Perspective of Leaders of Oil and Gas Sector on Implementation and Success of UNGC Principles on Environment

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Abstract

1. Environmental management working group work as a group to ensure inclusion of environment and sustainability in their policies and projects. They therefore do focus on waste management, consumption of energy, water use, protection for biological diversity and ecosystem services. Major industries make a review panel on environmental stewardship to research the topic in order to strengthen the approach to environmental management. Study indicates that under the framework, the corporations stabilize their environment policy at company management level, the board of directors, are guiding the environment leadership of the next era. The leading organizations not only embed sustainable policies, balance them and enforce them, but are also committed to making progress in cyclical approach to specific management. Some necessary steps are taken out by these corporate to sustain the environment as their priority.

Biographical notes. Mayank Upadhya is a serving GoI officer, who holds MBA Marketing, in Marketing and MBA in Financial Management, from National Institute of Financial Management, Ministry of Finance. He hasa flair for learning and this is his second paper in the field of writing.

1.1 Principles of UNGC

The businesses are compliant with the 10 values as enunciated by UNGC, policies/procedures. The Ten Principles have been established by the Universal Declaration on Human Rights, the UN Convention against Corruption and the Statement on Basic Principles and Working Rights of the International Trade Union. UNGC has since created a many opportunities for society to be strengthened, but 10 values remain unchanged and undisputed. 10 criteria for value enhancement are found in four areas: human rights, labor, the environment and anti-corruption.

1.2 Environment & Environmental Principles of UNGC

Since its founding in 1972, UNEP has been a pioneer in organizing and putting together environmental activities internationally. The programme has provided guidance, thereby supporting all forms of environmental organizations, including through Multilateral Environmental Agreements (MEAs), which address species loss and globally agreed conservation criteria at all levels. The UNEP has developed the majority of the environmental laws that are used worldwide. The United Nations Environmental Protection Agency (UNEP) oversees all environmental program. The UNEP also allows different countries to adopt all forms of environmentally sustainable activities and policies.

The Earth Summit of 1992 was the precursor to the United Nations Conference on Climate and Sustainability (UNGC Environment Principles) as an international development strategy (Agenda 21). Chapter 30 of Agenda 21 showed that different firms will contribute significantly towards the reduction of the effect of their activities on resources and the environment [1]. It said that clean production and business conduct growth may play an important role, as an outcome of their promotion of clean production and business practices.

Ten UN Global Compact Principles form the basis of the concept of doing business (business practices) by the corporate. Figure 1 is about UNGC principles and development goals. The following are the 10 Principles in four main fields.

Human Rights

First Principle

(a) Companies at all cost assist and honour of internationally declared observed human rights.

Second Principle

(b) Ensure the company is not in connivance with human rights abuses.

Labour

Third Principle

(a) Corporate at all cost ensure the freedom of association and recognize right to collective bargaining.

Principle Four

(b) Eradicate forced and compulsive labour.

Principle Five

(c) Eradicate child labour.

Principle Six

(d) Corporate at all cost should make sure that no one is differentiated and put to disadvantage for job opportunities and means to earn.

Environment

Seventh Principle

(a) Business must take care and assist careful approach to environmental challenges.

Principle Eight

(b) Accept initiatives to encourage bigger environmental leadership.

Principle Nine

(c) Encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption

UN Global Compact Leaders' apex meeting was organised on 24 June 2004, and at that time, for UN Global Compact principle to fight dishonesty in corporate world was announced to be included thereafter.

Principle Ten

(a) "Businesses should work against corruption in all its forms, including extortion and bribery."

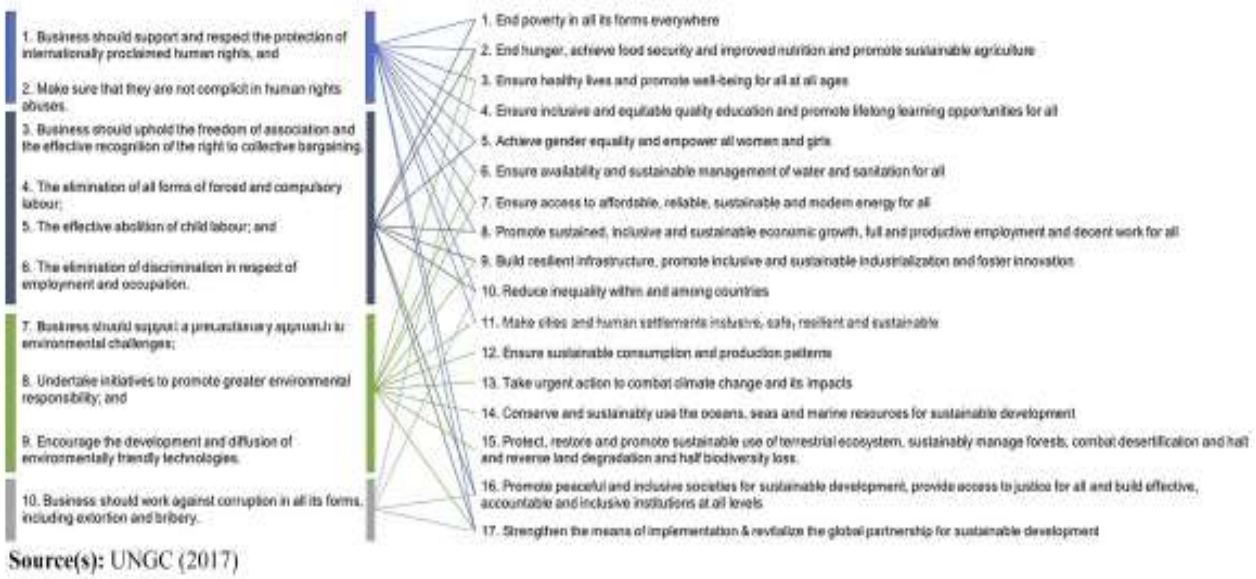

Fig. 1 UNGC 10 Principles and sustainable development goals

2. Perspective of Oil and Gas Companies

ONGC

The ONGC was established under Jawahar Lal Nehru who anchored his trust in Shri Keshav Dev Malviya. Founding of this venture was the Oil and Gas Division beneath the Indian Geological Survey in 1955. In the next couple of years, the organization got turned

into the Directorate of Oil and Natural Gas. Year 14 August 1956, the Directorate turned to a Commission which was named Oil & Natural Gas Commission ONGC). During the year 1994, the ONGC became company. This mega oil and gas giant in 1997 designated as Navratn by the GoI. Later, the status of Maharatna was conferred in 2010.

