enterprise's activities and performance. Its main goals are:

1) to increase internally the understanding of enterprise's environmental, social economic, governance and ethical performance and to enable proper management and improvement in the environmental, social economic, governance and ethical (sustainability) performance areas;
2) to communicate and build externally understanding of the quality of the enterprise's sustainability strategy, management and performance that facilitates investment decisions, and more broadly,

allows governments and other stakeholders to assess an enterprise's contribution to social and economic development. (UN Global Compact, GRI. 2016)

.**Sustainability performance indicators** (SPI) are used to measure and manage a company's performance and to monitor and report on future progress. The HCBM has grouped the HCBM SPIs in four categories, each covering either the economic, social, environmental or ethical/integrity aspects of sustainability[17].

- **Economic sustainability performance indicators (ES)**: company turnover, cash flow, profit, return on investment, sales, , market share, etc.
- **Social sustainability performance indicators (SS)**: human rights, labor practices, and broader issues affecting consumers, community, and other stakeholders in society.
- **Environmental sustainability performance indicators (ESI)**: greenhouse gas emissions, water consumption, waste output, etc.
- **Integrity/Ethics performance indicators (IS):** anticorruption, etc**.**

Currently there is an emerging body of work led by the GRI and the UN Global Compact on how business may measure their contributions to SDGs, including the social dimension of sustainability, as well as work by the Sustainability Accounting Standards Board (SASB), the World Bank Group and IFC, the International Integrated Reporting Council (IIRC), the World Business Council for Sustainable Development (WBCSD), and other international organizations-led and private initiatives on measuring enterprises' environmental, social, economic and governance performance.

Our selection of proposed indicators for the HCBM Environmental Sustainability Principles is guided by the aim to identify for the HCBM pilot test phase an initial set of well tested environmental indicators with maximum acceptance globally across maximum variety of sectors and types stakeholders. It is based on the findings from our research showing that the Global Reporting Initiative (GRI) is the international instrument for sustainability reporting used by the largest number of enterprises globally and most-widely used by a spectrum of large corporations and smaller enterprises. GRI is also the only existing Sustainability Reporting Standard and the only one so far providing a framework with indicators (disclosures) and practical technical guidance in all dimensions of sustainability for development of sustainability reports.

GRI 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. This enables real action to create social, environmental and economic benefits for everyone. The GRI Sustainability Reporting Standards are developed with true multi-stakeholder contributions and rooted in the public interest. With the release of the first Guidelines on Sustainability Reporting at the World Summit for Sustainable Development in 2001 in Johannesburg, South Africa, the Global Reporting Initiative (GRI) delivered for the first time a global multi-stakeholder agreement and acceptance by governments, the UN and all major stakeholder groups, on economic, social, environmental, governance and ethical indicators with measurement protocols developed through a global multi-stakeholder process.

[17] A large team of consultants is charged with the task to propose indicators for the HCBM Social, Environmental and Integrity Principles. The work is done in three parallel workstreams.

The enclosed in this paper **Table 11** illustrates how the HCBM Environmental Sustainability Principles can be tracked by using GRI indicators and measuring protocols and in some cases - by indicators from other sources. It provides a starting point for the necessary multi-stakeholder consultations and pilot testing that will further define and refine the HCBM Environmental Sustainability Performance Indicators.

The proposed Environmental Sustainability Indicators (ESI) have been selected after extensive review of the main international instruments and other sources:

- legal and public policy frameworks set at international and national level, guidelines that set sustainability norms and principles for companies that guides their sustainability reporting practices;
- requirements set, and due diligence performed by the financial sector, the private sector, public authorities and consumers' organizations;
- reporting frameworks addressing the needs of specific stakeholders;
- the GRI Sustainability Reporting Standards;
- and after review of good practices of companies in Europe, USA, Canada and Brazil, leaders in sustainability reporting and social sustainability.

Table 11 within aligns the proposed environmental sustainability indicators and measurement protocols to the HCBM Environmental Sustainability Principles. The Environmental Sustainability Principles (ESP) are clustered in ten groups, each including one or more principles. For each individual principle are assigned one or more Environmental Sustainability Indicators (ESI). The proposed here Environmental Sustainability Indicators will undergo further review and revision after consultations with the HCBM partners and peer reviewers.

At this stage, for the HCBM it is premature to set targets in regard with the HCBM principles. These will be set through extensive consultation with industry through multi-stakeholder process during the implementation of the pilot projects.

Table 11: HCBM Environmental Sustainability Principles and Proposed Indicators Table

ENVIRONMENTAL SUSTAINABILITY PRINCIPLES (ESP) & INDICATORS (ESI) BY GROUP			
ESP 1: PRECAUTIONARY PRINCIPLE (A)		**ES Indicator (ESI)**	**ESI Metric/Measurement Protocol**
ESP-1.1.	**ESP-1.1. Businesses should support a precautionary approach to environmental challenges**	ESI-1.1. GRI Disclosure 102-11 /G3 4.11. Precautionary Principle or approach	ESI-1.1.Whether and how the organization applies the Precautionary Principle or approach. Explanation of whether and how the precautionary approach or principle is addressed by the organization.
ESP 2: ENVIRONMENTAL COMPLIANCE PRINCIPLE (B)			
ESP-2.1.	**ESP-2.1. Compliance with national, sub-national, regional, and local environmental laws and regulations**	ESI-2.1.GRI Disclosure 307-1 Non-compliance with environmental laws and regulations	ESI-2.1. a. Report significant fines and non-monetary sanctions for non-compliance with environmental laws and/or regulations in terms of: i. total monetary value of significant fines; ii. total number of non-monetary sanctions; iii. cases brought through dispute resolution mechanisms. b. I f the organization has not identified any non-compliance with environmental laws and/or regulations, a brief statement of this fact is sufficient. (GRI Secretariat 2016)
ESP-2.2.	**ESP-2.2. Compliance with the international environmental conventions and agreements and promotion of greater environmental responsibility**	ESI-2.2. GRI Disclosure 307-1 Non-compliance with environmental laws and regulations	ESI-2.2 a. S significant fines and non-monetary sanctions for non-compliance with environmental laws and/or regulations in terms of: i. total monetary value of significant fines; ii. total number of non-monetary sanctions; iii. cases brought through dispute resolution mechanisms.

ESP-2.2.			b. I f the organization has not identified any non-compliance with environmental laws and/or regulations, a brief statement of this fact is sufficient. (GRI Secretariat 2016)
ESP 3: POLLUTER PAYS AND ENVIRONMENTAL LIABILITY PRINCIPLE (C)			
ESP-3.1.	**ESP-3.1. Enterprises should prevent environmental damage and ensure damage repair. Enterprisers are subject to the polluter pays principle and to the principle of environmental liability**	ESI-2.3. Compliance with the environmental liability and the polluter pays principle	ESI-2.3. Payments for negative environmental impacts applied through the economic instruments required/prescribed by the national or international legislation, such as taxes and charges, emissions trading, as in cap and trade, deposit refund schemes, liability and insurance, etc.
ESP 4: CONSUMPTION OF MATERIALS AND WATER RESOURCES PRINCIPLES (D)			
ESP-4.1.	**ESP-4.1. Enterprise should optimize the use of resources. Materials used by an enterprise should be minimized.**	ESI-4.1. GRI Disclosure 301-1 Materials used by weight or volume	ESI-4.1 a. Total weight or volume of materials that are used to produce and package the organization's primary products and services during the reporting period, by: i. non-renewable materials used; ii. renewable materials used. (GRI Secretariat 2016)
ESP-4.2.	**ESP-4.2. Recycle input materials used/Reclaimed products and their packaging materials must be maximized.**	ESI-4.2. 1. GRI Disclosure 301-2 Recycled input materials used	ESI-4.2.1. a. P percentage of recycled input materials used to manufacture the organization's primary products and services. (GRI Secretariat 2016)
		ESI-4.2.2. GRI Disclosure 301-3 Reclaimed products and their packaging materials	ESI-4.2.2. a. Percentage of reclaimed products and their packaging materials for each product category. b. How the data for this disclosure have been collected. (GRI Secretariat 2016)

ESP-4.3.	**ESP-4.3. Enterprises must minimize their consumption of water and water withdrawal.**	ESI-4.3.GRI Disclosure 303-1 Water withdrawal by source	ESI-4.3. a. Total volume of water withdrawn, with a breakdown by the following sources: i. Surface water, including water from wetlands, rivers, lakes, and oceans; ii. Ground water; iii. Rainwater collected directly and stored by the organization; iv. Waste water from another organization; v. Municipal water supplies or other public or private water utilities. b. Standards, methodologies, and assumptions used. (GRI Secretariat 2016)
ESP-4.4.	**ESP-4.4. Enterprise must avoid environmental damage to water sources significantly affected by withdrawal of water**	ESI-4.4. GRI Disclosure 303-2 Water sources significantly affected by withdrawal of water	ESI-4.4. a. Total number of water sources significantly affected by withdrawal by type: i. Size of the water source; ii. Whether the source is designated as a nationally or internationally protected area; iii. Biodiversity value (such as species diversity and endemism, and total number of protected species); iv. Value or importance of the water source to local communities and indigenous peoples. b. Standards, methodologies, and assumptions used. (GRI Secretariat 2016)
ESP-4.5.	**ESP-4.5. Water recycled and reused must be increased**	ESI-4.5. GRI Disclosure 303-3 Water recycled and reused	ESI-4.5. a. Total volume of water recycled and reused by the organization. b. Total volume of water recycled and reused as a percentage of the total water withdrawal as specified in Disclosure 303-1. c. Standards, methodologies, and assumptions used. (GRI Secretariat 2016)

