



Sustainability **in India**

Forging a resilient socio-economic
growth roadmap

February 2023

Editor's Note



Pooja Ahluwalia
Assistant Secretary General
ASSOCHAM

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For editorial enquiries, please email:
pooja.ahluwalia@assochem.com
research@assochem.com

For advertising enquiries, please
email:manju.negi@assochem.com

Humankind has been a poor custodian of our fragile home, with the Earth now facing a triple planetary crisis - climate disruption, nature and biodiversity loss, waste, and pollution. As declared by the UN, this triple crisis is disrupting the core blocks of healthy lives in terms of stable climate, fresh and clean water and air, thereby threatening the survival of millions of people globally.

The world came together some 50 years ago at the Stockholm Conference to initiate the global environmental movement. While we did witness considerable success across segments - expanding protections for wildlife and ecosystems, shrinking the ozone hole, and ending the use of leaded fuel, among many others, much more needs to be done to avert the climate catastrophe.

We are far off track on the journey to limit global temperature rise to 1.5°C, which entails various Governments must cut emissions by 45 per cent by 2030 and work towards carbon neutrality by mid-century. However, economic growth phases and the availability of resources across countries do not allow for a consistent pace to be maintained.

Significant efforts are underway worldwide to drastically cut emissions and accelerate the end of our fossil fuel addiction by speeding up the deployment of renewable energy. Despite the gradual reduction in cost and improvement in access, the intermittency of renewables, coupled with the need for high investments needed to bring renewable technologies and renewable energy to the masses, continues to restrict wider adoption.

As most consumers are currently unwilling (many also unable) to pay more for sustainable products, companies that decarbonize have to bear the energy transition's significant cost burden, with some government support. This puts developing countries at a higher economic disadvantage in pursuing their energy transition journeys. Thus, collective action is a must for the world to tackle climate change.



The recent past has established the crucial role that India will play in driving global growth, reinforcing the Prime Minister's thoughts - "when India grows, the world grows; when India reforms, the world transforms".

The country is focused on balancing its growth ambitions with its environmental commitment. The pandemic brought forth various opportunities for India to display its mettle. It set benchmarks for the world to follow and imbibe, be it our vaccination drive, vaccine manufacturing for domestic and global consumption, digital payments, e-governance, etc.

Furthermore, India's Nationally Determined Contribution (NDC) progress has been significant even in the post-pandemic scenario when the world witnessed less action on climate change. The country's updation of the NDCs, committing to reduce the emissions intensity of its GDP by 45% from 2005 levels by the year 2030, further its vision of promoting a healthy and sustainable lifestyle, 'LIFE'- 'Lifestyle for Environment'.

As a voice of the developing nations and as a global solution provider, India will play a central role in managing the challenges surrounding reliable, efficient, and affordable energy storage that can do away with the variability of supplies. Given India's technological prowess and focus on innovation, the country is expected to be a leading player in finding solutions for energy infrastructure.

It is time for the world - developed and developing - to gather forces and foster innovation that can address the various challenges emerging from climate change. The poorest and most vulnerable countries

are most impacted by climate change despite contributing the least to the crisis. Thus, investments in adaptation and resilience become critical. The collaboration between the public and private sectors will foster innovation, help reduce the cost of climate solutions and maximize their access to the masses.

ASSOCHAM resonates with the transition in the global sentiment from gloom and doom toward the impact efforts that will help address climate change. The Chamber has been aligned with various stakeholders to facilitate energy transition, industrial decarbonization, adaptation of climate-resilient agriculture practices, promoting the circular economy framework across segments and enhancing efforts towards carbon sequestration to build an Aatmanirbhar and Shrestha Bharat.

We at ASSOCHAM, under the Bharat@100 initiative, are working towards bringing together the academia, policymakers and industry players to create a sustainable development plan for the country. As official UNFCCC observers at COP27, we facilitated various interventions to pursue India's focus on just climate action.

Together with the ASSOCHAM team, I am excited to share this compendium of industry insights exploring sustainable development ideas across segments. We recognise the need to make concerted efforts, bringing together not only Governments and businesses but individuals and communities, to find pathways that mitigate climate change. No one is safe unless everyone is!



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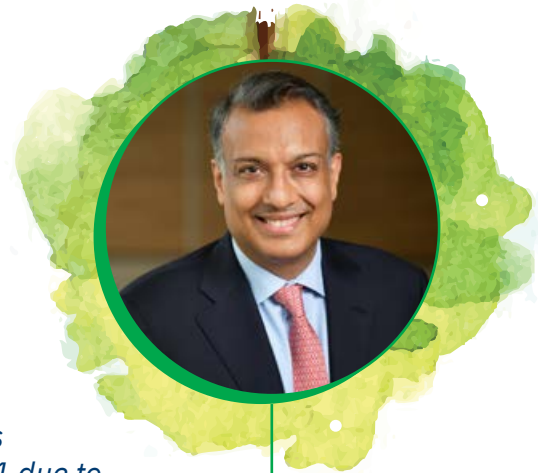


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Striving towards a sustainable future



India's score on the Sustainable Development Goals (SDGs) has increased from 60 in 2019 to 66 in 2021 due to improvements in clean water and sanitation and affordable and clean energy across the nation

Sumant Sinha

President ASSOCHAM, and
Founder, Chairman and Managing Director of ReNew Power

The country, as it stands today, has most business enterprises trying to commit to the Environment, Social and Governance related goals. Last year, many Indian companies rushed to adopt the environment, social and governance norms, following pressures from investors and regulators. Many of them have taken steps to restructure their operations in order to meet India's goal of net-zero emissions by 2070.

The private sector is essential for realizing ambitious national climate objectives. Business is not only a key partner in achieving sustained growth, but it is also the primary driving force to get there - through both changes in behaviour and resources that go far beyond government budgets.

Sustainability is a critical differentiator

Sustainability has become a key differentiator for Indian companies because it provides them with an opportunity to create long-

Last year, many Indian companies rushed to adopt the environment, social and governance norms, following pressures from investors and regulators.

term value while contributing to social and environmental goals. Companies in India who embrace sustainability initiatives can set themselves apart from the competition, while also helping to build a better future.

Companies have a large responsibility to help tackle environmental challenges, both through domestic laws and regulations as well as international treaties and frameworks. Indian corporations have been asked to increase the amount of information they disclose regarding sustainable practices, and many companies





have adopted the Global Reporting Initiative (GRI) to do this. Additionally, the Securities and Exchange Board of India (SEBI) has also suggested integrating reports for greater insights.

The government has released new National Guidelines for Responsible Business Conduct, which is incorporated into the Business Responsibility and Sustainability Reports (BRSR) to be submitted by India's top 1000 listed companies.

Indian businesses are also beginning to adopt the practice of the "circular economy", in which resources are reused and recycled with minimal waste being released into the environment.

A circular economy seeks to minimize waste and environmental damage, while concurrently maximizing efficiency, productivity, and economic growth. This type of economic system keeps resources and products circulating without creating any waste, pollution, or overconsumption of natural resources. By 2030, the projected global economic impact of this system is over one trillion dollars, with India's portion estimated to be \$218 billion.

According to the Ellen MacArthur Foundation, implementing a circular economy in India by 2050 could be incredibly beneficial, with estimated benefits amounting to approximately Rs 40 lakh crore (\$624 billion).

Furthermore, it has the potential to reduce greenhouse gas emissions by an impressive 44 percent.

India is currently greatly dependent on imported oil and gas, its import bill for the first half of 2022-23 having increased 76 percent to \$90.3 billion. As such, it is of vital importance that India follows the Government's mission of 'Aatmanirbhar Bharat' and pursues a circular economy. To this aim, several policies have been enacted, including the Natural Resource Efficiency Policy, Plastic Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy, and Extended Producer Responsibility.

To achieve economic self-sufficiency and reduce the reliance on foreign debt, India must focus on reducing its imports. Embracing the circular economy can help to bridge the growing demand-supply gap.



Charting a sustainable world for future generations



Ajay Singh

Sr. Vice President, ASSOCHAM and
Chairman & Managing Director, Spicejet

The global ecosystems are reeling from the significant impacts of climate breakdown. These include the COVID pandemic, irreversible climate change, scarcity of resources and global warming. Amidst these compounding effects of the climate crisis, it raises one big question: What do we owe future generations?

The answer could be tricky but simple as well – we owe the future generations a world where they can enjoy a delicate balance of resources, necessities and luxuries.

Mahatma Gandhi, the Father of the Nation, once said, “The world has enough for everyone’s needs, but not enough for everyone’s greed.” Doesn’t sustainability speak about the same? As a concept, sustainability tries to maintain a fine balance between meeting the needs of the current generation without compromising on the ability of future generations to meet their own needs. It takes into account three factors, apart from natural resources, which include environment, social and economic resources. This is where in 1983, the United Nations (UN) roped in former Norwegian Prime Minister Gro Harlem Brundtland to run the new UN World Commission on Environment and Development.

Unless there are immediate, rapid, large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.

More recently, in 2015, United Nations (UN) member states adopted 17 Sustainable Development Goals (SDGs), including no poverty, clean water and sanitation, affordable and clean energy and responsible consumption and production. It’s an urgent call to all countries to adapt this agenda by 2030.

In India, while being on track with the UN’s SDGs, a slew of schemes have been put in place over the last 5-7 years, which include - Swachh Bharat Mission, Beti Bachao Beti Padhao, Pradhan Mantri Awas Yojana, National Smart Cities Mission, Pradhan Mantri Jan Dhan Yojana, Deen Dayal Upadhyaya Gram Jyoti Yojana and Pradhan Mantri Ujjwala Yojana, among others.



Considering that India is home to one-sixth of the world's population, as per the vision of Prime Minister Narendra Modi, the country would have to lead by example. The concept of inclusive growth is being given priority, wherein the welfare of the citizens, economy and environment go hand-in-hand.

On the economic front, the sustainable growth trajectory is followed by stimulating manufacturing, building infrastructure, spurring investments, fostering technological innovation, and boosting entrepreneurship. India aims to be a USD 5 trillion economy by 2025. According to year-end estimates of 2022, India's GDP would be USD 2980 billion.

On the environmental front, rivers across the country are being revived to ensure the availability of safe drinking water and sanitation for all. In our country, the river Ganges, which enjoys a holy status as well, passes through 11 states. It is considered to be the lifeline of the entire country; therefore, efforts are now being put into place to formulate policies for the long-term sustainability of the River Ganga. The project has been named Namami Gange Mission, wherein there has been priority given to this programme with a budget outlay of Rs 20,000 crores. During the period from 2014-15 to

2018-19, a total amount of Rs 6,106.25 crore was spent on the programme.

On the other hand, to align all the regions in the country on the lines of these sustainable goals, a single measurable index has been set to track the progress of all the states and union territories on SGDs.

Currently, Kerala and Himachal Pradesh are front-runners amongst all the states, while Chandigarh and Puducherry are front-runners among the union territories (UTs). Some of the important aspects of these states' sustainability include health, hunger reduction, gender equality and quality education, among others.

The National Logistics Plan (NLP) is also expected to propel the PM Gati Shakti National Master Plan's ambitious goal of achieving seamless multimodal connectivity through integrated planning of different ministries and implementing multimodal connectivity projects. Apart from reducing the cost of logistics, it will fuel green transportation as it seeks to shift cargo movement from the roads to the rails. However, there will be a need to speed up the process if the country is to meet its sustainability goals for 2030.

According to the latest Intergovernmental Panel on Climate Change (IPCC) Report, which is prepared by scientists observing changes in the Earth's climate, global warming levels will surpass 1.5°C in the next decade. Unless there are immediate, rapid, large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.

