

KEY CONCEPTS

- Environment ■ Water quality ■ Air quality ■ Climate change ■ Nationally Determined Contributions (NDCs)
- Environmental Impact ■ Energy Conservation and Management

Learning Objectives

To understand:

- The concept of environment and its significance
- Policy related aspects of environment
- Environmental policies
- Environmental impacts
- The scenario of energy consumption in India
- The approaches embraced by various companies for fostering energy conservation
- Creating awareness for effective energy management
- Bureau of Energy Efficiency
- Environmental improvement scenario in India

Lesson Outline

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| ➤ Introduction | ➤ Carbon Border Adjustment Mechanism (CBAM) |
| ➤ Environmental Policy | ➤ Lesson Round-Up |
| ➤ Environmental Permits | ➤ Glossary |
| ➤ Environmental Impacts | ➤ Test Yourself |
| ➤ Energy Consumption | ➤ List of Further Readings |
| ➤ Energy Conservation Scenario- Cases of Selected Indian Companies | ➤ Other References |
| ➤ Awareness on Environment Protection, Energy Conservation and Management | |
| ➤ Way forward- India's Environmental Improvement Scenario | |
| ➤ S&P Global's Corporate Sustainability Assessments- Indian Companies Features in Global ESG Assessments | |

INTRODUCTION

The environment consists of all things-living or non-living that influence human life. It plays a vital role in the functioning of our daily lives. The environment/nature and its wonderful species existed even before human habitat. Every species, be it on land or water, existed peacefully. The mayhem began after the dawn of human civilization and industrialization. Humans began to use the environment as a means to an end without giving much thought to the consequences of the abuse or respect that it should give to the facilitator of life on Earth.

The importance of environment is evident from the following facts:

- i) The environment provides us with resources for production which include renewable and non-renewable resources.
- ii) The environment includes sun, water, air, and soil without which human life would not exist. It sustains life by providing genetic diversity and biodiversity.
- iii) Production and consumption of activities generate waste mainly in the manner of garbage that the environment helps get rid of.
- iv) Humans enjoy the beauty of mountains, lakes, rivers, deserts, and many other breath-taking natural elements only because of the existence of the environment.
- v) In absence of environment existence of human beings, animals, food etc. will become extinct.

The above mentioned points have been discussed at length in the ensuing paragraphs thereby focusing on the importance of environment conservations:

- a) **Agriculture:** Agriculture relies on the environment, and so do we rely on agriculture. A country's wealth could be measured on its ability to feed its people, although not all nations can produce agriculturally. Preserving the environment, with regards to agriculture, could mean preventing soil erosion, flooding and desertification, and could help its citizen have something to eat. Unsustainable farming techniques impact natural ecosystems and make farming impossible.
- b) **Fishing:** The various bodies of water, like the oceans, lakes and seas are another source of essentials such as food. All over the world, communities depend on seafood and related activities. Marine conservation is therefore vital in protecting human food supplies, human activities and marine animals. It saves more animals from extinction and also feeds land animals which depend on water. Some of the major challenges affecting the oceans include overfishing and pollution.
- c) **Climate:** Human activities have a direct impact on the climate and a subsequent effect on all life. Global warming, linked to greenhouse gas emissions, which is an adverse effect on the climate, results in droughts, floods, rising sea levels and cases of extreme heat and cold.

Climate change is the outcome of human activities and has been linked to excess rainfall, extreme weather and a change in regular weather patterns. Conserving natural environments should be done to see these extreme outcomes reversed, making the world a better place. For instance, reforestation will bring about rainfall, which will facilitate agriculture.

- d) **Water quality:** Conservation measures ensure there is excellent-quality water for all. This, in turn, has both social, environmental and economic benefits. Economically, conservation of the environment boosts tourism, provides catch for fishing, decreases the cost of healthcare, and provides an environment for the ecotourism industry.

Generally, a conserved environment reduces the prevalence of water-borne diseases, increases the quality of water entering aquifers, helps use surface water for recreation and increases the overall quality of life. Environmentally, a conserved environment preserves the diversity of water-dependent plants and animals and preserves the various natural services of aquatic ecosystems.

- e) **Air Quality:** A preserved environment provides good-quality air, which also has both social, economic and environmental benefits. Economically, it boosts tourism, decreases healthcare costs and decreases the erosion of buildings and pavements.

Socially, it decreases the prevalence of circulatory and lung-related diseases and also increases the quality of life for the residents. Environmentally, it preserves water quality and preserves aquatic ecosystems and biodiversity.

- f) **Protects Biodiversity:** A conserved environment preserves biodiversity, which has equal benefits to the ones mentioned above. It preserves water and land-based ecosystems, preserves energy flow throughout the biosphere, provides for natural services, preserves food webs, and boosts nature-based tourism.
- g) **Protects Wildlife:** Environmental protection protects wildlife and promotes biodiversity. Maintaining a healthy and functional ecosystem helps prevent the extinction of certain animal species. If the environment is destroyed, some animals are forced out of their habitat, making it hard for them to survive elsewhere. It could also bring about human and animal conflict, which ends disastrously for both species.
- h) **Protects Earth:** Environmental protection definitely safeguards the environment from certain factors that are destroying the planet, such as climate change. We need to reduce the amount of harm we are inflicting on the planet as it is contributing to its destruction. If we do not conserve the environment, nature has a ferocious way of fighting back, such as extreme weather, droughts and heavy rains which are negatively affecting our lives, our food, and homes. We have to do everything humanly possible to conserve the environment, for the planet.
- i) **Protects Human Health:** Environmental conservation will in turn protect and improve human lives and health. If the environment is destroyed, new diseases emerge, and species that could help produce medicines are destroyed. Wild habitats are particularly important as they prevent emerging infectious diseases from jumping from animals to humans.

POLICY RELATED ASPECTS OF ENVIRONMENT

Environmental law is an integral part of any government agency. It includes a series of laws and regulations related to water quality, air quality, and other environmental aspects. The success of environmental legislation mainly depends on how they are implemented. Legislation is also a valuable tool to educate people about their responsibility to maintain a healthy environment. Environmental law in India is based on principles of environmental law and focuses on the management of certain natural resources such as minerals, forests, and fisheries. Environmental law in India directly reflects the provisions of the Constitution. The need to protect and maintain the environment and make sustainable use of natural resources is reflected in India's constitutional framework and India's international obligations.

In India, the major regulatory bodies entrusted with the environmental related matters are:

- i) The Ministry of Environment & Forests is the nodal agency in the administrative structure of the Central Government, for the planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. The Ministry is also the Nodal agency in the country for the United Nations Environment Programme (UNEP).

The principal activities undertaken by Ministry of Environment & Forests, consist of conservation & survey of flora, fauna, forests and Wildlife, prevention & control of pollution, afforestation & regeneration of degraded areas and protection of environment, in the frame work of legislations. The main tools utilized for this include surveys, impact assessment, control of pollution, regeneration programmes, support to

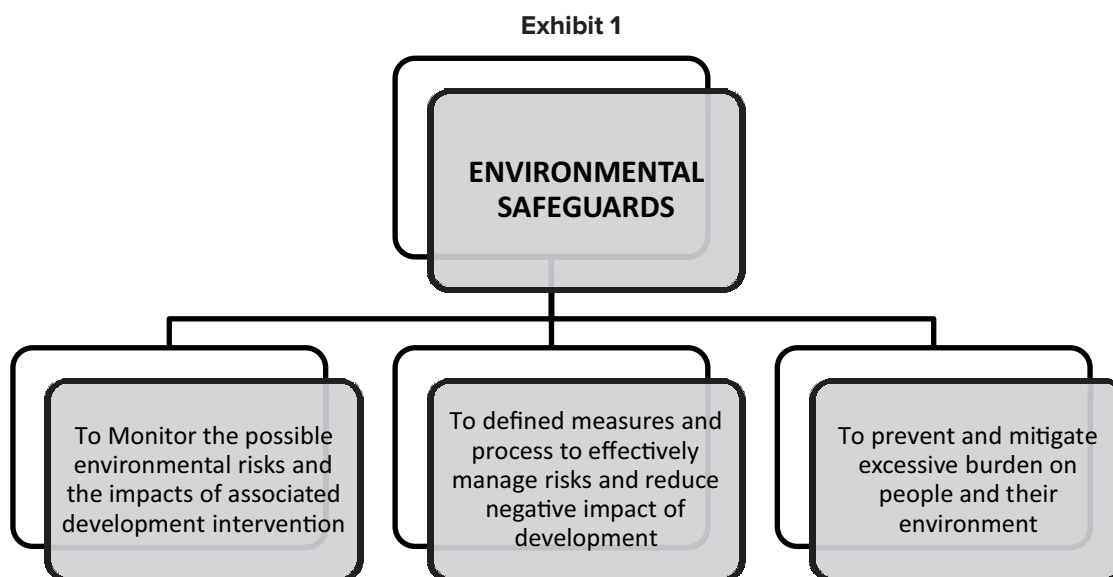
organizations, research to solve solutions and training to augment the requisite manpower, collection and dissemination of environmental information and creation of environmental awareness among all sectors of the country's population.

- ii) The Central Pollution Control Board (CPCB), statutory organisation, was constituted in September, 1974 under the Water (Prevention and Control of Pollution) Act, 1974. Further, CPCB was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. It serves as a field formation and also provides technical services to the Ministry of Environment and Forests of the provisions of the Environment (Protection) Act, 1986.

Principal Functions of the CPCB, as spelt out in the Water (Prevention and Control of Pollution) Act, 1974, and the Air (Prevention and Control of Pollution) Act, 1981, (i) to promote cleanliness of streams and wells in different areas of the States by prevention, control and abatement of water pollution, and (ii) to improve the quality of air and to prevent, control or abate air pollution in the country.

At this juncture, it would be of substantial academic interests to explore the genesis of environment protection policies in India. Its beginning can be traced to Stockholm Declaration of 1972 which pushed India towards ensuring environmental protection by setting up an authority named National Council for Environmental Policy and Planning within the Department of Science and Technology that same year. It was later transformed into the Ministry of Environment and Forest (MoEF) in 1985, which is an apex body to regulate and ensure environmental protection in India. A constitutional amendment incorporated Article 48A and Article 51A (g) under Directive Principles of State Policy and Fundamental Duties, respectively, to strengthen the environmental laws in India.

The environmental safeguard policies are framed by the Government of India (GoI) to reduce the risks due to impacts of development. These environmental safeguards have the potential to address key challenges such as biodiversity conservation, natural resource management and pollution abatement through specific policies that integrate environmental concerns into decision-making. The environmental safeguards is provided in exhibit 1.



Source: Citizen Consumer and Civic Action Group

Since the enforcement of the Environment (Protection) Act in 1986, the Government of India has launched programs for conservation of natural resources and biodiversity. However, the challenges have increased

with rapid urbanisation, industrialisation and other destructive human activities leading to climate change. The overview of the important environmental protection policies of India is provided in exhibit 2.