ESP 5: ENERGY CONSUMPTION PRINCIPLES (E)			
ESP-5.1.	**ESP-5.1. Enterprise should increase the proportion of renewable energy used for energy consumption within the organization**	ESI-5.1. GRI Disclosure 302-1 Energy consumption within the organization	ESI-5.1. a. Total fuel consumption within the organization from non-renewable sources, in joules or multiples, and including fuel types used. b. Total fuel consumption within the organization from renewable sources, in joules or multiples, and including fuel types used. c. In joules, watt-hours or multiples, the total: i. electricity consumption ii. heating consumption iii. cooling consumption iv. steam consumption d. In joules, watt-hours or multiples, the total: i. electricity sold ii. heating sold iii. cooling sold iv. steam sold e. Total energy consumption within the organization, in joules or multiples. f. Standards, methodologies, assumptions, and/or calculation tools used. g. Source of the conversion factors used. This approach is followed for all calculations in ES-5. (GRI Secretariat 2016)
ESP-5.2.	**ESP-5.2. Enterprise should increase the proportion of renewable energy used for energy consumption outside the organization**	ESI-5.2.GRI Disclosure 302-2 Energy consumption outside of the organization	ESI-5.2. The reporting organization shall report the following information: a. Energy consumption outside of the organization, in joules or multiples. b. Standards, methodologies, assumptions, and/or calculation tools used. c. Source of the conversion factors used. (GRI Secretariat 2016)

ESP-5.3.	**ESP-5.3. An enterprise must improve energy efficiency and maximize reduction of energy consumption through reduction initiatives in its operations**	ESI-5.3.1. GRI Disclosure 302-3 Energy intensity	ESI-5.3.1. a. Energy intensity ratio for the organization. b. Organization-specific metric (the denominator) chosen to calculate the ratio. c. Types of energy included in the intensity ratio; whether fuel, electricity, heating, cooling, steam, or all. d. Whether the ratio uses energy consumption within the organization, outside of it, or both. (GRI Secretariat 2016)
		ESI-5.3.2. GRI Disclosure 302-4 Reduction of energy consumption	ESI-5.3.2. a. A mount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives, in joules or multiples. b. Types of energy included in the reductions; whether fuel, electricity, heating, cooling, steam, or all. (GRI Secretariat 2016)
ESP-5.4.	**ESP-5.4. Reduction in energy requirements of products and services should be made whenever possible**	ESI-5.4.1. GRI Disclosure 302-5 Reductions in energy requirements of products and services	ESI-5.4.1. a. Reductions in energy requirements of sold products and services achieved during the reporting period, in joules or multiples. b. Basis for calculating reductions in energy consumption, s. c. Standards, methodologies, assumptions, and/or calculation tools used. (GRI Secretariat 2016)
ESP 6: WASTE GENERATION AND DISPOSAL PRINCIPLES (F)			
ESP-6.1.	**ESP-6.1. Enterprise should avoid generating waste and if this is not possible it should ensure efficient management of its waste and effluents**	ESI-6.1.1. GRI 306 Disclosure on Management Approach of Waste Generation and Disposal	ESI-6.1.1. When reporting its management approach for effluents and waste, the reporting organization can also disclose expenditures on: • treatment and disposal of waste; • c lean-up costs, including costs for remediation of spills as specified in Disclosure 306-3. (GRI Secretariat 2016)

ESP-6.1.		ESI-6.1.2. GRI Disclosure 306-1 Water discharge by quality and destination	ESI-6.1.2. a. Total volume of planned and unplanned water discharges by: i. destination; ii. quality of the water, including treatment method; iii. whether the water was reused by another organization. b. Standards, methodologies, and assumptions used (GRI Secretariat 2016)
ESP-6.2.	**ESP-6.2. Enterprise should reduce its discharged waste. It should choose the eco-friendliest effluent and waste discharge method by quality and destination and the most efficient disposal method by type waste.**	ESI-6.2. GRI Disclosure 306-2 Waste by type and disposal method	ESI-6.2. The reporting organization shall report the following information: a. Total weight of hazardous waste, with a breakdown by the following disposal methods where applicable: i. Reuse ii. Recycling iii. Composting iv. Recovery, including energy recovery v. Incineration (mass burn) vi. Deep well injection vii. Landfill viii. On-site storage ix. Other (to be specified by the organization) b. Total weight of non-hazardous waste, with a breakdown by the following disposal methods where applicable: i. Reuse ii. Recycling iii. Composting iv. Recovery, including energy recovery v. Incineration (mass burn) vi. Deep well injection vii. Landfill viii. On-site storage ix. Other (to be specified by the organization) c. How the waste disposal method has been determined: i. Disposed of directly by the organization, or otherwise directly confirmed ii. Information provided by the waste disposal contractor iii. Organizational defaults of the waste disposal contractor. (GRI Secretariat 2016)

ESP-6.3.	**ESP-6.3. Significant spills must be dealt by the enterprise with the aim to minimize 1) the number of spills, and 2) their impact based on spill's location, volume, and material.**	ESI-6.3. GRI Disclosure 306-3 Significant spills	ESI 6.3. a. Total number and total volume of recorded significant spills. b. The following additional information for each spill that was reported in the organization's financial statements: i. Location of spill; ii. Volume of spill; iii. Material of spill, categorized by: oil spills (soil or water surfaces), fuel spills (soil or water surfaces), spills of wastes (soil or water surfaces), spills of chemicals (mostly soil or water surfaces), and other (to be specified by the organization). c. Impacts of significant spills. (GRI Secretariat 2016)
ESP-6.4.	**ESP-6.4. Transportation of hazardous waste should be minimized.**	ESI-6.4. GRI Disclosure 306-4 Transport of hazardous waste	ESI-6.4. a. Total weight for each of the following: i. Hazardous waste transported ii. Hazardous waste imported iii. Hazardous waste exported iv. Hazardous waste treated b. Percentage of hazardous waste shipped internationally. c. Standards, methodologies, and assumptions used (GRI Secretariat 2016)
ESP-6.5.	**ESP-6.5. Water bodies affected by water discharge ESP and/or runoff should be minimized and reduced.**	ESI-6.5. GRI Disclosure 306-5 Water bodies affected by water discharges and/or runoff	ESI-6.5. a. Water bodies and related habitats that are significantly affected by water discharges and/or runoff, including information on: i. the size of the water body and related habitat; ii. whether the water body and related habitat is designated as a nationally or internationally protected area; iii. the biodiversity value, such as total number of protected species. (GRI Secretariat 2016)

ESP 7: EMISSIONS INTO AIR PRINCIPLE			
ESP-7.1.	**ESP-7.1. Enterprises should reduce and minimize both direct and indirect greenhouse gas (GHG) emissions and their intensity, including ozone-depleting substances (ODS), and nitrogen oxides (NOX) and sulfur oxides (SOX), and other significant air emissions**	ESI-7.1.1. GRI Disclosure 305-1 Direct (Scope 1) GHG emissions ; OECD; ISO 14000	ESI-7.1.1. a. Gross direct (Scope 1) GHG emissions in metric tons of CO2 equivalent. b. Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all. c. Biogenic CO2 emissions in metric tons of CO2 equivalent. d. Base year for the calculation, if applicable, including: i. the rationale for choosing it; ii. emissions in the base year; iii. the context for any significant changes in emissions that triggered recalculations of base year emissions. e. Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source. f. Consolidation approach for emissions; whether equity share, financial control, or operational control. g. Standards, methodologies, assumptions, and/or calculation tools used. This approach applies to following GHG measurements as well. (GRI Secretariat 2016)
		ESI-7.1.2. GRI Disclosure 305-2 Energy indirect (Scope 2) GHG emissions	ESI-7.1.2. a. Gross location-based energy indirect (Scope 2) GHG emissions in metric tons of CO2 equivalent. b. I f applicable, gross market-based energy indirect (Scope 2) GHG emissions in metric tons of CO2 equivalent. c. If available, the gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all. (GRI Secretariat 2016)

		ESI-7.1.3. GRI Disclosure 305-3 Other indirect (Scope 3) GHG emissions	ESI-7.1.3. a. Gross other indirect (Scope 3) GHG emissions in metric tons of CO2 equivalent. b. I f available, the gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all. c. Biogenic CO2 emissions in metric tons of CO2 equivalent. d. Other indirect (Scope 3) GHG emissions categories and activities included in the calculation. (GRI Secretariat 2016)
		ESI-7.1.4. GRI Disclosure 305-4 GHG emissions intensity	ESI-7.1.3. a. GHG emissions intensity ratio for the organization. b. Organization-specific metric (the denominator) chosen to calculate the ratio. c. Types of GHG emissions included in the intensity ratio; whether direct (Scope 1), energy indirect (Scope 2), and/or other indirect (Scope 3). d. Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all. (GRI Secretariat 2016)
		ESI-7.1.5 GRI Disclosure 305-5 Reduction of GHG emissions	ESI-7.1.5. a. G HG emissions reduced as a direct result of reduction initiatives, in metric tons of CO2 equivalent. b. Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all. c. Base year or baseline, including the rationale for choosing it. d. Scopes in which reductions took place; whether direct (Scope 1), energy indirect (Scope 2), and/or other indirect (Scope 3). e. Standards, methodologies, assumptions, and/or calculation tools used. (GRI Secretariat 2016)

