



SUSTAINABLE PRACTICES IN INDIA BY OIL & GAS INDUSTRY: AN OVERVIEW

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ABSTRACT

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The UN introduced the 17 Sustainable Development Goals (SDGs) in 2015 under 17 indivisible goals and 169 targets. These goals give a comprehensive attitude in addressing the issues of society, environment, and economy. The Oil and Gas (O&G) industry is a major contributor to the overall GDP of India. India is a net crude oil importer and has good refining capacities. In general, the O&G industry can contribute to all 17 SDGs. However, most industries focus on certain goals that are in alliance with their company. This paper gives a quantitative content analysis about the involvement of the major 5 Indian O&G industries' involvement in sustainability. The frequency of projects and policies by each industry toward Sustainable Development Goals are computed. From analysis, it is concluded that these 5 Indian firms largely concentrate on Goals 12 and 13.

KEYWORDS: Sustainable Development Goals, Oil and Gas Industry, quantitative content analysis, sustainability, Indian refineries

1. INTRODUCTION

As propaganda for 2030, the UN introduced the 17 Sustainable Development Goals (SDGs), and 169 targets in 2015. These SDGs give a holistic approach to improving the challenges of the economy, environment, and society. The targets and indicators are inseparable and are interrelated with one another.

Oil, petroleum, and related industries greatly impact India's economy. It has become a substantive part of our modern-day life. However, this industry is known for its notorious environmental and social devastation. Blending sustainability in the upstream and downstream processes is the only way forward for its survival. A sudden complete shift to renewable projects can be seen as expensive and ineffective, hence, simultaneous formulation of renewable and non-renewable projects is suggested.

The contribution of this paper is to review the steps taken by the Indian O&G industry for

sustainable development. The contribution of petroleum refineries toward UN Sustainable Development Goals (UNSDGs) is obtained from the Sustainability Report, Corporate Social Responsibility Report (CSR), and official websites.

1.2. Scenario

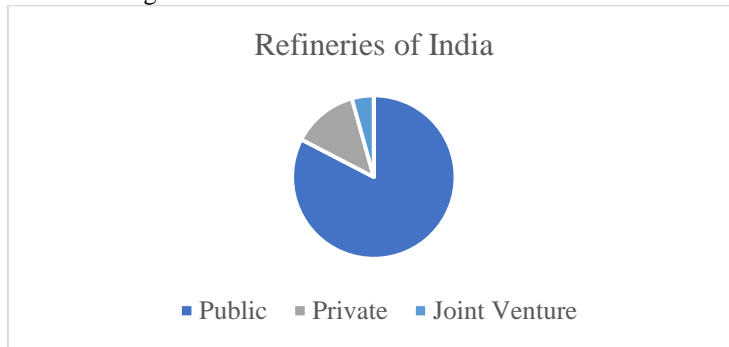
The Indian subcontinent is energy deficient and depends on the Organisation of Oil Exporting Countries (OPEC) for crude oil. However, it has the largest refining capacity in the Indian subcontinent.

Among the 23 refineries owned by 11 oil companies in India. Among them - 82.61% are public, 13.04% are private, and 4.35% are joint ventures. India's Companies Act 2013 states that every industry with (a) a net worth of the company to be Rs 500 crore (\$60.88 million) or more; (b) a turnover of the company to be Rs 1000 crore (\$121.77 million) or more; or (c) a net profit of the company to be Rs 5 crore (\$0.60 million) or more is

obliged to spend a minimum of 2% of their net profit on Corporate Social Responsibility (CSR).

In this paper, 5 major O&G companies are considered. Data for collecting its investment

towards sustainable goals were collected from their official webpage, sustainability/CSR/environmental reports.



Graph 1: Percentage of refineries classified into – (1) public, (2) private, and (3) joint venture.

2. METHODOLOGY

The overview of the method undertaken is briefly explained in *Fig 1*. First and foremost, the availability of sustainability reports and information is checked. They are cases in which transparency is difficult. The reports from 2019 onwards were collected, based on their availability. *Table 1* shows the obtainability of the sustainability reports. Information from the most recent sustainable report is taken. Quantitative content analysis based on these reports and data from websites was done. Quantitative content analysis was chosen rather than qualitative as the selected O&G industries have

already mapped the UN SDGs with their projects. It should be noted that as aforementioned the SDGs are indivisible and connected. Therefore, the same action can come under different goals and indicators. To avoid confusion, projects are not repeated while counting.