Exhibit 2

Overview of key environmental safeguard policies of India

S.NO.	Name of Policy and Year	Aim/Target
1	National Water Policy, 1987	To govern the planning and development of water resources and their optimum utilisation
2	National Forest Policy, 1988	To maintain ecological balance and safeguarding the interest of tribals and forest-dependent people by involving them in timber production and other local livelihood opportunities
3	National Conservation Strategy and Policy Statement on Environment and Development, 1992	To regulate the utilisation of natural resources through joint efforts of local communities and other stakeholders by incorporating traditional knowledge for environmental protection
4	Policy Statement for the Abatement of Pollution, 1992	To strengthen the environmental compliance and enforcement of pollution control norms in India through CPCB and SPCBs
5	National Population Policy, 2000	To achieve a stable population by 2045 through strategically managing the Total Fertility Rate (TFR)
6	National Environment Policy, 2006	To achieve sustainable development, by incorporating environmental consideration into the development process
7	National Agroforestry Policy, 2014	To increase sustainable agricultural production by combining tree farming with agriculture

Source: Citizen Consumer and Civic Action Group

India's complex environmental regulations hinge on five major pieces of legislation: The Environment (Protection) Act, 1986 amended 1991; Forest (Conservation) Act, 1980 amended 1988; Wildlife (Protection) Act, 1972; the Water (Prevention and Control of Pollution) Act, 1974 amended 1988; and the Air (Prevention and Control of Pollution) Act, 1981 amended 1987. New laws making an impact on the regulatory landscape are the E-Waste Management Rules, 2016 and the Plastic Waste Management Amendment Rules, 2021.

The Indian government launched the National Action Plan on Climate Change in 2008 to enhance climate change mitigation and adaption efforts. The Climate Change Division of Ministry of Environment, Forest and Climate Change is India's nodal agency for climate change cooperation and global negotiations. It is also the nodal unit for coordinating the National Action Plan on Climate Change.

In 2010, the Government of India established the National Green Tribunal to better uphold environmental protections in the country. The Tribunal is an increasingly integral force in the effort to create a more sustainable national development path across industries.

In 2015, India released its Nationally Determined Contributions (NDCs). Back then, the key targets were mainly to increase the cumulative electric power installed capacity from non-fossil sources to 40 percent, and reduce the emissions intensity of GDP by 33 to 35 percent compared to 2005 levels, by 2030. The key highlights of India's updated NDCs include:

At the COP 26 in Glasgow, India's Prime Minister announced five targets to fight climate change: India will (1) raise its non-fossil energy capacity to 500 GW by 2030; (2) meet 50 percent of its energy requirements from renewable sources by 2030; (3) reduce total projected carbon emissions by one billion tons from 2021 to 2030; (4) reduce the carbon intensity of its economy by more than 45 percent by 2030; and (5) achieve the target of Net Zero by 2070. India is currently not on track to meet these ambitious targets.

The targets are raised significantly higher than before and accommodate the “Panchamrit”—goals presented by PM Modi at COP26—which are to raise the non-fossil fuel-based energy capacity of the country to 500 GW by 2030; to reduce the total projected carbon emissions by one billion tonnes between now and the year 2030; and to achieve net zero emissions by the year 2070.

This NDC serves as a first-of-its-kind step in the journey of realising the goal of net zero, and deeply focuses on improving the share of renewables in the energy sector. It is complemented by several government schemes at home such as PM-UJJWALA, PM-KUSUM, and PM-UJALA yojana, and internationally like the “One Sun, One World, One Grid initiative.

Taking a step further, at COP27, India submitted its Long-Term Low Emission Development Strategy (LT LEDS) to UNFCCC, which included plans for rapid expansion of green hydrogen production, three-fold increase in nuclear capacity by 2032, 20 percent ethanol blending in petrol by 2025, and more. With this, India joins the select list of fewer than 60 parties that have submitted their LT LEDS and shows India's readiness to fulfil its climate pledges.

The significance of environmental policies, acts or regulations all the more become important for addressing the issue of climate change. According to a study by the World Meteorological Organization in 2020, India is estimated to have suffered an average annual loss of US\$ 87 billion (more than INR6 lakh crore) from climate-induced extreme weather events such as heat waves, tropical cyclones, floods, and more.

Climate change has also made heatwaves in India 30 times more likely. As the most vulnerable country to climate change, as per a ranking by HSBC, the loss incurred is not only substantially harming India's GDP but is also uprooting the lives of millions of people and exacerbating food and water insecurity, health risks, and environmental degradation.

ENVIRONMENTAL PERMITS

Beginning March 5th 2016, the Ministry of Environment, Forests, and Climate Change has adopted a new method of classifying each type of industry. A concept of “white industries” has been introduced for classifying “non-polluting” companies. They do not need a permit or consent and just require to notify the relevant State Pollution Control Board.

For all the others (red, orange and green industries), there are certain environmental permits that are required to be obtained. You might require multiple numbers of permits depending on what kind of activity your business is delving into and the size of the business. Your company will be given a Pollution Index (PI) score, depending on the utilization of the resources, the air emissions, water effluents, and hazardous waste generated. You will be required to obtain consents and permits from the apt board. The PI score is allocated in the following manner:

Red category: PI score of 60 and above. Including but not restricted to asbestos, nuclear power plants, shipbreaking, oil and gas extraction, etc.

Orange category: PI score of 41 to 59. For example, food processing, printing ink manufacturing, paint blending, and pharmaceutical formulations.

Green category: PI score of 21 to 40. 63 sectors have been identified under it. For example sawmills, tyres/rube retreating, polythene and plastic products.

White category: PI score up to 20. For example solar power generation through solar photovoltaic cells, wind power, and mini hydro-electric power less than 25 megawatts.

In India, there exists an integrated permit system where a single permission suffices for a lot of consents and permits. For example, a combined consent application to the relevant State Pollution Control Board can be submitted to obtain the 'consent to establish' and subsequently the 'consent to operate' under the Water Act, Air Act and Hazardous and Other Waste Rules, 2016. Technology has made the process easy. For instance, the recently adopted E-Waste (Management) Rules, 2016 has introduced only one centralized and pan India application form by the Central Pollution Control Board instead of the State Board in order to get an authorization for the producers.

ENVIRONMENTAL IMPACTS

Environmental impacts are changes in the natural or built environment, resulting directly from an activity that can have adverse effects on the air, land, water, fish, and wildlife or the inhabitants of the ecosystem. In other words, environmental impacts are those concerned with the built and natural environment, including air, water and biodiversity. Events cause impacts resulting from activities such as construction, energy use and transport of spectators and participants, which in turn impact on major environmental issues such as climate change and the reduction in natural resources.

Pollution, contamination, or destruction that occurs as a consequence of an action that can have short-term or long-term ramifications is considered an environmental impact. Most adverse environmental impacts also have a direct link to public health and quality of life issues. Several successful reductions in pollution levels have been attributed to stricter regulations, including levels of carbon monoxide and more recent reduction in fine particulate matter.

Mass transit, as a result of the operations and maintenance of infrastructure, facilities, and vehicles, has numerous potential environmental impacts to manage, including air pollution and greenhouse gas from energy use, noise, and vibrations, water discharges, waste removal of passenger trash, harmful materials such as lead-based paint, mercury, PCBs, asbestos, contaminated soil, and groundwater.

The environmental impacts of fossil fuels often result in real costs to society, in terms of human health (i.e., loss of work days, health care costs), infrastructure decay (i.e., from acid rain), declines in forests and fisheries, and perhaps ultimately, the costs associated with climate change.

Dollar costs of environmental externalities are difficult to evaluate and depend on assumptions that can be subject to wide interpretation and discretion. Although environmental impacts and associated dollar costs are often included in economic comparisons between renewable and conventional energy, investors rarely include such environmental costs in the bottom line used to make decisions.

Environmental impacts on health have long been a major concern of social reformers, forward-looking health professionals, and social movements. The state of a society's environmental health is very related to its social and economic organization. The huge upsurge of synthetic chemicals since World War II has altered the environment in dramatic ways, leading to increased cancers of various types and to other diseases. Actual and potential environmental hazards and catastrophes have become a significant component of the cultural milieu of many societies.

Environmental impacts from shipping have been the focus of increasing attention over the past decades, primarily focused on waterborne discharges and spills of oil, chemical, and sewage pollution. A number of international treaties and national laws have been adopted, along with industry best practices, to prevent these pollution releases through accident or substandard operation.

IPAT Equation

The environmental impact of materials use has often been conceptually formed by the “IPAT” equation:

$$I=P \times A \times T \dots\dots\dots \text{(Equation 1).}$$

in which the overall environmental impact I is expressed as the product of population P, the affluence A (expressed, for example, as gross domestic product [GDP] per person), and technology T (expressed, for example, as environmental impact per unit of per capita GDP). Historically proposed by Commoner, Ehrlich, and Holdren, the IPAT equation is now the “master equation” of industrial ecology. If the technology factor is expanded somewhat, the equation can be rewritten as:

$$I=P \times A \times M \times D \times H \dots\dots\dots \text{(Equation 2).}$$

where M is the materials intensity, D is the dissipation factor, and H is the hazard factor, which depends on the chemical form of the material lost and the susceptibility of the receiving ecosystem. In words, Eq. (2) becomes:

$$\text{Environmental impact} = (\text{Population}) \times (\text{GDP/person}) \times (\text{units of material/GDP}) \times (\text{units of pollution/unit of material}) \times (\text{impact/unit of pollution}) \dots\dots\dots \text{(Equation 3).}$$

In the energy sector, the equivalent of the IPAT equation is the Kaya’s identity, a mathematical expression for energy-related carbon emissions that can be written as:

$$C=P \times \text{GDP} / P \times E / \text{GDP} \times C / E \dots\dots\dots \text{(Equation 4).}$$

Where the total energy-related carbon emissions C is expressed as a product of population P, GDP per capita, energy intensity E/GDP, and carbon intensity of energy use C/E. Although the master equation and Kaya’s identity should be viewed as conceptual rather than mathematically rigorous, they can be used to suggest goals for technology and society.

The technology-related terms M, E, and C offer the greatest hope for a transition to sustainable development, especially in the short term, and it is modifying these terms that is among the central tenets of industrial ecology.

To comprehend the environmental impacts, it is essential to understand it in the light of ESG dimensions applicable to the corporate sector. In this section, the Indian corporate landscape have been considered to explore the environmental impacts, as these are intertwined concepts.

The awareness of ESG issues and targeting goals beyond maximising profits and minimising risks is now a growing trend among corporates around the world. While industrialisation has brought newer opportunities, there is no denying the fact that it also led to challenges like fast increasing global temperatures, natural calamities, extreme weather, loss of biodiversity, disease transmission and widening inequality. A sector-wise data shows that a mammoth 56% of the emissions is accounted for by energy industries, followed by manufacturing and construction ones. The transport accounts for 13% share in it.

According to S&P Global , India is likely to have over 52% of its gross domestic product (GDP) exposed to physical risks like wildfire, flood, sea” level rise, or storms by 2050. Clearly, embracing sustainability has become an imperative for businesses nowadays.

The good news is that the awareness of ESG issues and targeting goals beyond maximising profits and minimising risks is now a growing trend among the corporates around the world. And this trend is now reflected among Indian companies too. Much like their global counterparts, they are also paying attention to the ESG framework.

In a survey wherein 586 companies were covered, it was observed that only one-fifth published a detailed sustainability report in fiscal 2021. While FMCG and hotel industries were high on disclosures, companies that showed some glimmer of hope included auto OEMs, lending and cement sectors. In the cement industry, almost half of the companies analysed disclosed the clinker ratio, while two-thirds of the companies analysed in the auto space had EVs in their portfolio.