However, the UN report also states that the estimated 10.6% rise in emissions by 2030 is down from 13.7% in 2021. This gives hope that things can still turn around for the planet, and the chance to leave a healthy and balanced world for the coming generations will be a reality soon!



A healing touch needed to climate-proof India's agro sector



In recent times, issues like land degradation, climate change, and biodiversity loss have emerged to thwart the sustainability of agri-food systems.

Deepak Sood

Secretary General, ASSOCHAM

The agriculture sector of India is the lifeline of the country, and its importance to the economy cannot be overemphasised as it contributes 17% to the national GDP. It has not only proved to be one of the most resilient sectors during the pandemic, registering a growth of 3.6% in 2020-21 and 3.9% in 2021-2022 but also played a significant role in the revival of the economy. However, one of the biggest challenges faced by the agriculture sector in India and across the globe is climate change. There is a common consensus that the world is getting warmer, and the increasing weather vagaries adversely impact the agriculture sector. This growing strain is not only reducing the food produce but also impacting the sustainability of the livelihood dependent on it.

Climate change and land sowing pattern

Unseasonal rains, rising heat waves, and changing climate patterns are forcing the government to take preventive steps to ban the exports of crops in high demand globally.

It has not only proved to be one of the most resilient sectors during the pandemic, registering a growth of 3.6% in 2020-21 and 3.9% in 2021-2022 but also played a significant role in the revival of the economy.

According to a paper released on the perspective of Least Developed countries released earlier this year reveals that the goals kept at COP26 cannot succeed without delivering on the most vulnerable sectors. Agriculture is considered one of the most vulnerable sectors due to its high dependence on monsoons and weather conditions.

India has almost 68 per cent of its population, directly and indirectly, depending on the agriculture sector. Though the share of



agriculture in India's GDP has decreased from 51 per cent to around 16 per cent, the number of households dependent on it has increased. The share has gone up from 70 million households in 1951 to about 120 million in 2020. The loss due to extreme conditions to the agriculture sector was pegged at around \$9-10 billion dollars annually, according to the Economic Survey of 2017.

Other challenges faced by the sector

The Desertification and Land Degradation Atlas 2021 points out that almost 30 per cent of India's geographical land comes under the category of degraded land. Negligent soil management and the division of cultivable land into small plots have increased the degradation of land in India. Desertification annually depletes about 12 million hectares of cultivable land, enough to grow 20 million tonnes of grain.

The Intergovernmental Panel on Climate Change (IPCC) in 2019 reported that land division is one of the important drivers of climate change due to reduced carbon uptake rates and emission of greenhouse gases.

This has also led to unprecedented weather and natural crises like drought, heavy rains, floods, and cyclones. The increased use of water has also resulted in a decrease in the per capita water availability by around 60 per cent in the last 50 years.

Climate change has also been impacting agriculture production by around 4-9 per cent annually, resulting in a loss of 1.5 per cent to the GDP. This has also led to India trailing most countries in terms of productivity.

Drivers for growth

To achieve the targets set last year at COP, India needs to rejuvenate around 30 million hectares of land by 2030. To do this, the agriculture sector needs to adopt technology-

led solutions coupled with government policy support for land-management alternatives, such as:

- an improved rectangular 'zai' (small linear holes dug in the field, about 80 cm apart, with compost added with soil)
- half-moons (a form of bocage, an integrated agrosilvopastoral system combining several technologies of rainwater and fertility management and crop rotation)
- vegetative contour bunds combined with micro-dosing of fertilizer
- Sahelian bocage (focusing on control of water to achieve zero runoff)
- tree-plantation techniques (specific ways of planting fruit trees in dry areas) and
- improved germplasm of fruit trees.
- Modern Climate Resilient Technologies that improve water use efficiency, such as water absorbent that conserve surplus water in the root zone of plants and release for plant use when required

Technology intervention can not only remedy dryland desertification but even reverse it, the provided information is available on what areas are most at risk. Satellite images can highlight relevant land use changes along with increased surface reflectivity, temperature, dryness and dustiness. Infrared sensors can detect vegetation stress due to environmental shifts.

This satellite data is being combined with in-situ information, processing tools, models and geo-information systems (GIS) to create standardised and comparable geo-information products that can also be used to satisfy the objectives of COP8 of UNCCD and its reporting requirements. This will help in mitigating the impact of climate change and boost agriculture productivity.

Note: The article was originally printed in Hindu Business Line on November 14, 2022



There is also a need to adopt sustainable traditional practices like crop rotation, using biofertilisers, and integrating pest management through the judicious use of pesticides. Natural resources like water can be conserved using drip irrigation and solar power for agriculture. Thus, there is an urgent need to invest in enhancing the supply chain to distribute climate-resilient crops that can handle temperature fluctuations.

The government should also promote resource conservation and incentivize farmers for outcomes like total farm productivity rather than just their agriculture yields. There is a need to focus on knowledge exchange and capacity building among farmers on sustainable agricultural practices.

It is strongly believed that technology will drive the next wave of the green revolution in the agriculture sector to enhance food production and reduce the impact of climate change.

Energy transition is much talked about in the sustainability space, as it is backed by large corporations and often at the core of Government plans worldwide. However, we must recognise that while agriculture is often classified with the social sector, its sustainability transition helps with the country's climate goals and drives socio-economic growth as well. With Governments largely driving the reform of the agricultural sector across countries, we look forward to more action in making this segment climate-proof.



Why Green Warehousing Is the Way Forward

The journey to “green warehousing” in India has begun. Responsibility and commitment towards this paradigm shift are an absolute must for all stakeholders.

Vineet Agarwal

Past President, ASSOCHAM and
Managing Director of Transport Corporation of India



ESG adoption and implementation globally and in India is in full swing. Countries, corporates and individuals are increasingly cognizant of their responsibilities. As per IEA 2020 review report, the Indian transport sector is responsible for 13.5% of CO2 emissions.

The discussions and investments in the electrification of the freight movement, be it EVs, or alternative fuels such as biofuels, Hydrogen, etc., are witnessing substantial traction both in public and private domains. However, if we wish to implement a ‘Green Supply Chain’, then warehousing needs to be focused upon both by manufacturers as well as warehouse services providers.

Historically, warehousing in India has been highly fragmented, with non-standardized design and construction norms, low cost, and a lack of a local ecosystem. The last five years have seen a definite shift in the trends. Newer construction materials and designs have seen an upheaval, primarily focusing on safety and green practices.

Green and sustainable warehousing involves integrating and executing eco-friendly practices to reduce a warehouse’s power consumption, electricity costs, carbon footprint, and greenhouse gases.

Green and sustainable warehousing involves integrating and executing eco-friendly practices to reduce a warehouse’s power consumption, electricity costs, carbon footprint, and greenhouse gases. In addition, it also consists of the implementation of systems, tools, and devices along with technological integrations, viz.

- Usage of green materials for the development of modern warehouses, a pollution-free environment



- Use of LED lighting & HVLS fans to regulate temperature
- Cool roofing of warehouses (light-coloured reflective materials) & Solar Power Panels
- Good drainage system (waste-water treatment plants & rainwater harvesting)
- Energy efficient windows, Aluminium weather Resistant Insulated Access Panel. Aluminium panels help regulate indoor temperature and prevent moisture and pests from entering.
- Recycling & landscaping.

With warehousing on the periphery of growing more prominent in India, government and industry bodies too are collectively taking measures towards achieving India's net zero targets by 2070; therefore, certification of 'green warehouses' is the need of the hour.

ASSOCHAM, through its GEM program, the Green and Eco-Friendly Movement, is a certified sustainability rating programme for new and existing prestigious Government and Private projects, including residential,

commercial, healthcare, warehouses, smart campuses, universities, schools, airports, and railway station buildings. It focuses on the built environment and has been successfully running for five years with more than hundreds of registered projects in India. It is supported by many architects, architects, planners, MEP designers, green building and environment consultants, educationists, and professionals from India.

The programme has also trained more than 1500+ certified green building auditors and professionals. GEM has active chapters in 11 states in India. GEM has signed 14+ MoUs with leading organizations in the building industry, such as NAREDCO, CSIR-NEERI, TERRE, IIA, ISHRAE, FSAI, ISLE, IAQA, ASHRAE, GACS, SHF, SESI etc., 100+ MoUs with Educational Institutes. It has been recognized by five states for availing state incentives.

The journey to 'green warehousing' in India has begun. Responsibility and commitment towards this paradigm shift are an absolute must for all stakeholders.



Green real estate is the way forward

Eco-friendly initiatives, which include sustainable housing, are bringing a shift in the real estate market

Niranjan Hiranandani

Past President, ASSOCHAM and
Co-founder & Managing Director, Hiranandani Group



The real estate sector in recent years has undergone a significant transformation, allowing for the flourishing of innovation at all levels. Buyers have become more environmentally conscious in the aftermath of the pandemic, which is where the concept of green real estate comes into play. Green buildings that are environmentally responsible and resource-efficient have become the norm. In fact, many real estate developers also recognise the importance of green buildings and incorporate their features into their projects.

It is encouraging to see that green asset classes are desirable and feasible. In terms of sustainable measures, several innovations have already been implemented, assisting developers in achieving significant gains. It includes the use of Building Information Modeling (BIM) during the design phase as well as during the construction phase. In addition, high-efficiency HVAC (heating, ventilation, and air-conditioning) is used in the construction of the building, along with heat-resistant materials to keep it cool. This results in the usage of less water, energy, and natural resources in green buildings, which in

Buyers have become more environmentally conscious in the aftermath of the pandemic, which is where the concept of green real estate comes into play.

turn have the ability to reduce and eliminate their environmental impact. According to a CBRE report, India's seven largest cities have seen a 31% increase in green real estate assets over the past decade, including the National Capital Region (NCR), Mumbai, Pune, Hyderabad, Bengaluru, and Chennai.

The government has also taken a few steps to encourage and inspire green real estate business practices. For example, in May, under the Pradhan Mantri Awas Yojana-Urban, 1,152 houses were constructed as part of the 'Light House Project—Chennai, which aims to provide large-scale housing for Indians in a timely, efficient, and sustainable manner. Similarly, the new Ministry of Defence complexes, inaugurated last year as part of the Central Vista redevelopment project,





was designed to be energy-efficient. It was built with new and sustainable construction technology that used less water and was non-polluting.

Furthermore, investing in green buildings is not only necessary for a sustainable future but also profitable. Sustainable real estate has the potential to generate both economic and environmental returns while lowering greenhouse gas emissions and improving energy efficiency. Green real estate, for example, can provide a true and sustainable investment alternative if it is broadly diversified in terms of both market and sector risk. It can also factor in climate policies and environmental development to make it more comprehensive.

We need to go beyond ratings and certificates to decarbonize the built environment because more than half of the existing structures in 2040 have yet to be built. It's important to explore alternative materials and methods for decarbonizing cement and steel and reducing embodied carbon. However, modernizing the existing building stock necessitates efficient operations and measurable outcomes.

Lastly, the future and longevity of green real estate in the country is an ongoing process and is dependent on the meaningful strides taken toward providing a greener environment to the people. The contribution from sustainable real estate can make a significant dent in the resource deficit if deployed in sufficient quantities. Therefore, we must 'go green' sooner rather than later as a country.