In this paper, 5 major Indian O&G companies are chosen: Bharat Petroleum Corporation Limited (BPCL), Oil and Natural Gas Corporation Limited (ONGC), Hindustan Petroleum Corporation Limited (HPCL), Indian Oil Corporation Limited (IOCL), Reliance Industries Limited (RIL).

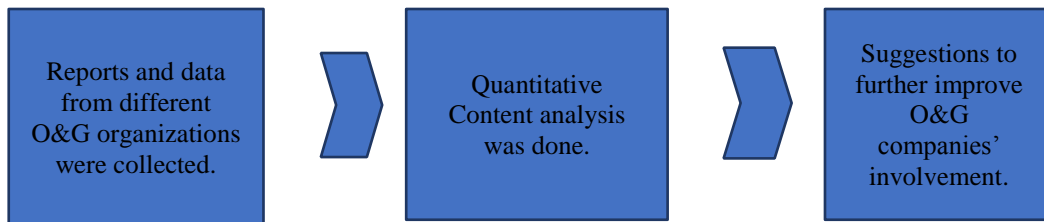


Fig 1: Methodology in reviewing the involvement of the O&G industry.

Company	2019-20	2020-2021
Oil and Natural Gas Corporation Limited (ONGC)	Yes	No
Bharat Petroleum Corporation Limited (BPCL)	Yes	Yes
Indian Oil Corporation Limited (IOCL)	Yes	Yes
Hindustan Petroleum Corporation Limited (HPCL)	Yes	Yes
Reliance Industries Limited (RIL)	Yes	No

Table 1: Availability of Sustainability reports

3. OBJECTIVES

- To collect information about the 5 Indian O&G industries about their contribution to UN SDGs.
- To suggest ways to further improve the industry’s involvement in sustainable development.

5. CONTRIBUTION OF O&G COMPANIES TOWARDS SDGS

5.1. Bharat Petroleum Corporation Limited (BPCL): From *Graph 2*, BPCL mainly focuses on Goals 11, 12, and 13. It is least focused on Goals 5,

4. UN SUSTAINABLE DEVELOPMENT GOALS:

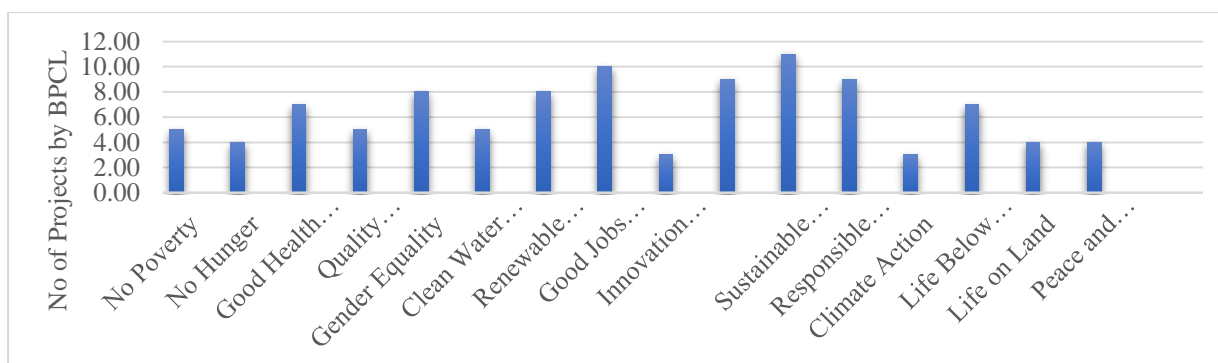
The 17 Sustainable Development Goals (SDGs) are adopted by all United Nation members for the 2030 Sustainable Development Agenda. Among these 17 goals, SDGs 7, 9, 11, and 12 are closely knitted to the Oil and Gas (O&G) industry. In many cases, companies focus on objectives and goals that are beneficial for them. The rest are normally met through the CSR law. Most SDG goals are interdependent, and the same project can come under different targets and indicators.