2.1 Perspective on Environment

1. The environment management Scheme of the ONGC is percieved on the precautionary principle.

2. Climate is the company's highest agenda.

3. The business aims to shield the nation from the power supply deficit, while keeping a sustainable and environmental agenda alive.

4. Adopts best practice in order to uphold the specified restrictions on atmospheric Sox and NOx, Benzene and Sulphur. Perceives sustainability thus works to minimize emissions of GHGs by the CDM (Clean Development Mechanism).

5. Saving environment and to progress in the direction which leads towards moves that support its conservation.

6. Understands the necessity of HSE and thus has an integrated HSE policy.

7. To work with aim of bringing down the adverse effect on the nature and surroundings due to business functioning like exploration, drilling and production. Put in money in procurement of **latest and best available technologies** for affluent and solid waste management, environment watch and reporting, putting in resources to protect bio-diversity, and enhancement and sustenance of environment management systems. Figure 2 represents sustainability journey of ONGC [2].

8. Committee of Directors (COD) HSE, under Independent Director to continue observation on progress and scrutinize policy issues related to HSE. ONGC have executed around the world recognized, ISO 9001, ISO 14001 and OHSAS 18001, in complete list of centers carrying out operations.

Fig. 2 Sustainability journey of ONGC

2.2 Energy Audits

Periodic energy audits and clean energy investments have been carried out by ONGC and Dehradun's energy cell controls its compliance with energy audits.. Paperless bureau are evolving, water foot printing, rainwater harvesting, desalination facilities and waste water treatment plants inside and around the whole business are on cards. In collaboration with the World Business Council for Sustainable Development (WBCSD), Silchar & Jodhpur conducted 16 water foot printing studies in the Oil & Gas field. Projects for improvement were identified and are being implemented at various levels. Conducted 210 energy audits in

2013-14 and achieved an energy savings of Rs. 4,532 per million. The figure 3 below indicates annual energy savings.

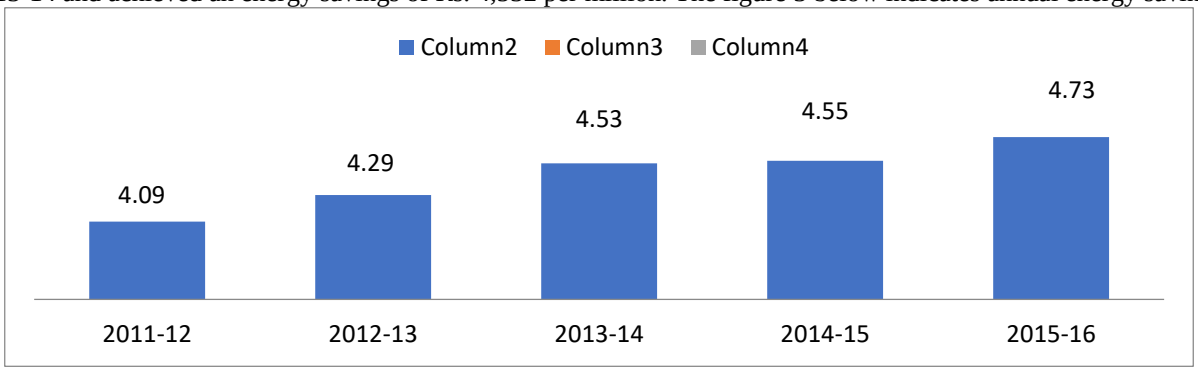

Fig. 3 is about energy saving at ONGC

2.3 Climate Change

ONGC knows the challenges and opportunities resulting from carbon reduction steps. ONGC's commitment to lowering GHG emissions and introducing clean energy initiatives is also strongly focused on climate change mitigation. As of today (until 2016), 13 projects under the UN Framework Work Convention on Climate Change have been developed by the Clean Development Mechanism and have been registered until march 2016 [3]. The Gas Flare Recovery was registered in 2016 at GGS and chairali was also inaugurated at Tripura's 726.6 MW gas power plant by P.M. Narendra Modi. This is India's largest gas-fired power plant and the world's largest CDM project.

2.4 Biodiversity

ONGC is sensitive to the climate and knows the susceptibility of their environment, so upstream and downstream operation in areas declared environmentally sensitive is not conducted. Environmental Impact Studies precede the launch of any project (EIA). Consequently, 74 environmental clearances were obtained in Fy 16. Being in line with UNGC 10 principles, ONGC has taken a two-headed approach, taking biodiversity considerations into account:

1. Study of threats & effects of ONGC working.
2. Handling of Ecological diversity and amalgamating it into Environmental Management System (EMS).

2.5 Corporate Sustainability

The ONGC is pursuing sustainability and has recognized that carbon conservation initiatives are the right and productive approach to sustainable business growth. Different ONGC CDM projects which add to the ONGC Carbon portfolio are registered. The organization therefore constantly works to minimize CO2 by reducing direct and indirect consumption of oil.

2.6 Renewable energy: In the year 2017-18 with INR 532.44 Million solar power plants were put into operation. Other such energy initiatives during the year are as under:

- Spending INR 527.9 million Hazira Plant put up 10 MWp Solar Power Plant.
- An expenditure of INR 5.4 Million and INR 4 Million put into use Solar Energy based systems mounted on roof of 100 KW and 60 KW at Vadodara.
- 1 MW and 5 MW operational solar plant at Goa and Vagra, Ankleshwar.
- The states of Gujarat 3.9 MW, Uttarakhand 1 MW, Assam 1.8 MW and Tripura 0.7 MW in the FY2019 received Roof top solar projects with complete capacity of 7.5MW.

2.7 Energy-efficient lighting: Placement 115,000 LED lights at different ONGC operational locations, which eventually is estimated to bring down per year use of electricity for lighting by 50% and conserve f INR 180 Million.

2.8 Efficient gas utilization: Vide PCRA a study by Technical Services established importance of in house use of gas and make most efficient use gas on in operations. A recommendation was thereby made stating for running a pilot project towards energy preservation methods for application for heater treater in Mehsana. Such actions ultimately caused reduction in the use of gas by 33%. Such measures have been worked for all work center's in ONGC.

2.9 Dual fuel technology: The intent focused on reducing carbon footprint, thus executed dual fuel technology in EV2000-II drilling rig of Ankleshwar Asset as pilot project (March - April 2017), purpose being use of low-pressure gas (unexploited to earn profit/ not easy to generate revenue and otherwise flared). For the first time with ease on OEM technology implemented successfully in drilling rigs in India [4]. The technology (called DGB system) allows to make use of rig diesel engines with mix of diesel and gas, and smoothens swapping of diesel by gas by up to 60%. To a large extent the fuel cost brought down and greenhouse gas emissions too.