ESP-7.2.	**ESP-7.2. If GHG emission is unavoidable, an enterprise should strive to develop a CO2 offset to mitigate unavoidable emissions.**	ESI-7.2. GHG Emission mitigation through offsetting, green tariffs and other instruments	ESI-7.2. a. Carbon offsets/credits. b. Green tariffs/RECs
ESP 8: IMPACT ON BIODIVERSITY PRINCIPLES (H)			
ESP-8.1.	**ESP-8.1. Enterprise should limit the number of operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.**	ESI-8.1. GRI Disclosure 304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	ESI-8.1. a. F or each operational site owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas, the following information: i. Geographic location; ii. Subsurface and underground land that may be owned, leased, or managed by the organization; iii. Position in relation to the protected area (in the area, adjacent to, or containing portions of the protected area) or the high biodiversity value area outside protected areas; iv. Type of operation (office, manufacturing or production, or extractive); v. Size of operational site in km2 (or another unit, if appropriate); vi. Biodiversity value characterized by the attribute of the protected area or area of high biodiversity value outside the protected area (terrestrial, freshwater, or maritime ecosystem); vii. Biodiversity value characterized by listing of protected status (such as IUCN Protected Area Management Categories, Ramsar Convention, national legislation). (GRI Secretariat 2016)

ESP-8.2.	**ESP-8.2. Enterprise must avoid making significant negative impacts on biodiversity through its activities, products and/or servicies**	ESI-8.2.GRI Disclosure 304-2 Significant impacts of activities, products, and services on biodiversity	ESI-8.2. a. Nature of significant direct and indirect impacts on biodiversity with reference to one or more of the following: i. Construction or use of manufacturing plants, mines, and transport infrastructure; ii. Pollution (introduction of substances that do not naturally occur in the habitat from point and non-point sources); iii. Introduction of invasive species, pests, and pathogens; iv. Reduction of species; v. Habitat conversion; vi. Changes in ecological processes outside the natural range of variation (such as salinity or changes in groundwater level). b. Significant direct and indirect positive and negative impacts with reference to the following: i. Species affected; ii. Extent of areas impacted; iii. Duration of impacts; iv. Reversibility or irreversibility of the impacts. (GRI Secretariat 2016)
ESP-8.3.	**ESP-8.3. Enterprise play major role regarding the protection of biodiversity by increasing the areas of habitats protected or restored by the enterprise alone or/and in partnership with a third party**	ESI-8.3. GRI Disclosure 304-3 Habitats protected or restored	ESI-8.3. a. Size and location of all habitat areas protected or restored, and whether the success of the restoration measure was or is approved by independent external professionals. b. Whether partnerships exist with third parties to protect or restore habitat areas distinct from where the organization has overseen and implemented restoration or protection measures. c. Status of each area based on its condition at the close of the reporting period. d. Standards, methodologies, and assumptions used. (GRI Secretariat 2016)

ESP-8.4.	**ESP-8.4. Enterprises must identify endangered plant and animal UCN Red List Species and national conservation list. Species with habitats in areas affected by operations and where its activities pose a threat to the species, and it must initiate appropriate steps to avoid harm and to prevent the extinction of Species.**	ESI-8.4. GRI Disclosure 304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	ESI-8.4.a. Total number of IUCN Red List species and national conservation list species with habitats in areas affected by the operations of the organization, by level of extinction risk: i. Critically endangered ii. Endangered iii. Vulnerable iv. Near threatened v. Least concern. (GRI Secretariat 2016)
9 : ENVIRONMENTALLY RESPONSIBLE BUSINESS			
ESP-9.1.	**ESP-9.1. Enterprises should provide environmental information and ensure transparency**	ESI-9.1. GRI Disclosure 102-20 Executive-level responsibility for economic, environmental, and social topics	ESI-9.1 a. Whether the organization has appointed an executive-level position or positions with responsibility for economic, environmental, and social topics. b. Whether post holders report directly to the highest governance body. (GRI Secretariat 2016)
ESP-9.2.	**ESP-9.2. Extension of UN Global Compact's Principles 7-9 through the value chain**	ESI-9.2. 1.Evidence of life-cycle approach in operations, services and products (ISO 14040 and 14044)	ESI-9.2.1. life cycle assessment (LCA) is a standardised methodology - the standards for the four main phases of an LCA (goal and scope, inventory analysis, impact assessment and interpretation) are provided by the International Organisation for Standardisation (ISO) in ISO 14040 and 14044
		ESI-9.2. 2. Product design and environmental performance	ESI-9.2.2. % of products created with application of eco-design, biomimicry, sustainable product design, eco-label, integrated product policy or/and LCA and % products subjects of environmental performance assessment (Product Environmental Footprint (PEF), etc.)

		ESI-9.2.3. Sustainable consumption and responsible use of materials and products	ESI-9.2.3. Policies and actions taken by the enterprise to promote and ensure sustainable consumption and responsible use of materials and products
ESP-9.3.	**ESP-9.3. Minimization of the negative environmental impacts in the supply chain**	ESI-9.3.1. GRI Disclosure 308-1 New suppliers that were screened using environmental criteria	ESI-9.3.1. a. Percentage of new suppliers that were screened using environmental criteria. (GRI Secretariat 2016)
		ESI-9.3.2. GRI Disclosure 308-2 Negative environmental impacts in the supply chain and actions taken	ESI-9.3.2. a. Number of suppliers assessed for environmental impacts. b. Number of suppliers identified as having significant actual and potential negative environmental impacts. c. Significant actual and potential negative environmental impacts identified in the supply chain. d. Percentage of suppliers identified as having significant actual and potential negative environmental impacts with which improvements were agreed upon as a result of assessment. e. Percentage of suppliers identified as having significant actual and potential negative environmental impacts with which relationships were terminated as a result of assessment, and why. (GRI Secretariat 2016)
ESP-9.4.	**ESP-9.4. Extended Producer Responsibility to the Customers**	ESI-9.4.GRI Disclosure 416-1 Assessment of the health and safety impacts of product and service categories	ESI-9.4. a. Percentage of significant product and service categories for which health and safety impacts are assessed for improvement. (GRI Secretariat 2016)
ESP 10: ADOPT CIRCULAR ECONOMY PRINCIPLES			

ESP-10.1.	**ESP-10.1. Enterprises should adopt a circular economy (CE) perspective and approach**	ESI-10.1.1. Evidence of CE approach in operations, product development and services	ESI-10.1.1. Apply Circular Economy Toolkit developed at the University of Cambridge (Evans and Bocken 2013) which provides a web interface and a range of questions covering the product lifecycle
		ESI-10.1.2. Material Circularity Indicator (MCI)	ESI-10.1.2. Apply MCI Methodology based on Ellen MacArthur Foundation Circular Design Guide (Ellen MacArthur Foundation.2015)
		ESI-10.1.3. CE Complimentary Risk (toxicity; scarcity; etc.) and Impact (energy; water)	ESI-10.1.3. Apply Materiality Circularity Indicator (MCI) Methodology based on Circular Design Guide (Ellen MacArthur Foundation.2015)
ESP-10.2.	**ESP-10.2. Enterprises should adopt self-regulation and control**	ESI-10.2. Env Management systems and policies in place GRI Secretariat.2016)	ESI-10.2. See GRI Standard GRI 103

ESP-10.3.	**ESP-10.3. Enterprises should measure in order to improve.**	ESI-10.3. Reporting process set up, materiality applied and reporting disclosures defined, measurement systems set up, data collection, analysis, reporting, decision-making and information loop for improvement set up (GRI Secretariat 2016)	ESI-10.3. See GRI Standard General Disclosures 102
ESP-10.4.	**ES-10.4. Enterprises should take into account the environmental needs and expectations of interested parties (stakeholders)**	ES-10.4. Stakeholder consultations and engagement re environmental performance, impacts, strategy and commitments/targets (GRI Secretariat.2016)	ES-10.4. See GRI Standard General Disclosures 102 stakeholder mapping, consultations, engagement
ESP-10.5.	**ES-10.5. Enterprises should get involved in addressing the local and global environmental challenges**	ES-10.5. Company strategy and commitments re sustainability/environment (GRI Secretariat.2016)	ES-10.5. See GRI Standard General Disclosures GRI-102
ESP-10.6.	**ES-10.6. Businesses should encourage the development and diffusion of environmentally friendly technologies**	ES-10.6. Eco-innovation (UM-MERIT. 2007)	ES -10.6. Introduced pollution control, recycling technologies; technologies for new or improved products or services that are more environmentally friendly than those already on the market; new or improved processes with environmental benefits; organisational innovations such as environmental reports, audits, or management programmes; new or improved delivery, transport, or distribution systems for products or services, with environmental benefits, etc.

VIII. Annexes

Annex 1: Case Studies of Enterprises that Illustrate HCBM Environmental Principles

This section of the paper will illustrate how some large enterprises have already began adjusting their business philosophy, policies, and practices to align with HCBM Environmental Principles, often in an integrated approach that encompasses other Principles within the HCBM Model. The focus will be on extractive industries (oil, gas, minerals), often thought of as one the most impactful businesses on the environment with accompanying social impact on communities where they operate. These large actors in the industry working in multiple countries around the world, conflict zone often in impoverished communities with little legal or rights representation.

Large Enterprises Aligning with HCBM Environment Sustainability Principles

Extractive industries have long been under scrutiny from governments, environmental groups and communities where they operate, for environmental pollution and degradation. Their operations also bring a range of new social issues to communities of operation, and for some benefits from jobs, business and supply chain opportunities to meet the needs of oil operation workers. For those industries that extract and process hydrocarbons (oil, gas, coal, etc.) it has been accepted by the scientific community, that emissions from extraction and use of these fuels are one of the major contributors to greenhouse gases that has led to climate change.

Corporate Social Responsibility (CSR) reporting that encompasses social, environmental, governance and ethical issues has been on a rise alongside respect of national laws and multilateral treaties and conventions for enterprises and business to adhere. Greater social awareness of the role business plays in addressing environmental and social needs, alongside economic benefits, has moved the extractive industry sector, and many other sectors, to embrace an approach that address environment, social, economic, integrity and ethical issues in an overall framework for the company. These generally include stakeholder relations and governance policies and action, supported by an overall company Code of Ethics and policies on Anti-Corruption.

