



SUSTAINABILITY OUTLOOK

Pulling back from
the "Climate Cliff"

ClimaJo in collaboration with
Insights International

INSIGHTS INTERNATIONAL

2023

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FROM THE DESK OF THE CEO, CLIMAJO



ANKIT SRIVASTAVA
CEO, ClimaJo

As we all know, today we as humankind are facing the biggest challenges in our lifetime in the form of the current climate crisis. We are facing unprecedented changes to our planet globally - the repercussions of which will be felt far and wide by our future generations. The great thing is that we are now aware of these challenges and all the stakeholders have increasingly started to take immediate and urgent action. Governments, regulators, investors, businesses and customers are all invested. Today, industries are being transformed by a collective desire for sustainable offerings.

At ClimaJo, we also believe that we have an immense opportunity on our hands. There are completely new table stakes for ClimateTech today. We are at the same stage as the retail boom and the advent of warehouse management systems in the 1970s and internet tools and HRMS and CRM systems at the turn of the 21st century. As per an estimate by McKinsey, there is a \$12T global green opportunity by 2030.

SUSTAINABILITY OUTLOOK 2023

However, to make progress in our aims to create a better planet for ourselves and our future generations, we need an even greater galvanisation of actions. We need all the stakeholders to pull together in the same direction. Governments and regulators need to drive the policy landscape. Businesses need to leverage the right technology and tools and customers and individuals need to adapt their lifestyles.

At ClimaJo, we are building the platform to help businesses become sustainable and communicate that to their stakeholders. We have already built ClimaJo Standards to simplify sustainability claims and a technology platform to help businesses report it to regulators and communicate it to customers.

For this report, we have partnered with Insights International to better understand the key drivers to help us in our quest for sustainability. We are grateful to all the luminaries who were gracious with their time to share their expertise and views. We hope that you will be as inspired in reading this as we are in presenting this to you.



ANKIT SRIVASTAVA
FOUNDER, CLIMAJO



FROM THE DESK OF THE CEO, INSIGHTS INTERNATIONAL

ARPIT CHATURVEDI

CEO, Insights International



2023 should be viewed as an opportunity to take decisive action towards the sustainability agenda. The current global events such as the COVID-19 pandemic, the Russia-Ukraine War, and the escalating climate crisis have created a unique and pressing need for a concerted effort to address these challenges.

The pandemic has caused widespread economic disruption, leading to a decline in business activity, and a decline in government revenues across the world. Before the supply chain transitions in the post-COVID world could culminate in a meaningful way, the Russia-Ukraine War brought significant disruptions in international trade and the energy markets. In the immediate term, it is apparent that the sustainability agenda takes a backseat when governments across the world struggle to provide their citizens with basic amenities at the lowest cost possible.

However, the correct way to look at 2023 is to view it as a “window of opportunity”, a turning point to re-evaluate our economic priorities and to focus on creating more resilient and sustainable economic systems. Governments all over the world are more determined to use this opportunity to invest in green infrastructure and clean energy, creating jobs and supporting economic recovery while also addressing climate change.

SUSTAINABILITY OUTLOOK 2023

Here, the private sector has an opportunity to take a leadership role in advancing the sustainability agenda by investing in and developing new technologies and implementing sustainable business practices. Transitioning to renewable energy, reducing waste and carbon emissions, and working with suppliers and customers to promote sustainable practices have never been higher on the agenda of the private sector than now.

The governments and civil society have the opportunity of creating a sort of “tripe-helix” with the private sector to facilitate sustainable growth through a conducive policy environment and the reframing of the sustainability agenda in a manner that sustainability is not equated with “de-growth”. In fact, the only way the sustainability agenda will garner enthusiasm from all the stakeholders who come together to make any economy and society function is to frame sustainability as a pathway to bring unprecedented prosperity to the world.