2.10 Energy Audits: Energy audits with full thrust to continue for in house installations, rigs/installations, and spelling out means to overall energy efficiency. 218 energy scrutiny were carried out in FY'18.

2.11 Gas flaring reduction: With Gas flaring reduction on the agenda measures instituted in Onshore Assets towards Gas flaring reduction:

1. Hiring of new compressor and revamping of existing compressors in Ankleswar Asset.
2. Hiring of compressors at Geleki.
3. 16” gas trunk pipe line from Geleki to Dikhow Junction Point (DJP) for carriage of excess gas from Geleki to Lakwa in Assam Asset.

ONGC as per its policy and perspective on environment protection strives to lessen the adverse effect on environment as a result of various activities of doing business. Since environment protection is perceived as important factor in doing business thus all care taken and exhibited through environmental management employing integrated Health, Safety & Environment (HSE) Policy formulated in 1983. It does and therefore would pursue pushing in resources to employ best available technologies, discharge & treatment of solid leftover, keeping a watch on environment and reporting, saving of variety of living things endeavor and up-gradation and ensuring on effective running and maintenance of environment management systems.

The monitoring of risks and timely review of QHSE policy along with robust internal audit is the norm at ONGC. A few HSE practices for environment protection are –effecting and to use of Environment Management Systems (EMS), Occupational Health Safety (OHS), and keeping all informed of agreement on its implementation. Health, Safety and Environment have been amalgamated in ONGC’s vision and mission and thus in HSE policy too.

BPCL (BHARAT PETROLEUM CORPORATION LIMITED)

3. BPCL, India 's highest producing Maharatna Public Sector Firm, and its path to Fortune 500 oil refining , exploration and marketing corporation is in itself a saga of success. The today’s BPCL as a starter was Rangoon Oil and Exploration company established to search off Assam and Burma during the British Raj. Approval of its privatization by GOI was received on 21Nov2019 and subsequently government called for bids to sell off 52.98% stake of the corporation on 7 March 2020 [6]. In 2018-19, the aggregate throughput of BPCL's Refineries of Mumbai, Kochi, its subsidiary company Numaligarh Refinery Limited (NRL) and 50 percent throughput of the Joint Venture Company (JVC) Bharat Oman Refineries Limited (BORL), was 36.76 million metric tonnes (MMT) as against 34.72 MMT in 2017-18. The BPCL corporation by end of year had retail sales of 43,30 MMT compared to 41,38 MMT during 2017-18. Same year the BPCL Group exported 1,99 MMT of petroleum product compared to 2,02 MMT during 2017-18. Figure 4 give a view of steps taken by BPCL for environment.

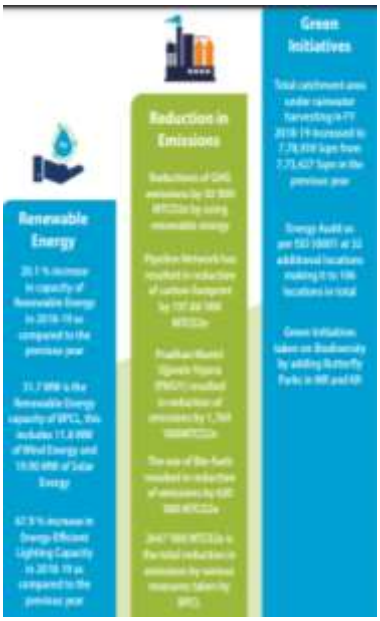

Fig. 4 give a view of steps taken by BPCL for environment.

BPCL does understand the evil effects on environment and populace as a result of its Operations. The corporation continues its drive to lessen the threats and better environmental performance with wholesome outlook.

3.1 Perspective on Environment

BPCL seeks opportunities towards minimizing its environmental foot prints and bears foresight to be the best and appreciated world class energy company. BPCL perceives business to be conducted with responsibility & therefore doves every possible work to mitigate threat to environment all the time. The perspective of BPCL on environment:

1. Company is committed towards implementation and installation of **Renewable energy**.

2. The art of doing business is observed in perspective of mimimising impact of its activities on environment & maintains a health, safety and environment policy. Thus BPCL uses **appropriate technology** for this purpose.

3. BPCL refineries are certified for ISO 9001:2015 for quality, ISO14001:2015 for environment & OAHS 18001:2007 for occupational health and safety management system.

4. Sustainable development committee half yearly collects and works on ways and means to enforce values on environment thereby caring and saving and also gives a relook at sustainable development projects.

BPCL perceives environment protection through renewable energy (especially solar), therefore looks forward to develop hybrid **solar plants** in retail outlets, eighteen of them, which are under its owner ship through the nation. In FY 2018-19 a total of 96 retail outlets were equipped with rooftop solar units, making a total of 1313such outlets. Resultant 19542.92 GJ of such produced solar energy for use by the company certainly benefitted the stake holders.

3.2 Energy Saving

Energy saving is the thought and perceived to be one of the means to care for environment and benefit the stake holders. A few methods were adopted for the same in the year 2018-19 which led to remarkable savings in terms of fuel consumption. To quote a few initiatives, capability to bring electrification conserving energy got a fillip from 7.54 MW to 12.66 MW in 2018- 19. Transportation of fossil fuel and gas through pipelines saw a rise of 7%.This gave a way to bringing down carbon footprint by 1,48,772 MTCO2e, via different Oil and Gas Marketing companies pipeline network 40,600 MTCO2e and through LPG pipeline 8,481.20 MTCO2e. Figure 5 gives contribution towards environment by BPCL.

Fig. 5give view of contribution of BPCL towards environment.

IOCL (INDIAN OIL CORPORATION LTD.)

4. IOCL a company which is belongs to our country that does corporate activities covering from ensuring purification and making sure its carriage through pipeline and then such hydrocarbons to be marketed, its search & development from crude oil & gas for natural gas and petrochemicals. This venture is the top Indian corporate in the Fortune 'Global 500' ranking, ranked 168th in 2017. IOCL is a public sector business. The GOI holds a 56.98 per cent stake in IOCL as of 31 December 2017. UNGC has affirmed its commitment to advance sustainable ocean science-based enterprise by signing a letter of intent to the IOC for Sustainable Development[7]. IOCL has struggled hard to reduce climate change effects. In the direction of this business, different mitigation approaches and initiatives contribute. The company's development and growth is related to climate protection and care for environment. A number of initiatives are the testimony to this perspective and approach of this oil and gas company.

4.1 Perspective on Environment

1. Ongoing **sustainable initiatives** are seen as a direct route towards progress and the fulfillment of the stakeholder involvement.

2. IOCL involves numerous projects, with **development of renewable**, waste water collection, **recycling of rainwater**, energy conservation, planting of tree trees, biodiversity protection, etc.