10, and 14. BPCL’s contribution to UNSDG is found on its official website. *Table 2* mentions the major projects and policies’ impact on society and the environment.

UN Sustainable Developments Goals	Major Practices Adopted by BPCL
Poverty	<ul style="list-style-type: none"> • Setting up skill development training centres. • Training leprosy-affected and impaired youth.
Zero hunger	<ul style="list-style-type: none"> • Providing mid-day meals to schools.
Good health and well-being	<ul style="list-style-type: none"> • Health care programs for cancer-affected patients. • Provide vehicle health care facilities to reach village communities.
Quality education	<ul style="list-style-type: none"> • Creating drinking water and toilet facilities for school children. • Providing diploma education to students. • Supporting computer-assisted learning courses. • Improving allied facilities of government schools.
Gender equality	<ul style="list-style-type: none"> • Introduced an equal-gender opportunity policy.
Clean water and sanitation	<ul style="list-style-type: none"> • Construction and renovation of toilets for high school students. • Projects in transforming water-scarce into water-dwelling villages. • Tasks in cleaning the rivers of India were organised. Water and energy-conservative initiatives have been taking place in a few organisations.
Affordable and clean energy	<ul style="list-style-type: none"> • A hybrid format of co-existing biofuel and non-renewable sources has been seen in industries.
Innovation and Infrastructure	<ul style="list-style-type: none"> • Production of BS-VI grade motor spirit. • Development of a refrigeration-based vapour recovery system for hydrocarbon recovery. • A tool for crude blend compatibility prediction. • Developed gasoline reduction additive, which reduces sulphur by 32%. • Furnace cleaning chemical, maximising the crude output. • A crude oil characterisation software, enabling refineries to smooth switchover and avoid unexpected shutdowns. • Transmission fluid for electrical vehicles. • Synthetic petrol engine for passenger vehicles with after-treatment devices. • Design high-viscosity sizing oil for weavers.
Reduces inequalities	<ul style="list-style-type: none"> • Skilling programs for adolescents with intellectual disabilities. • No discrimination based on race, gender, origin, caste, or nationality.

Sustainable cities and communities	<ul style="list-style-type: none"> ● Installation of solar, wind, and energy-efficient lighting capacity across plants. ● LPG connections for underprivileged communities. ● Bio-refineries for second-generation ethanol production. ● Reduction of carbon dioxide by energy conservation schemes. ● Increased land for rainwater harvesting.
Responsible consumption	<ul style="list-style-type: none"> ● Sustainable transport system. ● Conversion of conventional light to LED light. ● Implementation of online stack emission monitoring. ● Reduction in the dependency on raw water from the municipality.
Climate action	<ul style="list-style-type: none"> ● Plantation of trees. ● Conducted studies on carbon sequestration from trees.
Life below water	<ul style="list-style-type: none"> ● Les aqua-toxic oil-based drilling mud formulation used in offshore and onshore drilling. ● Ensuring disposal of sewage affects no water bodies or land.
Life on land	<ul style="list-style-type: none"> ● Implementation of composting for organic waste.
Peace Justice	<ul style="list-style-type: none"> ● Mandatory training on ethics. ● Clubs are organised across schools and colleges to inculcate a value system at a young age. ● Strong policy on environment and sustainability for all stakeholders.

Table 2: Major Practices adopted by BPCL (Source: BPCL website)