2023, is likely to be a year where the contradictions between the incentives of the private sector, the governments, and the civil society, vis-à-vis the sustainability agenda are going to dissipate and the year would serve as a turning point where greater alignments and domains of cooperation will emerge between various stakeholders to take the sustainability agenda forward.



ARPIT CHATURVEDI
CEO, INSIGHTS INTERNATIONAL





PART I

A photograph of an industrial facility, likely a power plant or refinery, situated on a dark, elevated landmass. Two tall, dark smokestacks are prominent, each emitting a thick, white plume of smoke that rises into a clear blue sky. The facility itself is a complex of various structures, including pipes, tanks, and scaffolding, silhouetted against the sky. In the foreground, a body of blue water is visible, with some small, dark objects floating on its surface. The overall scene is captured in a high-contrast, slightly desaturated style, emphasizing the industrial nature of the subject.

EXECUTIVE SUMMARY

“We can and must win this battle for our lives” declared Antonio Guterres, the UN Secretary-General at the conclusion of COP27 in Sharm el-Sheikh this year. This Sustainability Outlook 2023 report from ClimaJo and Insights International, has a dual focus. The first objective of this report is to further explore the Secretary General’s vision that “we can” and “must” win the battle against adverse impacts of climate change, and offer insights on “how” collective human efforts can win the battle against global warming and climate change. The second objective of this report is to view and integrate the key trends, risks, opportunities, and breakthroughs in 2023 that would change the sustainability landscape and how we frame sustainable development strategies.

In our view, 2023 will be a year of tremendous opportunities with significant advancements in the approach and progress towards sustainability. Technology, innovations in reshaping economic and political incentives, and a positive commitment of businesses, governments, civil societies, and individuals, will make 2023 a tipping point in our battle with global warming and the adverse effects of climate change.

2023 has the potential to be a year of challenges as well as innovations. Most of all, it has all the markings of being a year where individuals, governments, corporations, and civil society, can together pull humanity back from the proverbial “climate cliff”.

This optimism about 2023 is not in ignorance of the scientifically valid and often alarming signals related to global warming. The crisis is real and existential. The climate crisis is the no. 1 challenge faced by the world today and exacerbates other important challenges related to poverty, economic growth, political strife, etc. If not managed in time, it will undoubtedly be the undoing of the human species and even planet earth. At 1.5 degrees warming, about 14 percent of Earth's population will be exposed to severe heatwaves at least once every five years. At 2 degrees warming, that number jumps to 37 percent. Further, if all existing greenhouse gas reduction pledges are fulfilled, the earth would heat by 1.9-3 C by 2100. If current emissions trends continue, the planet’s temperatures would increase by 2.1-3.9 C. Add to this, the danger of compounding hazards and “unknown-unknowns” and it is easy to see humanity walking down the path of its own extinction.

However, as Suresh Kumar, former Indian Administrative Services officer and the Former Chief Principal Secretary of the State of Punjab, India has said in this report (refer to perspectives in the Part-II of the report), “the human response to this crisis will have a significant impact on our future and provide insight into our true nature.” Therein lies hope, because human beings have had a track record of being extremely adaptive and resilient. “Obstinate yet flexible” has been the hallmark of human nature and flexible cooperation at scale has been the secret sauce of success for the sapiens, as Yuval Noah Harari would have it.

Or as Dr. Christopher Schwalm, Director of the Woodwell Institute has noted in this report (Part-II) “we have a chance to accelerate change by working towards social and cultural transformation”.

2023 could be a point of departure in an evolutionary “punctuated equilibrium” where revolutionary change occurs in brief, punctuated bursts, generally catalyzed by a crisis or problem that breaks through the systemic inertia and shakes up the deep organizational structures in place. The point of departure becomes a point where compounding hazards may give way to compounding opportunities.





THE TIPPING POINTS

KEY TRENDS AND
OPPORTUNITIES
FOR 2023



01

Russia-Ukraine War does more for supply chain transitions than COVID-19 did. It also presents a unique opportunity for companies to transition into cleaner and more sustainable supply chains.