3. **IOCL keeps a watch on quality of used and cleaned and discharged water from the company's facility and makes sure that the PCB guidelines are followed stringently.** Indian Oil makes sure and prevents, no water resources affected as a result of its operations. Figure 7 gives the different aspects of IOCL regarding water consumption.

4. IOCL, **perspective is to constantly observe and employ new technologies** and **best practices.**

5. **Biodiversity means a source of sustainability and is therefore significant for the ecosystems to be stable.**

6. **Water Conservation and Renewable Projects** are the belief of IOCL to care for environment while doing business.

7. Anthropogenic emissions result in Global warming which has become a serious and a complicated issue being suffered across nations. For Indian Oil, refineries give out 90% company's emissions. **IOC perspective in terms of emission is seen to carbon foot printing exercises throughout their refineries and units where emission happens due to production activities and with them in observation they pinpoint and execute ways to bring down emissions.** Figure 6 is about emission reduction due to ENCON project. In 2017/18, total emission of refineries is greater vis- a-vis 2016-17. Increase in total emissions is as a result of taking into account latest established Paradip refinery. The peculiar emissions of refineries are 0.242 MTCO e/MT of crude throughputs, a reduction of 7.45% as against 2012-13. The ENCON methodologies enforced in the year worked out a figure of approximation to show carbon dioxide emissions equivalent to 2,04,321 tCO e. The emissions reported approximated as per international protocols and pertinent industry rules.

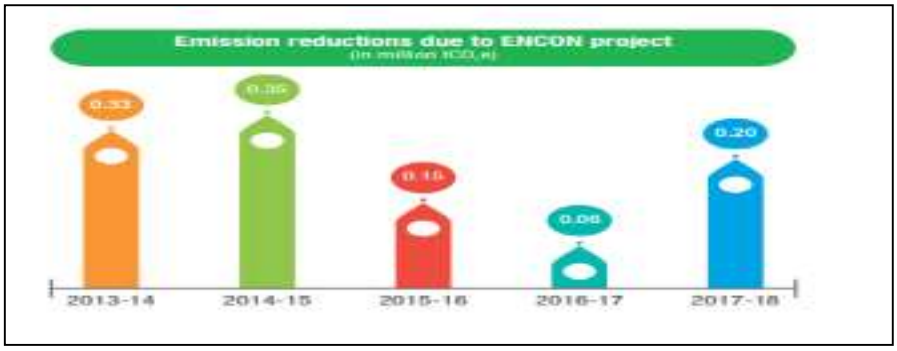

Fig. 6 is about emission reduction due to ENCON project by IOCL.

Indian Oil's cumulative carbon footprint for 2019-20 is 19.54 MMTCO e, in scope 2 while direct energy or Scope-1 emissions took into its responsibility for 97% of the emissions. This takes into account marketing; pipelines and R&D centre affiliated data, ands refineries and petrochemical complex data. The total GHG emission from refineries and petrochemical plants during 2019-20 was 18.84 MMTCO e. 2 (~96% of total emissions). Total emissions exhibited little lowering decrease as to previous year. Figure 7 and Figure 8 give description about carbon foot print and water foot print management.

Fig. 7 Carbon foot print management

Fig. 8 Water foot print management

8. Use of **Technology** & **Solid Waste Management**

9. IOCL, are constantly observing and **employing new technologies and best practices** in order to conserve the resources of our operating units. The steps above resulted in a 10.09 percent decrease from 2012-13 to 2016-17 in the real carbon footprints. The ENCON interventions introduced during 2016-2017 saved SRFT 19,371, which was equal to a decrease of 62,731 GHG emissions to tco2e. In 2016-17, **refinery emissions** total was 13.38 MMT (179,000 passenger cars and light trucks for one year) (Million metric tons). Figure 9 is about emission year by year.

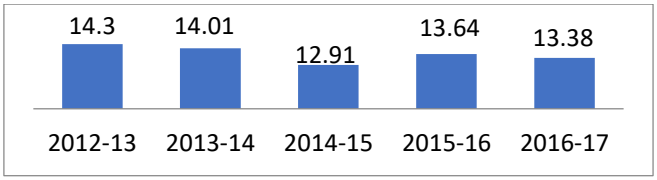

Fig. 9 year by year emission

HINDUSTAN PETROLIUM CORPORATION LIMITED (HPCL)

5. Environment and Perspective

HPCL is moving in a direction to achieve and provide a high grade produce & ecological exercise, to **grow & save Environment**. In their perspective, economy needs business to infuse growth in economy. Business boosts the economy, and as a result of best practices, while ensuring preservation of environment for a **sustainable future**. In the current situation in which **a shift from hydrocarbon fuel to renewable energy combustible product or method** is necessary. HPCL acknowledges the complexity of doing trade.

5.1 Sustainable Approach

HPCL have developed a five-year strategic plan up to 2020-21, for ensuring a better future. It values customers and strives to achieve faster growth and benefit maximization. HPCL has aligned its sustainability and materiality with the ethos of the interdependent parties and companies. Community significance and value symbolizes more sustainable and holistic development. In its field of activity and around it, the HPCL ensures a clean and polluting environment. PSM (process safety management) is integral part of HPCL Safety & Environmental plan of action [8], affecting all stakeholders.

5.2 Environment Approach

HPCL has been developing processes, procedures and technology to keep the environmental agenda on the priority of business. Large company facilities are fitted with Industry Standard Environment Management System certificates. At HPCL they established a well prepared Institutionlised Environmental Management System (IEMS) and refineries are accredited to ISO 1400, daily Energy audits and built LED and water efficiency systems. The company's best practices include the ETP (effluent treatment facilities), air pollution control, waste disposal. For better environmental awareness, daily training & seminars are arranged.

5.3 Energy Consumption and Conservation

HPCL takes its energy demand & usage seriously and closely tracks it, reducing total use. The aim is to conserve electricity. Figure 10 and Figure 11 represents the view of direct and indirect consumption of energy.