Graph2: Adoption of UN SDGs by BPCL

5.2. Oil and Natural Gas Corporation Limited (ONGC)

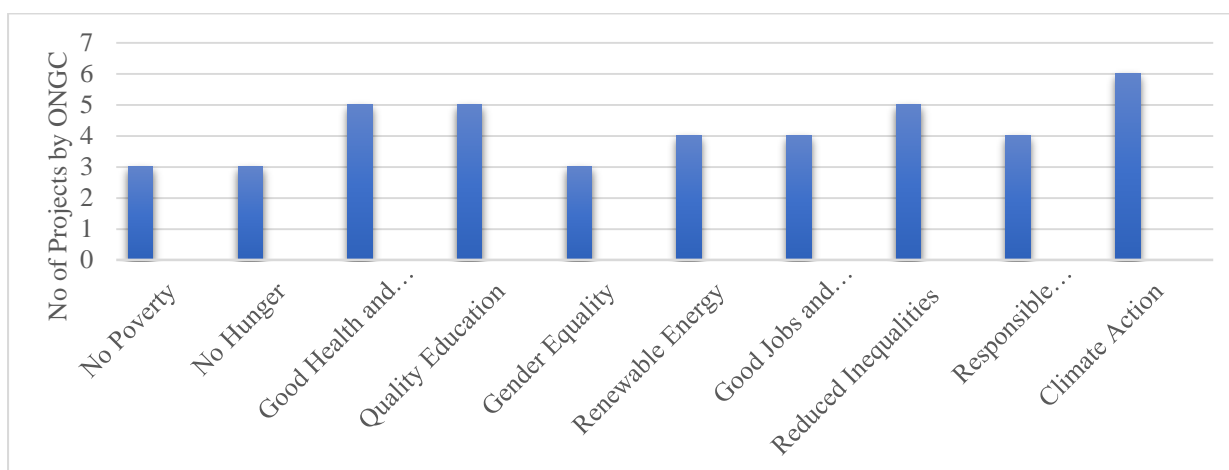
As per *Graph 3*, ONGC’s major contribution is towards Goal 13, Climate Action. However, the official website (ONGC website) says Goal 12

(Responsible consumption) has been its central theme of sustainability. ONGC’s least focus is on Goals 6, 9, 11, 14, 15, and 16. Information about ONGC’s contribution to UNSDGs is taken from its official website and sustainability report.

UN Sustainable Developments Goals	Major Practices Adopted by ONGC
Poverty	<ul style="list-style-type: none"> ● Spent Rs 44.27cr on skill development initiatives.
Zero hunger	<ul style="list-style-type: none"> ● Providing mid-day meals to school children. ● Construction of Anganwadi and providing LPG connections.
Good health and well-being	<ul style="list-style-type: none"> ● CSR initiative towards ONGC’s operational areas. ● Construction of hospitals and providing medical equipment, ambulances, etc.
Quality education	<ul style="list-style-type: none"> ● Construction of classrooms. ● Creating drinking and facilities in schools. ● Introduction of innovation learning systems in 20 aspirational districts.
Gender equality	<ul style="list-style-type: none"> ● Spent Rs 5.47cr for women’s empowerment. ● Supporting women and skilling entrepreneurship development.

Affordable and clean energy	<ul style="list-style-type: none"> • Solar panel for offshore installation. • Installation of the wind power project. • Solar power plant is installed at work centres.
Reduces inequalities	<ul style="list-style-type: none"> • Employers have welfare measures such as medical, housing, transport, and superannuation facilities. • Encourage local suppliers to participate in the tendering process.
Responsible consumption	<ul style="list-style-type: none"> • Limiting energy consumption and emissions. • Measures are taken to prevent accidents and spills while producing hydrocarbons. • Installation of seawater desalination plant thereby eliminating freshwater usage.
Climate action	<ul style="list-style-type: none"> • Green house accounting. • Clean development mechanism. • A signatory to the global methane initiative. • Installation of microturbines • Introduction of dynamic gas blending system, which reduces energy consumption and tack emissions by 40%.

Table 3: Major Practices adopted by ONGC (Source: ONGC website)