Green infrastructure: A decisive step towards Future sustainability



With green infrastructure in urban planning, we can protect future generations' resources as well as provide a framework for growth and development in the future

B K Goenka

Past President, ASSOCHAM and
Chairman, Welspun Group

Infrastructure is undoubtedly one of India's top development priorities. This was evident when it was highlighted in the Union Budget 2022 as a critical component of the country's development initiatives. However, in India, infrastructure is mainly associated with 'grey' elements like engineered brick-and-mortar structures despite the fact that green projects are quickly becoming a part of modern urban planning at the national, regional, and municipal levels. We urgently need to shift our perspective on urban planning and go beyond the traditional frameworks, as sustainable infrastructure has been identified as a critical solution for addressing the aforementioned issues.

Green infrastructure could be understood as a strategically planned network of natural and semi-natural areas within the existing urban centres or new & proposed infrastructure projects which are designed and managed to use natural benefits like water purification, air quality, climate mitigation and adaptation for the benefit of society.

Given that half of the structures that will exist in 2040 have yet to be created, there is ample potential and need to develop green infrastructure through a framework for future expansion while ensuring that resources are protected for future generations.

The goal of green infrastructure is to obtain both economic and environmental benefits, especially to counter the challenges in an urban environment. Given that half of the structures that will exist in 2040 have yet to be created, there is ample potential and need to develop green infrastructure through a framework for future expansion while ensuring that resources are protected for future generations. The initiative can help



organise growth and regulate city expansion within the context of enhanced conservation and open space lands. Since climate change impacts human life, some cities around the globe have changed their planning and design approach to make way for more nature-driven solutions, such as blue-green infrastructure rather than grey-engineered infrastructure.

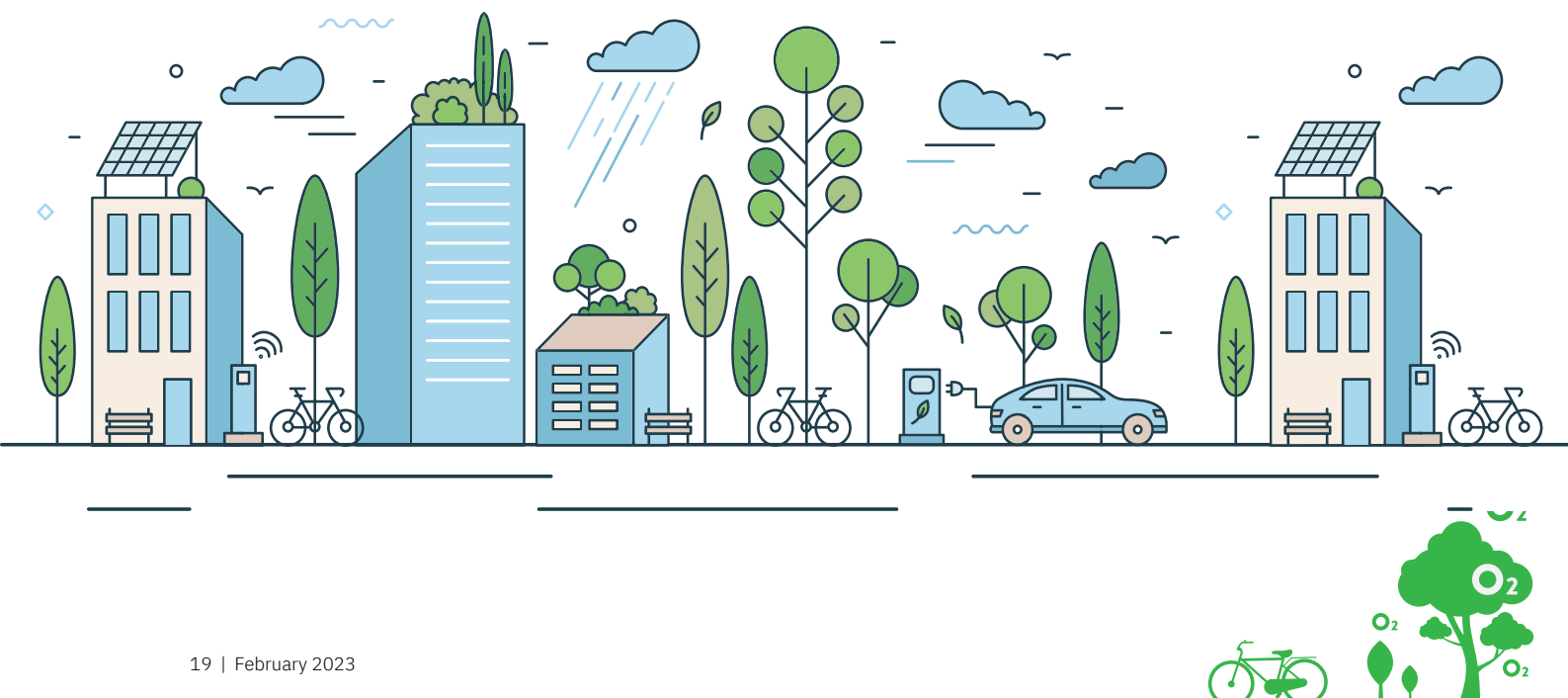
Furthermore, utilising green infrastructure creates recreational spaces, promotes community identity, and offers several other benefits. Green cities also provide rich biodiversity, reduce air and noise pollution, prevent water scarcity, ensure cool temperatures, and minimise the effects of climate change's effects. As a result, the country is likely to witness an increase in investments in strong, well-resourced, and resilient infrastructure. The transformation that will take place will also include better urban designs, shifting the development cart to smaller cities, investments in enhancing connectivity, easing information symmetry, the greening of SMEs and the local economy, as well as effective waste management systems.

Similarly, green infrastructure can help cities mitigate the effects of climate change, such as heat stress. It also reduces the impact

of extreme weather events and promotes community resilience by protecting and nurturing mangroves, wetlands, forests, and coral reefs that act as natural shock absorbers. In coastal cities, for example, planting mangroves along the coasts acts as a good sand-binder and can prevent saltwater from degrading the quality of groundwater due to increased rainfall and flooding, etc. Also, vertical gardens may not capture as much carbon as a forest already standing or a small area of trees like a park; however, it would lessen the need for thermal cooling.

Prominent among the many advantages is that advocating environment-friendly solutions could give rise to job creation, which is necessary if you want to make the country self-sufficient and independent.

In an era when climate change and environmental degradation have been identified as the two most serious concerns of our time, India has the opportunity to reverse the trends by implementing green infrastructure approaches alongside blue infrastructure. In honouring its legacy and respecting nature, India may set an example not only for sound economic policies but also for other countries to follow.



The Future of Sustainability in the Steel Sector



Dr Vinod Nowal

Chairman, ASSOCHAM National Council on Iron & Steel and
Chairman, Bhushan Power & Steel Ltd.

Decarbonizing steel production, which contributes 0.7% to global GDP while generating 7-9% of global CO₂ emissions, is vital to achieving a net-zero world. In India, the problem is more acute given that the steel sector contributes to ~10% of emissions at a 2% contribution to GDP. The National Steel Policy 2017 targets a crude steel capacity of 300 MT by 2030 to meet the projected demand. Further, given India's massive \$1.3 trillion infrastructure plan, the steel demand is only going to go up, and it becomes imperative to reduce emissions in order to mitigate climate change - which is among the most critical threats to the world - according to the Global Risks Report 2022, published by the World Economic Forum.

The IEA announced the Iron and Steel Technology Roadmap in 2020 with detailed emission reduction pathways for the Global as well as the Indian Iron & Steel sector. The Roadmap sets out a "Sustainable Development Scenario (SDS)" - an ambitious pathway to net-zero emissions by 2070 for India. As per SDS, the Indian steel industry must plan to reduce its direct and indirect CO₂ emissions by 60% by 2050 in comparison to 2019-20 levels. This process

Indian steel producers face unique challenges across four broad categories in the decarbonization journey of limited technological Investments in BF-BOF, lack of quality Scrap, cost barriers to Hydrogen and CCUS technology adoption, and emission intensity of the grid.

is not instantaneous and requires managed transition between phases. Further, India has set out stringent NDCs in alignment with the Paris agreement.

Indian steel producers face unique challenges across four broad categories in the decarbonization journey of limited technological Investments in BF-BOF, lack of quality Scrap, cost barriers to Hydrogen and CCUS technology adoption, and emission intensity of the grid.



Given the current state of the Indian steel industry and the best available technologies, decarbonization can be achieved through significant investments in process interventions. These could optimize power and energy consumption, recycling, and emerging technologies like CCUS & Hydrogen technologies to be feasible.

In due course, with the deployment and optimization of appropriate technologies, low-carbon steel-making technologies are expected to become competitive w.r.t. conventional iron and steel-making technologies. However, the industry will need government support through a well-designed policy to help moderate the initial capital costs and the higher OPEX costs in the transition period that could otherwise render them uncompetitive.

To further push the envelope and fully realize the potential for decarbonization, examining the role of market forces in shaping the path to green steel will be critical. This has already started to happen globally, and India must move quickly to establish a sustainable market for green steel.

Embarking on this journey to shape the market for green steel will require addressing three primary strategic considerations - Definition, Demand Generation, & Adequate Supply of Green Steel. Also, the Indian steel industry does not have an agreed methodology to evaluate GHG emissions; hence, it is vital to adopt a specific methodology in this context. The effort should not be to duplicate existing measurement standards but to develop or adopt a standard that adheres to relevant international energy and emission accounting frameworks and works in harmony with the existing standards.

JSW has aligned its sustainability target for GHG emissions with the projections based on IEA's sustainable development scenario and set a target to reduce by 42% by 2030,

considering the base year as 2005 to be on the trajectory aligned with India's NDC in the long term. A few steps taken include - energy transition from thermal coal to RE in steel making, reduction of solid fuel rate in BF, use of PCI, usage of natural gas in BF, increased use of scrap in steel making, and implementation of best available technologies, thereby reducing carbon emissions, fugitive emissions and improving safety.

In 2021, JSW became a vital member of the India Hydrogen Alliance (IH2A) and was entrusted with bringing industry majors and the government on a shared platform for hydrogen commercialization in the steel and cement industry.

We are committed to achieving a target reduction of 19% in energy consumption by 2030 from 2005 levels and aim for RE consumption of 1,000MW by 2030 in our operations. JSW Steel has started utilizing solar power with the commissioning of a 225 MW Solar Power Plant at Vijayanagar, reducing steam coal consumption and aiding the transition to renewable energy from fossil fuel.

Water, a resource vital for supporting life on earth, is getting depleted at an unprecedented rate. Globally, the importance of water security has become paramount. Like other steel companies, JSW Steel is equally dependent on water for conducting our operations. We value this critical resource, and as part of our water stewardship approach, we have implemented water-efficient technologies that help us conserve, reuse and recycle water, enabling judicious use of the resource. We are committed to maintaining our zero liquid discharge (ZLD) status.

To fully harness the potential of embracing sustainability in the steel sector, it is crucial to ensure that the right governance frameworks



are in place. Board-level awareness and monitoring are imperative. The Company has developed a sustainability framework based on 17 critical areas which embody the long-term ESG goals of the enterprise. JSW Steel has also established a Board-level Business Responsibility/Sustainability Reporting Committee, which reviews the sustainability parameters half yearly.

A key governance exercise that has been undertaken in light of the rapid developments related to climate change viz. technology, regulations, taxation, investors' growing expectations, disclosures and so on, is the constitution of a Climate Action Group

(CAG) with cross-functional expertise, encompassing R&D, strategy, operations, communications etc.

To conclude, a vibrant steel industry has historically been the foundation of a country's robust industrial development. To fully embrace sustainability in this sector, collaboration amongst all stakeholders, including producers, consumers, policymakers, shareholders, and investors, is the need of the hour and the steel sector being a backbone of the economy, will strongly emerge to lead to a low carbon economy.