Refineries

Marketing locations

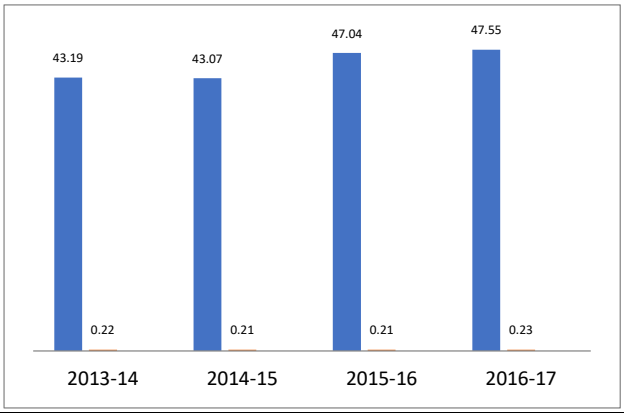

Fig. 10 Direct energy consumption

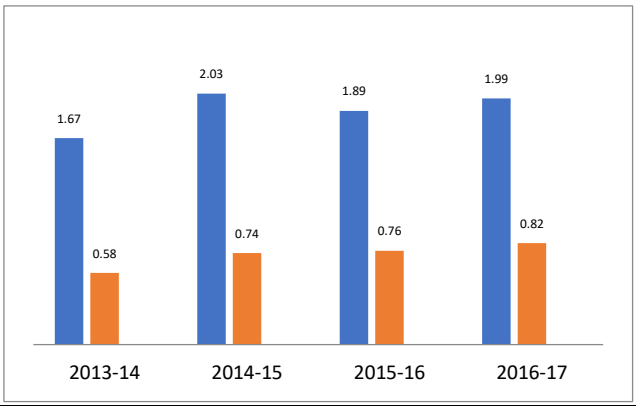

Fig. 11 Indirect energy consumption

At a glance, the intake of energy seems to have risen considerably. It is very clear that, relative to the input & output, i.e., both in downstream and upstream operations, the energy consumption increase is marginal. Following are few necessary steps taken out by HPCL.

1. Diesel Hydro Treater (DHT)
2. Diesel Hydro Treater – Hydrogen Generation Unit (DHT – HGU)
3. DHT-SRU (Sulphur Recovery Unit)
4. Continuous catalytic Regeneration (CCR) & pressure saving Adsorption (PSA)

Above, carbon emissions are controlled not only by saving currency as it requires substantial running costs; it also contributes to protecting the atmosphere. HPCL's **renewable technology allows for minimum carbon footprint**. As a result of significant investment capital at both Mumbai &Visakh Encon in 2016-17, HPCL's Energy Intensity Index (ETI) (COP 2016-17) and saving of SRFT 35,500 SFT/year recorded the lowest ever energy consumption (Standard Refinery Fuel Tonnage per year).

5.3 Emission Reduction

HPCL recognizes its carbon footprints and therefore continues to reduce the adverse consequences and attempts at environmental conservation. Figure 12 represents the emission reduction of GHG.

Refineries

Marketing locations

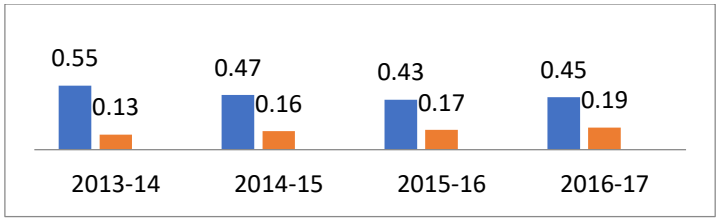

Fig. 12 view of emission reduction GHG.

5.4 Initiative for Emission Reduction

1. Pulling out and transportation of 75% of produce by means of pipelines
2. Changing over to BSIV with effect from Jan 2017.
3. Fuel gas treated in fuel gas desulphurization unit to bring down Sulphur Content before firing in furnaces & boilers & reducing Sox.
4. To monitor flare with the help of Low NOx burners.
5. Flare gas recovery installed & reducing air emission self.

5.6 Waste Management

HPCL complies with MOEF & CC, CPCB & SPCP legislative rules and regulations. Popular hazardous waste collection, storage and disposal facility approved by the CPCB Disposal (CHWTSDF). **Oil zapper technology** is used to strip harmful oilier sludges from water for bioremediation where microbial are used.

Evaluation of Perspective of Oil and Gas Companies

6. ONGC

Actions taken by ONGC to support the environment and supporting perspective of management are given as under:

6.1 State of the Art Technology

To minimize environmental impacts, and increase efficiency, the ONGC TERI Biotech Ltd, along with the Energy Research Institute (TERI), has encouraged the use of best available biotechnology.

Precautionary Principle of Environment Management

Big projects consider environmental impact minimization in the design phase and in subsequent phases of project extension, upgrade etc. In order to continuously evaluate needs for environmental instruments, ONGC dedicates its institutions to Mumbai and Goa (IEOT, IOGPT & IPSHEM) and then define, establish and effectively execute the initiatives.

6.2 Mitigation of Environmental Impact & HSE Policy

They have established a key corporate role which works in conjunction HSE and security officers around properties, reservoirs and safety officers' plants that form the organizational structure's operational layer efficient safety performance monitoring and documentation. HSE CEO I/C HSE Director Reports: HSE and SD Board of Directors Quality feedback for HSE.

6.3 Energy Saving Initiative

They are discovering and generating across over 400 companies both on land and on the high seas. The Uran, Hazira and Ankleshwar plants process crude oil and natural gas, yet working on energy saving.

Uran

Energy saving initiative introduced "Additional Recovery CSU Rich Gas by the stripping of Rich Gas." 59 million in INR annually. The synchronous 3.35 MW RGT engine replacement LPG-1 resulted in 4.8 MMSCM gas saving and Steam-based VAM installation at Cogen Factory, saved 342,000 KWh. Also by improving the power factor in the Uran plant saved INR3.12 million.

Hazira

The supply of LP gas from MP header to KRIBHICO gas, rather than HP header, to maximize the use of power Plant for LPG. INR 210 million is expected to be saved annually. Replacement of 24 old 160-watt MLL fittings with Energy savings were achieved by 125 watts of HPMV fitting of MWh 3.68.

Replacing nine air handling units with more efficiency saved amounted to 249,660 KWh and more energy-efficient auto mode replacement of lighting conducted 273,312 KWh in savings.

For the last two years, energy saving in 2012-13 in terms of units is 779.72 million & Units 743.63 million in 2011-12.

6.4 Green Building

Two of their Green Building ventures have taken on a special importance in the period 2012-2013 Mumbai and Dehradun. They were validated and sent to the UNFCCC for registration. Two other buildings — in Delhi and in Kolkata wherein ONGC has reached a new foray. The energy-efficient buildings CDM arena. Just a few energy-efficient buildings worldwide were registered successfully to date. Energy saving characteristics.

The buildings are being designed under the USGBC LEED Classification scheme for the Platinum Rating. The projects deliver environmentally sustainable and energy-efficient workspaces. The project operation aims to reduce the energy consumption of the grid and thereby reduce the emissions of greenhouse gases. The buildings are built on a sustainable and environmentally compatible concept of architecture. The HVAC, the lighting, the electricity, individual entry control, access control, parking and fire detection and control in the vehicles, the management of the water and waste disposal, the automation offices and communication processes in the buildings will be controlled by an Integrated Building Management System (IBMS).