Graph 3: Adoption of UN SDGs by ONGC

5.3. Hindustan Petroleum Corporation Limited

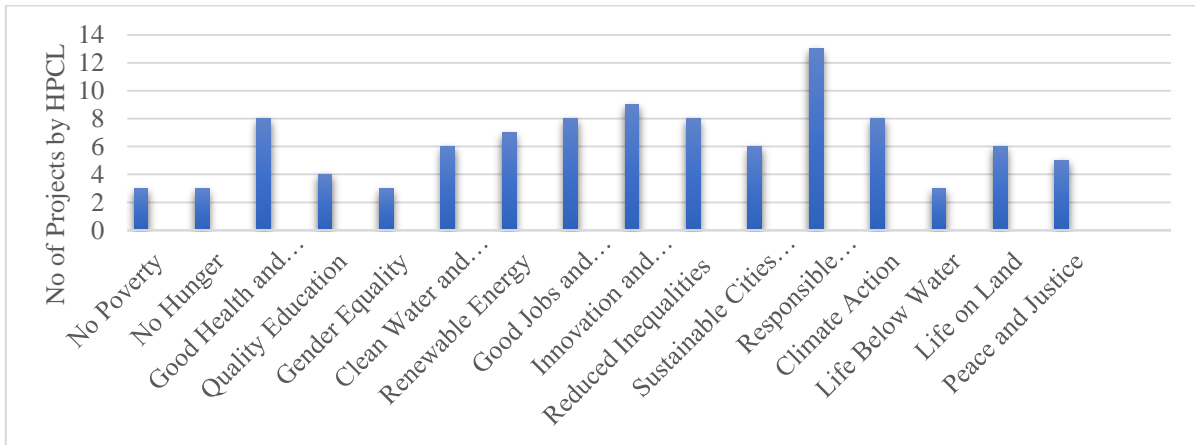
From *Graph 4*, HPCL majorly focuses on Goal 12: Responsible Consumption. The least focused Goals are 1, 2, 5, and 14. HPCL’s

commitment towards UNSDGs is obtained from the official website and the 2020-2021 sustainability report.

UN Sustainable Developments Goals	Major Practices Adopted by HPCL
Poverty	<ul style="list-style-type: none"> • Setting up skill development training centres.
Zero hunger	<ul style="list-style-type: none"> • Rations are given to families.
Good health and well-being	<ul style="list-style-type: none"> • Installed oxygen generation plant. • Provided a helping hand during COVID-19. • Mobile medical vans to rural India. • Funding heart surgeries for the less fortunate.
Quality education	<ul style="list-style-type: none"> • Providing quality education to disabled children • Promoting girl child education and gender equality in communities • Kashmiri less privileged students are selected for free education. • Providing residential coaching for entrance exams for selected students in Ladakh.
Gender equality	<ul style="list-style-type: none"> • Promoting girl child education and gender equality in communities • Kashmiri less privileged students are selected for free education. • Providing clean cooking fuel to women in rural areas.

Clean water and sanitation	<ul style="list-style-type: none"> ● Drinking water facilities in remote areas. ● Adopt methods to reduce water usage in boilers, and cooling towers. ● Usage of electronic and mechanical instruments for water measurement. ● Mapping the location of refineries about stress. ● Recycling of water.
Affordable and clean energy	<ul style="list-style-type: none"> ● Establishment of green Research & Development centre. ● Construction of Second-generation bio-refinery. ● Blended ethanol and biodiesel ● Setting up of compressed biogas. ● Installation of solar of the canopy. ● Launched ‘Solar Refueler Cart’ ● Only green hydrogen is used in the hydrogenation pilot plant and batch reactor. ● Installed wind power plants
Innovation and Infrastructure	<ul style="list-style-type: none"> ● Establishment of green Research & Development centre with research facilities in areas of FCC/RFCC, hydro-processing analysis, fuel research, nanotechnology, etc. ● Implementation of the Greenco Rating system at marketing locations. ● Start-up initiative ‘Udgam’ for offering energy solutions and applications. ● Technology developed for medical oxygen approx. 93% ● Development of fuel-gas desulphurisation nozzles. ● Developed technology for capturing blue hydrogen using carbon dioxide. ● Developed PSA-based technology for purifying biogas. ● Developed technology for recovering hydrocarbons in vapour the recovery unit. ● New products such as power 100 additive with high octane number, gas dolphin to improve power output and torque of SI engines, waxy crude antifoulant, and new lubricants.
Reduces inequalities	<ul style="list-style-type: none"> ● Introduction of local development plan. ● Impact assessment carried out for CSR projects.
Sustainable cities and communities	<ul style="list-style-type: none"> ● Start-up initiative ‘Udgam’ for offering energy solutions and applications. ● Start-ups include projects such as harvesting solar energy for household cooking, utilisation of biomass, 2G Bioethanol from biomass, and developing electrical vehicles.
Responsible consumption	<ul style="list-style-type: none"> ● Working with consultants to achieve net zero scopes 1 and 2 by 2040. ● Forming energy transition cells to cells, facilitating energy transition, low-carbon, and new energy pathways. ● Saving steel consumption by reducing the thickness of MS drum ● Increasing flare gas recovery.
Climate action	<ul style="list-style-type: none"> ● Installing green covers around refineries. ● Harnessing renewable energy.
Life below water	<ul style="list-style-type: none"> ● Mapping location of refineries about stress. ● Deployment of oil spill recovery. ● Bioremediation of low oily sludge
Life on land	<ul style="list-style-type: none"> ● Initiative for land biodiversity protection. ● Dedicated stack analysers for stack emissions. ● Deploying composting pits and organic waste converter to reuse it as manure.
Peace Justice	<ul style="list-style-type: none"> ● Implementation of Corporate Governance which consists of conduct, whistleblowing policy, risk management, etc. ● Employer welfare beneficial for family members, housing loans, computer loans, vehicle loans etc.