Three out of five companies in the textile sector disclosed the usage of recycled or sustainable source material. But only one adopted the Sustainable Apparel Coalition (SAC) HIGG Index, an industry standard to measure sustainability. The REITs put up a good show with 100% of them making quantitative disclosures on green building certifications in their portfolio.

However, of the total companies covered, merely 20 per cent made it in the 'strong' and 'leadership' matrix, while a whopping 80 per cent or 464 companies were placed as 'weak', 'below average' and 'adequate'. Entrepreneur India reached out to some of these companies from IT space to Pharma to Cement (who figured in the leadership and strong matrix of Crisil Sustainability Yearbook 2022) to understand how they are walking the talk on maximizing their organisation's environmental, social, and governance (ESG) impact.

Exemplary Approach of Indian Companies in creating Positive Environmental Impacts – Based on Annual Reports of 2021-22

i) Infosys

This IT giant has not only made it to the Crisil's ESG rankings for a second year in a row, but also finds a place in the Dow Jones Sustainability Index, which assesses the ESG performance of companies globally. Starting its climate action journey in 2008, the company turned carbon neutral in 2020, 30 years ahead of the timeline set by the Paris Agreement. By 2030, it aims to reduce absolute Scope 1 and 2 greenhouse gas emissions by 75% and scope 3 emissions by 30%, recycling 100% of used water, and zero waste to landfill.

ii) Marico

In the FMCG space, a number of initiatives are being taken like reduction in lamination based paper packaging, eliminating the use of single plastic, usage of recyclable packing material and water conservation.

Marico's water stewardship program, 'Jalashay,' focuses on replenishing more water for the community than that consumed in its own operations, year-on-year. Through this, it has successfully created 263 crore litres of water conservation capacities pan-India, till date which is over three times of total water that the company consumed in its operations in FY22. "We aim to build 412 crore litres of total water harvesting capacity across India by FY25," says Saugata Gupta, MD and CEO, Marico.

The FMCG company also launched the ESG 2.0 framework this year. Through this it plans to phase out hazardous substances such as PVCs while introducing at least 30% r-PCR in the packaging portfolio, wherever applicable. By FY25, it also aims to have a 100% recyclable, reusable or compostable packaging portfolio. "In parallel with this, we have set our net zero emissions target in global operations by 2040. In India, we aim to achieve net zero in operations by 2030," adds Gupta.

iii) DR. REDDY'S LABS

The pharma giant identified its first set of six ESG goals in 2010 for the following decade. By 2020, it had met three goals fully water consumption, waste reduction, and stopping hazardous waste and three partially-water neutrality, energy consumption and renewable energy. It became the first pharma company in India and the third in Asia to join the Science-based Targets initiative (SBTi) for reducing the carbon footprint.

Recognised by the S&P Corporate Sustainability Assessment, the Dow Jones Sustainability Index, Frost & Sullivan TERI among others, it is the only Indian pharma company to be featured on the Bloomberg Gender- Equality Index. Its ESG goals for 2030 include 100% renewable power, carbon neutral in direct emissions (Scope 1 & 2), 12.5% reduction in indirect carbon emissions (Scope 3) and being water-positive by 2025.

iv) **MINDTREE**

The IT company scores high on ESG goals and has won several awards for the same. All its campuses are zero discharge locations. It implements WOW initiative- a program where the recyclable waste is scientifically disposed and sent for recycling. Through its 3R strategy (Reduce, reuse, recycle), it ensures minimal freshwater usage. The rainwater harvesting and installation of recharging pit initiative at its Bengaluru facility helped it reduce private water purchases by 12.370 KL in FY22. It is committed to invest in green new buildings at all its locations, increase EV vehicles, and a large-scale data command center.

Going forward, it aims to achieve carbon neutrality by using 100% renewable energy for internal operation by 2030, a whopping 30% reduction in scope 1 & 2 emissions and 20% reduction in scope 3 emissions by 2025.

v) **ULTRATECH CEMENT**

Cement industry is a massive Co2 emitter. However, manufacturers are taking several steps to lower emissions. They are adding solar and wind power generating capacities along with utilising every potential of waste heat recovering system (WHRS) in the plant. They are also pushing for blended cement to reduce clinker ratio to reduce emissions. UltraTech cement, the industry leader, is committed to Net Zero Concrete by 2050 under the GCCA Climate Ambition 2050 and to the Science Based Targets Initiative (SBTi) of reducing Scope 1 CO2 intensity by 27% by 2032 from the 2017 levels.

The decarbonisation endeavours of the company has resulted in a 9.1% reduction of Scope 1 Co2 intensity against our SBTi target. Apart from this, it has taken measures like rain water harvesting & water recharge within its manufacturing units (mines, plant area and unit residential colonies) as well as through watershed projects in the local communities around the units, resulting in giving back 73+million m³ of water to nature in FY22 alone making it 3.8 times water positive. It launched a sustainable supply chain called 'Project Sahyog', in 2019 and integrated ESG criteria into it.

The focus of the company is to accelerate 'ESGbility, strengthen sustainability', wherein the company report comprehensive measures that have been taken and planned for the future to enhance the ESG quotient and sustainability.

vi) **Welspun Group**

In the textile space, Welspun group, is making great strides by restoring ecological balance in the domains of air, water and land. It is reducing its energy & carbon footprint through dedicated efforts towards energy efficiency, cleaner fuels and replacement of virgin raw materials with recycled raw materials. Moreover, it is monitoring its Scope 1 & Scope 2 emissions and reporting in the public domain.

It has also initiated Scope 3 emissions calculation as per the global standards and shall report the same. Its facilities are located in waterstarved zones and processing operations are highly water-intensive, making it imperative to be judicious in its usage. It has implemented a unique project in the area of water management at Anjar through the establishment of a 30 MLD Sewage treatment plant to meet its water requirement.

ENERGY CONSUMPTION

The history of human evolution rests on the availability and use of energy. From the transformation from the early use of fire and animal power that improved lives, to the present world with use of electricity and cleaner sustainable fuels for a multitude of purposes – energy has been the enabler of development. Energy presents a fundamental need ranging from, but not limited to, the essential services of cooking, heating, cooling, lighting, mobility, and operation of appliances, to information and communications technology, and machines in every sector of every country.

The lack of access to reliable and clean energy supplies is now considered as a major barrier to improving human well-being around the globe. Energy is one of the major inputs for the economic development of any country. In the case of the developing countries, the energy sector assumes a critical importance in view of the ever increasing energy needs requiring huge investments to meet them.

Energy can be classified into several types based on the following criteria:

- Primary and Secondary energy
- Commercial and Non commercial energy
- Renewable and Non-Renewable energy

Primary and Secondary Energy

Primary energy sources are those that are either found or stored in nature. Common primary energy sources are coal, oil, natural gas, and biomass (such as wood). Other primary energy sources available include nuclear energy from radioactive substances, thermal energy stored in earth's interior, and potential energy due to earth's gravity.

Commercial Energy and Non Commercial Energy

Commercial Energy: The energy sources that are available in the market for a definite price are known as commercial energy. By far the most important forms of commercial energy are electricity, coal and refined petroleum products.

Commercial energy forms the basis of industrial, agricultural, transport and commercial development in the modern world. In the industrialized countries, commercialized fuels are predominant source not only for economic production, but also for many household tasks of general population. Examples: Electricity, lignite, coal, oil, natural gas etc.

Non-Commercial Energy: The energy sources that are not available in the commercial market for a price are classified as non-commercial energy. Non-commercial energy sources include fuels such as firewood, cattle dung and agricultural wastes, which are traditionally gathered, and not bought at a price used especially in rural households. These are also called traditional fuels. Non-commercial energy is often ignored in energy accounting.

Example: Firewood, agro waste in rural areas; solar energy for water heating, electricity generation, for drying grain, fish and fruits; animal power for transport, threshing, lifting water for irrigation, crushing sugarcane; wind energy for lifting water and electricity generation.

Renewable and Non-Renewable Energy

Renewable energy is energy obtained from sources that are essentially inexhaustible. Examples of renewable resources include wind power, solar power, geothermal energy, tidal power and hydroelectric power. The most important feature of renewable energy is that it can be harnessed without the release of harmful pollutants.

Non-renewable energy is the conventional fossil fuels such as coal, oil and gas, which are likely to deplete with time.

It is to be noted that in response to increasing concerns about the effect of anthropogenic greenhouse gases on global climate, international action has agreed to reduce emissions. Renewable energy is being explored with renewed commitments as an intelligent solution to be tapped for addressing challenges such as poverty and global warming. If the world is to develop sustainably, it has been recognised that it is then necessary to secure access to affordable, reliable, sustainable, and modern energy services while reducing greenhouse gas emissions and the carbon footprint of the energy sector.

The world in its commitment to sustainability has pledged to expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries (SDG 7).

Development of an Energy systems which is capable of delivering to the ever growing and emerging needs of developing economies, is the need of the hour. Growing energy demands world over and in the densely populated regions of Asia including India have driven the need to shift to cleaner fuels and larger energy systems.

Therefore, in India, there has been a push to increase installed generating capacity of power and to decrease the reliance on primary fossil fuels to cater to these needs. Generating and providing reliable power at competitive prices in a sustainable manner by optimising the use of multiple energy resource with innovative eco-friendly technologies has been at the core of policy planning in India. Also, the environmental and health burdens arising out of the use of hydrocarbons force the world towards adopting energy efficiency and clean energy systems.

It is noteworthy that not all potential is viable to be transformed into capacity, and overall capacity does not lead to an equal amount of generation due to production losses etc. Power plants have a capacity to produce a certain amount of power during a given time, but if they are taken offline (i.e. for maintenance or refuelling) then they are not actually generating power.

ENERGY CONSERVATION SCENARIO – CASES OF SELECTED INDIAN COMPANIES

Having discussed about energy consumption scenario, it would be of immense academic interest to explore energy conservation scenario of selected companies in India.

i) The Mahindra Group

The Mahindra Group is committed to achieving carbon neutrality by 2040 – the four big drivers for the decarbonisation of all Group companies being energy efficiency, renewable energy, electric mobility and offsetting. Some of the key initiatives and successes include Mahindra Holidays, Mahindra Heavy Engines Ltd., (MHEL) becoming India's first and the world's third manufacturing unit to double its energy productivity in 2020 (baseline 2016), achieving the goal within four years. Mahindra & Mahindra has deployed more than 100 energy efficiency projects within the auto Group alone; energy used to produce a vehicle is 67% less than what it was some years ago.

Twenty Mahindra companies have also committed to the Science-based Targets Initiative, pledging to set science-based emissions reduction targets and align business strategies with steps to reduce global warming. Other Group-wide initiatives include the adoption of technology for energy-efficient lighting, air-conditioning, motors and appliances; business process re-engineering to reduce energy requirements; heat recovery projects to re-use waste heat, and construction to reduce the need for energy.

ii) ITC Group

At ITC, more than 41% of the company's total energy consumption is from renewable sources, despite a growing manufacturing footprint. The company has set a target of achieving a 50% share of renewable energy in its total energy mix, and meeting 100% of purchased grid electricity requirements from renewable sources.

In 2020-21, ITC units consumed 22,369 Terra Joules (TJ) of energy, lower by about 6.2% due to the ongoing pandemic. Of the total energy requirement, 41.3% was met from renewable sources – biomass, wind and solar. In 2020-21, the investments in energy conservation equipment has resulted in saving of 190 TJ which is equivalent to 21,468 tonnes of GHG emissions (Scopes 1 & 2).