02

The loss and damage fund gains clarity in COP27 and moves closer towards operationalization to provide financial assistance to nations most vulnerable and impacted by the effects of climate change.

03

The G20 plays an even more active role in providing climate finance to meet the need for US \$4 to \$6 trillion a year to be invested in renewable energy until 2030 - including investments in technology and infrastructure - to allow us to reach net-zero emissions by 2050. More and more developing countries step up their contributions towards financing renewable energies to make up for the shortfall in achieving annual targets.

04

Renewable power generation grows to a healthy 8% in 2023 leading to at least a 1% reduction in global emissions in 2023 alone.

A photograph of a forest with a fire burning in the foreground, symbolizing environmental change. The image shows a dense forest of tall, thin trees. In the foreground, there is a pile of charred wood and a fire burning brightly, with smoke rising into the air. The overall tone is somber and urgent.

KEY DRIVERS OF CHANGE

Technology: Technology takes a giant leap. A suite of technologies known as the fourth industrial revolution – including systems such as robotics, artificial intelligence (AI), internet of things (IoT), decentralized edge computing, and data trend monitoring are already creating outsized impact. Currently, the manufacturing industry alone contributes to nearly a fifth of the carbon emissions globally.[1] Technology related to industrialization 4.0 offers the potential to provide on average 30% of energy savings in buildings alone (buildings consume 40% of the world’s energy which accounts for 30% of CO2 emissions).

This is expected to improve even further. Newer technologies such as direct carbon capture, green cement, and green hydrogen will further create ripple effects across industries and help reduce the current “green premium” between existing entrenched practices and their sustainable alternatives. Finally, a software layer will help improve the impact of these newer technologies on practices globally.



Public Policy: Reliable emission standards and certifications for business enterprises play a significant role in bridging information asymmetry by priming investors, markets, and companies to transition to climate-friendly technologies, operations, sourcing, and supply. Clubbed with reliable data capturing and resource intelligence technologies, they create a solid foundation for governments, investors, the private sector, and consumers to design incentives that separate the ‘truly green’ from ‘greenwashed’ and help markets move to a new green equilibrium.

Individual Lifestyle Decisions: Individuals step up with the growing climate awareness to make healthy lifestyle choices reducing carbon their footprints. Research shows that lifestyle changes could help the planet slash emissions by up to 70 percent by 2050. Commercialization of meat alternatives at larger scale and affordable prices, availability and incentives for electrified land based transport, expansion of public transport and car-pooling services, increased rejection and reduction of fast fashion, and the growth of sustainable tourism - are consumer led changes that will establish a stronger hold on the markets in 2023 than ever before.