Table 4: Major Practices adopted by HPCL (Source: HPCL website)



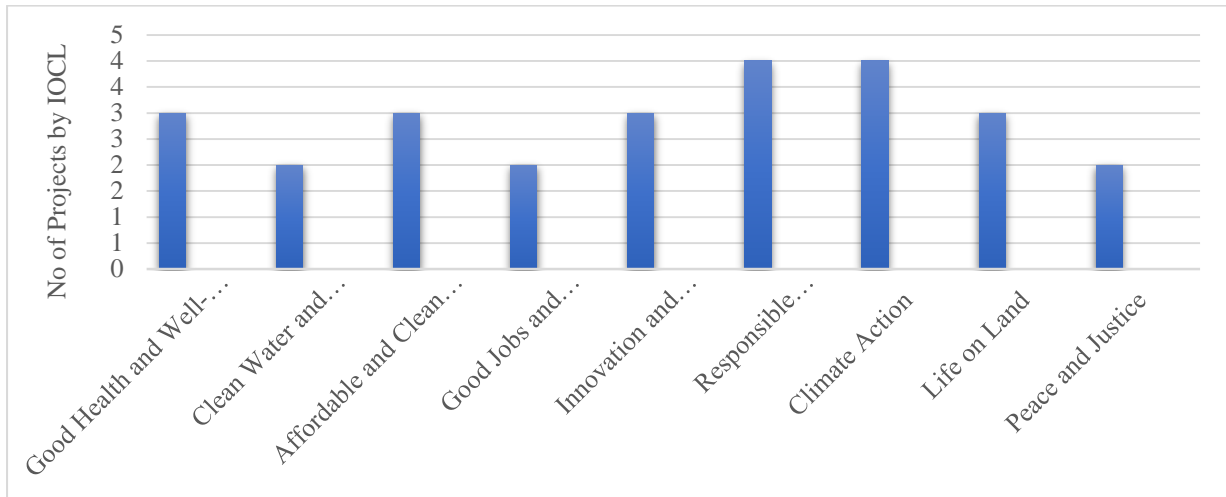
Graph 4: Adoption of UN SDGs by HPCL

5.4. Indian Oil Corporation Limited (IOCL)
 Graph 5 shows that Goals 12 and 13 (Climate action and Responsible Consumption) are IOCL’s major

contributions. The information is acquired from the 2020-2021 sustainability report.