Energy conservation measures adopted across ITC units:

- a) Installation of new energy-efficient electric boilers.

- b) Installation of Vapour Absorption Machine (VAM).
- c) Optimisation of compressed air through measures such as intelligent flow controller and additional compressor to manage low-pressure load etc.
- d) Installation of zero air-loss moisture removal traps for compressed air system.
- e) Automation in tube cleaning systems in Heating, Ventilation and Air Conditioning (HVAC) chillers resulting in higher efficiency.
- f) Advanced dirt separator system in chilled water line of HVAC.
- g) Replacement of cooling tower, AHUs, chillers, compressors, motors, fans, pumps and agitators with higher efficiency ones.
- h) Replacement of steam heated equipment such as pressing machine, laundry driers, dishwashing machine etc. with energy efficient electrically heated ones.
- i) Improvement in energy usage efficiency in lighting systems by changing over to efficient lighting solutions such as Light Emitting Diodes (LEDs).
- j) Process improvements to enhance productivity and reduce specific energy consumption across Businesses.

iii) HDFC Bank

HDFC Bank plans to become carbon neutral by 2031-32. As part of this initiative, the Bank is looking at reducing its emissions, energy, and water consumption. It will continue to incorporate and scale up the use of renewable energy in its operations. HDFC Bank is developing an internal framework to track and measure its carbon footprint. The bank has taken the following initiatives to reduce the overall consumption of energy and conserve water at the branches:

- a) 3 star and above rated appliances used and regular maintenance carried out to ensure efficiency.
- b) Replacement of Tube/CFL lights with LED lights (69% branches currently use LED lighting).
- c) Implementation of switch rooms across 384 branches resulting in reduced air-conditioning usage (both in running hours and temperature settings), leading to decrease in electricity bill units by 14%.
- d) Replacement of Uninterruptible Power Supply UPS with new energy efficient devices; reduction of UPS capacity by 50% (equivalent to 750 KVA).
- e) Replacement of bottled drinking water with water purifiers.
- f) Installation of sensor-based taps at corporate office and other select office locations.

iv) Godrej & Boyce

Godrej & Boyce believes that energy is a vital gear for driving a greener and cleaner future. The company is entrenching an energy efficient culture through improved operational efficiencies, energy conservation mechanisms and increased focus on inclusion of renewable sources into the energy mix.

G&B has the goal to improve energy productivity by 100% by 2030. The company intends to use 40% renewable energy in its manufacturing facilities across the country over the next three years. G&B has generated 23% revenue has been accrued from Good & Green products. Fuel consumed includes high speed diesel, piped natural gas, liquefied petroleum gas, furnace oil, biomass energy, energy from grid electricity and solar energy.

Energy management has assumed a large role in sustainable and inclusive growth at Godrej & Boyce. With humble beginnings as an energy conservation cell way back in 1980, new dimensions such as green certification, carbon foot printing and sustainability reporting have been added.

The Vikhroli manufacturing facility has maintained unity power factor for more than two decades, resulting in substantial cost savings. Godrej & Boyce is conscious of the preparedness required to meet the potential future scenarios related to energy consumption.

In line with its commitment, the Company invested Rs. 6.7 crore during the reporting period in various energy efficiency initiatives that resulted in savings of over 21 lakh kWh of electricity per annum. Key initiatives were related to optimisation of Heating, ventilation, and air conditioning (HVAC), Compressed air system, Pumps and motors, Variable Frequency Drive (VFD) and lighting.

v) **Tata Consultancy Services (TCS)**

TCS saw a year-on-year reduction in absolute energy use by 46.6 percent in MWh and an absolute carbon footprint reduction (across Scope 1 and Scope 2) by 48.8% (in tonnes of carbon dioxide equivalent). This reduction was not commensurate to the extremely low occupancy because some utilities had to be run to maintain the infrastructure.

TCS' specific greenhouse gas emissions (Scope 1 + Scope 2) comes to 0.54 tCO₂e/ FTE (Full Time Equivalent)/Annum in the current reporting year, a reduction of 53% year-on-year. This is estimated with the actual carbon footprint and a notional FTE (working out of TCS offices), considering an increase of 8.23% in the FTE over the last year due to the pandemic.

Total renewable energy used – rooftop solar power plants and through power purchase agreements – was 45.5 million units amounting to 15.6% of the total electricity consumption. Tata Consultancy Services achieved the target power utilization efficiency (PUE) of 1.65 across 21 of 23 target data centres.

The company has also taken up additional 44 data centres for this initiative and reduced weighted average PUE of all DCs to 1.77 in reporting year from 2.4 in 2017. The company has focused on temporary closure of ODCs and hub rooms as SBWSTM was approved by customers and all stakeholders, leading to further reduction in energy consumption.

The investment in IoT based energy management system helped TCS to define a new normal of consumption profile, leveraging cognitive AI/ML algorithms and monitoring performance against it to drive efficiency.

Encapsulating the energy scenario of India:

1. India's economy grows at a rate of 4.7% a year in 2019-2050, down from 7.4% a year over the past 20 years.
2. Primary energy grows strongly in all three scenarios, more than doubling between 2019-2050. Average growth per year is between 2.4% and 2.6%. As result of this strong growth, India accounts for around 14% of the global primary energy consumption in 2050 across all scenarios, up from around 7% in 2019.
3. The share of coal in total primary energy has been broadly stable around 2019 levels (45%) over the past 40 years. However, coal's share declines in all scenarios, reaching between 6% and 33% by 2050.
4. India's natural gas production grows in all scenarios, up to 59-132 Bcm in 2050 (from 27 Bcm in 2019).
5. The share of natural gas in total primary energy grows in all scenarios, increasing from 5% in 2019 to 7-11% in 2050, supported by industry and heavy road transport demand.
6. Renewable energy grows strongly in all scenarios, at an average of 4-6% a year. As a result, renewable

energy becomes the largest source of primary energy in 2050 in Accelerated and Net Zero, and the largest together with coal in New Momentum.

7. Electricity generation in 2050 is around four times of that in 2019 in New Momentum and Accelerated, and five times in Net Zero, with solar and wind power accounting for 57% to 95% of that growth.
8. Solar and wind installed capacities in 2050 reach 1.3-2.2 TW and 0.3-1.2TW, respectively, depending on the scenarios.
9. Hydrogen demand grows by a factor of four in New Momentum up to a twelve-fold increase in Net Zero. In 2050 green hydrogen represents 47% of total production in New Momentum and 80% in Net Zero.
10. Carbon emissions vary significantly by scenario. In New Momentum, emissions increase by around 85% in 2050. In Accelerated and Net Zero, emissions decrease by 30% and 77%, respectively.

Significant Features of Energy Conservation Act, 2001

The Energy Conservation Act, 2001 empowers the central government, and in some cases, the state government, with several important features and provisions to promote energy conservation and efficient energy use. The salient features of the Energy Conservation Act, 2001 are as follows:

- i) **Energy usage standards:** The Act grants the power to the central government and state government to establish energy usage standards for specific appliances and equipment. This enables the government to regulate and set minimum energy performance standards for various products, appliances, and equipment to promote energy-efficient technologies and practices.
- ii) **Mandatory labelling:** The Act mandates the display of labels on specific equipment and appliances, indicating their energy performance and efficiency levels. This helps consumers make informed choices and encourages the adoption of energy-efficient products, appliances, and equipment in the market.
- iii) **Restriction on non-compliant items:** The Act empowers the government to prohibit the manufacturing, import, and sale of items that do not meet the energy usage standards set by the government. This helps to ensure that only energy-efficient products and equipment are available in the market, thereby promoting energy conservation and efficient energy use.
- iv) **Information dissemination:** The Act requires energy-intensive industries, commercial establishments, and other designated consumers to be informed about energy conservation measures and guidelines. This promotes awareness among consumers and businesses about the importance of energy conservation and encourages the adoption of energy-saving practices.
- v) **Energy utilization standards:** The Act authorizes the government to establish and recommend energy utilization standards and guidelines for designated consumers. This helps set benchmarks for energy consumption and promotes the adoption of energy-efficient practices in industries, commercial establishments, and other sectors.
- vi) **Energy Conservation Building Codes (ECBC):** The Act allows the government to prescribe or modify Energy Conservation Building Codes (ECBC) to suit local conditions for new commercial buildings with a contract load of 500 kW or more. This promotes energy-efficient building design, construction, and operation practices, leading to reduced energy consumption in the built environment.
- vii) **Energy Conservation Fund:** The Act provides for the establishment of Central and State Energy Conservation Funds. These funds are utilized for promoting energy conservation measures, creating awareness, implementing energy efficiency programs, and supporting research and development in the field of energy conservation.

Significant Changes in The Energy Conservation (Amendment) Act, 2022

1. **Carbon Credit Trading Scheme:** The Amendment Act empowers the Central Government to specify a carbon credit trading scheme, allowing the trading of permits to emit a specified amount of carbon dioxide or other greenhouse gases. Registered entities compliant with the scheme may be issued carbon credit certificates, and any person, other than designated consumers, may purchase carbon credit certificates on a voluntary basis. The aim is to reduce greenhouse gas emissions and address climate change.

India took a giant step in 2024 by revamping its Carbon Credit Trading Scheme (CCTS), allowing non-obligated entities to participate in the tradable carbon credits market. That means companies and individuals can voluntarily use carbon credits to address their planet-warming emissions.

This significant revision introduces an offset mechanism, enabling these entities to register projects and obtain tradable carbon credit certificates (CCCs). Each credit represents one tonne of carbon dioxide equivalent (tCO₂e). The aim is to efficiently price emissions through CCC trading and expand the voluntary carbon market.

In 2023, India introduced the 2023 Carbon Credit Trading Scheme (CCTS), encompassing both compliance and voluntary sectors. However, while the compliance segment is scheduled to commence in 2025-26, there is no set timeline for the launch of the voluntary carbon market.

Under India's revised carbon market scheme, obligated entities have the flexibility to purchase additional credits or sell surplus ones. Meanwhile, businesses can trade CCCs to offset their emissions.

However, sectors facing challenges in meeting reduction targets, particularly those with hard-to-abate emissions, are exploring the possibility of trading energy-saving certificates (ESCerts) and renewable energy certificates (RECs) as offsets.

2. **Obligation to Use Non-Fossil Sources of Energy:** The Amendment Act empowers the Central Government to specify a minimum share of consumption of non-fossil sources of energy or feedstock by designated consumers, including industries, transport sector, and commercial buildings. Failure to meet the minimum share may result in penalties, including a penalty of up to INR 10 lakh for each failure, and an additional penalty of up to twice the price of every metric ton of oil equivalent prescribed under the Act, which is more than the prescribed norms.
3. **Energy Conservation and Sustainable Building Code:** The Amendment Act substitutes the definition of 'energy conservation building codes' with 'energy conservation and sustainable building code' which provides norms and standards for energy efficiency and conservation, use of renewable energy, and other green building requirements for buildings. Buildings constructed after the notification of the code by the Central and State Governments, and having a minimum connected load of 100 Kilowatt, are required to comply with the energy conservation and sustainable building code.
4. **Renewable Energy and National Green Hydrogen Mission:** The Amendment Act focuses on the promotion of renewable energy and the National Green Hydrogen Mission, which is aimed at developing domestic carbon markets and combatting climate change. The Act introduces concepts such as carbon trading and mandates the use of non-fossil sources to ensure faster decarbonization and help achieve sustainable development goals in line with the Paris Agreement and other climate change actions.
5. **Penalty for Non-Compliance:** The Amendment Act introduces penalties for non-compliance with the provisions of the Act, including penalties for failure to meet the minimum share of consumption of non-fossil sources of energy by designated consumers. This is aimed at enforcing compliance and encouraging the use of renewable energy and other sustainable practices.