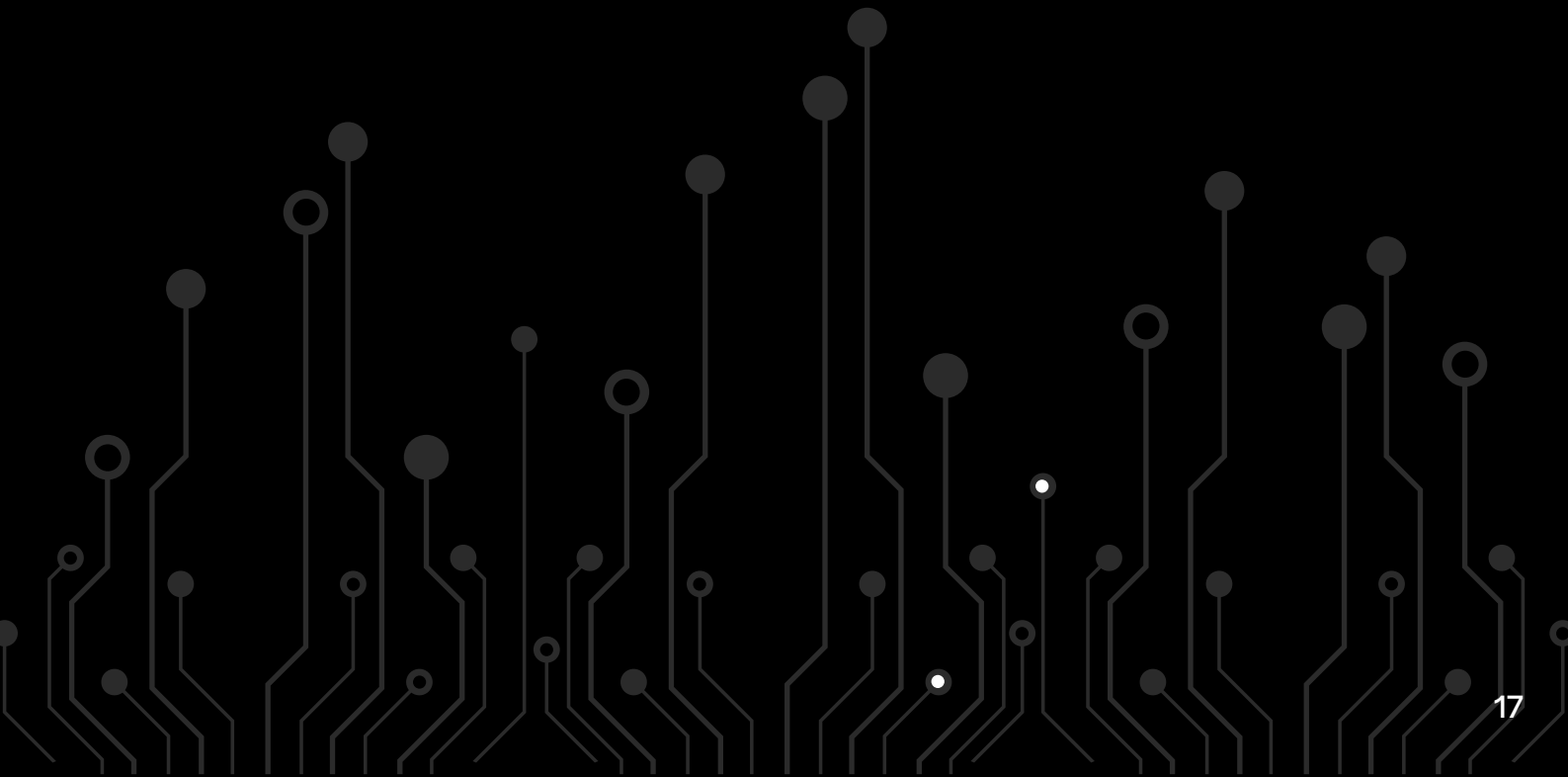


Finance and Investments: With the establishment of the Loss and Damage Fund in COP 27, COP 28 is likely to see a greater effort in funding mitigation initiatives. This is already reflected in the growing number of countries that have committed to net-zero emissions targets and the increasing number of businesses that are setting science-based targets for reducing their carbon emissions. This trend is likely to drive increased investment in clean energy, energy efficiency, and other climate-related projects. Moreover, the war between Russia and Ukraine, the ensuing energy crisis in Europe, and increasing oil and gas prices for the rest of the world, would push governments to take serious measures to fund the SDG financing gap. Private investments are likely to follow government investments and blended finance initiatives. Most private investments would be directed towards energy efficiency, energy transitions, emission reductions, water conservation, electric mobility, and adaptation measures.

[1] How Manufacturing Can Raise the Bar on Global Climate Goals," World Economic Forum, accessed December 11, 2022, <https://www.weforum.org/agenda/2021/06/manufacturing-industry-climate-change-goals/>. For more details, refer to: Hannah Ritchie, Max Roser, and Pablo Rosado, "CO₂ and Greenhouse Gas Emissions," Our World in Data, May 11, 2020, <https://ourworldindata.org/emissions-by-sector>.