UN Sustainable Developments Goals	Major Practices Adopted by IOCL
Good health and well-being	<ul style="list-style-type: none"> Ensuring safety in the workforce. Health services to communities in rural areas. During COVID-19, steps were taken to provide healthcare facilities to employers and communities.
Clean water and sanitation	<ul style="list-style-type: none"> Optimise water usage in operating locations. Rainwater harvesting to recharge groundwater.
Affordable and clean energy	<ul style="list-style-type: none"> Diversifying products to incorporate clean energy. Sustainable alternative towards transportation.
Innovation and Infrastructure	<ul style="list-style-type: none"> Pursuing research firming the foundations of Atmanirbhar Bharat, self-reliant India. Set up cross-country infrastructure for the delivery of fuels and petroleum products.
Responsible consumption	<ul style="list-style-type: none"> Moving towards a circular economy through the efforts of developing bioenergy from waste, plastic recycling, etc. Promoting indigenous purchases. Awareness programmes for fuel conservation for safe and efficient use.
Climate action	<ul style="list-style-type: none"> Implementing projects on energy efficiency, and renewable energy. Process fuel improvements and technological upgradation to mitigate operations. Incorporation of biofuels and hydrogen-based fuels
Life on land	<ul style="list-style-type: none"> Introduction of green belt at the operating location
Peace Justice	<ul style="list-style-type: none"> Committed to the highest standards of accountability and integrity within operations.

Table 5: Major Practices adopted by IOCL (Source: IOCL sustainability report)



Graph 5: Adoption of UN SDGs by IOCL

5.5. Reliance Industries Limited (RIL)

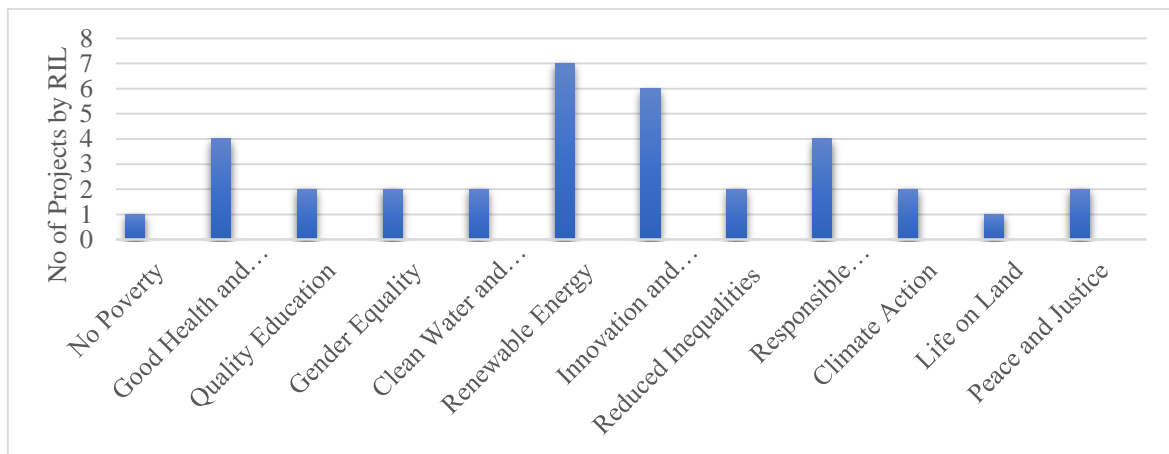
In comparison to all other industries mentioned, RIL is a private venture. *Graph 6* mainly focuses on Goals 7 and 9 (Renewable energy and Innovation and Infrastructure). The least focused are

Goals 1 and 15. Data collected from the website shows that RIL has opened innovative projects such as the conversion of algae to fuels, circular economy, etc.

UN Sustainable Developments Goals	Major Practices Adopted by RIL
Poverty	<ul style="list-style-type: none"> ● Setting up skill development training centres.
Good health and well-being	<ul style="list-style-type: none"> ● Health consultations through JioHealth Hub. ● Daily COVID-19 symptom checker for employers. ● Medical facility for employers. ● Rs 630cr expenditure on HSE.
Quality education	<ul style="list-style-type: none"> ● Employee training through LinkedIn, Coursera, and Lynda learning partnerships. ● Education and sports efforts for society.
Gender equality	<ul style="list-style-type: none"> ● Diversity with increasing women in retailers ● Non-discrimination and human right policy.
Clean water and sanitation	<ul style="list-style-type: none"> ● Water conservation initiatives during the year. ● Development of a water-secure village via community leaders.
Affordable and clean energy	<ul style="list-style-type: none"> ● Algae-to-oil and bio-refineries plants to create renewable bio-crude. ● RCAT-HCL technology converts organic waste to renewable crude. ● Incorporating circular economy by rerouting plastic waste to the road. ● Increasing PET recycling capacities. ● Recycling waste PET, and polyester to create high-value fabric, chemicals, and products. ● Deployment of fuel cells and lithium-ion batteries in telecom infrastructure. ● Carbon dioxide capturing plant from power plant flue gas.