Future Technologies- Indian Automotive Sector



R. S. Kalsi

National Council on Auto and Auto Ancillaries, ASSOCHAM and
Member, Executive Board, Maruti Suzuki India Limited

The long-term objective of thinking for change in the mobility paradigm is sustainable and clean transportation. In our journey towards this long-term goal, the economy and ecology must stay healthy in the short and medium term for us to achieve our long-term goals. Hence, we need to adopt the objectives of Decarbonization and reduction of crude oil imports.

Globally, the automotive industry is witnessing a transformation, especially in the area of powertrain technologies. One of the primary objectives is to reduce carbon footprint to make the environment cleaner. Likewise, the Indian automotive industry is working aggressively to develop & promote sustainable & clean mobility solutions. India is a unique country, and its mobility solutions may differ from the rest of the world. In India, ~75% of the vehicle population is of Two-Wheelers & ~15% of Cars which is very unlike the rest of the world. In addition, India's GDP per capita is much lower than that of European Countries, the USA, Japan, China etc. Hence, we need a much more cost-efficient, sustainable & clean mobility solution for all.

The Government is actively supporting the development of the Ethanol ecosystem by engaging with all the stakeholders and ensuring that all enablers are in place, such as the production & distribution ecosystem and a favourable regulatory mechanism.

Against this backdrop, the Indian Auto industry is pursuing Electrification with full efforts. Leading OEMs and a host of Start-Ups have made significant investments in the EV ecosystem. Also, it is widely understood now that different vehicular segments would have a different propensity to switch to Battery Electric Vehicles (BEVs) because of the factors such as the acquisition cost of BEVs and charging infrastructure. It can be



confidently said that 2W and 3W segments would be the initial drivers of BEV in India, and the increasing number of BEV products in this space and the considerable growth of BEV sales are a testament to this. This would be followed by Intra-city buses. Cars may take a longer time to electrify for obvious factors, while the Electrification of heavy-duty vehicles is still a challenge. It may also be noted that the full benefits of EV technology in terms of emission reduction (well-to-wheel emission reduction) can only be achieved when the power mix of India is dependent on renewable energy. However, various credible reports predict that electricity generation in India would be largely thermal-based for the next few decades. Hence to expedite the achievement of the national objectives of carbon footprint reduction, there is also a need to explore additional clean mobility alternatives that complements BEVs. More and more countries are shifting their focus to alternative renewable energy sources like Solar and Wind. Both these sources combined have become the fourth most significant source of electricity after coal, gas and hydropower & generated around 10% of global electricity, whereas India's contribution is about 8%. Geographically, India is at a sweet spot with a vast coastline of over 7500 km and an abundance of sunlight because of its proximity to the equator, aiding the utilization of windmills and solar panels, respectively. Therefore, India would continue to invest in producing electricity in a greener way.

Another powerful technology is the Strong Hybrid Electric Vehicle (SHEV) which runs in EV mode nearly 60% of the time. BEV & SHEVs are part of the same electrified family. Both these technologies have three core key components – Battery, Motor, and Power Electronics. SHEVs help in carbon reduction as it has 35% ~45% less CO₂ emissions than conventional cars. SHEV technology can be

Indian Auto industry is making concerted efforts to achieve Decarbonization which is in line with India's International Climate commitments and Internal need for energy security by working on a host of advanced mobility technologies.

scaled up quickly as it is self-charging and does not depend upon external charging infrastructure.

Another alternative is CNG. It offers an excellent opportunity to achieve decarbonisation & oil import reduction, especially in vehicular segments such as heavy-duty vehicles and commercial vehicles like intra-city buses & trucks, cars. It may also be noted that the Hon'ble Prime Minister of India has given a vision of transforming India into a Gas Based Economy by increasing the share of natural gas in the country's primary energy mix from the current level of 6.2% to 15% by 2030. CNG mobility would play an essential role in achieving this vision. One of the critical enablers for CNG mobility is station infrastructure. With the support of the Government & Gas industry, stations have expanded significantly over the past three years. Today we are nearing 5,000 CNG stations. In line, the Auto industry has also made rapid progress, especially in the last 3-5 years, by developing more factory-fitted, advanced technology CNG products.

Also, Biofuels like Ethanol is set to play a major and significant role in helping achieve Zero emissions. On a life cycle basis, Ethanol is among the least Carbon emitting



India's moment in the sun for being the sustainability leader

Srini Viswanathan

Chief Executive Officer, Vibrant Energy

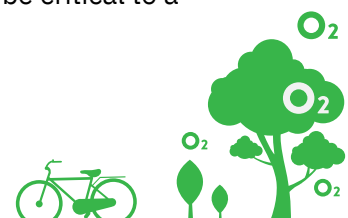


In the current era of high inflation and possible recession globally, India stands out as a potential silver lining to build a resilient climate economy. A large part of future economic growth is going to be driven by initiatives taken around climate change, sustainability, and net zero initiatives. The climate economy covers industries that cater to renewable energy deployment, renewable energy manufacturing facilities, sustainability compliance markets, circular economy mandates, climate finance actions, and grassroots sustainable development. More than ever, today, we deeply care about contributing to the climate economy as it is the only way to reduce global warming below 1.5deg by 2030. India put forth bold plans to hit 40% renewables by 2030 and achieve 500GW of renewable capacity but is still short of hitting the 45GW yearly run rate requirement.

The underpinnings of the climate economy require significant stakeholders, including government, industries, electricity bodies, and local government, to consider this a primary goal for future generations. Taking a page out of how various countries are starting to

As a start, we will have to measure our carbon footprint on a live basis and build economic models on encouraging behaviour that reduces the release of additional carbon. Hence one of the primary requirements for making this climate economy will be an active carbon market.

build their climate economies, India needs to urgently start focusing on compliance markets that can drive much-needed change. Many green energy requirements among the Indian corporate players today in the steel, aluminium, cement and other hard-to-abate industries are originating due to the taxonomies in Europe and the US markets. A robust domestic compliance market and strict enforcement of RPOs will be critical to a prosperous climate economy.





As a start, we will have to measure our carbon footprint on a live basis and build economic models on encouraging behaviour that reduces the release of additional carbon. Hence one of the primary requirements for making this climate economy will be an active carbon market. India is taking the mantle of the G20 presidency, with sustainability being one of the priority areas. India should seize this opportunity to lead the world with a framework for a global carbon market where India can be the solution to meeting a large part of carbon offsets to the rest of the world.

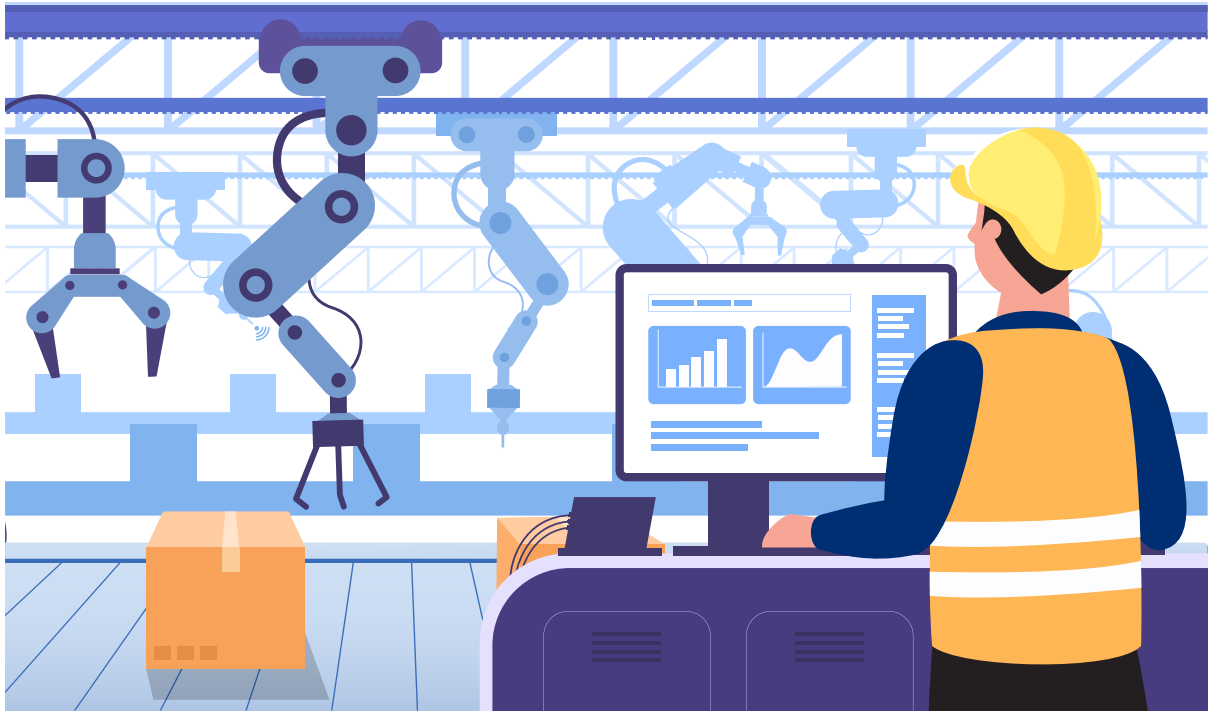
While innovative business models and regulatory reforms are crucial to building a successful roadmap for sustainability, India needs to rethink how it can create an ecosystem for technological innovation in clean energy at home. There is a strong focus on developing local manufacturing capabilities to support the growth of renewable energy capacity. However, the global landscape of cleantech solutions is evolving quickly.

The industry is witnessing significant R&D investments in storage systems with multiple chemistries, AI-based asset monitoring, next-generation solar panels, and advanced technologies for grid resiliency. India needs to balance its protective policies for India-based manufacturing with active global technology partnerships to encourage India to stay on top of the clean technology curve. Moreover, encouraging investment flows to Indian clean energy R&D activities with tax sops or depreciation write-offs can foster a culture of cleantech finance.

In summary, the opportunity to create a sustainable future is both exciting and daunting. It is this one time that the world needs India more than ever to lead by example.

Note: The opinions expressed in this article are those of the author, and they do not reflect in any way those of the organization with which he is affiliated.





fuels. Ethanol production will be a massive support to our farmers. The Government is actively supporting the development of the Ethanol ecosystem by engaging with all the stakeholders and ensuring that all enablers are in place, such as the production & distribution ecosystem and a favourable regulatory mechanism. The auto industry is also committed to supporting and complementing the efforts of the Government. The industry has committed to launching E-20 material-compliant vehicles by 2023 and E-20 engine-compliant vehicles by 2025 and is also working dedicatedly on developing Flex Fuel vehicles.

Hydrogen mobility represents a further next-generation alternative technology option for Decarbonization. The hydrogen stored in the vehicle is converted into electricity by a fuel cell, which drives an electric motor. If the

hydrogen is produced from renewable energy by water electrolysis, it is a climate-neutral drive technology. Therefore, this technology presents vast opportunities; however, the technology is currently at a nascent stage and may take some time to achieve significant levels of market adoption penetration.

Hence Indian Auto industry is making concerted efforts to achieve Decarbonization which is in line with India's International Climate commitments and Internal need for energy security by working on a host of advanced mobility technologies. Indian auto industry will continue to work to fulfil our hon'ble PM's promise of COP27 to provide sustainable and clean mobility solutions for the country and hence for mother earth, demonstrating the message of 'Vasudhaiva Kutumbakam!'