Enterprise's sustainability policies and CSR reporting addresses environment both at the local and operational site context, but also within a global context that address role and actions the company will take towards reducing the impacts of climate change. Social well-being and development issues, such as health and education are addressed alongside local economic issues of skills development for hire of local workers, to purchase of local content and procurement of materials, goods and food from the community. These companies begin to illustrate some of the Environmental Principles of a Human Centered Business Model (HCBM) and examine how extractive industries influence and can create value within the business ecosystem they operate.

The cases we selected are: the Italian integrated energy company, Ente Italiano Idrocarburi (ENI or Eni) S.p.A.*"an Italian company with a worldwide presence*" and TOTAL (France) a global energy company in oil and gas. Specifically, we are interested at areas of the HCBM Environment Sustainability Principles (ESP) that these enterprises are already taking actions and illustrate good example of acting within these Principles. We also look at where the enterprises are taking an integrated approach and have policies and programs address HCBM Principles in social, ethical and integrity. The selection of these corporate case studies doesn't imply endorsement nor critic of the enterprises, but rather a means to illustrate how some

companies are practicing key principles of the Human Centered Business Model. In addition, we also examine the Small to Medium enterprise sector, the challenges SMEs face participating in the opportunities offered by Green, and Circular economies, or participating in supply chains with these requirements, and successes by working, together with government, larger industries and supporting nongovernmental actors in promoting eco-innovation.

This paper looks at, climate strategy and safeguards to biodiversity and ecosystem Within these efforts these enterprises also contribute to developing a Green Economy and responsible business through research and innovation in renewable energy, carbon capture, and more efficiency in energy, water and other critical resources. In protecting biodiversity, they address key environmental principles which also effect social well-being.

ENI S.p.A. Company Overview

The Italian energy and chemical company, ENI S.p.A. has a long history dating back to 1926. ENI is one of the global oil and gas super-players – operating in 71 countries worldwide and employing around 33,000 people. As of March 31, 2018, the company's market capitalization was calculated at $64 billion. Eni is consistently ranked among the top 150 companies on the Fortune Global 500 list according to revenue. In 2016, the company was listed in 65th place. Eni has operations in oil and gas exploration, production, refining and selling operations, electricity and chemistry.

Upstream

Upstream refers to ENI's onshore and offshore projects, from choosing oil exploration blocks and drilling wells through to the hydrocarbon production operations. The strengthening of the Upstream business is one of the key elements of the new Eni strategy.

Midstream and downstream

Midstream refers to activities associated with the transportation and storage of hydrocarbons; downstream includes oil refining and distribution.

ENI's new strategy involves restructuring this sector to improve its efficiency and productivity. Biorefineries and green chemistry underpin Eni's green economy. The Midstream sector brings together the work of the Gas, LNG (liquefied natural gas), Power and Trading business units, all of which report to the Gas & LNG Marketing and Power management and are increasingly being integrated into the Upstream sector. The Downstream sector, meanwhile, encompasses gas and power retail activities via the company Eni gas e luce**.**

ENI global operations

ENI has an integrated approach to contributing to the development of the countries in which the company works. Their approach dates to the founder Enrico Mattei's view that oil-producing countries should be self-sufficient in terms of their energy supplies and seeks to improve access to energy in the countries in which it operates. ENI's corporate communications note an approach:

"that establishes an equal relationship with oil-producing countries, creating the basis for a model of responsible economic development." "ENI today aims to help producing countries become independent in energy supply through dialogue and respect for cultures."

Political/Legal Issues

"ENI's ownership of domestic gas transportation had long been under attack from the European Commission. In 2012, under Mario Monti, the Italian government make it clear that Eni would have to

relinquish its 52% ownership of SNAM Rete Gas, the gas network owner. The European Commission had also pressured Eni to sell its ownership stakes in several international pipelines on the basis that it had limited competition in the Italian gas market by restricting third-party access" (Grant, 579).

With environmental awareness becoming much more important among the social issues, ENI came under attack by environmental groups for "the company's lack of investment in renewable energy sources and concerned over the environmental consequences of individual projects – most notably ENI's tar sand project in Congo" (Grant, 580).

Since2017, Friends of the Earth Nigeria and Friends of the Earth Europe have been supporting the community of Ikebiri for their court case against ENI in Milan, Italy, seeking clean-up and compensation for the pollution that ENI has brought to their land in the Niger Delta. The Ikebiri community comprises several villages in the State of Bayelsa, Nigeria. The community's main economic activities include palm-wine tapping, canoe carving, fishing, farming, animal trapping and traditional medical practices. Nigeria is calling for adequate compensation and clean-up of an oil spill dating back to 2010, which has yet to be addressed. *"The Italian oil giant ENI, which operates in Nigeria through its subsidiary Nigerian Agis Oil Company (NAOC), is responsible for the spill, caused by equipment failure" as stated by.* The King of Ikebiri, plaintiff, and the lawyers representing them are Luca Saltalamacchia.

ENI sustainability strategy

ENI's overall sustainability strategy includes:

- ENI draws inspiration from fairness, transparency, honesty and integrity principles, adopting the highest standards and international guidelines when managing its activities, in every operating context.
- ENI considers sustainability as an engine of a continuous improvement process that guarantees achievements over time and strengthens economic performance and reputation.
- ENI is engaged in a wide range of activities that are aimed at promoting the respect of people and their rights, of the environment and, more generally, of the widespread interests of collectivities that reside where Eni works.
- ENI undertakes to conduct its activities by considering the stakeholders' interests, being aware that the creation of reciprocal value is possible through dialogue and the sharing of objectives.

ENI's sustainability model:

To operate in a sustainable manner means to create value for stakeholders, and to use resources so that the needs of future generations will not be compromised, respecting people, the environment and the society.

It contains sections on policies and commitments for:

- Stakeholder relations
- Human Rights
- Relations with communities and contributions to local development
- Climate strategy
- Safeguarding biodiversity and the ecosystem

- ENI contributes, through its activities, to a sustainable development of the countries where it operates, creating opportunities for local people and companies.
- ENI guarantees the sustainability of its activities by applying a model that crosscuts all processes and all company's functions. It is conceived for a long-term strategy providing a coherent framework for innovation development as well as risk mitigation and risk prevention management strategy.

ENI Climate Change Strategy

Environmental Sustainability Principles 7: EMISSIONS INTO AIR-(G)-Essential

7.1- Enterprises should reduce and minimize both direct and indirect greenhouse gas (GHG) emissions and their intensity including ozone-depleting substances (ODS), and nitrogen oxides (NOX) and sulfur oxides (SOX), among other significant air emissions

ENIi has a Strategy for Decarbonisation:

"Our challenge is to build a low-carbon future in which everyone can access energy resources sustainably." Claudio Descalzi

The energy industry is facing the dual challenge of guaranteeing access to cheap energy for the entire global population – which will grow from 7 to 10 billion people by 2050 – and ensuring that this is done in a sustainable way for the environment, limiting the temperature rise to within 2°C.

ENI position on COP21

ENI acknowledges the scientific evidence on climate change produced by the Intergovernmental Panel on Climate Change (IPCC).

ENI governance on climate

> "We are one of the key players in the energy sector and as such are aware that we have an important role to play in combating climate change. For this reason, we have defined a strategy for reducing climate-altering emissions, which includes both operational and managerial interventions."

The global climate agreement reached in Paris was a positive step due to the ambitious goals it set out.

- Energy scenarios and the Climate Change Conference
- Comparing scenarios
- The UN Climate Change Conference (COP21) in Paris
- COP22 a Marrakesh: the "action COP"

ENI asserts, "*Ensuring that supply meets demand while respecting the objectives of the Paris Agreement requires a significant reduction in the emissions intensity of the current energy mix. This will determine in a gradual transition to lower carbon intensity sources. Over the next 20 years, albeit at a progressively slower rate, world oil demand is expected to continue to grow at least until 2035. There will be*

improvements in transport efficiency, and an increase in the spread of electric vehicles, but their impact on replacing oil will remain marginal, held back by the slow process of replacing the car pool. Moreover, despite essentially stable demand, the decline in existing production will require new discoveries and new developments."

ENI has developed a climate strategy that encompasses several HCBM Environment Sustainability Principles.

- ENI assumes an active role in the international scene, in adopting different solutions that deal with the problems of climate change, including the development of flexible mechanisms and of new instruments to reduce deforestation and to promote technology transfer towards developing countries.
- ENI invests in scientific research with the aim to develop new technologies for the reduction of emissions that alter the climate and a more efficient and sustainable production of energy.
- ENI undertakes to reduce greenhouse gas, improving plant efficiency and increasing the use of fuel that contains less carbon.
- ENI adopts a system that detects, analyses and manages risks connected to climate change, to carry out proper mitigation and adjustment measures concerning its operational activities.
- ENI promotes the sustainable management of water resources in actions that are oriented towards the adjustment of the consequences of climate change.
- ENI promotes a conscious and sustainable use of energy, through internal and external information and education campaigns, and by inserting sustainability criteria, when selects and evaluates its suppliers.

Gela and the environment

The bio oil produced by the Gela refinery is a new-generation fuel that will allow for compliance with the provisions of European law on the minimum energy content of biofuel in those fuels introduced to the market (10 per cent as at 2020).