At this juncture, it is imperative to discuss about Bureau of Energy Efficiency (BEE) also. The Bureau of Energy Efficiency (BEE), established under the Energy Conservation Act, 2001, is a statutory body in India with the following key features:

- i) **Statutory body:** The Bureau of Energy Efficiency (BEE) is established as a statutory body under the provisions of the Energy Conservation Act, 2001. It is responsible for initiating and implementing policies and methodologies to improve energy efficiency in the Indian economy.
- ii) **Establishment and merger:** The BEE were set up on March 1, 2002, by merging with the earlier Energy Management Centre, which was a society under the Ministry of Power. This merger brought together expertise and resources to form a unified body dedicated to energy efficiency and conservation.
- iii) **Focus on self-regulation and market standards:** The BEE aims to develop policies and methodologies that emphasize self-regulation and market standards. This approach promotes voluntary adoption of energy-efficient practices by industries and consumers and encourages the use of market mechanisms to drive energy efficiency improvements.
- iv) **Accelerated and sustained adoption of energy efficiency:** The primary objective of the BEE is to reduce the energy intensity of the Indian economy through accelerated and sustained adoption of energy efficiency measures in all sectors. This involves actively engaging with all stakeholders, including government agencies, industries, consumers, and other relevant entities, to promote energy-efficient practices and technologies.
- v) **Promoting energy efficiency in all sectors:** The BEE's mandate includes promoting energy efficiency in all sectors of the economy, including industry, commercial, residential, and transportation sectors. It works towards developing sector-specific policies, standards, and programs to improve energy efficiency and conservation practices in each sector, contributing to the overall goal of reducing energy consumption and promoting sustainable energy management.

The objectives of Bureau of Energy Efficiency are as under:

- i) **Leadership and policy support:** The BEE aims to provide leadership and policy support for national energy efficiency and conservation programs and efforts. This involves developing strategies, guidelines, and recommendations to promote energy-efficient practices across various sectors of the economy, including industry, commercial, residential, and transportation sectors.
- ii) **Stakeholder guidance:** The BEE is tasked with guiding and advising stakeholders on policies and programs related to energy efficiency. This includes providing technical expertise, conducting awareness campaigns, and disseminating information to consumers, businesses, and other relevant stakeholders about the benefits and importance of using energy efficiently.
- iii) **Monitoring and verification:** The BEE established frameworks and procedures to monitor, verify, and measure the efficient use of electricity in individual sectors as well as at the national level. This involves conducting energy audits, data collection, and performance evaluation to track progress, identify areas of improvement, and ensure compliance with energy usage standards and guidelines.
- iv) **Multi-sectoral support:** The BEE seeks to garner support from multiple sectors, including government, private sector, and bilateral/multilateral agencies, to implement the Energy Conservation Act and promote effective utilization of energy and its conservation. This involves collaboration, partnerships, and coordination with various stakeholders to implement energy efficiency projects, programs, and initiatives.
- v) **Delivery mechanisms:** The BEE aims to demonstrate effective delivery mechanisms for energy efficiency through public and private partnerships. This involves working with government agencies,

industry associations, financial institutions, and other stakeholders to promote innovative financing mechanisms, business models, and market-based approaches to accelerate the adoption of energy-efficient technologies and practices.

- vi) **Policy implementation:** The BEE is responsible for managing, implementing, and planning energy conservation policies as specified in the Energy Conservation Act. This includes developing and implementing energy efficiency standards, labelling programs, building codes, and other regulatory measures to promote energy conservation and efficient use of energy in various sectors of the economy.

Powers and Functions of Bureau of Energy Efficiency

1. Recommending norms for processes and energy consumption standards to be notified by the Central Government, in order to regulate and promote energy efficiency in various sectors.
2. Recommending the issuance of energy savings certificates by the Central Government, which serve as a tradable instrument for promoting energy efficiency initiatives and investments.
3. Developing standards and labels for appliances and equipment to guide consumers in making energy-efficient choices and creating market demand for energy-efficient products.
4. Creating a list of designated consumers, i.e., industries or establishments that are identified as high energy consumers and are required to comply with energy consumption norms and reporting requirements.
5. Undertaking promotional activities in coordination with central and state-level agencies, such as awareness campaigns, capacity-building programs, and training initiatives to promote energy efficiency practices across different sectors.
6. Developing Energy Service Companies (ESCOs) that provide energy efficiency services and solutions to consumers, thereby facilitating the implementation of energy efficiency projects.
7. Transforming the market for energy efficiency by creating mechanisms for demand aggregation, bulk procurement, and innovative financing models to overcome financial barriers and promote investments in energy efficiency projects.
8. Creating awareness about energy efficiency through various measures, such as operating a clearing house for information dissemination, conducting workshops, seminars, and educational programs to sensitize stakeholders about the benefits of energy conservation.
9. Promoting innovative financing mechanisms for energy efficiency projects, such as performance contracting, energy performance certificates, and green bonds, to mobilize funds and accelerate the implementation of energy efficiency initiatives in the country.

As an initiative towards effective energy management, the Bureau of Energy Efficiency has notified the regulations for Energy Accounting and Auditing of DISCOMs. The Bureau of Energy Efficiency (BEE), through Ministry of Power, Government of India, notified the regulations viz. 'Bureau of Energy Efficiency(Manner and Intervals for Conduct of Energy Audit in Electricity Distribution Companies) Regulations, 2021' vide Notification No.18/1/BEE/DISCOM/2021 dated 6th October 2021, and amendment issued thereof on 28th Oct. 2022. The extant regulations specify the following key aspects related to energy accounting and audit for electricity distribution companies.

- i) Intervals of time for conduct of periodic energy accounting and annual energy audit and report submission thereof.
- ii) Pre-requisites for annual energy audit and periodic energy accounting.

- iii) Reporting requirements for annual energy audit and periodic energy accounting.
- iv) Manner of annual energy audit and periodic energy accounting.
- v) Prioritization and preparation of action plan and
- vi) Structure of annual energy audit report.

These regulations have been issued under the ambit of Energy Conservation Act, 2001, with an overall objective to reduce inefficiencies and losses in distribution sector thereby ensuring financial and economic viability of DISCOMs.

Energy accounting for all energy inflows in the distribution system, including renewable energy generation, open access consumers, and energy consumption by the end consumers, shall be conducted on a periodic basis. This necessitates that energy accounting data is made available at a consumer, transformer, feeder and system level. Energy accounting will help to identify areas of high loss and pilferage, and thereafter, focused efforts can be made by DISCOMs to take corrective action.

The regulation stipulates quarterly energy accounting by DISCOMs, through a certified Energy Manager and annual energy audit by an Independent Accredited Energy Auditor. The periodic energy accounting (quarterly) report needs to be submitted within 60 days of completion of the respective Quarter while the annual energy audit report should be submitted within four months of the completion of the financial year. Up to 31st Dec. 2022, five (5) Quarterly Energy Accounting Reports (for Q2, Q3 and Q4 of FY 2022, and Q1 & Q2 of FY 2023) and two annual energy audit reports (for FY 2021 and FY 2022) should have been submitted by all DISCOMs.

(Detailed regulation may be referred from the following link: https://powermin.gov.in/sites/default/files/uploads/Guidelines_Energy_Accounting_and_Auditing_of_DISCOMs.pdf)

WAYFORWARD- INDIA'S ENVIRONMENTAL IMPROVEMENT SCENARIO*

- i) **Energy Transition:** The utilisation rate of coal power plants is falling. India's coal mines use only two-thirds of the capacity with some large ones using only 1 percent, according to a Global Energy Monitor (GEM) analysis. Despite this situation, India hosted its biggest ever coalmine auction (141 new sites) just a few weeks ago, allowing mining in some of India's most ecologically rich and fragile forests, and rural areas populated by tribal communities.

India's coal, with its high ash content, is extremely polluting and inefficient to burn, requiring twice as much to produce the same amount of power as imported coal. With falling prices of renewables, these new coal mines can become stranded assets in future, while adding heavily to emissions in the present. To get on a 1.5°C emissions pathway, Indian needs specific plans from now until 2070 to phase out old, low-efficiency power plants and reduce or stop new coal capacity additions.

India provides subsidies for both fossil fuels and renewable energy, including direct subsidies, fiscal incentives, price regulation, and other government support. According to a 2022 report by International Institute for Sustainable Development and Council on Energy, Environment and Water, as compared to previous financial years, the support for fossil fuels increased in 2021, with subsidies for coal, oil, and gas being nine times higher than the subsidies for renewables and Electric Vehicles (EVs).

However, there is a silver lining that India has commenced with noteworthy schemes such as FAME and tools like the e-Amrit portal for boosting EV sales. However, for EVs to truly contribute to reducing India's emissions, the share of renewable energy over fossil fuel sources in India's electricity generation must also increase. India's climate pledge on renewable energy is based on installed capacity and not actual generation.

According to actual generation, coal dominates while renewable energy holds a low share. In this

• Statistical figures indicated under this head is only for information purpose.

regard, India may develop a detailed assessment of the finance and time required for transition from coal to renewables, and a clear plan for its implementation. This may assist India to negotiate better for international financial support at intergovernmental dialogues and other key partnerships such as the G7-India Just Energy Transition Partnership.

It is significant to note that during final days of COP27, India suggested including 'phase down' of all fossil fuels (not just coal) in the cover decision of COP27 which did not succeed this time. It will be a crucial point to persist on in the upcoming negotiations to promote emission reduction drastically worldwide.

- ii) **Carbon Sink:** Since 2015, India has been planning on increasing its forest and tree cover and has initiated several programs like the Green India Mission, green highways policy, financial incentives for forests, plantations along rivers, and more to achieve the same. However, the total forest and tree cover in India in 2015 was 24.16 percent of the total land, barely increasing to 24.62 percent by 2021.

While India has made bold commitments to restore 26 million hectares of deforested and degraded land (Bonn Challenge) and sequester an additional 2.5-3 billion tons of CO₂ by 2030, in order to realise these goals, forest conservation and reforestation must be catalysed with appropriate funding. Ironically, the budget for the Green India Mission afforestation programme decreased from INR246 crore in 2020-21 to INR 235 crore in 2021-22.

- iii) **Adaptation:** During 2015-16, India set up a National Adaptation Fund with an initial allocation of US\$ 55.6 million (INR3,500 million) to combat the adaptation needs in crucial sectors, further assisting national and state-level adaptation measures financially. However, there exists a lack of accountability in monitoring the impact of the projects and a severe lack of information on its progress and financing in the public domain.

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Moreover, there is a need to specifically address agricultural adaptation. Around 60 percent of Indians depend on agriculture for their livelihoods, and climate change is an existential threat to their yields and to India's food security.