Future of Sustainability in India the roadmap for industrial decarbonisation



Rohit Kochar

Member to ASSOCHAM Taskforce for Sustainable Financing and
Founder, Executive Chairman & CEO Bert Labs

Decarbonization in an industrial setting is about the complete removal or significant reduction of carbon dioxide gas (CO₂) produced due to human activity in the atmosphere. The significant reduction of global greenhouse gas emissions will limit the increase in global temperature. Practically achieving zero net emissions mandates a shift from fossil fuels to alternative low-carbon energy sources, energy optimization, production efficiency, the longevity of the equipment, etc. Therefore, the progress must be carried on all levels - globally, nationally, locally and individually.

Energy demand for the ten members of the ASEAN is expected to rise by about a third of the EU's total by 2050. For India to cease relying on fossil fuels, others will have to pitch in. India alone would need additional capacity equivalent to today's EU by 2040.

As with any initiative, decarbonization will work wonderfully if the industry aligns its goals with smart low-carbon policies, collaborative actions from outside the industrial sector and substantial investment from industry and Government in the

Practically achieving zero net emissions mandates a shift from fossil fuels to alternative low-carbon energy sources, energy optimization, production efficiency, the longevity of the equipment, etc.

next generation of sustainable industrial breakthroughs will help the industry to adopt path-breaking initiatives. This can be done by accelerating technology development through increased investment in technology institutes.

The approach to be followed to deliver results is:

Identify first steps with immediate targets:

Immediate action on easy-to-decarbonize areas of operations. Change to a local supplier, efficient equipment, energy optimization solutions or work with a company using renewable energy.



Uncertainty: Plan considering the current targets and look for the solutions viable for tomorrow, so the best plan is always a work in progress. Accepting the technology advancement will reap the benefits on a larger scale with better results.

Partners and Collaboration: Right partners to be onboarded for technology solutions, renewable energy, energy storage, energy optimization and process optimization.

Regulatory Landscape: A strategic decarbonization roadmap supports the incentives and subsidies available for reducing CO₂ emissions when setting the pace and potential cost of achieving net-zero goals.

Digitization: Digital technologies can handle more than 70% of the management in asset monitoring, metering, data measurement, energy management, energy optimization, and improved performance, providing real-time “health” and 360° view of the infrastructure. The digitization of the process and the solutions will help large automobile ovens reduce CO₂ emissions. When we economize fuel consumption in the evaporator in any manufacturing process, including pulp and paper, when we reduce coal consumption in industrial-grade turbines, India is reducing CO₂ in the atmosphere.

Adaptability: Collaborating with a company for emissions or energy optimization is rewarding in the long term. Working with the pre-set checkpoints, measuring milestones and reflecting on changes.

Communicate: Once implemented, a well-structured decarbonization roadmap becomes a strong asset from which the organization draws energy. The storyline of the company, brand message, onboarding an investor, or choice of stakeholders can be attracted to the journey.

The efforts must focus on the organization’s operations with a holistic system approach to unlock opportunities in the transition to a low-carbon economy. This can be achieved by working on emerging low-carbon initiatives for long asset lifespans, high energy dependency, and the complexity of electrification. What we need is the most economical form of achieving decarbonizing goals across sectors by reducing energy consumption, both power and fuel. Some more energy-consuming processes are linked to the carbonation process in chemical soda ash manufacturing when burning Volatile Organic Compound (VOC) in an automobile paint shop oven process.

Industrial processes and products are over-reliant on fossil fuels, and carbon intensity across the value chain increases operational risks for industrial manufacturers. The no. 1 energy guzzler in any commercial building is HVAC, and energy-intensive industries like iron & steel, cement & concrete, petrochemicals, aluminium, fertilizers, Pharmaceuticals and Automobiles have to resort to better energy management. And the day the industry knows how to control this energy usage, we will be very close to the goal of decarbonizing.

India’s Prime Minister, Narendra Modi, has shared that to achieve net zero, we would need \$1tn in funding by 2030 alone, which is ten times the annual commitment under the Paris agreement of 2015, to all poor countries. According to the Asia Investor Group on Climate Change, weaning Asia off carbon will require investments worth \$26tn-37tn between now and 2050. India is lobbying to copy a model where rich countries provide grants and cheap loans to shut coal generators. Indian industrial sector needs to transition to resource efficiency, energy optimization, and sustainable and low-carbon production to support future growth.



Fulfilling India's energy needs in a Sustainable, Safe and Reliable manner



Akhil Mehrotra

Co-chairman, ASSOCHAM National Council on Hydrocarbons and Managing Director & CEO, Pipeline Infrastructure Ltd

The oil and natural gas industry is likely to continue to have a crucial global role in supplying affordable, reliable energy for global economic development for decades. However, in the context of environmental considerations, especially climate change aspects, there is rising scrutiny of oil and gas companies adapting business models to align with a low-carbon energy transition and long-term sustainability.

Sustainability has been put at the centre as a critical consideration for oil and gas companies across the globe. They focus on adhering to health, safety and environmental regulations and have been enhancing contributions to the societies in which they operate. However, with climate change becoming increasingly imminent with melting glaciers and rising temperatures, there is an increased focus on several climate-related concerns. This includes an increased emphasis on methane, recognising its essential role in responding to climate change risks in the short term. Other areas of focus include the transition to lower carbon energy sources, carbon capture and storage (CCS) application, the health of natural ecosystems, the application of offsets, fostering of energy

With climate change becoming increasingly imminent with melting glaciers and rising temperatures, there is an increased focus on several climate-related concerns.

efficiency and conservation, and the roles of natural gas and renewables.

Many traditional oil and gas companies are beginning to identify themselves as energy companies or mobility companies as they diversify into new areas with innovative business models. Sustainability and digitalisation have become the key focus of many energy and utility companies, which are leading across segments when it comes to adopting sustainable practices. According to a recent SAP and Oxford Economics survey, energy and utility executives have made more sustainability-related transformations to their operations than executives in other industries. More than three-quarters (79%) say sustainability issues are a significant concern at all stages of the manufacturing process.



Key Drivers of Sustainability in the Oil and Gas sector

§ Regulatory: Increasing government interventions, such as the United Nations' Paris Agreement, the European Commission's European Green Deal, India's National Hydrogen Mission, Bio-fuels policy, CCUS roadmap, etc. are pushing oil and gas companies to look for sustainable solutions to meet carbon-neutral targets.

§ Stakeholders: Well-informed consumers are pushing companies to focus on sustainable practices and transition to renewable energy sources. ESG commitments are also leading to mounting pressure from investors to become more sustainable. There is a rising belief among investors that companies which perform well on ESG are less risky, better prepared for uncertainty and thus well-positioned for the long term.

§ Portfolio Diversification: With several oil and gas companies extending beyond traditional revenue streams, the industry boundaries are blurring. Many are focusing more on customer needs and diversifying to include newer and greener revenue streams, such as renewable power, EV charging stations, Biofuels, Hydrogen, Gas-based power, etc.

§ Digitalization: Advanced technology is changing the way companies work, creating more opportunities for collaboration and opening doors to new options for innovative business models. 'Data is the new Oil' and data analytics will help businesses to enhance operational efficiencies and optimise costs. Digitalisation facilitates businesses to remain agile, integrate & streamline operations and provide an opportunity for product & service innovations.

India's Net Zero Roadmap

While India is the 4th largest emitter of carbon dioxide, its target to reduce carbon emissions by 1 billion tonnes by 2030 and achieve net-

zero emission status by 2070 has created a buzz across the country. To meet this target, Government reforms and policy initiatives should be supported by both private and public sector organisations by adopting sustainable business practices. Govt. has launched various initiatives to move toward a sustainable future, e.g., National Hydrogen Mission, National Gas Grid, International Solar Alliance, Compressed Biogas SATAT initiative, National Bio-fuels Policy, CCUS roadmap for Upstream E&P companies, etc.

How do gas pipelines contribute to the implementation roadmap?

Natural Gas Pipeline infrastructure development is critical for securing India's energy supply. Pipelines are a critical component of the gas grid and act as highways that carry energy nationwide. Natural Gas has a crucial role in India's energy transition, and thus ensuring access to gas in every part of the country is significant to achieve sustainability. Cross-country pipelines traverse across various regions and terrains, impacting the local community's environmental and societal aspects; hence, pipeline entities must adopt safe, reliable, and sustainable practices to ensure smooth and uninterrupted operations.

PIL have a strong focus on sustainability, from improving operational efficiency and the environmental performance of our facilities, reducing waste and losses, and developing to pursuing low-carbon energy solutions, thereby ensuring better and continued access to resources through stronger community and stakeholder relations. In our view, sustainable practices are the best way to ensure our business remains viable in the long term.



ESG Standards and Green Financing in India

Ashwin Bhadri

Member to ASSOCHAM Taskforce for Sustainable Financing and
CEO, Equinox Labs



India has been on the journey to fund green projects for more than several years, and the financial systems in the country are seeing a rapid shift towards adopting eco-friendly practices. As challenges related to climate change are increasing, so is the drive towards sustainable finance worldwide. There are dedicated ESG funds and green instruments in the global markets (ranging from green bonds to green insurance) that are designed to promote projects - not just within climate finance but focusing on environmental objectives needed to sustain resilience.

This unifying approach would contribute to strengthening developments in ESG investments, environmental guidelines and financial products, as well as in the roles of private, public, banking and asset managers. Using domestic investments, including Green Infrastructure Investment Trusts (InvITs), that incorporate markets for bonds and instruments to finance green finance. The Government of India announced sovereign green bonds during its fiscal year budget meeting, which will be a monumental instrument to raise funds for various green projects across sectors with lowered capital costs, further catalysing the deepening of bond markets.

The Securities and Exchange Board of India (SEBI) is looking at expanding green bond usage and strengthening disclosure requirements, introducing blue bonds, and reducing the compliance costs of issuers selling green bonds, avoiding “greenwashing”.

India’s leading renewables companies like Adani, Power Finance Co. etc., issued green bonds of ten-year maturity. At the same time, the World Bank has also invested in Indian green bonds in different cases. Most green bonds issued in South Asian countries over the past few years were sold by non-financial companies, particularly ones involved in renewable energy. Indian issuers are also wary of borrowing abroad, keeping the larger global pool of green money away from domestic banks.



As the South Asian countries move towards their sustainability goals, Indian banks will have to ramp up financing for green projects. The South Asian nations need to broaden their lending rules in the preferred sectors to cover a more comprehensive array of green projects. The Securities and Exchange Board of India (SEBI) is looking at expanding green bond usage and strengthening disclosure requirements, introducing blue bonds, and reducing the compliance costs of issuers selling green bonds, avoiding “greenwashing”.

In addition, regulations and guidelines issued by the Indian securities regulator, SEBI, regulate India’s green bond environment. In 2021, Indian businesses raised about \$7 billion through ESG and green bonds. The amount of money raised in Indian jurisdictions differs significantly from that raised in foreign or autonomous jurisdictions.

Meeting our current demands without compromising the ability of future generations to meet their own requirements is referred to as sustainability in the development of products, goods and services. The idea of sustainability acknowledges that the environment is a finite resource. For the sake of the Earth, our environment, humanity and all living creatures, it is crucial to use the environment and its resources wisely and to safeguard them.

Although most people only think of sustainability in terms of the environment, it may also be discussed in terms of social responsibility and economic growth. The carrying capacity of the planet, the viability of ecosystems, occupations, behavioural patterns and so forth are some examples of these contexts.