Gela: new activities in a wide-ranging project

Gela is a symbolic city that represents ENI's industrial history in Sicily. The Upstream activities conducted here are carried out by Eni Mediterranean Idrocarburi SpA (EniMed), which owns 11 concessions onshore and two offshore. The EniMed production in Sicily originates from 11 oil fields and eight gas fields, with a total of 148 wells in production, 62 of which are in the district of Gela and nearby. The launch of new onshore and offshore hydrocarbon exploration and production activities is expected in Sicily, to promote the potential of operative fields as well as a series of maintenance operations. The development of offshore gas deposits in Argo and Cassiopea in the Strait of Sicily is one of the main initiatives of the Memorandum of Understanding for the Gela area, which was signed in November 2014. These Upstream projects will bring benefits to the area, as they promote employment and respect the environment. Redevelopment of the Gela refinery should be complete by the end of 2018. Thanks to the design of the plant, it will be possible to produce green diesel in compliance with the recent regulations governing the reduction of greenhouse-gas emissions at every stage, and to use the plant's entire capacity in processing second-generation raw materials. Also at Gela, a new training centre concentrating on health, safety and the environment was inaugurated in 2017.

Safeguarding biodiversity and the ecosystem - ENI Biodiversity and Ecosystem Services (BES) Policy

"Biodiversity is the variability of life on Earth. It supports the provision of ecosystem services, the benefits that people and businesses obtain from ecosystems such as food, fresh water, air and climate regulation. The conservation of biodiversity and ecosystem services (BES) is necessary for human wellbeing, a key component of the global sustainable development agenda and is of increasing importance to Eni and its stakeholders."

'Biological diversity' means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
(Convention on Biological Diversity, 1992)"

"Eni operates in a wide range of environments around the world, with different ecological sensitivities and regulatory regimes. We are committed to the conservation of BES by implementing an effective BES management model which aligns with the strategic goals and targets of the Convention on Biological Diversity. This integrated approach to BES management is based on sound conservation science and internationally accepted good practices. BES management is a key component of Eni's Health, Safety and Environment Integrated Management System (HSE IMS) and operating practices. Eni's approach to BES management ensures that interrelationships between environmental issues such as BES, climate change, water management, and social issues, like the sustainable development of local communities, are identified and properly managed."

The Poseidon project-transforming our platforms out at sea

Eni is helping to protect marine biodiversity by transforming disused offshore mining platforms along the stretch of coastline between Bellaria and Rimini in Romagna into **a genuine science park**. This is **the Poseidon project, promoted by Eni** and the Italian National Research Council (CNR), the Institute of Marine Sciences (ISMAR) and the Cetacea Foundation.

The pilot project aims to **convert the platforms into hi-tech, interconnected scientific stations for studying the marine environment** through minor technical modifications. This transformation, which is capable of being repeated in other locations, will create the first hi-tech marine park in the Adriatic Sea – and indeed Europe – making use of offshore facilities that would otherwise have been removed, thereby altering an ecosystem that has formed naturally over time in the surrounding area.

The more structures are connected, the bigger the potential of the project as a whole: with multiple **environmental monitoring points and a range of different technologies** available, an enormous amount of meteorological and environmental data can be generated in real time. During the pilot phase, Poseidon will involve two platforms – Azalea A and PC73 – chosen because of their distance from the coast and the fact that they are at the end of their productive life.

The project is based on a combination of objectives related both to commercial fishing and the social and economic development it can generate and environmental protection.

Eni is committed to protecting the planet's natural resources in all contexts in which it operates in line with its policy, the protection of biodiversity, ecosystems and natural resources is one of the fundamental principles of Eni's way of working.

ENI commits to operating beyond compliance in all countries and throughout the project lifecycle, from inception to decommissioning. Priority BES values are identified as early as possible in the decision-making process. The company follows a risk-based approach which takes into account the complexities of each project and the value of the local natural environment and social context. Dependencies and potential

impacts on priority BES values are assessed and managed, whilst exploring opportunities to make a positive contribution to BES. Through the adoption of the mitigation hierarchy. Eni prioritizes preventive over corrective measures and drives continuous improvement of BES management performance towards no net loss or net gain of biodiversity, depending on project-specific risks and context. Eni's BES management model systematically implements its commitments by integrating BES considerations into global activities and decision-making processes along the project lifecycle supported by technical guidance.

Biodiversity risk exposure is routinely monitored by screening new and existing sites (operated, in joint ventures and non-operated) for proximity to protected areas, important sites for biodiversity and for the presence of threatened species. Eni uses the results of this screening. BES values include species, habitats, ecosystem and ecosystem services that exist within an operational area.

The sequence of actions to anticipate and avoid, and where avoidance is not possible, minimize, and, when impacts occur, restore, and where significant residual impacts remain, offset for biodiversity-related risks and impacts on affected communities and the environment. CSBI, A cross-sector guide for implementing the Mitigation Hierarchy, 2015 to identify priority sites for action and set targets for biodiversity risk management as part of the company's Strategic HSE Plan.

At existing priority sites, risk exposure is addressed by identifying and assessing, BES dependencies and direct, indirect and cumulative impacts potentially associated with company's activities, both at landscape and site-scale. At all new sites, BES assessments are performed as part of environmental, social and health impact assessments. Based on the outcome of the above assessments, BES Action Plans (BAPs) are implemented to ensure the delivery of BES impact mitigation and effective management of Eni's exposure to biodiversity risk.

Active **engagement with stakeholders, both at company and site level, is central to the implementation and continuous improvement of Eni's BES management model** and ensures the effective implementation of the mitigation hierarchy.

- ENI promotes a transparent and continuous dialogue with relevant stakeholders and partnership with conservation NGOs, and with national and international scientific institutions.
- ENI works in long term partnerships with international non-governmental organizations (NGOs) and scientific institutions for implementing Eni's commitments and ensuring alignment with international good practice. Early stage consultation and collaboration with local communities and NGOs, indigenous peoples, governments and academia helps Eni to understand their concerns, determine dependencies on BES and identify management options that include these needs.
- ENI considers the conservation of biodiversity ecosystems and the services they provide as a fundamental component of sustainable development in the implementation of its projects and is committed to integrate their conservation during the whole life cycle and all its operational sites.
- ENI considers, when evaluating projects and in operational practices, the presence of protected areas and of areas of biodiversity value, the presence of threatened and endangered species and of ecosystem services that are ecologically and socially important.

- ENI identifies and assesses all potential impacts of its operations on biodiversity and implements mitigation actions, including offsets in order to minimise any adverse effects.
- ENI evaluates the interaction of its activities with ecosystem services, and promotes efficient water management, especially in areas under water stress, and the reduction of emissions in air, water and soil, and;
- ENI promotes investment projects and initiatives that combine the conservation biodiversity and ecosystems with the sustainable development of local communities and raises awareness on these topics through dedicated initiatives.

ENI's comprehensive approach to environment with their larger CSR policies is an illustration of how economic, environmental, social, integrity and ethical principles can come together through a variety of instruments and voluntary initiatives, stakeholder engagement and over all policy support internally. Many of the outcomes of implementing these strategies also foster innovation, and new business opportunities in the transition from a carbon economy to a green economy.

TOTAL (France)

TOTAL is a global gas and oil integrated energy producer and provider, a leading international oil and gas company, and the world's second-ranked solar energy operator with SunPower, with oil, gas and solar activities in more than 130 countries. In Europe it also retails gas and solar energy.

The French oil and gas company operates five refineries and nine petrol depots in France. Recently, it has invested €275 million ($324 million) to transform a refinery at La Mede, in southern France, into a plant that can make 500,000 tons of biodiesel per year. TOTAL is no strange to protest, lawsuits and claims on environmental damage. In 2017, 13 sites were being picketed by members of the French farmers' union FNSEA, the blockades were intended to pressure the French government over recent trade agreements that would allow imports of meat, sugar, and ethanol from countries *"that do not respect the same conditions of production as French products."* TOTAL's decision to import palm oil for biofuel refinery was only *"the last straw"*, stated FNSEA, union boss Christiane Lambert.[ii][18] In 2005, The Burma Campaign UK today welcomed the climbdown by TOTAL Oil – which was being sued in French courts over its involvement in forced humanitarian fund in an out of court settlement.[19]

As research for the HCBM Social Sustainability Principles a detailed case study on how TOTAL applies Human Rights and with which level of transparency as well as other social principles which TOTAL applies in in operation and interactions with communities (Annex B). TOTAL has also made a commitment to the environment as part of their integrated CSR reporting, addressing climate and local environment among others. Climate is an integral part of TOTAL corporate strategic vision.

Integrating Climate into TOTAL's strategy

Climate issues are stated as an integral part of TOTAL's corporate strategic vision, aimed at keeping global warming below 2°C in relation to pre-industrial levels by 2100.

"*We (TOTAL) have a responsibility to provide cost-effective, reliable and clean energy to as many people as possible, while managing energy consumption and the related emissions.*

[18] http://www.dw.com/en/french-farmers-picket-total-refineries-in-palm-oil-protests/a-44153401
[19] https://www.business-humanrights.org/en/total-oil-settles-french-lawsuit-over-forced-labour-in-burma-will-set-up-£35-million-humanitarian-fund-campaigners-vow-to-keep-up-pressure-for-divestment

"As a responsible industrial player, we are taking action to develop these new energies. TOTAL efforts are focused on solar energy and bio energies.

- *Benefitting from an abundant and decentralized energy source, the solar photovoltaics industry has seen significant technological advances, especially in energy storage, which have contributed to making it more competitive, profitable and efficient.*
- *As for Bio energies remain the only renewable alternative to fossil fuels for producing liquid fuels such as biodiesel, bioethanol and bio jet fuel."*

TOTAL's ambition is to have close to "20% low-carbon businesses in 20 years' time". These businesses include midstream and downstream gas, renewable energies, energy storage and energy efficiency as well as clean fuels and carbon capture, utilization and storage technology. They are on track to represent close to 20% of our portfolio in 20 years' time. As an energy source that is more cost-effective and above all produces less carbon emissions than other fossil fuels, natural gas is one of the keys to the energy transition. TOTAL ceased coal operations in 2016.