CHAPTER 1

TECHNOLOGY OUTLOOK 2023



We are at the cusp of a new era of innovation in 2023. Artificial intelligence (AI), machine learning, blockchain, Internet of Things (IoT), 3-D printing, geo-spatial mapping powered through Low Earth Orbit (LEO) satellites, Augmented Reality (AR), and Virtual Reality (VR) are already transforming how businesses work and the way we lead our lives.

The success of such technologies is in their availability as well as adoption. Further, technology creates winners and losers, and “failing to smooth the transition sufficiently for the incumbents and, alternatively, offering excessive protection for the incumbent are twin risks that need to be navigated carefully” (Rosenberg and Fray).

New technologies such as direct air capture, green hydrogen etc. are beginning to reduce the green premium. Such changes will have a profound impact on how businesses can put themselves on the path to sustainability.

This will be the year when developing countries begin seeing the onset of technologies with the potential to disrupt infrastructure allowing for better services at low costs and lower emissions. Under budgetary constraints, governments are likely to prefer technologies that improve efficiency and would need to play a key role in lowering regulatory barriers to reaping the benefits of clean tech. At the same time, this year is likely to be a year of high trade barriers, which means greater localization of sourcing of technology and materials.

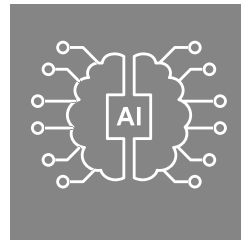
The global crisis triggered by the Russia-Ukraine War which has, in turn, led to an energy crisis will present a window of opportunity for governments and the private sector across the world to look at transitioning to cleaner sources of energy, power generation, and power distribution.



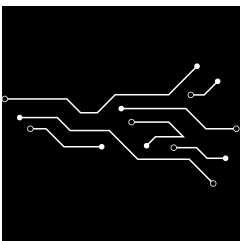
Green-Tech Macro Trends for 2023



Greater innovations in deep tech that reduces the green premium with proofs of concepts and initial steps in scaling.



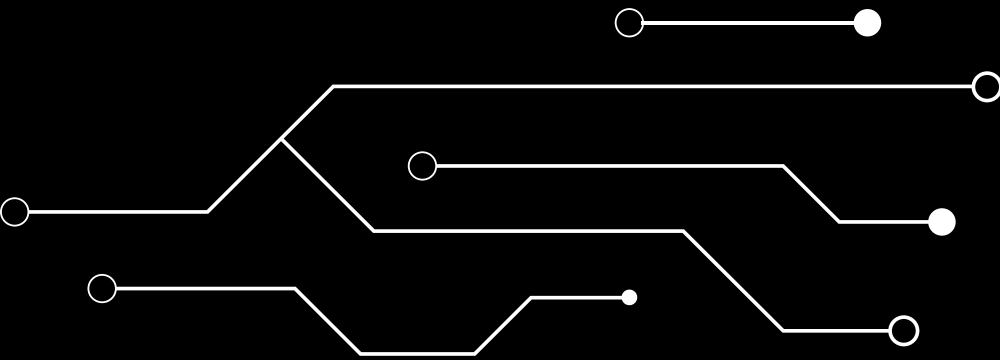
Applications of such technologies at scale in limited areas for consumers as well as businesses through public-private partnerships and/or established industry players.



Conceptualization of policies and regulatory standards to prepare the necessary ecosystem for scaling applications of Industry 4.0-related technology across industries and regions at scale.



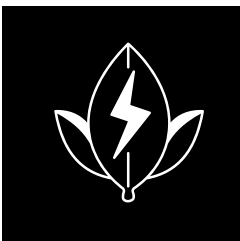
Innovations in business and financial models to finance and scale the application of deep-tech innovations across industries.