Along with scaling and redesigning current programs, like on-farm water management and simplifying soil health cards, India must also develop robust programs on skill development for farmers, and implement financial security mechanisms enabling them to shift to climate-friendly agricultural practices like agro ecology, crop diversification, use of organic fertilisers, promoting plant-based agriculture, alternative proteins, and more. This will in turn help reduce the massive share of carbon emissions from the agricultural sector, which is around an enormous 14 percent in India.

ICMA Green Project Categories

i) **Renewable Energy:**

Transition and Net Zero: INR 350 billion (\$4.3 billion) outlay provided for energy security, energy transition, and Net Zero objectives.

INR 207 billion (\$2.5 billion) outlay provided for renewable energy grid integration and evacuation from Ladakh.

Green Hydrogen: This involves a budget outlay of INR 197.44 billion (\$2.4 billion). The target is to reach an annual production of 5 MMT by 2030 to facilitate the economy's transition to low carbon intensity and to reduce dependence on fossil fuel imports. The project aims to meet at least 10% of the global demand for green hydrogen by 2030. The National Green Hydrogen Mission is to enable India to be energy independent by 2047.

Battery Energy Storage System: The goal is to set up capacity of 4000 MWh, supported by Viability Gap Funding. A detailed framework for Pumped Storage Projects will also be formulated.

GOBARdhan: A 5% compressed biogas mandate is to be introduced for all organizations marketing natural and biogas.

ii) Circular Economy:

GOBARdhan: 500 new 'waste to wealth' plants will be established to promote a circular economy, at a total investment of INR 100 billion (\$1.2 billion). These will include 200 compressed biogas (CBG) plants, including 75 plants in urban areas and 300 community or cluster-based plants.

iii) Clean Transportation:

Customs duties will be exempted for imports of capital goods and machinery required to manufacture lithium-ion cells for batteries used in electric vehicles. By 2027, the market for lithium-ion batteries in India is anticipated to grow to INR 400 billion (\$4.85 billion), with a remarkable CAGR of 17.23 percent over the forecast period of 2022–2027.

iv) Environmentally Sustainable Management of Living Natural Resources and Land Use:

Atmanirbhar Clean Plant Program: INR 22 billion (\$267 million) will be allocated to boost the availability of disease-free, quality planting material for high-value horticultural crops.

PM-PRANAM: This programme will aim to incentivize States and Union Territories to promote alternative fertilizers and balanced use of chemical fertilizers.

GOBARdhan: Bio-Input Resource Centres will assist 10 million farmers to adopt natural farming over the next three years. For this, 10,000 Centres will be set up, creating a national micro-fertilizer and pesticide manufacturing network.

A Green Credit Program has been introduced under the Environmental Protection Act to inculcate green and sustainable practices at all levels, including local bodies and individuals.

iv) Terrestrial and Aquatic Biodiversity:

MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes) aims to conserve mangroves and preserve the landscapes in which they are located.

The Amrit Dharohar scheme will encourage the optimal usage of wetlands; enhance biodiversity, carbon stock, and eco-tourism opportunities; and help generate income for local communities.

v) Sustainable Water and Wastewater Management:

India can transition from man-made-holes to machine-made-holes by enabling all cities and towns to undertake 100% mechanical de-sludging of septic tanks and sewers.

S&P Global's Corporate Sustainability Assessment - Indian Companies Features in Global ESG Assessments

S&P Global's Sustainability Yearbook 2024 which is the only analysis of its kind based on S&P Global's Corporate Sustainability Assessment or CSA has given berth to Indian corporate houses affiliated to different sectors.

However, before discussing about the criteria under which Indian companies have secured berth in CSA, it is imperative to discuss the methodology embraced for preparation of S&P Global's Sustainability Yearbook 2024.

The Sustainability Yearbook aims to distinguish those companies within their industries that have each demonstrated strengths in corporate sustainability. Yearbook members and distinction levels are selected based on their 2023 Corporate Sustainability Assessment (CSA) Score, which is the S&P Global ESG Score without the inclusion of any modelling approaches. The selection methodology reflects exclusion screening criteria.

As of December 22, 2023, over 9,400 companies assessed for the 2023 CSA were considered for inclusion in the Sustainability Yearbook 2024. Distinctions have been calculated against the top performing company in each Industry, and exclusions applied thereafter. The methodology also encompasses the following categories:

- i) *Top 1%:* Within each industry, companies with a minimum CSA Score of 60, whose score is within 1% of the industry's top-performing company.
- ii) *Top 5%:* Within each industry, companies with a CSA Score of at least 57, whose score is within a range of 1% to 5% of the industry's top-performing company. This distinction is not assigned if no company in the industry achieved a minimum CSA score of 60.
- iii) *Top 10%:* Within each industry, companies with a CSA Score of at least 54, whose score is within a range of 5% to 10% of the industry's top-performing company. This distinction is not assigned if no company in the industry achieved a minimum CSA score of 60.
- iv) *Industry Mover:* In this category, the companies are assessed based on whether the company achieved an improvement in its S&P Global Score of atleast five percent and accomplished the strongest improvement in their industry, on the condition that the company is a Yearbook Member and participated in the CSA this year and last year.
- v) *Member:* Under this category, companies within the top 15% of their industry by number and achieved a minimum CSA Score above 30 and falling within 30% of that industry's top performing company are considered.

It is to be noted that certain companies have been excluded from the assessment such as tobacco, anti-personnel mines, biological and chemical weapons, cluster munitions etc.

As a sample study, five Indian companies covered under the Sustainability Yearbook 2024, i.e., Hindustan Zinc Limited, Tech Mahindra Limited and Dr.Reddy's Laboratories Limited affiliated to Metal & Mining, IT Services and Pharmaceuticals industries respectively have been covered for the mentioned five categories – *Top 1% S&P Global CSA Score, Top 5% S&P Global CSA Score, Top 10% S&P Global CSA Score, Industry Mover and Member* is provided below-

Category 1: Top 1% S&P Global CSA Score

Company: Hindustan Zinc Limited

Industry: Metals & Mining

Highlighted Criteria & Dimension Weights	Companies performance on Highlighted Criteria (Based on Annual Reports 2022-2023)
<i>Environmental Dimensions- 34%</i> ● Biodiversity ● Climate Strategy ● Waste ● Water <i>Social Dimension- 33%</i> ● Occupational Health & Safety ● Social Impacts on Communities <i>Governance & Economic Dimensions-33%</i> ● Business Ethics ● Corporate Governance ● Risk & Crisis Management	The performance of the company under Environmental, Social and Governance & Economic Dimensions have been broadly explored based on the company's Sustainability Goals 2025. <u><i>Environmental Dimension</i></u> i) <i>Climate Change-</i> a) 0.5 mn tCO₂e Greenhouse gas (GHG) emission savings in company's operations from base year 2017. As part of its net-zero journey, the company strives to address the climate change. b) The company has revised its emission targets to make them more stringent. c) These target revisions will assist the Company in achieving net-zero emission by 2050 or sooner in the long-term, and in the short-term will serve to reduce Scope 1 and Scope 2 emissions by 50% and Scope 3 emissions by 25% by 2030, in line with the business ambition for 1.5°C campaign led by the SBTi in partnership with the UN Global Compact and the 'We Mean Business' coalition. ii) <i>Water Stewardship-</i> Become 5x water positive company and achieve 25% reduction in freshwater consumption. The company is working to achieve water stewardship goals through a strategic approach that identifies the following elements: a) Minimising freshwater consumption. b) Exploring alternative water solutions. c) Increased use of recycled water. d) Replenishing groundwater. e) Monitoring and auditing of water consumption at end user, withdrawal from source, water balance, quality of water including waste water and efficiency of waste water treatment facility iii) <i>Circular Economy-</i> a) 3x Increase in gainful utilisation of smelting process waste. In this regard, company's Waste to Wealth Community is continually working on this objective to identify ways for recycling and gainful utilisation of the waste we generate during the manufacturing process.

	b) The company is working on a pilot trial with a Calgary-based technology company which has developed the capability to use mine waste to produce cement like materials that serve to save resources, lower environmental impact and potentially reduce GHG emissions. c) Value-added product from smelter waste residue. iv) <i>Biodiversity Conservation-</i> a) Protect and enhance biodiversity throughout the life cycle. The company have prepared exclusive biodiversity management plans (BMPs) for each of its operational sites. b) Biodiversity management initiatives include biodiversity risk assessment, afforestation programme, restoration of exhausted waste dumps, conservation of schedule-1 fauna species, awareness, and partnership, etc. c) The company has engaged with the International Union for Conservation of Nature (IUCN) for revisiting its BMP and to align its actions towards no net loss. <i>Social Dimension</i> i) <i>Social Impact-</i> Positively impact one million lives through social, economic and environmental initiatives. ii) <i>Diversity in Workforce-</i> Inclusive and diverse workplace with 30% diversity. iii) <i>Ensuring Zero Harm-</i> Zero work-related fatalities and 50% reduction in total recordable injury frequency rate (TRIFR). iv) Five CSR Programmes of the company – Zinc Kaushal, 4000+ youth benefitted since FY 2019-20; Unchi Udaan, 7 batches since FY 2017-18 comprising 226 students; Zinc Football Academy, 4000+ youth benefitted since FY 2017-18; Sakhi Microenterprise, 27,000+ women benefitted since FY 2019-20 and Drinking water, 100,000 villagers benefitted since FY 2018-19. <i>Governance & Economic Dimensions</i> i) <i>Responsible Sourcing-</i> 100% responsible sourcing in the supply chain. ii) Implementation of responsible sourcing guidelines of London Metal Exchange (LME) and Organisation for Economic Cooperation and Development (OECD) framework. iii) Supplier sustainability assessment. iv) Human rights training and awareness. v) Ensuring local procurement
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Category 2: Top 5% S&P Global CSA Score

Company: Tech Mahindra Limited

Industry: IT Services

Highlighted Criteria & Dimension Weights	Companies performance on Highlighted Criteria (Based on Annual Reports 2022-2023)
<i>Environmental Dimensions- 23%</i> ● Climate Strategy ● Environmental Policy & Management Systems <i>Social Dimension- 35%</i> ● Customer Relationship Management ● Human Capital Development ● Privacy Protection ● Talent Attraction & Retention <i>Governance & Economic Dimensions- 42%</i> ● Business Ethics ● Information Security/ Cybersecurity & System Availability ● Innovation Management	<i>Environmental Dimension</i> <i>Climate Change:</i> - During FY23, the company's emissions have reduced 40.62% from the base year of FY16 while Scope 1+2 emissions have risen minimally on account of our people resuming work from office. - The company's management approach is underscored by its commitment to transition towards being a net zero organisation. It tracks and monitor our performance as per the rules set by the Board, governed by our Climate Policy, aligned with TCFD recommendations - The company have signed the SBT initiative of Business Ambition of 1.5°C and committed to become carbon neutral by 2030 and achieve Net Zero by 2035. - Additionally, the company have joined the 1.5° Supply Chain Leaders by the Exponential Roadmap Initiative (ERI) to reduce GHG emissions across the value chain. - The company's GHG emissions scope includes Scope 1,2 and 3 emissions for global operations. - The company is working to minimize environment impact of its operations by making its facilities more energy efficient as well as taking steps to conform to green building norms through the presence of recycling equipment, air and water purification systems, etc. - Tech Mahindra is undertaking carbon pricing to drive carbon offsets. Total Environmental Protection Expenditure Funds from the Internal Carbon Pricing mechanism help the company to invest in low-emission technologies. - The company is supporting efforts pertaining to carbon sequestration at its locations. It is collaborating with NGOs to enable its Green Marshals in planting trees in and around its campus to realise its carbon sequestration aim of offsetting 5% of its emissions in the long run. <i>Social Dimension</i> - The company has an employee engagement framework that track progress across five critical dimensions of associate experiences- Career Alignment, Recognition, Empowerment and Strive. Tech Mahindra's CARES survey is conducted annually to provide an insight into its Associates experiences at the organisation.