One-sixth of the world’s population lives in India, which is essential to the 2030 Agenda’s success. India’s alignment with the national development strategy, as evidenced by the tagline Sabka Saath Sabka Vikaas,

demonstrates its commitment to the SDGs (Collective Efforts for Inclusive Growth). The country has created a strong SDG localisation strategy focused on adoption, implementation and monitoring at the state and district levels. This model is based on data from the SDG India Index, which monitors progress at the subnational level. India’s efforts towards a sustainable future are apparent, with many movements at the forefront. According to the most recent SDG India Index published by NITI Aayog, which measures the nation’s progress in social, economic and environmental development over the past year, the country has made steady progress toward achieving the SDGs in the areas of infrastructure, energy and health. According to an official NITI Aayog statement, since 2019, India’s total score across SDGs has increased from 60 to 66 in 2021 as a result of national progress in “clean water and sanitation” and “cheap and clean energy,” respectively.

A lot of work needs to be done at an individual level by the citizens of India to ensure that the country’s future is clean, sustainable and safe for generations to come. That being said, we must pat ourselves on our backs to appreciate the long way we have covered. The road ahead is certainly difficult and will require significant overhauls in the way we spend our daily lives. It is our moral responsibility as proud citizens of a wonderful country to chase a new horizon collectively.



The Road Ahead for Sustainability 2.0 in Mining

Satish Kumar Sinha

Head- Sustainability & Compliance, Adani Enterprises Limited



The mining industry has been under surveillance in recent years on the grounds of sustainability. Mining is increasingly becoming conspicuous as a land-breaker in today's land crunch scenario, along with the loss of ecosystem services connected to that. However, the industry, especially from the past decade, is leveraging advanced technologies, a vast fleet of modern mining equipment, evolving mining surveys, environmental engineering, and decarbonizing initiatives to make itself aligned to sustainability.

Any state/country is blessed with an abundance of resources, including forests, watersheds, agricultural land, grazing land, mineral resources, livestock, people, etc. Instead of engaging in conflict with one another, we need to conduct business in harmony for overall excellence.

Sustainability initially began as an extension of the environment and then connected to climate change and carbon footprints etc. But the advent of ESG, Net Zero Carbon, Carbon credit and financing have led to the worthiness of companies in today's world and evolved these concerns to Sustainability 2.0, wherein it necessitates observing a dynamic balance among Ecology, Economy & Society while conducting a business.

Sustainable mining practices create long-term values for the community residing in and around mine operating areas. Community development programs are introduced post-need assessment exercises that envisage developing cordial relationships and building trust with the local community.

Challenges of the mining industry:

Today, the foremost challenges faced by the mining industry are primarily of the non-mining category, such as:

- Land,
- Stakeholders - (PAPs)
- CSR and R&R
- Environment and Forest Clearances / Conservation
- Socio-economic issues
- Ecosystem services etc.



Sustainability - a Growth Mantra

The challenges aforesaid can be best addressed by taking it ahead as an opportunity for business excellence. The leveraging of evolving technology, decarbonization through digitalization, ITES / IoT and robotics, AI / ML and Deep Learning as safety predictors are the arenas with huge capitalization potential. The rewards in terms of quality, speed and precision can be quantified in an appropriate financial market with tangible as well as intangible gains. This we call “Sustainability through the ESG way”.

Environment Sustainability

Environment Sustainability is our key priority as the mining industry, by its very nature, begin on a confrontation note with the existing ecosystems. Steered by sound environmental policy, we are committed to reducing and mitigating environmental impacts while ensuring the overall well-being of biodiversity in the areas of the mining operation by following the ESG way, which includes managing:

- Climate change
- Circular economy
- Carbon footprints
- Biodiversity
- Ecosystem services
- Re wildering
- Soil

Social Sustainability

Sustainable mining practices create long-term values for the community residing in and around mine operating areas. Community development programs are introduced post-need assessment exercises that envisage developing cordial relationships and building trust with the local community. Since Education, Community Health, Sustainable Livelihood, and Community Infrastructure are a few initiatives that always have a long-term



impact on business and society, we need to take proper care of the following in Mining Industry:

- Labour standards / Employees
- PAPs -Skills / Training
- Equal employment
- Regenerative Economy

Governance Sustainability

The most essential and fundamental component of a business methodology is the Governance that administers the whole industry through the following:

- Ethical Biz
- Board Diversity
- Risk Avoidance
- Tax & Accounts
- Data Governance & Security
- Sustainability Policy
- Biodiversity Conservation
- Gender Diversity
- Inclusivity

Extending beyond Environmental Impact Assessment (EIA) and Environmental Management Plan (EMPs), the time has arrived to estimate and account for the value of ecosystem services that are impacted by mining activity. One must attempt to restore ecosystem services to near original (in-situ Conservation) to bring inclusive and sustainable development.



Net Zero for Healthcare – An approach to Control emissions in Healthcare



Dr Aravindan Selvaraj

Chairman, Tamil Nadu State Development Council, ASSOCHAM and Co-Founder & Executive Director, Kauvery Group of Hospitals

The Healthcare sector, consisting of Hospitals, Medical facilities and medical supply chains, accounts for nearly 5% of global emissions. Now that the scourge of Covid is mostly behind us, there is a need for renewed attention to reducing carbon emissions in healthcare.

How to Measure Emissions:

When we talk about Greenhouse, it is not just CO₂ but also a mix of different gases, which are expressed as CO₂ equivalent in terms of their Global Warming Potential. The below table talks about various greenhouse gases

When we talk about Greenhouse, it is not just CO₂ but also a mix of different gases, which are expressed as CO₂ equivalent in terms of their Global Warming Potential.

and their Global Warming Potential expressed in terms of CO₂ Equivalent (CO₂E).

Greenhouse Gas	Global Warming Potential (GWP)
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous oxide (N ₂ O)	298
Hydrofluorocarbons (HFCs)	124 - 14,800
Perfluorocarbons (PFCs)	7,390 – 12,200
Sulfur hexafluoride (SF ₆)	22,800
Nitrogen trifluoride (NF ₃)	17,200



Net Zero:

According to Yale Institute on Sustainable Finance, the objective of Net Zero is to minimise greenhouse gas emissions resulting from the organization’s activities to essentially zero, accounting for all sources and sinks. In a way, it is a more stringent way of controlling emissions for an organisation than Carbon Neutrality, as Carbon Neutrality allows an organisation to purchase carbon credits to mitigate their emissions. Net Zero as a concept makes individual organisations more accountable, and every organisation should aspire to meet that ideal.

How to define the scope of your emissions:

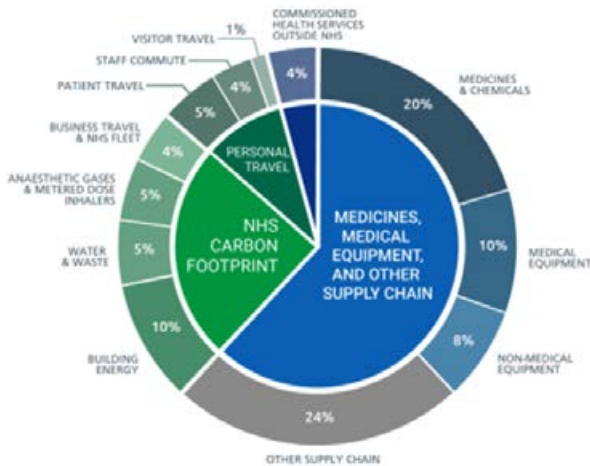
The Greenhouse Gas Protocol (GHGP) defines the following scopes for emissions:

- **GHGP Scope 1:** Direct emissions from owned or directly controlled sources, on-site
- **GHGP Scope 2:** Indirect emissions from the generation of purchased energy, mostly electricity
- **GHGP Scope 3:** All other indirect emissions that occur in producing and transporting goods and services, including the full supply chain.

If we use the framework for hospitals, we can categorise the sources of emissions as follows:



According to the National Health Service of the United Kingdom, the Medical supply chain is the biggest cause of emissions in Healthcare, as illustrated below.



Way Forward:

Indian healthcare is in its nascent stages of achieving Net Zero emissions. In COP26 in 2021, India announced its desire to achieve Net Zero by 2070.

The COVID pandemic played a role in delaying work on this and even made it worse with the proliferation of PPEs and other protective equipment, whose development and disposal contribute to Greenhouse Gas emissions.

For the Indian hospitals to transition to Net Zero alternatives, I propose the following course of action:

Define the Carbon Footprint of the organisation

- Categorize sources of emission under GHG Scope 1, 2 and 3
- Measure emissions intensity for the sources of emission
- Arrive at the overall CO₂e value (CO₂ Equivalent)

Footprint

Assess mitigation strategies

- Identify Low carbon alternatives for Emission sources
- Assess Feasibility and Timeline for Implementation
- Assess Investment required

Define

Implementation

- Implement low-hanging fruit opportunities
- Establish a timeline for the long-term goal
- Establish a North Star year for Net Zero

Act

In my assessment of hospital facilities, there are immediate changes that can be implemented, such as switching to low-intensity LED lights or setting up smart monitoring systems for our non-clinical consumption, such as electricity. There are long lead projects which require capital investment, such as switching to renewal sources of power such as solar power. However, regardless of when these efforts will bear fruit, the time to act is now.

If we have doubts about whether these efforts would aid the immediate growth of the organisation, then think about the cost to the business that climate disasters bring. The journey to Net Zero is not just about the larger survival of our planet but a prudent decision for the immediate profitability of the organisations too.



Future of Sustainability in India



Mohammad Zahid Ansari

Member to ASSOCHAM Taskforce for Sustainable Financing and Lead HSE & Sustainability O2 Power Pvt. Ltd.

Over the past few years, India's remarkable growth story has brought immense new opportunities for businesses to the fore. Corporates have created significant value for the nation, a dimension visible in the enhanced market capitalization and increasing tax revenues, including SGT to the Government. However, this growth has not been equitable and inclusive. Despite the country's GDP in PPP terms ranking amongst the top 5 in the world, India's Human Development Index has been hovering at the bottom of the scale for many years. It is abundantly clear today that future generations' security depends on sustainable and inclusive economic growth. Rapid progress with callous depletion of natural resources and disparities in wealth will have consequences that will impact the sustainability of the business, the economy, and the nation.

At COP26, the main point of discussion was "changing consumer behaviour", reflecting on the increasing demand for sustainable products, a holistic approach to raw material sourcing, and manufacturing processes that are environmentally sound, including low or zero emissions, water usage and waste.

More than ever, consumers are aware of sustainable and unsustainable practices,

The great psychologist Abraham Maslow said in their "philosophy of the future" that thinking about and planning for the future are central attributes of a healthy human personality.

placing a significant demand on the former. Companies need to be agile, adapt fast to market changes and have a holistic approach to meet consumer demand. However, efficacy remains vital, and the demand for transparency is set to grow. These trends are seen across all our sectors, and you can read more about changing consumer behaviour specific to the Personal Care industry here.

Why Sustainability matters

Due to the increasing rate of human economic activity and rapid population growth, the twenty-first century has seen unprecedented environmental and social change. These changes have an unparalleled impact on the climate and life-sustaining systems on the earth. Future generations are exposed to more significant harm, the way humans



exploit the earth's environmental resources. There is a call among environmental ethicists to review human ethical relationships with the environment to attain sustainable development for now and future generations.

Secondly, why do people think about the future?

In the end, we cannot but think about the future; it is an existential burden for all of us to carry, some more constructively than others. The great psychologist Abraham Maslow said in their "philosophy of the future" that thinking about and planning for the future are central attributes of a healthy human personality.