Establishment of large-scale hubs or “green energy islands” for renewable power production in developed countries. Approvals of similar projects in developing countries.



Efforts to create standards, international regulatory regimes, and partnerships to scale green hydrogen and other biofuels.



Development of green-energy islands in the hub and spoke generation-distribution structures before the development of decentralized networks.



Investments in and expansion of low-tech solutions with a focus on efficiency and adaptation.

Multi-National and Multi-lateral Commitments towards Technology Adoption



India at the upcoming G20 meeting plans to pitch for a global alliance on biofuels on the lines of the International Solar Alliance (ISA). The biofuel alliance aims at developing an ecosystem for fuel standards & engines. India also intends to initiate international dialogue and cooperation for new products, services, and sustainable financing for green hydrogen, a priority area for the upcoming G20 agenda. Currently, there is a significant mismatch between the climate finance flowing towards developing countries and India's G20 presidency can be vital in catalysing required flow of sustainable finance towards developing economies given its nuanced understanding of the global south.

2023 is likely to be a year of increased global action through platforms such as G20 and these platforms are likely to have a greater impact than other multilateral forums such as the Conference of Parties (COP), according to some experts.



Multi-National Hub and Spoke Collaborations for Green-Energy

Multilateral and multi-national actions towards the development and commercialization of green technologies are likely to follow a hub and spokes structure before it evolves into a truly decentralized structure, especially when it comes to energy production and distribution.

An example in this regard is Shell and RWE, two major European energy companies, which are creating the first major green pipeline from wind plants in the North Sea as a result of a partnership between countries such as Denmark, and potentially other countries such as the Netherlands, UK, and Germany. Such energy islands are being perceived as the answers to achieving energy self-sufficiency in regions, especially after the Russia-Ukraine War.

A similar energy islands concept based on the hub and spokes structure is visible in the Indo-Danish energy partnerships resulting in offshore wind farms. The Danish Energy Agency (DEA) and the Indian Ministry of New and Renewable Energy (MNRE) have published a conceptual offshore wind plan for 15 locations in India under their joint initiative, the Centre of Excellence for Offshore Wind and Renewable Energy.

Moreover, four initial sites in Tamil Nadu for the first auction of 4 GW equivalent seabed in 2022-2023 have been identified for leasing to carry out required studies & surveys and subsequent project development under an open access model. Adopting a relatively high-capacity density would allow for up to 25 .GW across the identified areas in Tamil Nadu alone.

This provides a clear pipeline and contribution to the 30 GW government target for offshore wind in 2030. The launch of the India-Denmark Centre of Excellence on Offshore Wind as part of the green strategic partnership between the two nations is a critical step in the direction of green energy transitions at the national level.



Focus on Technology Transitions to transform National and State Level Infrastructures with a key role played by the Private Sector



With 5G finding a solid foothold in countries like India, IoT-enabled technologies are likely to see a boom and widespread applications to reduce the carbon footprint of industries as well as to manage resources efficiently. 2023 is likely to be an year which sees a leapfrog in the usage of IoT sensors and devices to monitor and track energy usage in buildings, factories, and other facilities, allowing commercial enterprises in developing countries to identify ways to improve efficiency and reduce waste.

These will, in turn, open pathways to using IoT technology to monitor and manage natural resources, such as water and forests, helping to prevent overuse. Further, this will enable more sustainable and efficient transportation systems, such as electric vehicles and ride-sharing platforms.

At a larger scale, 5G, IoT, and LEO satellites, and machine learning algorithms will lay the necessary groundwork to optimize power systems to balance supply and demand in a decentralized manner. However, the widespread establishment of such infrastructure could take about a decade more. Governments will play a significant role in making such infrastructure available at a rapid pace. Investments in such fundamental infrastructure, incentives, and a conducive regulatory environment for the production of sensors and upstream as well as downstream space technology will go a long way in revolutionizing the power system. One outcome of this will be the power systems becoming more “democratic”, cheaper (with the smart allocation of demand and supply), and reliable (i.e. with fewer outages). With the advances in household solar PV panels and storage, and the use of technology like blockchain for peer-to-peer electricity trade within local energy communities. The second outcome of this will be a significantly reduced carbon footprint. Smart grids can engage renewables at scale, and as per various estimates, reduce greenhouse gas (GHG) emissions between 4% to 27%.