	ii) As a global sustainability leader, the company is 'intentionally diverse and globally inclusive organisation'. It has adopted specific policies to encourage and support women as well as members from the LGBTQ+ community. iii) Conducting of Meet & Greet events across locations to welcome new joiners to the Tech Mahindra family. iv) Involving Associates in CSR activities through two platforms- Individual Social Responsibility (ISR) and Making Sustainability Personal (MSP). v) 61,995 lives directly benefited from CSR programs of which 53% were women. vi) Upskilling of 22,596 youths, including 1,303 with disabilities. vii) For enabling education, 4,379 teachers trained and 4,829 children with disabilities were supported with special education. <i>Governance & Economic Dimensions</i> i) At TechM, Board composition reflects the values of independence, diversity, expertise and experience. ii) Conducting of quarterly sessions to enhance collective knowledge. MD&CEO as well as the senior leadership of the company conduct knowledge sharing sessions with the board on quarterly basis. These sessions serve to apprise the members of the key areas of focus of the company's diverse businesses, understanding their respective operating external environment in depth, and implementing plans for various business strategies being adopted across the organisation. iii) TechM has taken the following three main steps towards sustainable development- Supplier audits (Questionnaire-based complemented by on-site inspections), Capacity-building measures, i.e., trainings workshops and other collaborations and Continuous improvement, i.e., conducting programmes on climate risk evaluation. iv) Incentivising suppliers for adopting sustainability practices by felicitating the top supplier with the 'TechM Supplier Sustainability Award'.
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Category 3: Top 10% S&P Global CSA Score**Company: Dr. Reddy's Laboratories Limited****Industry: Pharmaceuticals**

Highlighted Criteria & Dimension Weights	Companies performance on Highlighted Criteria (Based on Annual Reports 2022-2023)																	
Environmental Dimensions- 13% - Environmental Policy & Management Systems Social Dimension – 42% - Access to Healthcare - Health Outcome Contribution - Human Capital Development - Marketing Practices - Talent Attraction & Retention Governance & Economic Dimensions- 45% - Business Ethics - Innovation Management - Product Quality & Recall Management	Environmental Dimension The goals and target of the company under environmental dimension is as under: <table><tr><th>Goal</th><th>Target</th><th>Progress this year</th></tr><tr><td>Leading the energy transition</td><td>By 2030, transition to 100% renewable power.</td><td>42% electricity through renewable sources.</td></tr><tr><td>Pathway to carbon neutrality</td><td>By 2030, carbon neutrality in our operations (Scope 1 & 2 emissions).</td><td>30% carbon neutrality.</td></tr><tr><td>Addressing the global water crisis</td><td>By 2025, be a water-positive Company.</td><td>Water-positivity target achieved.</td></tr><tr><td>Building a resilient value chain.</td><td>By 2030, reduce 12.5% indirect carbon emissions across our supply chain (Scope 3 emissions).</td><td>Revised Scope 3 emissions inventory complete, emissions reduction plan in progress.</td></tr></table>			Goal	Target	Progress this year	Leading the energy transition	By 2030, transition to 100% renewable power.	42% electricity through renewable sources.	Pathway to carbon neutrality	By 2030, carbon neutrality in our operations (Scope 1 & 2 emissions).	30% carbon neutrality.	Addressing the global water crisis	By 2025, be a water-positive Company.	Water-positivity target achieved.	Building a resilient value chain.	By 2030, reduce 12.5% indirect carbon emissions across our supply chain (Scope 3 emissions).	Revised Scope 3 emissions inventory complete, emissions reduction plan in progress.
	Goal	Target	Progress this year															
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	Pathway to carbon neutrality	By 2030, carbon neutrality in our operations (Scope 1 & 2 emissions).	30% carbon neutrality.															
	Addressing the global water crisis	By 2025, be a water-positive Company.	Water-positivity target achieved.															
	Building a resilient value chain.	By 2030, reduce 12.5% indirect carbon emissions across our supply chain (Scope 3 emissions).	Revised Scope 3 emissions inventory complete, emissions reduction plan in progress.															
	Social Dimension <table><tr><th>Goal</th><th>Target</th><th>Progress this year</th></tr><tr><td>Advancing access to medicines.</td><td>By 2030, serve 1.5 billion patients.</td><td>689 million+ patients reached.</td></tr><tr><td>Enhancing affordability of medicines.</td><td>By 2027, 25% new launches to be first to market.</td><td>39% first to market new launches.</td></tr><tr><td>Innovating for better health.</td><td>From 2027, launch 3 innovative solutions every year to improve the standard of treatment.</td><td>Key innovative set of solutions chosen for further development.</td></tr><tr><td>Gender diversity.</td><td>By 2030, at least 35% women in senior leadership positions</td><td>16% representation of women in leadership.</td></tr></table>			Goal	Target	Progress this year	Advancing access to medicines.	By 2030, serve 1.5 billion patients.	689 million+ patients reached.	Enhancing affordability of medicines.	By 2027, 25% new launches to be first to market.	39% first to market new launches.	Innovating for better health.	From 2027, launch 3 innovative solutions every year to improve the standard of treatment.	Key innovative set of solutions chosen for further development.	Gender diversity.	By 2030, at least 35% women in senior leadership positions	16% representation of women in leadership.
	Goal	Target	Progress this year															
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	Gender diversity.	By 2030, at least 35% women in senior leadership positions	16% representation of women in leadership.															

	Gender equity.	By 2035, gender parity across the organisation.	18% gender diversity globally.
	18% gender diversity globally.	By 2030, include at least 3% Persons with Disabilities (PwDs) in our workforce.	0.4% Persons with Disabilities in our workforce.
	Equity and fairness for all.	By 2025, ensure living wages for the extended workforce on our premises.	Strategic partner and action plan identified to close the living-wage gap
	<i>Governance & Economic Dimension</i>		
	Goal	Target	Progress this year
	Excellence in compliance, ethics and corporate governance.	Robust corporate governance with the highest standards on compliance and ethics.	Strong corporate governance structure in place, no material deviations
	Greater transparency and improved reporting.	By 2025, enhance ESG disclosures to reach top quartile.	Comprehensive BRSR, integrated reporting, independent assurance and enhanced ESG disclosures.
	Engaging our suppliers.	By 2030, ensure 100% strategic suppliers are compliant with our chosen ESG framework.	Capability building complete, supplier audits in progress

Category 4: Industry Mover

Company: Dabur India Limited

Industry: Personal Products

Highlighted Criteria & Dimension Weights	Companies performance on Highlighted Criteria (Based on Annual Reports 2022-2023)	
<i>Environmental Dimensions- 27%</i> ● Biodiversity ● Product Stewardship <i>Social Dimension - 36%</i> ● Customer Relationship Management ● Occupational Health & Safety ● Sustainable Marketing & Brand Perception <i>Governance & Economic Dimensions - 37%</i> ● Business Ethics ● Innovation Management ● Product Quality & Recall Management ● Supply Chain Management	<i>Environmental Dimension</i>	
	<i>i) Climate Change:</i>	
	Goal	Achievement
	Achieve Net Zero in the entire value chain by 2045.	Committed to near term and Net Zero science based targets.
	Eliminate coal across own manufacturing units by FY 2024-25.	Successful Coal Free Trials in Operations in June 2023.
	Achieve >60% Scope 1 and Scope 2 energy from renewable and cleaner sources by FY 2025-26.	50% of the total energy consumed in operations is from renewable sources.
	<i>ii) Biodiversity:</i>	
	Goal	Achievement
	Ensure own manufacturing operations outside Bio Endangered/protected biodiversity zones.	100% of DIL's own operations are outside protected biodiversity zones.
	Ensure 100% Afforestation equivalent to sourced critically endangered herbs by FY 2025-26.	a) 30% of risk associated with critical endangered herbs mitigated through conservation and restoration measures. b) 47% increase in the cultivation of medicinal herbs compared to FY 2020-21, with a total of 7,731 acres cultivated in FY 2022-23.
	<i>ii) Water Dimension:</i>	
	Goal	Achievement
	Reduce Water Intensity in operations by 30% by FY 2025-26.	22% reduction in water intensity (kL/MT) from FY 2018-19, despite high growth in the water intensive 'Juices' portfolio.
	Become Water Positive in own operations and communities by 2030.	77,412 KL of water recharged since FY 2018-19 through community-led water conservation initiatives.

iii) Circular Economy:

Goal	Achievement
Move from Plastic Waste Neutrality in 2021-22 to Plastic Waste Positivity in 2022-23.	Dabur emerges as Plastic Waste Positive enterprise in 2022-23, having collected, recycled and processed 35,000 MT of post-consumer Plastic Waste.
80% reusable, recyclable, or compostable packaging by 2028.	
Use 30%, 10%, and 5% of recycled plastic packaging content in plastic packaging of non-food grade items for Category I, Category II, and Category III plastics, respectively, by FY 2025-26.	
Promote circularity in value chain.	

*Social Dimension**i) Social Impact:*

Goal	Achievement
Transform lives of 2.5 Million people by 2023 and 5 Million by 2030 in a sustainable manner.	2.76 Million lives positively impacted in 2022-23, a 21% increase over 2021-22.
Sustainably cultivate medicinal and aromatic plants in 15,000 acres by 2030 (200% increase over 2020).	7,731 acres of land brought under cultivation till 2022-23.
Enhance livelihood of more than 13,500 farmers' families by 2030 (100% increase over 2020)	a) 9,653 farmers engaged in cultivation of herbs and 11,220 beekeepers engaged. b) 45% increase in the saplings distributed to farmers free of cost compared to FY 2020-21, with a total of 32.5 Lakh saplings distributed in FY 2022-23.

ii) Product Responsibility:

Goal	Achievement
Progressively reduce added sugar content in juices.	Reduced 20.95% added sugar from 2018.

iii) Diversity & Inclusion

Goal	Achievement
18% gender diversity at managerial level by 2028.	70 bps improvement in gender diversity in permanent employees and workers.

*Governance & Economic Dimensions**i) Governance:*

- 57% board independence.
- 100% independent audit committee.
- 5 out of 6 Committees are led by Independent Directors.
- 98.6% board meeting attendance.
- 96% average committee meeting attendance.
- An ESG committee formed to provide oversight on environmental, social, and governance matters.

Additional Information-

- Independent Director inducted in the ESG Committee in May 2023.
- Appointment of lead independent director in May 2023.
- Board gender diversity increased from 7% to 14% in FY 2023-24.

*ii) Responsible Outsourcing:***Goal**

Goal	Achievement
Ensure zero deforestation due to high risk materials by FY 2025-26 through 100% sustainable sourcing.	a) 100% of Tetra Pak laminate and paper sourcing being done from FSC certified vendors. b) 97% corrugated boxes sourced from sustainable sources. c) 84% sustainable sourcing of high deforestation risk materials in FY 2022-23.