6.5 Global Methane Initiative

The U.S. Environmental Protection Agency (USEPA Global)'s Methane Initiatives is an action-driven effort to cut global methane discharge to boost economic growth, improve energy efficiency, increase our environment, and minimize greenhouse gas emissions. At the moment, the Collaboration focuses on five sources of methane emissions, including agricultural, coal and waste water and petroleum and gas. Figure 13 represents methane reduction. The goal of GMI is to put business, NGOs, national governments and other stakeholders together to further develop projects worldwide [9].

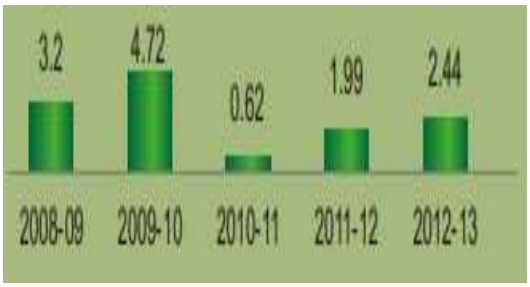

Fig. 13 Methane Reduction (MMSCM)

6.6 Money Spent by ONGC

Fig. 14 Money Spent By ONGC

BPCL(Bharat Petroleum Corporation Limited)

The main issues facing the world are carbon emissions and global warming. Carbon emissions have risen in the last two years. After nearly three years of observed deflation between 2014 and 2016 as a result of rise of global economic activities, worldwide Energy-connected carbon discharge increased by 1.7% in 2018 and have reported the most growth since 2013.. With a holistic approach, BPCL aims at mitigating risks and enhancing environmental efficiency.

7. BPCL and Environmental Principles

BPCL **perceives Renewable Energy** Engagement is the solution to clean energy requirement. Hence committed to implement, build capacity, producing and using renewable energy.

Use of State of the Art Technology to mitigate environmental impacts of operations [10].

A wellness, safety and **environmental policy is also in place** to provide guidance Using suitable technology to mitigate environmental impacts of operations [10].

In the **perception of BPCL precautionary approach to environment** is essential and therefore refineries are ISO 9001:2015 Quality Accredited, ISO14001:2015 for Environment and OHSAS 18001:2007 Apparatus for high quality trade such as Six Sigma and 5S are now being applied at different stages at Units as part of their Integrated Managing Processes.

Sustainability is implemented to ensure environmental principles. The Sustainable Development Committee is a committee of the Board meets half yearly once in a while to discuss and analyse projects for sustainable development. Figure 15 is of ecological sustainability way of BPCL.

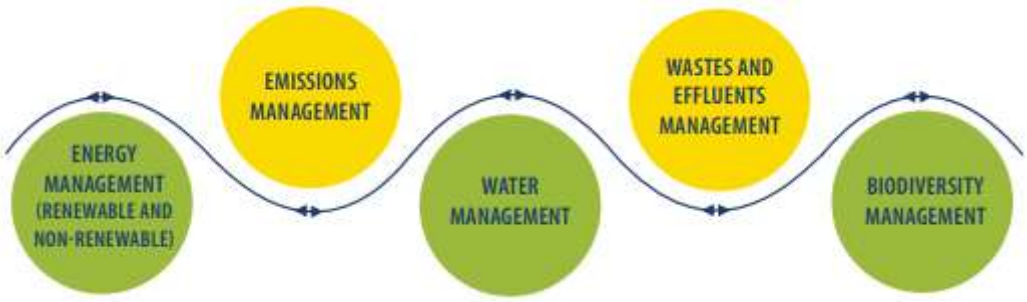

Fig. 15 Ecological Sustainability

7.1 Alternative Sources of Energy – Renewable Energy

BPCL encourages use of renewable energy sources to fulfil its energy needs Mitigate the risks from conventional energy sources to climate change. The potential of renewable energy has grown FY 2018-19: 26.36 MW at 31.70 MW. INR 46 crore, which is 0.42% of the total amount invested in renewable energy, Absolute investment in money.

7.2 Environment Conservation and Protection at Refinery

1. On site, dependent on enzyme- bioremediation with positive effects was conducted out for dealing with left over muck (to the tune of. 84.7 MT – bringing down oil 46% to less than 0.5%) in a time duration of six months in MOT Tank-13 located at an island which is 6 kms away from refinery.
2. As content of Green office program, Energy & Environment portion of company conducted on “Paper Saving”, “Green Housekeeping” and “Energy Saving” at BPCL Refinery Learning Centre (RLC).
3. BPCL have put money in STP which belongs to and is run by M/s RCF and BPCL presently consuming approximately 1250 KL/Day of handled waste water of RCF facility. Post authorisation for running of second phase of the Sewage Treatment Plant by end of Sept, 2019, approximately 6,000 KL/day of treated waste water is likely to be consumed by refinery, thus lowering the consumption of water drawn from the Mumbai Corporation.
4. Consciousness towards care and safe guard of environment in various stakeholders and students is regularly given in such classes and creative ENCON groups formed seventy educational institutions throughout Kerala.
5. Sapling issuing and assistance to herbal garden in nearby Government schools organised as an event of World Environment Day celebration.
6. 23.63 tons of paper recycled, equals protecting pproximately 402 trees and 24 MTCO2e.

7.3 Money Spent By BPCL

Environmental Expenditures (INR) Lakh	Refineries	Other BUs
Treatment and disposal of Waste	7927.55	96.08
Depreciation and maintenance cost of equipment used in pollution control	3739.73	42.86
External certification of management systems	4.51	63.06
External services for environmental management	442.71	79.13
Extra expenditures for installing cleaner technologies	58336.67	32.19
Other Environmental Costs	798.62	347.99

Fig.16 Money Spent by BPCL

IOCL

The approach of Indian Oil towards sustainability, continue to have an impact on the environment and society. Indian Oil promised to conducting its trade and commerce with utter sense of protecting environment, to continuously reduce the effect of its activities on the environment. As an undertaking, responsible Indian Oil takes a range of climate change mitigation steps at Corporate level to bring down environmental footprint.

8. IOCL and Environmental Principles

8.1 Energy & sustainability Initiatives

India's energy demand is expected to rise in ten years. To achieve sustainable and over all economic development, there are a small country fossil fuel reserves, involving efficient resource usage and maximum value deriving from the resources available. Figure 20 is of energy saving by IOCL. **Sustainable and inexpensive energy is therefore given greater importance** as a mechanism to promote growth and to resolve environmental issues.