To maintain the advantage that gas offers over coal, however, TOTAL committed to limiting methane emissions to a strict minimum, as methane's global warming potential is much higher than that of CO_2. TOTAL is continuing our efforts to reduce our methane emissions from the production and transportation of gas, which represent today less than 0.5% of marketed operated production. TOTAL has a committed partnership with the Climate & Clean Air Coalition, an association supported by the United Nations that aims to improve methane emission measurement and reduction methods across the industry. TOTAL is also investing downstream in the gas value chain to keep pace with growing demand and carry gas all the way to residential end users. With 2016 acquisition of Lampiris, TOTAL markets gas and power to one million European consumers with 2017 acquisition of PitPoint, we are the leading provider of natural gas vehicle fuel in Europe.

Another way TOTAL seeks to limit CO_2 emissions in the atmosphere involves capturing the CO_2 at the source and storing it underground or reusing it. This technology is called carbon capture, utilization and storage (CCUS). TOTAL plays an active role in developing this technology both independently and through partnerships, with the aim of evaluating its real potential in the fight against climate change and making it effective, safe and feasible on a large scale. A pioneer in this area, TOTAL invested heavily in the Lacq Pilot Project and contribute to other initiatives elsewhere in the world, in particular in Norway.

TOTAL global initiatives

TOTAL is actively involved in these areas, through international organizations and initiatives:

- Oil & Gas Climate Initiative
- Business Leadership Criteria on Carbon Pricing
- Paying for Carbon
- World Bank Carbon Pricing Leadership Coalition
- Zero Routine Flaring by 2030
- Climate & Clean Air Coalition
- Task Force on Climate-related Financial Disclosures (TCFD)

TOTAL has a dedicated website to communicate its climate indicators to the public: *Total Climate Indicators*.

The Third focus of TOTAL's climate strategy is to continue invest in the solar industry**.** TOTAL have been committed to developing renewable energies, and solar energy in particular for more than 30 years. Through *SunPower* and *TOTAL Solar*, TOTAL has expertise is present across the entire value chain, from manufacturing photovoltaic cells to developing utility-scale plants and installing solar home systems. In 2016, TOTAL acquired *Lampiris* and *Saft*, a leading provider of energy storage solutions, thereby confirming strategic expansion in gas and power marketing activities. These two major additions to TOTAL Group enable the company to fulfill its goal of remaining at the forefront of the solar industry. Investing in solar energy is in line with TOTAL's natural gas strategy. Stating, these two energy sources are compellingly complementary in terms of availability and cost: readily available natural gas resources can make up for the intermittent nature of solar energy, while the fixed price of electricity generated from solar energy can help smooth fluctuations in natural gas prices as they change with the market.

Biodiversity: TOTAL's approach and guidelines for daily action

TOTAL states a clear objective to avoid impacting biodiversity as much as possible everywhere the company operates throughout the entire life cycle of our facilities and products.

- **Taking tangible measures to avoid, reduce, mitigate and, when necessary, compensate** for any loss of biodiversity. "*We deploy this approach throughout the project life cycle to minimize the impact of our operations on biodiversity and, if the situation allows, help create a positive impact*."
- **Taking ecosystem sensitivity into account. "***We implement enhanced assessment and monitoring procedures in regions where biodiversity is particularly sensitive and apply strict environmental requirements that can go beyond the demands of current legislation and regulations. In addition, we have made a voluntary commitment to refrain from operating in certain regions".*
- **Managing biodiversity.** *"Our environmental management system (EMS) systematically integrates the management of risks and impacts on biodiversity. We are particularly attentive to ecosystem services related to climate and water resources. From the outset, each industrial project includes an assessment of biodiversity risk through a baseline study and an impact study. This risk is regularly monitored at every stage of the project, until the last unit is dismantled".*
- **Reporting.** TOTAL reports to its stakeholders on its performance with regard to biodiversity

PV Salvador: Harnessing Sustainable and Competitive Energy in thtacama Desert
Launched in June 2014, PV Salvador is a ground-based photovoltaic power plant located in Chile's Atacama Desert, one of the world's most arid and sunny regions. The plant has been providing Chile with electricity since early 2015 and is the world's first solar plant to deliver electricity at the same cost as the traditional power grid.

Yemen LNG: Coral at the Center of Our Marine Biodiversity Action Plan
Total discovered vibrant coral reefs during the pre-project studies for the Yemen LNG liquefaction plant in Balhaf, on the country's southern coast. As a result, our experts modified the initial construction plans to limit the impact on the ocean currents, coral and fish population. In making these decisions, we consulted with the International Union for Conservation of Nature (IUCN) and the local nature conservation authority. Certain coral colonies were relocated to protect them from damage and allow them to thrive in conditions similar to those in their original habitat. This transplantation, carried out by Total's teams, was the largest ever undertaken worldwide.

Private companies building innovative solutions together for better business in a better world: **The Livelihoods Fund**
It all began in Senegal in 2009, when Danone teamed up with local NGO Oceanium and Voyageurs du Monde to roll out one of the biggest mangrove reforestation projects in the world. This led to the planting of 80 million mangroves, positively impacting 100,000 people. To improve the living conditions of even more inhabitants through large-scale projects, Danone invited nine other companies to join forces, thus creating the Livelihoods Carbon Fund with Schneider Electric, Crédit Agricole S.A., Michelin, Hermès, SAP, CDC Climat, La Poste, Firmenich and Voyageurs du Monde. The fund has invested more than €40 million to finance mangrove plantation, agroforestry and rural energy programs as a means to offsetting operational CO2 of the companies and restoring biodiversity. Livelihoods Carbon Funds (LCF) leverages the carbon economy to finance ecosystem restoration, agroforestry and rural energy projects to improve food security for rural communities and increase farmers' revenues.

TOTAL's Biodiversity Indicators Reporting are found at TOTAL's Performance Site

TOTAL's reporting standards align with:

Global Reporting Initiative (GRI)

International Petroleum Industry Environmental Conservation Association (IPIECA)

Global Compact

Carbon Disclosure Project (CDP)

TOTAL's Performance Site contain the following indicators:

- Economic indicators
- Safety and health indicators
- Environmental indicators
- Climate indicators
- Social indicators
- Community indicators

These sets of indicators begin to illustrate a comprehensive approach to reporting that encompasses HCBM Principles.

More detailed additional information about TOTAL's Environmental and Social Strategy and Performance is available in a separate document entitled **HCBM Social Sustainability Principles Case Study - TOTAL (France).**

Corporate Approaches to mitigating Green House Gases

Environmental Sustainability Principles 7: EMISSIONS INTO AIR-(G)-Essential

7.2- If GHG emission is unavoidable, an enterprise should strive to undergo efforts efficiently mitigate and offset emissions.

The number of companies incorporating a carbon price into their business and investment, a recent CDP report[20] shows, with an increase of 23 percent over last year. The more than 1,200 companies that are currently using an internal carbon price (or are planning to within two years) are using them to determine which investments will be profitable and which will involve significant risk in the future, as carbon pricing programs are implemented around the world. Sometimes, they also use them to reach emissions reduction goals. Not all carbon prices are created equal, and companies differ in how they set their specific price. Here are look at some of these common methods:

Incorporating Carbon Prices

Shadow price

Some companies create a "shadow price" to evaluate potential investments. This approach attaches a hypothetical or assumed cost for carbon emissions—for example US$30 per metric ton of CO2 -equivalent (MTCO2 e)—to better understand the potential impact of external carbon pricing on the profitability of a project. Companies also create a range of shadow prices to test sensitivities or build them into financial models with various assumptions, probabilities, and discount rates. It is used by companies including BHP Billiton, Duke Energy, EMC, Google, NRG and Shell, as a risk assessment tool. It is the hypothetical or assumed cost of carbon emissions used to evaluate large investment decisions and profitability of projects in light of government regulation and/or the impacts of climate change. Compared to the more direct approach that companies such as Microsoft are taking, however, shadow pricing is not actually reflected in a company or division's profit and loss statement, thus it may not have the same incentivizing effect.

Internal taxes, fees, or trading systems

Some companies are creating explicit formal internal financial incentives and programs that can play a critical role in achieving aggressive greenhouse gas reductions. Some have created an internal tax or fee—for example, US$10 per MTCO2 e—that is assessed on various activities or expenditures. Others have set up internal trading programs where business units or facilities buy and sell credits to meet GHG targets.

Implicit price

Some companies do not establish an explicit carbon price but calculate the implicit cost per MTCO2 e based on how much the company spends to reduce GHG emissions. For example, a company may have set an aggressive GHG reduction target and is allocating internal capital to energy efficiency or renewable energy to achieve it. It is simply a price calculated based on how much a company spends to reduce its greenhouse gas emissions, including the cost of complying with regulations. Here, the price reflects actions taken, rather than being a charge that drives change.

[20] *(CDP Carbon Price Report 2016)*

Recognizing how much a company spends to meet its internal greenhouse gas targets and/or regulatory requirements can encourage greater action. Some companies, for example, employ an implicit pricing strategy as the first step before establishing a direct carbon fee is used by companies including Unilever and Novo Nordisk[21]. A vast range of internal carbon prices are used by companies in Europe, coinciding with the variety of policies that operate in the region, as well as a history of active engagement by companies on climate.