Future of sustainability

At a practical level, people think about the future because they want the future to be kind to them and others too, such as their grandchildren; planning for the future thoughtfully and choosing today's actions concerning their future consequences may help that to happen. Even when it appears that today's actions cannot influence one's future situation, it may still be considered beneficial to plan responses to the occurrences of any of the various future possible scenarios. People also think about aspects of the future in a disinterested way, without interpreting what might unfold in terms of their self-interest. This sort of thinking may just be curiosity-driven, or it may stem from a concern for others, for society, if we prefer.

We may say that we have to review our ethical stand in view of the following questions about future generations.

- Do we have obligations to future generations at all?
- Which ethical theory should govern our assessment of future events?
- Should the ethical approach towards future generations be egalitarian or utilitarian?

One may also say that the issue of obligation towards future generations raises two more interesting questions (Stephen, 1991).

The first question is concerned with future generations' identity, which is usually centred on the identity of future persons based on specific genetic criteria, i.e. They are persons linked to us genetically and form a specific link between future people and us.

The second question concerns the possibility of perceiving future obligations as obligations to all future generations taken as a group, without any specific identity of the individuals in that group. Even if we do not know precisely who it will be, someone will live generations after us.

But moral obligations are usually undertaken in reference to one's promises or commitments to specific individuals. It is unclear what type of obligation exists with reference to a group of people to whom no promises have been made.

Growing Demand for Sustainability Data, Action & Results

- Track and analyze sustainability performance
- Identify de-carbonization initiatives
- Monitor progress toward Net Zero Carbon targets
- Document & allocate offsets (Renewable Energy Credits & Carbon Credits)
- Manage GHG Emissions, including Scope 3 metrics for supply chain sustainability
- Forecast progress on sustainability targets as per SD Goals.
- For lenders, the financial risks of climate change are critical as regulators set out expectations for stress testing and climate risk management.
- Regulators and investors require asset and fund managers and asset owners to embed sustainable investments across their business portfolios and to consider the full spectrum of ESG.



Earth provides enough to satisfy every man's need but not any man's greed



Prophetic Words of Mahatma Gandhi

Shantanu Bhadkamkar

Chairman, Maharashtra State Development Council, ASSOCHAM and Managing Director, ATC Group

Indians are known for their propensity for high rates of savings & investments in Gold & Real Estate for stability and times of difficulty. The family ties and social safety net, not government welfare schemes, are at the core of an average Indian's notion of a support system during any crisis. We are frugal to the core; we reuse almost everything, and where we do not reuse, there's a secondary chain which either reuses or recycles nearly everything, even garbage.

Earth is Mother Earth, and we give the Earth the status of goddess. As a result, we have dominant traits which are very sustainability conducive. Yet it is also a reality that the Environmental Issues & Sustainability Challenges across segments and geographies in India are rising, and dealing with the challenges is getting more expensive every day. The reason is that sustainability is a byproduct of our ethos and cultural & societal values.

On the other hand, in Europe, most eco-friendly products are marketed to women. For female beauty brands, sustainability is a way of standing out in a crowded market & builds a greater attachment to the brand. European

Indians have a minimal per capita waste generation (a score of 0.3 compared to 2.6 for the US). Hence, we need to develop Indian solutions with local concerns and use local resources, including the nascent local talent for it.

Women and girls are influential leaders and change-makers for climate adaptation and mitigation. We will analyze what drives their belief in a separate article; for the sake of this article, we need to recognize that their commitment to sustainability is the driving force, and it influences their ethos, choices, opinions and options. In my conversation, a woman business associate from Europe explained that she buys sustainable products to make her feel good; on the other hand, consuming something not eco-friendly makes her feel guilty. In some countries, 95 per cent of the eco-volunteers and the participants in their environmental campaigns are women



and girls. There's an incredible scope for Indian women to take the lead and be at the forefront of solving many environmental problems, each at their personal level, and then the society. Given our cultural back and ethos, we can proliferate it globally, and it will be a straightforward transition and a case for natural leadership.

Indians have a minimal per capita waste generation (a score of 0.3 compared to 2.6 for the US). Hence, we need to develop Indian solutions with local concerns and use local resources, including the nascent local talent for it. We also need to establish indigenous standards; otherwise, we will be compelled to accept standards that conform to the needs of the countries that lead in research and advocacy. One study showed that out of 1000 papers on sustainability, only ten were from India, and most were from the Global North, many of which were not strictly relevant in the Indian context. Blindly adopting a foreign model may mean the loss of traditional livelihood based on the traditional knowledge and skills of the local population. The alternatives are often ideological, not practical, and unacceptable to the affected people.

In India, buildings are said to contribute to energy-related carbon emissions. Going green will pave the way for a new approach towards sustainable living. Yet, mushrooming several Eco-Friendly buildings in urban areas will only be effective if it is part of Green Living. Using natural elements is at the core of the Green-Solutions, but the more significant issue is respect for nature and all living things. The factors include using natural elements, using replenishable resources, reducing wastage, reducing energy consumption, recycling and reusing a lot of material. Regenerative buildings are designed and operated to reverse the damage and have a net-positive impact on the environment.

Some of the key challenges are:

- Rampant Environmental Degradation, particularly:
 - Degrading Air Quality Index
 - Loss of Biodiversity
- The urbanisation of ecologically sensitive zones, e.g. the Himalayas.
- Loss of Resilience in Ecosystems as a result of over-exploitation
- Poor Waste Management
- Depletion of Resources (land, air, water), notably, Growing Water Scarcity.

Countering the West's 'Doctrine of Poverty Is the Greatest Polluter', the then Indian Prime Minister pitched for a 'Cooperative Approach to Environment', which led to the famous 'Stockholm Declaration and Action Plan for the Human Environment' at the United Nations Conference on the Human Environment. The 1972 United Nations Conference on the Environment in Stockholm was the first world conference to make the environment a significant issue. Since then, humanity has made considerable strides in various areas of sustainability. The Five critical drivers for sustainability are:

- Climate change anxiety: The very real and visible changes in the climate's temperament
- Customer & Consumer.
- International Conventions and Government regulations.
- Business sense, as a part of salability of goods & services, mainly as sustainability technology is no longer unaffordable, and also business continuity plan.
- Investors' requirements: investors want to invest in companies that have a future.
- The sixth, I wish to add, though, is not spoken often - the Innate Goodness of Human Nature.

माता भूमि ः पुत्रो अहं पृथिव्याः पर्जन्यः पिता स उ नः पिपर्तु ॥-
अथर्ववेद, कांड १२ सूक्त १ ऋचा १२ ।



Sustainable Development in India

Manik Batra

Chairman, ASSOCHAM J&K Council and Director, Batra Group



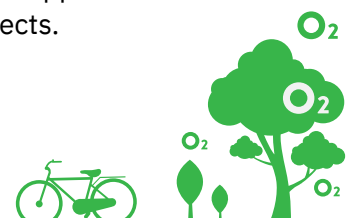
The term ‘sustainability’ is often used in the context of environmentalism. However, it is also essential to consider the sustainability of businesses – especially in India. The concept of sustainable development has been defined in many ways, but the most commonly used definition is from the Brundtland Commission, which described it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” In other words, sustainable development is about meeting current generations’ needs without compromising future generations’ ability to do the same. It is about ensuring that our activities today do not damage or deplete the resources that future generations will need. Sustainability is often thought of as three pillars: environmental, social, and economical.

With over 1.3 billion people, India is the second most populous country, and it is projected to be the world’s most populous country by 2027. India is also the world’s fastest-growing major economy, with an annual growth rate of 8.3% in 2021. In many ways, India is an economic success story. However, India’s high population growth and rapid economic development have strained the environment and natural resources. India now faces the challenge of sustaining its

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growth while protecting its environment and improving the quality of life for its citizens.

The Government of India has introduced various initiatives to promote sustainable development in the country. For example, the Government has launched the “Make in India” initiative, which aims to boost manufacturing in India and make it more environmentally sustainable. The Government has also created a National Clean Energy Fund to support investment in clean energy projects.



Industrial Decarbonisation

The process of industrial decarbonisation is the replacement of fossil fuels with renewable energy sources to reduce greenhouse gas emissions. In India, this process is essential to meet the country's climate change goals.

Industrial decarbonisation has many benefits, including reducing air pollution, creating jobs in the renewable energy sector, and decreasing dependence on imported fossil fuels. Additionally, it can help businesses save money on energy costs in the long run.

The Indian Government has set a goal of achieving 175 gigawatts (GW) of installed renewable energy by 2022, which includes 60 GW from wind, 100 GW from solar, 10 GW from biomass, and 5 GW from small hydroelectric projects. To meet this target, businesses will need to invest in renewable energy technologies and infrastructure.

Some challenges that need to be addressed for industrial decarbonisation to be successful include grid integration of renewables, financing of projects, and public awareness. However, with proper planning and implementation, these challenges can be overcome, and India can achieve its goal of a sustainable future.

Net zero

The term 'net zero' has been used about climate change to describe a state where greenhouse gas (GHG) emissions are balanced by sinks that remove an equivalent amount of carbon dioxide from the atmosphere over a specific time period, or annual GHG emissions are zero.

Achieving net zero status is seen as a necessary step on the path to mitigating and adapting to climate change. It requires businesses to take a holistic view of their operations and understand where their most

significant impacts are. Once these have been identified, policies and practices can be put in place that will help offset them.

Transport Transition

Public transport in India is undergoing a transition, and the Government is investing in new infrastructure and technologies to improve the efficiency and safety of the transport system. This includes projects such as the Delhi-Mumbai Expressway, the Mumbai-Nagpur Super Communication Expressway, and the Chennai-Bengaluru Industrial Corridor.

The transport sector is also seeing a shift from private vehicles to public transport, driven by factors such as rising fuel prices, congestion, and pollution. The Government is encouraging this shift by investing in mass transit systems such as metro rail and bus rapid transit.

This transition will significantly impact India's economy and environment, and it will reduce dependence on imported oil, save energy, and reduce emissions of greenhouse gases.

Fortunately, the Government has taken many steps to promote sustainable development in India. One of the most important things is educating people about sustainable development and why it is so important. This can be done through school programs, community outreach initiatives, and awareness-raising campaigns. Another critical step is to develop policies and regulations that incentivise sustainable practices such as energy efficiency, renewable energy use, waste reduction, and conservation. Finally, it is essential to invest in infrastructure and technology that supports sustainable development.

India is set to play a crucial role in driving global growth, and by focusing on these sustainability goals, we can be the world's most resilient and robust economy.



Green Financing- India's Transition to Clean Energy



S. Salee

Member, ASSOCHAM and
Deputy Managing Director & Chief Credit Officer, SBI

Climate change has emerged as one of the greatest threats to humanity and the world economy going forward. The international community recognises the critical need to join forces to mitigate the impact of climate change. Heads of national governments worldwide meet annually under the UNFCCC to take stock of the progress and renew their efforts to arrest climate change.