Fig. 17 Energy saving by IOCL

8.2 Carbon and Water Footprint Emissions

Indian Oil has voluntarily set itself a target of reducing its unique **carbon and water footprint by 18% and 20%**, and 2012-13 is the basic year, demonstrating that we are committed to reducing the effects of our climate [11].

Global warming because of anthropogenic pollution has become one of the world's most complicated problems. In addition to our environment, the overwhelming effects of climate change are also threatened with economic, social and political conditions. Figure 18 represents the specific emission reduction during the years. Heat stress, floods, drought, agricultural yield loss, sea level rise, extreme storm and precipitation, etc. Refineries account for more than 90% of Indian Oil Complete pollution of the company. IOCL does Carbon Exercises on footprint through their pages whereby emissions are detected and enforced Measures of elimination.

Fig 18. Specific emission reduction.

8.3 Water Conservation and Renewable Projects are the belief of IOCL to care for environment while doing business. Water foot printing exercises have been carried out to recognise and put to ue water preserving means. Placed more than 560 rainwater harvesting units as of present having water harvesting capacity of 3 billion liters per year. In 2017/18 Indian Oil refineries recycled approximately 38.74 million Kl of water i.e., 89% of waste water created. Various means employed rainwater harvesting, reusing/recycling of polluted water created, assisted refineries in lowering the usage of clean water.

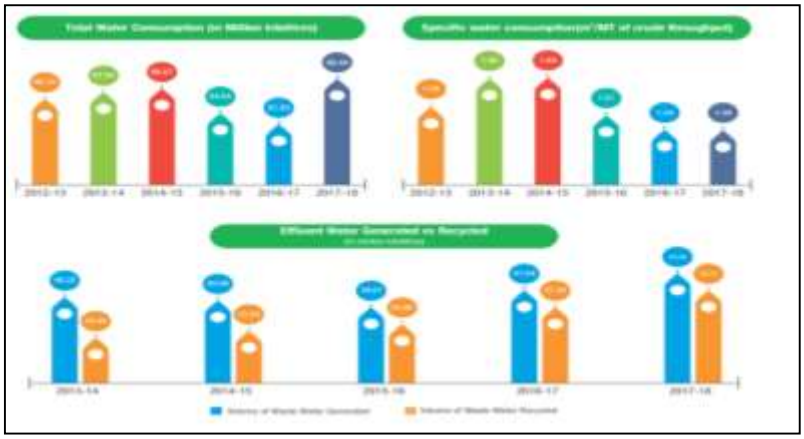

Fig. 19 view of water consumption by IOCL.

8.4 Water recycled and generated

IOCL have developed a goal to reduce its specific use of water by 20% by 2020. As of 31 March 2016, IOCL established a total of five hundred water collection systems in different refineries. This contributed to a rise of 42.5% in the use of collected rain water in 2015-2016. In order to prevent the use of fresh water in refineries, IOCL optimized the recycling and exercise retention process. The water use and recycling details are shown below (COP 2016-17). Figure 20 is about recycled and generated waste water.

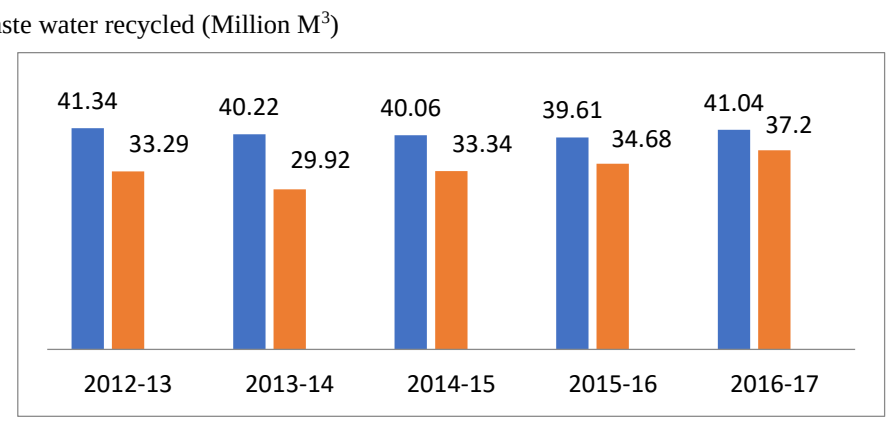

Fig. 20 water generated and recycled.

8.6 Use of Technology& Solid Waste Management and

1. Concept is prevent, Reduce, Reuse & Recover.
2. Waste/ Oily/ Chemical/ biological & muck are handled with machines.
3. Melting pits with skimming pumps high tecnology hydro cyclones are used to de-oil sludge.
4. Reprocessed waste is handled in Coker unit or bio remediated in bioreactor, a **latest innovation of IOCL.**

8.7 Energy Conservation

The demand for energy in India is increasing and thus **energy resources must be optimized**. The organization is making a relentless effort in its operating areas to conserve electricity and direct fuel consumption. The primary focus of conserving energy at all levels is on reducing carbon footprints. The steps taken by IOCL to reduce its real energy usage (ENCON) are focused on good practices and business performance. Figure 21 is about energy saving project.

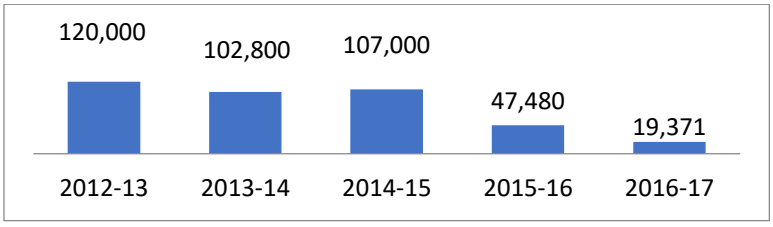

Fig.21 view of ENCON project.

8.8 Environment Expenditure

Indian Oil adheres without fail to both local and national legislation and regulations. For 2017-18, no infringements and sanctions affecting our operations were identified. By the national pollution control board and the state pollution board, IOCL comply with all environmental requirements. No show cause/legal notification of the 2017-18 year was issued from the CPCB/SPCB. In addition, no fines have been reported during the year for non-compliance with monetary or non-monetary penalties with environmental law and regulations. Strict compliance with the climate and legislation achieved in the business.

8.9 Bio-Diversity

Indian Oil have an established perspective that for **a steady and a firm ecological community Biological variety is more pertinent**. Indian Oil has created green areas in different area of operation. A large scale plantation of trees as drive done in the areas of refineries, their small community cities and other unit to prepare greenery. Local variety of

flora utilised for planting. In 2017-18, upto1,22,300 saplings in the area of upstream and downstream activity have been planted.