Some companies set their carbon price based on policies in the countries where they operate. For example, companies with operations in the European Union might decide to use a carbon price equal to that of the European Union Emissions Trading System (EU ETS) allowances, and those operating in the Northeastern United States might adopt the carbon price that results from the Regional Greenhouse Gas Initiative market.

Incorporating Carbon Prices from Existing Policies

Some companies set their carbon price based on policies in the countries where they operate. For example, companies with operations in the European Union might decide to use a carbon price equal to that of the European Union Emissions Trading System (EU ETS) allowances, and those operating in the Northeastern United States might adopt the carbon price that results from the Regional Greenhouse Gas Initiative market.

Conoco Phillips focuses its internal carbon pricing practices on operations in countries with existing or imminent greenhouse gas (GHG) regulation. As a result, its carbon price ranges from $6-38 per metric ton depending on the country. For operations in countries without existing or imminent GHG regulation, projects costing $150 million or greater, or that results in 25,000 or more metric tons of carbon dioxide equivalent, must undergo a sensitivity analysis that includes carbon costs.

Using Self-Imposed Carbon Fees

Others take a more aggressive approach by setting a self-imposed carbon fee on energy use. This involves setting a fee on either unit of carbon dioxide generated or a proxy measurement like energy use. These programs also often include a plan for using the fees such as investment in clean energy or energy efficiency measures. This can be an effective method for incentivizing more efficient operations.

Microsoft, for example, designed its own system to account for the price of its carbon emissions. The company pledged to make its operations carbon neutral in 2012 and does so through a "carbon fee," which is calculated based on the costs of offsetting the company's emissions through clean energy and efficiency initiatives. Each business group within Microsoft is responsible for paying the fee depending on how much energy it uses. Microsoft collects the fees in a "central carbon fee fund" used to subsidize investments in energy efficiency, green power, and carbon offsets projects. Still, by limiting carbon fees to operational activities, Microsoft has yet to address a large chunk of their emissions.

[21] https://www.c2es.org/2016/10/the-business-of-pricing-carbon/

Setting Internal Carbon Prices to Reach Emissions Reduction Targets

Other companies set an internal carbon price based on their self-adopted GHG emissions targets. This involves determining an emissions reduction goal and then back-calculating a carbon price that will ensure the company achieves its goal by the target date. This method is a broader approach focused more on significantly reducing emissions while also mitigating the potential future risk of carbon pricing policies.

> **Novartis**, a Swiss-based global healthcare company, uses a carbon price of $100/tCO2 and cites potential climate change impacts as a motivator.
>
> The company has its own greenhouse gas emissions target, which it is using to cut emissions to half of its 2010 levels by 2030. These internal policies mean that Novartis, which is included in the European Union's Emissions Trading Scheme (EU ETS), has been able to sell surplus allowances and thus far avoid an increase in operating costs.

Currently, 12 carbon tax systems, some of which have been in place since 1990, sit alongside the EU and Swiss emission trading systems, the UK's carbon price floor, and the French government's plans to introduce a price floor for the electricity sector. Notably, UK company prices are trending at the level of the UK's price floor, around $25.70 in 2016. *(CDP Carbon Price Report 2016)*

Internal carbon prices used by companies in Canada resemble the price levels set by Provincial policies operating in Québec, Alberta and British Columbia. Québec has a GHG cap and trade system in place with the current price at around $12.60. Alberta's carbon tax is around $15.30. British Colombia's tax is $23. A national carbon pricing system is also under consideration. *(CDP Carbon Price Report 2016/Carbon pricing policy information source: World Bank and Ecofys, 2016. "Carbon Pricing Watch 2016" (May), Washington, DC. (policy prices in USD based on April 1, 2016 exchange rate)*

There is little consistency in the pricing process and price levels among U.S. companies. Prices start as low as >$1 and range as high as $150. Companies reported references to the EU ETS and Californian Cap and Trade system, either because they fall under their compliance, or in order to model potential future pricing scenarios in the absence of a federal carbon price. Others internalize implicit carbon prices that already affect their business—including energy price forecasts, allowance prices, costs of energy efficiency standards, all manner of environmental and related compliance costs, and even costs that might result from the U.S. Clean Power Plan. This year, two U.S. companies, Ameren Corporation and Covanta Energy Corporation, disclosed internalizing the U.S. Environmental Protection Agency's social cost of carbon *(CDP Carbon Price Report 2016)***.**

Small to Medium Enterprise in the "Green Economy"

This section will also look at cases of small to medium enterprise and good examples of where SMEs and governments' work together to promote a green, circular economy that fosters development and diffusion of environmentally friendly technologies; and how green investors are enabling green economy in their supply chains or promote eco-innovation. A representation of how working in like-minded network or business ecosystem across public and private sector can enable environmental responsible business and

enterprise, operating ethically with integrity, can drives creation of a green, circular economy that provides equitable social benefits and tangible social outcomes.

and medium-enterprises (SMEs) are often praised as the economic and employment backbone of thriving economies as well as the driving force for innovation and value-added production. In OECD countries the competitiveness of SMEs and the emergence of new start-ups are often valued as an indicator for future economic growth potentials and as the prerequisite for healthy structural change processes, in which traditional sectors are declining and new, more knowledge-intensive sectors are emerging. During the last 2-3 decades many OECD countries went through different generations of promotion policies to strengthen the role of SMEs. It has contributed to a laboratory of experiences in which many different approaches, tools and methodologies have been tested. During these years a certain wisdom was commonly accepted:

- *There are very different (un)successful ways of promoting SMEs and that SME development strategies need to fit to the local and national socio-political context.*

- *There is no one-fits-all solution.*

Livelihoods Fund for Family Farming

How can smallholder farmers continue to provide 70% of the world's food when they cannot feed their own families? How can the world keep breathing when forests are disappearing, and soils are undergoing constant degradation? How can businesses increase the sustainability of their activity without losing their competitive edge?

On the strength of the Fund's success in financing CO2 improvements in developing countries, in 2015 a second investment fund was launched, the Livelihoods Fund for Family Farming (L3F), by Danone, Mars Inc., Firmenich and Veolia. This fund will invest €120 million in projects that will positively impact the lives of 2 million people, by converting 200,000 small farms to sustainable agriculture methods.

The Livelihoods Funds support the efforts of underprivileged rural communities in developing countries to restore their ecosystems. When villages and small farmers can access sustainable farming practices and simple, and expensive technologies, they can restore their soils, thus boosting their food security and increasing their incomes. Livelihoods Fund projects are co-constructed with local communities, NGOs and players in the public and private sectors. They are set up for the long-term (10 to 20 years) in order to give local communities time to make the projects their own and ensure that the benefits are long-lasting. These companies are investing along their supply chains for dairy products, vanilla and other food stuffs used in production.

Many countries had success with decentralized SME strategies, others, especially smaller countries, were able to promote competitive SMEs through rather centralized approaches. Some countries focused rather on the promotion of large enterprises in which SMEs became the followers rather than leaders of growth. Others again focused mainly on SME promotion and created a highly competitive entrepreneurial class (e.g. like the German Mittelstand with its famous "hidden champions", SMEs with a highly specialized and export orientation).

SMEs, even those in the retail sector, can have significant impacts on the environment, including those from nonregulated activities such as resource consumption, packaging and methods of hazardous and nonhazardous waste disposal. According to Environment Canada (2003), of the 2 million Canadian SMEs, the 400,000 most pollution-intensive are in the agriculture, primary and manufacturing sectors. A study prepared for the Organization for Economic Co-operation and Development (OECD) found that SMEs in

ADEME, France
One of the earlier efforts to promote eco-innovation was ADEME in France, was created in 1992 from the merging of 3 existing agencies (waste management, air quality and energy management). Under the joint authority of the Ministries for: Higher Education and Research, Ecology, and Sustainable Development, Energy. ADEME's objective-Be the point of reference and privileged partner for the general public, companies and local authorities. ADEME's areas of activity include:

~Sustainable Cities and Territories
~Sustainable Production and Energies
Buildings
~Air Quality Transportation
~Brownfields & pollution of soils Urban organisations
~Sustainable Consumption & Waste
~Bioresources Smart grids and Renewable ~Energy
~Agriculture and forestry
~Companies & eco-technologies
~Extended Producer Responsibility
~Waste Prevention and Management
~Eco-design & sustainable consumption
ADEME's role was to generalise good practices that save energy, protect the environment and support to innovation & R&D; with nearly 1000 staff -26 regional branches -3 representations in overseas territories, and an office in Brussels.

the United States are significant contributors of pollution in three branches of manufacturing: chemicals, primary metals and building materials (e.g., stone, clay and glass). National, regional and local governments often offer technical assistance to help SMEs develop environmental management systems and improvement. ISO 14000 Environment series has guidance for SMEs and a growing number of these involved in global trade and supply chains have adopted these standards. Many SME's are taking a comprehensive approach to CSR, inclusive of environment. This is a trend that is likely to prevail within the SME sectors.

"Farm-Fill Umweltinnovations- und Vertriebs GmbH", a micro Austrian retailer has as an important business objective to distribute toys that can be recycled, being made up of natural and renewable resources. The plants that constitute the major raw material for the product grow without fertilisers and pesticides on set-aside agricultural land. Thereby, local suppliers are referred to. At the same time, by playing with this toy children are familiarised with natural products while being encouraged to develop creativity. Furthermore, Farm-Fill is supporting several non-profit organisations.

These cases look beyond environmental compliance and efficient operations to look at the examples where SMEs, often in partnerships with government, academia and market actors, to benefit from a green, circular economy.