Innovation and Infrastructure	<ul style="list-style-type: none"> Algae-to-oil and bio-refineries plants to create renewable bio-crude. RCAT-HCL technology converts organic waste to renewable crude. Incorporating circular economy by rerouting plastic waste to roads. Recycling waste PET, and polyester to create high-value fabric, chemicals, and products. Deployment of fuel cells and lithium-ion batteries in telecom infrastructure. Carbon dioxide capturing plant from power plant flue gas.
Reduces inequalities	<ul style="list-style-type: none"> Diversity with increasing women in retailers Non-discrimination and human right policy.
Sustainable cities and communities	<ul style="list-style-type: none"> Algae-to-oil and bio-refineries plants to create renewable bio-crude. E-waste collection and extended producer responsibility. Rural transformation initiatives
Responsible consumption	<ul style="list-style-type: none"> Incorporating circular economy by rerouting plastic waste to the road. Recycling waste PET, and polyester to create high-value fabric, chemicals, and products. Deploying fuel cells and lithium-ion batteries in telecom infrastructure k) Carbon dioxide capturing plant from flue gas plants.
Climate action	<ul style="list-style-type: none"> Plantation of trees. Environmental performance oversight by Board (HSE Committee).
Life on land	<ul style="list-style-type: none"> E-waste collection.
Peace Justice	<ul style="list-style-type: none"> Resilient data security, and customer data privacy systems. Strong relationships with stakeholders.

Table 6: Major Practices adopted by RIL (Source: RIL website)



Graph 6: Adoption of UN SDGs by RIL

6. CONCLUSION AND SUGGESTIONS

The Oil and Gas industry can contribute to all 17 sustainable development goals. However, from the overall analysis of all 5 industries, a larger number of new projects are under Goals 12 and 13. Due to mandatory CSR reports, these industries also contribute to Goals 1, 2, 3, and 4. A ranking on which company is doing better than another cannot be concluded, as no projects are being counted rather the scale of impact. The analysis concludes that India is shifting towards an integrated energy platform.

Suggestions

Sustainability can further be improved by these suggestions:

1. Digitalisation of oil fields: Currently oilfields are working at 70% of their capacity. Most of the repetitive offshore work can be automated, improving workers’ health and safety.
2. Restoration of biodiversity: Once land is used for drilling purposes, they are usually

ignored. For example, an artificial coral reef can be introduced after its oil extraction.

3. Circular Economy: O&G industry does not belong to the circular cycle as it is a non-renewable source. However, recycling resources can be done at every stage. The introduction of a flare recovery system such as in BPCL and RIL is way to introduce circular economy into practice.
4. Introduction to the zero-discharge model: Although many of the mentioned companies have plans in making their industries free from discharge. Most of them still discharge their final waste into nearby rivers and send it to flare.
5. Indian O&G needs to further associate with government NGOs involving environmental protection.

REFERENCES

1. *Bharat Petroleum (2022)*, <https://www.bharatpetroleum.in/Sustainability/Sustainability-Development-Goals.aspx>(Accessed: July 2022)
2. *Hindustan Petroleum Corporation Limited (2022)*, <https://www.hindustanpetroleum.com/pages/sustainability> (Accessed: August 2022)
3. *IndianOil (2022)*, <https://iocl.com/sustainability> (Accessed: August 2022)
4. *Ministry of Corporate Affairs (2013)*, <https://www.mca.gov.in/Ministry/pdf/CompaniesAct2013.pdf> (Accessed: July 2022)
5. *Oil and Natural Gas Corporation Limited (2022)*, <https://ongcindia.com/web/eng/sustainability> (Accessed: August 2022)
6. *Reliance Industries Limited (2020)*, <https://www.ril.com/ar2019-20/our-approach-to-esg.html> (Accessed: July 2022)
7. *United Nations Foundations*, <https://unfoundation.org/> (Accessed: June 2022)