Money Spent by IOCL

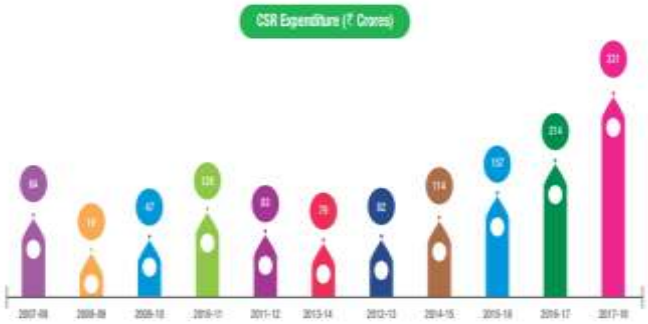

Fig.22 Money Spent by IOCL

HPCL

They dedicate themselves through our various initiatives and activities to continuously achieve the goals of economic, ecological and social responsibility for sustainability. HPCL is **working to support sustainable economic growth** through the continuous development of the our operations' performance and productivity. HPCL can carry out its operations in a manner which has no adverse affect on the environmental balance. HPCL to create and organize group activities that are tailor made to improve their capacity [12]. Various other ideas are given below:

1. **Assist and aid in formulation of ideas sustainable** development in the minds of workers and all stake holders.,
2. Include the sustainable development intent, aim and thought in business ideas.
3. Create and put to use good practices for max usage and efficiency of natural resources.
4. Regularly use and keep a watch on our various activities to bring down carbon footprint.
5. Try and offer a clean, healthy and safe working environment to employees and stake holders.

9. Environment Policy

Organization is devoted and assures to working in this regard a way that is environmentally and economically compatible community growth. It aims to sensitize people achieving respect for the workplace, emphasizing the participation of all workers in improving the environment through safe practices, education and philosophy.

Following are the main objectives of this policy: -

1. Acquire environmentally congenial methodology for working system.
2. Continuously work to bring in methodology that is inclined to protecting the environment of the institutions by using processes which are environment friendly. Such techniques also ensure best use of energy and bring down discharge of dangerous gases and muck.
3. Institute ways and means more apt for better ways to discarding harmful waste and scrap.
4. Bring in knowledge in the minds of various workers of the company and make plan action for environment care.
5. Follow legal regulations and prepare correct standards for environment protection.

9.1 Energy Conservation at Marketing Locations

The place where we have our market and business made a number energy conserving methods. These extensive initiatives include surveillance, the use of energy efficient equipment, optimization of systems, refining and construction capacity. **Energy initiatives executed at business areas**:

1. Doing regular audits on energy for identifying energy saving methods.
2. Placing competent energy watch apparatus for heavy energy consumption apparatus.
3. Placement of Variable Frequency Drives (VFDs) for electrical drives.
4. Installation of energy-competent apparatus/instrument.
5. Prevention of idle running of equipment through sensitization of workmen.

9.2 Water management

Economic development and growth in number of humans each day is putting an unnecessary burden on water requirement. In order to solve this challenge, it becomes a must for each human and various business doing organizations to act on it bring to use various methodologies in order to conserve water. It is also an inherent segment to the **attainment of the Sustainable Development** Goals (SDGs).

Money Spent by HPCL

Focus Area	Expenditure (₹ Crore) (2018-19)
Childcare and Education	29.93
Healthcare	12.70
Skill Development	20.23
Sports	0.78
Environment & Community Development (Including Pradhan Mantri Ujjwala Yojana (PMUY) and Swachh Bharat Abhiyan)	96.17
Total	**159.81**

Fig. 23 Money Spent by HPCL

10. Sustainability Principles and Implementation

The Oil and Gas Companies are committed to achieving high environmental performance in all its operations worldwide. To that end, Environmental Performance Practices (EPP) have been are observed to make sure all activities being done in an environmentally-responsible way and follow internationally-accepted environmental best practices.

10.1 Shell Oil Company

Shell a global energy company with competence in the probe & search, growth, purifying and selling of oil and natural gas, its production and bringing chemicals to market. Investing in infrastructure to help minimize pollution and partnering with others to reduce their effects on biodiversity. Shell was one of the first oil firms to consider the danger of climate change. Shell is calling for change on the part of governments, our industry and energy consumers and plays a leading role in showing how to treat carbon dioxide CO2 responsibly. The Business Values of the Company have included their determination to contribute to sustainable development since 1997. At Shell Oil Company they believe that it needs a balance of short-and long-term goals and an incorporation of fiscal, environmental, and social factors into business decision-making. Security remains a top priority. Its requirements are strict. If things do not go as expected, SHELL will respond quickly and decisively and review all incidents in order to learn and develop their performance. Shell was a founding member of the UNGC and shares its civil rights, labor, environmental and anti-corruption values. SHELL is now a signatory to the Global Compact LEAD, which strengthens the company's adherence to these principles. Towards environment protection and implementing sustainability practices they use Best Available Techniques (BAT) to ensure implementation of UNGC Principles.

10.2 Success of UNGC principles on environment

Corporate sustainability begins with the value structure of an organization and a company strategy. This means acting in ways that satisfy at least basic human rights, employment, and the environment and anti-corruption obligations. Responsible Oil and Gas Companies observe the all principles everywhere in various spread out units all over locally and internationally identifying with good practice. By integrating UN Global Compact Ten Principles into action plan, scheme and methodologies and developing a culture, companies just not ensure their basic responsibility for stake holders and the globe, but also make a route chart for a long-term success. The aim being a globe that we desire with assistance from businesses which look for sustainability in all spheres. To ensure this ,UN Global Compact helps business to:

1. To be in sync with UNGC 10 principles and execute trade with responsibility.
2. Initiate all strategic business actions and give a fillip to societal goals, viz. the UN Sustainable Development Goals, and focus on partnership and innovation.

Performance in business and organizations need stable economies and, inter alia, safe, trained and educated employees, Increased brand trust and investment promotion for sustainable companies.

Such actions are for a better – and ways to successful business which will certainly provide profit and sustainability. Companies deliver novel plans and innovative to the problems facing society – simply required to make a nice sustainable life on the planet. The United Nations Global Compact is now changing the future for over 10,000 business people and 5,000 non-enterprise members. They contribute to alleviating global poverty, solving labour concerns, reducing environmental threats throughout the globe and more. Beginner or existing corporate may take up and align with UNGC to make an even greater difference [14].

Benefits: -

1. UN Global Compact participants from almost all sectors and communities in more than 160 countries have unparalleled networking access.
2. Access to alliances with a variety of parties concerned – to share best practices and innovative solutions.
3. Based on 15 years of achievements, best practice recommendations are available
4. Instruments, tools and training.
5. Help for local networks in 85 nations.
6. United Nations moral competence, information and experience is available and shared.

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