According to European Commission figures, more than 99% of all European businesses are SMEs. They provide two out of three of all private-sector jobs and contribute to more than half of the total value-added created by businesses in the EU. Moreover, SMEs are the backbone of the European economy, responsible for wealth and economic growth, in addition to their key role in innovation and R&D. All these enterprising companies are trying to find their niche in the economy and respond to needs in society. For SMEs to offer their workers decent wages and working conditions, they must be able to negotiate decent deals with their buyers. The more competitive SMEs are, the stronger their bargaining power will be within international value chain. But their size is such that their market influence is very small. Equally SME capabilities for developing new products are inevitably restricted. In the same way, even earlier in the chain of knowledge and innovation, their access to expertise, finance and markets is more challenging for SMEs working alone. However, the brightest ideas come from small and medium-sized companies.

Eco-innovation is essential to respond developing a vibrant "Green Economy" that meets society's needs, creates high quality jobs and enables successful profitable businesses able to invest in further innovation.

SMEs have a crucial role to play in this area – both as eco-innovators and as recipients of green technologies.

Eco-innovation has often required partnership among SME's in a sector, government and investors, or with

> To boost local production economies, the German small kitchen producer **"Die Möbelmacher GmbH"** started a regional initiative to get other local manufacturers also involved into sustainable production methods. The company selects its suppliers through their commitment to local production systems. The firm manufactures only locally grown materials. To assure regional economic circuits, the enterprise initiated and participates in various co-operations with other firms, the local forest management and even universities. Once a year, regional producers come together for a "Day of the Region" to exchange experiences and inform others about their own sustainable business approach.

support from larger actors in the supply chain. Increasing these business ecosystems for eco-innovation and green economy come through partnerships with a diverse set of actors or within the business supply chain itself.

Promoting Eco-innovation among SMEs through the involvement of the entire supply chain: from raw materials to retailers.

This case looks at Promotion of Eco-innovation through the involvement of cluster of SME (Progetto Lissone) in Northern Italy to overcome difficulties in sharing best practices and in focusing on Life Cycle Thinking as a leverage for competitiveness. Furniture supply chain is presented with a Target Audience of SME, Trade association, Chamber of commerce and industry, Life cycle Analysis (LCA) practitioners.[22]

The presented case history refers to a pilot project conducted in Northern Italy since 2007, in a furniture district characterized by a high number of SMEs representative of the entire supply-chain: from designer to retailers. The project is undertaken by "Progetto Lissone", a consortium including over 200 SMEs which is owned for 51% by the municipality of Lissone and was developed in collaboration with the Research Unit on Sustainable Development of the University of Milano Bicocca.

The study was performed for identifying how to involve SMEs and how to disseminate eco-innovation and life cycle thinking starting from the identification of the most important impacts trough a qualitative LCA of the entire supply chain (from cradle to grave) and a quantitative LCA of a specific piece of furniture. In the project, a new model of business was developed, because the cluster of SME's started activities of collaborative innovation from designer to retailers, promoting local production in new perspectives.

Outcomes (Environmental, social, economic impacts):

The outcomes of the pilot project highlight the importance of a wider involvement of supply chain stakeholders. In this context, the role of a firms' consortium is crucial in promoting and disseminating best

> **"Eko-Expert"** is a small wool blowing contractor and wool recycling company in Finland, having developed a unique technology to reuse the building insulations that otherwise would end up on the dumping ground when buildings are renovated or pulled down. This technology results in an economic advantage for the customers through the savings in insulation expenses. A concrete example on the savings that Eko-Expert can offer is a building contract of a national construction company. In the process of renovating six apartment buildings savings of about € 35,000.- for the client (the construction company) could be realised, resulting in turn in cheaper prices for the residents in the buildings.

practices among associated firms; furthermore, it is necessary to encourage both networks of producers acting in the same sector (e.g. association of furniture producers) and stakeholders of the whole supply chain (designers, producers/ craftsman, retailers, consumers).

Since its initial experience, the project enlarged. An attempt to create a short supply chain in Lombardy combining the efforts of two consortia of SMEs (Progetto Lissone, consisting of SMEs working on furniture design, production and selling and a Consorzio Forestale Lario Intelvese, consisting of SMEs working on forest management, harvesting and logging). The project is intended to integrate forest management, furniture production, recycling of production waste and energy production with the aim to optimize materials and energy flows and to reduce the overall impact on environmental compartments considering strategic and economic perspectives. The idea is to support a group of companies willing to work on the sustainability concept with environmental knowledge and to put the conveyed knowledge into every-day practice, involving the whole related supply chain and rising awareness among the customers.

Annex 2: HCBM Environment Research Bibliography

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- Environmental labels and declarations
- Environmental management - The ISO 14000 family of International Standards
- GHG schemes addressing climate change
- Introduction to ISO 14001:2015
- ISO 14001 - Key benefits
- ISO 14001:2015 - Environmental management systems - A practical guide for SMEs
- ISO 14046 - Environmental management - Water footprint - A practical guide for SMEs
- ISO 14064, International Standard for GHG Emissions Inventories and Verification
- ISO 20400 - Sustainable Procurement
- ISO 37101 - Sustainable development in communities
- ISO and agriculture
- ISO and water
- Practical tools for addressing climate change
- Sustainable events with ISO 20121

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KEY AREAS OF WORK

- Behavioural Economics for Environmental Policy (BEEP)
- Carbon pricing
- Cost-benefit analysis
- Emission trading systems
- Environmental taxation
- Mortality impacts
- Morbidity impacts
- Policy reform
- Spatial Planning Instrument and the Environment (SPINE)

OECD, *Resource productivity and waste*

KEY AREAS OF WORK

- Circular economy (RE-CIRCLE)
- Cost of inaction and resource scarcity (CIRCLE)
- Extended Producer Responsibility
- Resource efficiency
- Sustainable material management
- Transboundary movements of waste
- Waste and nanomaterials
- Waste prevention and minimisation

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- ***2012 Guidance Notes***

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GRI 303: Water 2016 (PDF 0.1MB)

GRI 304: Biodiversity 2016 (PDF 0.2MB)

GRI 305: Emissions 2016 (PDF 0.3MB)

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- Circular Economy
- Climate Change
- Collaboration
- Conflict Minerals
- Consumer Products
- Energy and Extractives
- Environment
- Ethics and Governance
- Financial Services
- Food Beverage and Agriculture
- Healthcare
- Human Rights
- Inclusive Economy
- Industrials and Utilities
- Information and Communications Technology
- Media and Entertainment
- Reporting and Communications
- Resilience
- Stakeholder Engagement
- Strategy and Integration
- Supply Chain
- Sustainability Management
- Sustainable Communities
- Sustainable Futures Lab
- Transport and Logistics
- Women's Empowerment

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Business for 2030;

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List of Multilateral Environmental Agreements

A detailed table has been drawn listing the international environmental agreements to which the Union is already a Party or a Signatory.
In addition, for ease of reference, the main agreements have also been grouped below according to the general environmental themes, in line with the structure of the Site Map.

Air:

- Geneva Convention on Long-range Transboundary Air Pollution (CLRTAP)(1979) and its protocols

Biotechnology:

- Cartagena Biosafety Protocol (2000) to the Rio Convention on Biological Diversity (1992) and its Supplementary Protocol on Liability and Redress (2010)

Chemicals:

- PIC Rotterdam Convention on Prior Informed Consent (1998)
- POP Stockholm Convention on Persistent Organic Pollutants (2001)
- Minamata Convention on Mercury (2013)

Civil Protection and Environmental Accidents:

- Helsinki Convention on Industrial Accidents (1992)
- Barcelona Convention (1976) as amended and its protocols
- Helsinki Convention on the Baltic Sea (1992)
- OSPAR Convention (1992)
- Bonn Agreement (1983)
- Lisbon Agreement (1990)
- Bucharest Convention on the Protection of the Black Sea Against Pollution (1992)

Climate Change and Ozone Depletion:

- UNFCCC Framework Convention on Climate Change (1992)
- Kyoto Protocol (1997)
- Paris Agreement (2015)
- Vienna Convention for the Protection of the Ozone Layer (1985)
- Montreal Protocol (1987) as amended

Governance:

- Aarhus Convention (1998) on access to information, public participation in decision-making and access to justice in environmental matters and its Protocol on Pollutant Release and Transfer Registers (2009)
- Espoo Convention on Environmental Impact Assessment (1991)

Industry:

- Helsinki Convention on Industrial Accidents (1992)

Land use:

- Alpine Convention (1991) and its protocols

Nature and biodiversity:

- CBD Convention on Biological Diversity (1992)
- Cartagena Protocol on Biosafety (2003)
- Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits arising from their Utilization (2010)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES Convention) (1973)
- Bonn CMS Convention on the Conservation of Migratory Species (1979)
- Agreement on the conservation of African-Eurasian Migratory Waterbirds (AEWA-CMS) (1995)
- Bern Convention on European Wildlife and Habitats (1979)
- Convention for the protection of Vertebrate Animals used for Experimental and other Scientific Purposes (1986)
- International Tropical Timber Agreement (ITTA) (1994)
- Alpine Convention (1991) and its protocols
- Ramsar Convention on Wetlands of International Importance (1971)
- Agreement on the Protection and Sustainable Development of the Prespa Park Area (2010)
- CAMLR Convention for the Conservation of Antarctic Marine Living Resources (1980)

Soil:

- UNCCD Convention to Combat Desertification in Africa (1994)

Waste:

- Basel Convention on hazardous wastes (1989)

Water:

- Helsinki Convention on Watercourses and International Lakes (1992)
- Danube river basin convention (1987)
- Rhine river basin convention (1999)
- Barcelona Convention (1976) as amended and its protocols
- OSPAR Convention (1992)
- Bonn Agreement (1983)
- Helsinki Convention on the Baltic Sea (1992)
- Bucharest Convention on the Protection of the Black Sea Against Pollution (1992)