Category 5: Member

Company: PI Industries Limited

Industry: Chemicals

Highlighted Criteria & Dimension Weights	Companies performance on Highlighted Criteria (Based on Annual Reports 2022-2023)		
Environmental Dimensions - 34% - Climate Strategy - Emissions - Product Stewardship - Waste - Water Social Dimension- 32% - Human Capital Development - Occupational Health & Safety Governance & Economic Dimensions- 34% - Business Ethics - Innovation Management	Environmental Dimension		
	Company's 2025 Goal		
	Company's 2025 Goal	SDG alignment	Progress till FY23
	Increase renewable energy usage to 20 percent of total	SDG 12: Responsible Consumption and Production	4.83%
	Reduce Specific CO2 emissions by 25 percent	SDG 12: Responsible Consumption and Production	Reduced by 15%
	Reduce landfill waste by 25 percent	SDG 12: Responsible Consumption and Production	Increased by 63%
	Reduce specific freshwater consumption by 25 percent	SDG 6: Clean Water and Sanitation SDG 12: Responsible Consumption and Production	Reduced by 12.6%
	Social Dimension		
	Company's 2025 Goal	SDG alignment	Progress till FY23
	Today's IC for your necessary action please.	SDG 3: Good health and well-being SDG 8: Decent work and economic growth SDG 16: Peace, Justice and Strong Institutions	0.068 in FY23 for all employees and contract workers
Ensure NIL fatal injury in plant operations.	SDG 3: Good health and well-being SDG 8: Decent work and economic growth SDG 16: Peace, Justice and Strong Institutions	NIL	

	Increase employees' average training hours per full time employee by 25 percent	SDG 8: Decent work and economic growth	Increased by 62%
	Increase women's participation in leadership positions by 25 percent	Gender Equality	Increased by 23%

Carbon Border Adjustment Mechanism (CBAM)

On 16 May 2023, a significant milestone was passed as legal regulations for European Union Emission Trading System (EU ETS) reform and the new EU Carbon Border Adjustment Mechanism (CBAM) were published in the *Official Journal of the EU*.

The EU's "Fit for 55" legislative package, which was initially announced in July 2021 and includes the new CBAM and ETS reform, is viewed as a key enabler for helping Europe reduce emissions at least 55% by 2030 (from 1990 levels). These targets are set out in the European Climate Law and are part of the wider European Green Deal strategy to achieve climate neutrality by 2050.

A transitional period for CBAM will begin 1 October 2023 and extend through 2025, during which time quarterly emissions reporting will be required. Affected businesses will need to get ready to comply with new compliance and reporting requirements starting later this year and begin to assess the medium- to long-term process and cost implications.

The EU's Carbon Border Adjustment Mechanism (CBAM) is the EU's tool to put a **fair price on the carbon emitted** during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries.

By confirming that a price has been paid for the embedded carbon emissions generated in the production of certain goods imported into the EU, the CBAM will ensure the carbon price of imports is equivalent to the carbon price of domestic production, and that the EU's climate objectives are not undermined. The CBAM is designed to be compatible with WTO-rules.

CBAM will apply in its definitive regime from 2026, while the current transitional phase lasts between 2023 and 2026. This gradual introduction of the CBAM is aligned with the phase-out of the allocation of free allowances under the EU Emissions Trading System (ETS) to support the decarbonisation of EU industry.

Key principles of CBAM

The EU CBAM is a climate measure that aims to address the risk of carbon leakage by ensuring equivalent carbon pricing for imports and domestic (EU) production that is subject to carbon costs under the EU ETS. While the EU ETS applies to installations based in the EU and to certain production processes and activities (and will be extended further, as detailed below), CBAM will apply to certain goods imported into the EU.

Scope of goods covered

CBAM will cover the following product categories:

- Kaolin and other kaolinic clays, calcined
- Cement, aluminous cement, cement clinkers, etc.
- Fertilizers (e.g., ammonia, nitric acid, sulphonitric acids)
- Agglomerated iron ores and concentrates
- Comprehensive coverage of iron and steel products (except some ferro-alloys, scrap etc.)
- The iron and steel products include downstream products, such as screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers (including spring washers) and similar articles
- Aluminum structures and parts of structures
- Certain aluminum reservoirs, tanks, vats, containers
- Stranded wire, cables, plaited bands and the like, made of aluminum, not electrically insulated
- Other articles of aluminum
- Hydrogen
- Electrical energy

This product list has significantly increased compared to initial draft versions of the regulation; for example, downstream products are now included, not just raw and semi-finished materials. Therefore, the list will apply to a larger number of businesses.

Political discussions seem to favor extending CBAM further by 2030, to cover all product categories that are subject to the EU ETS if these products were manufactured in the EU. This would include polymers, diverse chemicals, mineral oil products, paper and pulp, among other categories.

Transition period: 1 October 2023 to 31 December 2025

Between 1 October 2023 and 31 December 2025, transitional provisions will apply. Quarterly emissions reporting will be required and purchasing CBAM certificates will be optional. Importers (customs declarants, indirect representatives) will be required to quarterly report embedded emissions in goods imported during that quarter of the calendar year, detailing direct and indirect emissions as well as any carbon price effectively paid in a third country.

Notably, from 31 December 2024, importers must have “authorized CBAM declarant” status to qualify for the import of in-scope goods.

How it will work

Under new CBAM rules, importers are required to report total verified greenhouse gas (GHG) emissions embedded in goods imported in a given calendar year. Following the transitional period (at the end of 2025), the financial impact of CBAM will gradually increase, with a progressive phase-in of CBAM costs until 2034. Carbon cost paid at origin can be deducted from the payable CBAM charges (provided that evidence of the cost can be made available).

Payment of CBAM charges will be facilitated through the purchase and surrender of CBAM certificates, which will be priced at the weekly averages of EU ETS allowances auctions.

During the calendar year, the importer must ensure that the number of CBAM certificates in its CBAM registry account at the end of each quarter corresponds to at least 80% of the embedded emissions in imported products since the beginning of the calendar year. The importer must surrender CBAM certificates in the exact number corresponding to emissions embedded in goods imported in the calendar year, in addition to submitting an annual CBAM declaration.

Definition of embedded emissions

CBAM charges correspond to embedded emissions in the named product categories, and the definition of embedded emissions to be declared has been extended to indirect emissions. The declaration of emissions can be made based on actual emissions, which need to be determined based on a schema provided by the EU regulators, although the details are not yet finalized. Implementing legal acts containing additional details are likely to be published in Summer 2023.

If actual emissions are declared, they must be accredited by independent verifiers. If no actual emissions are available, standard “default” values will be used that reflect average emissions

for a certain product manufactured in a specific country or region. If no reliable data to determine these standard values is available, the EU Commission will determine default values based on the worst-performing EU installations. Further guidance is expected in the implementing acts in Summer 2023.

Exemptions and extended circumvention practices

CBAM will not apply to goods of nonpreferential origin in Switzerland, Liechtenstein, Iceland and Norway. There are only a small number of exemptions, including for low-value consignments up to €150 and certain military imports.

Examples of circumvention practices have been slightly extended in what is now an open catalogue of practices that may consist of, but are not limited to:

- Slight modification of goods to change Combined Nomenclature classification
- Artificial split of shipments to benefit from CBAM exceptions described above

Implications for businesses

CBAM and the reform of the EU ETS will affect businesses both in the EU and across the globe, from an operational perspective and in terms of strategic decision-making. Impacts may be either direct or indirect. A holistic approach across the value chain and supply chain is recommended.

EU-based operators subject to EU ETS must plan for increasing carbon costs if usage of conventional fuels is continued. Consequently, increased costs may affect competition on the EU and global market for emission-heavy businesses. With the new EU ETS II, the price of conventional fuels will further increase and may catalyze the need for transformation in this sector. It is worth noting the EU and the EU Member States nationally provide large, diverse programs of grants and incentives to support businesses in the transition. Additional revenues from the carbon market will bring further funding opportunities as part of the EU Innovation Fund, especially for businesses investing in innovative low-carbon technologies.

LESSON ROUND-UP

- The environment consists of all things-living or non-living that influence human life. It plays a vital role in the functioning of our daily lives.
- Environmental law is an integral part of any government agency. It includes a series of laws and regulations related to water quality, air quality, and other environmental aspects. The success of environmental legislation mainly depends on how they are implemented.
- Energy can be classified into several types based on the following criteria- Primary and Secondary energy, Commercial and Non-commercial energy and Renewable and Non-Renewable energy
- Commercial energy forms the basis of industrial, agricultural, transport and commercial development in the modern world.
- The energy sources that are not available in the commercial market for a price are classified as non-commercial energy.
- The awareness of ESG issues and targeting goals beyond maximising profits and minimising risks is now a growing trend among corporates around the world.
- India's Energy mix has been seeing a shift from more conventional resources of energy to renewable sources.
- The utilisation rate of coal power plants is falling. India's coal mines use only two-thirds of the capacity with some large ones using only 1 percent, according to a Global Energy Monitor (GEM) analysis.
- Environmental impacts are changes in the natural or built environment, resulting directly from an activity that can have adverse effects on the air, land, water, fish, and wildlife or the inhabitants of the ecosystem.
- Since 2015, India has been planning on increasing its forest and tree cover and has initiated several programs like the Green India Mission, green highways policy, financial incentives for forests, plantations along rivers, and more to achieve the same.
- Renewable energy grows strongly in all scenarios, at an average of 4-6% a year.
- Atmanirbhar Clean Plant Program: INR 22 billion (\$267 million) will be allocated to boost the availability of disease-free, quality planting material for high-value horticultural crops.

GLOSSARY

Biodiversity: The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. A high level of biodiversity is usually considered to be desirable and important to all species' survival.

Carbon footprint: The measurement of greenhouse gas emissions attributable to an event or activity, expressed as tonnes of carbon dioxide equivalent which allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO₂.

Carbon offsetting: Where individuals and organisations mitigate their emissions by investing in projects that avoid the production of carbon or remove it from the atmosphere.

Climate change: The term used to describe the change in global or regional climate patterns, in particular attributable to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Greenhouse gases: Gases that trap heat in the atmosphere are called greenhouse gases. The principal greenhouse gases are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and fluorinated gases, such as hydro fluorocarbons (HFCs).

Green procurement: The purchasing of environmentally friendly products and services, and the use of environmental requirements in the selection, and contracting, of suppliers.

LEED certification: A third-party verification process in order for structures to be considered “green,” or environmentally friendly. LEED stands for Leadership in Energy and Environmental Design, is focused primarily on new, commercial-building projects and based upon a points system, see <http://leed.usgbc.org>.

TEST YOURSELF

(These are meant for recapitulation only. Answer to these questions are not to be submitted for evaluation.)

1. What do you understand by environmental impact and what measures corporate houses are taking to reduce negative impacts on the environment?
2. How effective environmental policy can play a pivotal role in preserving the environment?
3. How awareness on a wide scale regarding conservation of energy may be created?
4. Pollution is a menace. In this regard, how to achieve the trade-off between industrial development and environmental protection?

LIST OF FURTHER READINGS

- Energy Management And Conservation (PB) by Shrama K V, I K International
- Energy Management And Conservation by K V Sharma and P Venkatasessaiah, Wiley India
- Environmental Law by Gurdip Singh Edition: 2nd Edition 2016, with Supplement, Reprinted 2021
- Principles of Environmental Laws [HB] by Dr. Rabindra Kr. Pathak, Ms. Surbhi Singh, published by Book Corporation

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