Hon'ble PM of India has announced climate action goals for India during COP26 ("Panchamrit"), as given below:

1. Reach 500 GW of non-fossil fuel energy capacity by 2030
2. 50% energy requirement to be met from renewable energy by 2030
3. Reduction of total projected carbon emissions by 1 Bn tonnes by 2030
4. Reduction of the carbon intensity of the economy by 45% over 2005 levels by 2030
5. To achieve net zero emission target by 2070

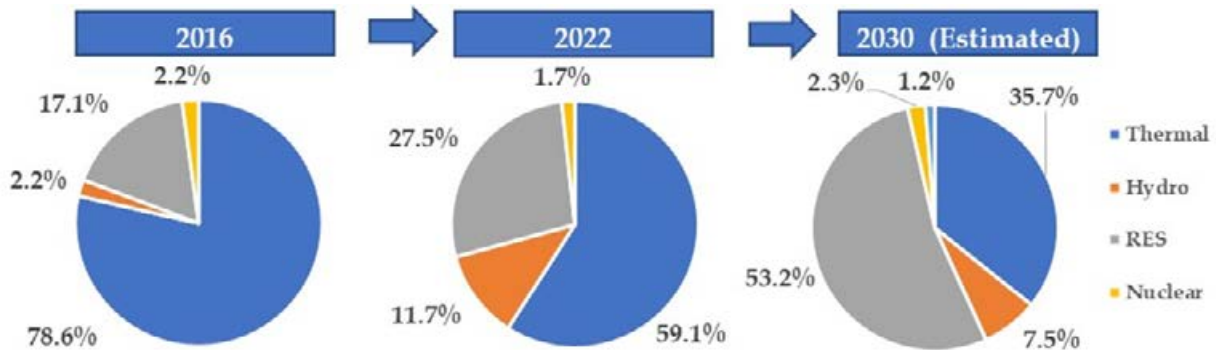
As mentioned in the Panchamrit goals, the transition to renewable energy would be the biggest driver for decarbonisation, followed

As mentioned in the Panchamrit goals, the transition to renewable energy would be the biggest driver for decarbonisation, followed by electric vehicles and other green technologies.

by electric vehicles and other green technologies. The energy sector is also the largest carbon emitter; thus, the GoI's primary focus for carbon reduction.

As on September 2022, the total installed power generation capacity in India from all sources is 408 GW. Out of this, renewable energy is at 118 GW, about 27% of the total installed capacity. Though the capacity additions till about 2016 were driven by coal-based thermal power, going forward, renewable will be the single biggest driver of the capacity additions, resulting in renewable energy becoming the dominant source in the overall mix by 2030, as may be seen in the chart below.





A significant amount of capital would be required to set up the renewable capacity by 2030. Rough estimates suggest the total investments needed at approx. Rs 16.60 lakh crores and debt capital required at approx. Rs 11.6 lakh Crore (assuming capital cost of Rs 5 Cr per MW and Debt/Equity of 70:30).

The investments in electric mobility are expected to be even higher if we consider the GOI targets for EV sales projections for passenger cars, E-buses, and two- and three-wheelers by 2030. Energy storage capacity (battery and pump storage) is expected to be the third area where significant investment would be needed. Investments in energy storage will pick up once the country integrates more renewable power into the grid. Both the transition to electric mobility and the emergence of energy storage systems present tremendous funding opportunities for banks.

SBI has been supporting renewable energy projects. As on March 31, 2022, SBI has deployed over Rs 32,000 Cr for various solar, wind, biomass, waste-to-energy and hydro projects. In FY22, the projects funded by SBI added an incremental capacity of over 6,900 MW and looking to further increase our support going forward.

In addition to using domestic sources for funding, SBI has also tapped concessional overseas capital from multilateral/bilateral

development agencies such as the World Bank, KfW, EIB, etc. So far, SBI has tapped green lines worth over USD 2.2 billion and is arranging additional green lines worth over USD 0.60 billion. These lines have enabled targeted support to new segments like rooftop solar projects to C&I customers by extending term loans at a competitive rate.

While there are significant lending opportunities in clean energy and electric mobility, devising viable business models with robust payment security mechanisms would be critical to increase the credit flow to these sectors. For example, in the power sector, banks still manage legacy issues from thermal assets. We will have to incorporate learning from these projects and work to avoid similar problems again. Payment delays, curtailment and contract renegotiations are some of the significant issues that affect the debt-serving capacity of the generation projects and elevate the risk perception of the sector.

There have been concerted efforts from the Ministry of Power, GoI and other regulators to address these challenges, and we are hopeful that suitable solutions will be found to some of these challenges soon.

The bank is continuously interacting with the business community, the Government, and regulatory bodies; and exchanging views on ways to support the industry's financing needs towards its transition to clean energy.



Sustainable agriculture in India

Vivek Sah

Chairman, ASSOCHAM Bihar State Development Council and Managing Director, SBML, Patna



It is evident that the ongoing geopolitical conflicts in many corners of the world are threatening global food production and supply chains. It is primarily due to the sudden anticipatory restrictions put in place by international trade. At the same time, the effect of the COVID-19 pandemic on food supply chains has yet to settle. The ongoing conflict and inconsistent epidemic continue to threaten the production and supply of sunflower oil and food grains, e.g., wheat, around the globe. Consequently, India has witnessed a decrease in around 23% import of sunflower oil. Agriculture is very vulnerable to climate change around the world, and it is a significant concern in the long term for food production and supply chain management.

According to the IPCC, global agriculture contributes around 15% of total anthropogenic emissions. As the world's second-largest food-producing country, India is also subject to the impact of climate change.

At the domestic level, the impacts of climate change are already being felt with the increase in the heat waves and change in the monsoon patterns, which directly affect the food production in the country. Indian agriculture grew by around 4% during the past two years. Along with the major rice and wheat crops, the share of coarse cereals has grown at 4.5% per annum. It's

At the domestic level, the impacts of climate change are already being felt with the increase in the heat waves and change in the monsoon patterns, which directly affect the food production in the country.

time to evaluate both the opportunities and challenges in our nation.

The Government of India launched the National Mission on Edible oils – Oil Palm to explore the options of expanding palm oil cultivation with a target of covering 10 Lakh hectares by 2026 and to encourage the farmers with guaranteed farm prices. Introducing Genetically Modified Mustard plantations is the right step in increasing domestic edible oil production. The national mission on sustainable agriculture is one of the eight missions in the National Action Plan on Climate change, with its annual budget of 1200 crores in transforming Indian agriculture into a more resilient and conserving resources, such as water efficiency and soil health management.



Furthermore, the Government of India is taking steps to increase farmers' income under 'Aatmanirbhar Bharat'. GoI has allocated 1000 crores with the creation Agriculture Infrastructure Fund and 500 crores for beekeeping which aims to double the farmers' income. The NMSA also mainly emphasises Livelihood diversification in Indian Agriculture. Various other reforms such as 'Pradhan Mantri Fasal Bima Yojana', 'Soil Health Card' and 'per Drop more Crop' mainly focus on water conservation and input cost reduction. All these interventions are aimed at sustainable agriculture to address the challenges of climate change and to protect the farmers from the market and naturally induced crop failures.

Changing dietary patterns are also observed in various studies showing increasing consumption of cereals such as millet and sorghum among the urban population, where the prevalence of lifestyle diseases is such as type 2 diabetes. COVID-19 has brought back healthy dietary to the table. India has initiated and sponsored a resolution at the United Nations on the 'International year of Millets' for 2023. The need for policy intervention in the crops such as millet, such as exemption from GST, is echoed by entrepreneurs across the country. Policy intervention and promotion of such crops play a critical role in SDG 2 in reducing malnutrition and other diseases such as anaemia and other nutrition-deficient diseases.

Along with the opportunities, India also faces particular challenges in terms of burning crop residue, a major environmental concern in the Northern Indian states. Indian agriculture produces around 900 MT



of crop residues per annum. Approximately 10% MT of crop residues is manually burnt, causing air pollution and carbon emissions. Government policies and interventions are needed to tackle the issue. Solutions such as biochar and composting which are being developed, should solve the problem, which requires more investment in research and development.

With these opportunities and challenges, there are many gaps to be assessed toward solutions. It would need the adaptation of new technologies, spreading awareness amongst key stakeholders and engaging industry leaders around the nation. ASSOCHAM, as the apex chamber of India, works in tandem with ministries and industries to outline building a sustainable nation. Let us all hope for engagements and interventions towards the cause.



Building Sustainable Infrastructure

Ar. Nalin Goel

Co-Chairman, ASSOCHAM GEM Jharkhand Chapter and Principal Architect, Nalin Goel and Associates



At a time when India has pledged to embark on its decarbonisation journey in order to achieve targeted green goals, the need for sustainable infrastructure is critical for a better tomorrow.

Sustainability is a broad term encompassing several different aspects. A truly sustainable infrastructure project is one which is executed with environmental sensitivity, local ecology & economy, cultural sustenance, prospects, and financial viability simultaneously in mind. These projects are planned, designed, constructed, operated, and decommissioned in a manner to ensure economic and financial, social, environmental (including climate resilience), and institutional sustainability over the entire life cycle of the project.

The entire lifecycle – from planning and design to construction, management, and maintenance – can involve hundreds of vendors and other stakeholders and span decades. Add to that urbanization, digitalization, rising social expectations, and the quest for green growth, and it's clear that we need to transform the infrastructure we have today and the way new infrastructure is planned, delivered and managed. We need to become cleaner, more energy efficient and more resilient to the rapidly intensifying effects of climate change.

Sustainable infrastructure can play a role in reducing energy consumption, which helps in minimising carbon dioxide emissions.

India is now moving towards sustainable infrastructure development. The recent schemes of the government give a clear hint to make a radical shift towards sustainability. The growing focus of the government is on activities related to sustainable infrastructure.

While the design principles for sustainable infrastructure remain universal, however, their design will vary from region to region and within regions, depending upon the prevailing climate, site conditions, culture, traditions, available materials, construction practices, and building typology, besides the environmental, economic, and social priorities.

Developing green business lines and growing them stronger would lead to financial as well as environmental sustainability for infrastructure players. Developing more certified green buildings across construction



segments, developing solar power parks, focusing on Co2 fixing technologies, large (MW) scale building of EV Charging Infrastructure, and achieving a reduction in emissions from Coal Fired Power plants are some of the green businesses that we as a committed sustainable infrastructure player are already working on and intend to grow vigorously in the future. Our GHG reduction of 8.5% in FY21 is equivalent to an emission reduction delivered by almost 3 million fully grown trees per annum.

Three key Budget announcements have specifically accorded high praise across the board – setting up a high-level committee of urban infrastructure planners, builders, economists, and institutions to recommend policies for urban planning and governance; plans to issue green bonds and referring to climate action as ‘sunrise sector’. It clearly shows the government’s seriousness in achieving sustainable goals and enabling it to attract investors to fund environmentally friendly projects like those that reduce carbon intensity. These moves not only give a big boost to India’s commitment at COP26 of reaching net zero by 2070 but also achieve ambitious targets like 175 gigawatts of renewable energy capacity by this year.

Sustainable infrastructure can play a role in reducing energy consumption, which helps in minimising carbon dioxide emissions. The usage of renewable energy sources directly helps in improving air quality. It can also help in reducing solid waste. Since the focus has now shifted to solid waste management, companies manufacturing construction materials are coming up with renewable building materials which are easy to recycle. Various solid waste reduction practices such as construction byproduct management, recyclable management, recycled material usage and waste mitigation have been incorporated.



Apart from bringing down energy consumption, there is a reduction in water consumption, too owing to the fact that civil engineers practising sustainable infrastructure design also incorporate water-saving-technologies. These projects have water-free urinals – no flush toilets and low-flow shower heads.

It also comes with the benefit of improved community health. With improved air quality, reduction in carbon emission, less energy consumption and usage of renewable energy sources, sustainable infrastructure has tremendous health benefits.

Climate change is affecting us now more than ever, and green infrastructure can help build up community resiliency today and into the future. This truly begins with conscious consumerism that propels urban liveability and adds to the communities’ wellbeing.







4th Floor YMCA Cultural Centre and Library Building
01, Jai Singh Road, New Delhi-110001

Web: www.assochem.org



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