One of the largest carbon savings potentials enabled by smart grids is in providing cost-effective and increasingly clean energy for plug-in electric vehicles (PEVs). According to some estimates, PEV

could reduce fuel consumption by about 60% compared to conventional vehicles. 2023 is likely to be a year of greater policy deliberations in the developing world towards the transition to electric vehicles and smart grids.

While 2023 is likely to be a year where we see substantial policy ideation, and policy drafts to tackle green transitions, the implementation of such policies is likely to follow in the next few years, accelerating in the second half of the decade. Organizations working in lock-step with the government agenda of infrastructural transitions will therefore have an advantage.

The Great Convergence

Emergence and Widespread adoption of Software to drive changes at scale

With the advent of newer technologies as well as regulatory standards in place, there will be an increase demand of software to enhance easy of adoption of newer technologies driving sustainable practices.

A host of new software solutions are already coming up in response to this demand. The year 2023 will be transformational for this industry driven by government and regulatory requirements as well as business demands.

A FOCUS TO DEVELOP LOW TECH FOR ADAPTATION

Much of the focus so far, globally, has been on mitigation strategies. However, after the COP27, there is likely to be a greater focus on adaptation in addition to mitigation. Adaptation, in its own turn, would be powered by technology. While a lot of climate-related technology and innovations come from developed countries, there is a vast pool of technological solutions and innovations. Tech transfer among developing countries as a part of south-south cooperation has the potential to generate various low-tech energy solutions to impact the global market.

In addition to the application of deep-tech and high technology, localized technology applications and making low-tech more energy efficient would bring in tremendous payoffs. Deep-tech focused on hi-tech solutions are usually mitigating way-outs to the climate change conditions while there is a need for stronger exposure of adaptation technologies from the developing countries. Mitigation makes good sense to prevent an approaching threat instead of finding ways to live with it. However, the financial flows which were focused on mitigation solutions are increasingly shifting towards adaptation too.



CONCLUSION

2023 will be an year where adaption gains greater relevance than the conventional focus on mitigation. Similarly, low-tech gains greater importance that it has in the past in addition to the growing importance of deep tech in advancing climate action. The coming year could see substantial action on issue-specific international partnerships (such as the global alliance on biofuels) and greater success can be expected from these as opposed to multi-lateral forums focused on sweeping agendas.

Finally, there is likely to be a substantial focus on developing infrastructure at the national and state levels for green-energy transitions. Such infrastructural development will be costly and the choice of technology will play a significant role in bringing down costs. Initially, these infrastructure projects are likely to be envisioned in hub and spokes structures to achieve scale and uniformity before they mature into a more decentralized structure of energy generation and distribution. In either case, fundamental to these transitions would be the use of technology and support from the private sector.



CHAPTER 2

POLICY & GOVERNANCE OUTLOOK 2023

INTRODUCTION

Effective management of the global climate system needs to be addressed via climate governance at the global, national, and local levels with a combined effort from governments, the private sector, and the civil society. It is essential that climate policies and actions take into consideration vulnerable populations' perspectives, interests, and rights. Multilevel climate governance, negotiations at the global level for climate actions like dialogues on climate finance, and methods for reducing environmental inequality are going to be the avenues for 2023 and ahead. The global governance framework should be placed such that it nudges countries to create favorable policy foundations within their boundaries while enabling each level of governance to coordinate policies.

The Great Convergence

The international regime has converged on the development of complex climate solutions. So far, the challenge in implementing effective climate policies has been due to a lack of consensus along the dual axes of (a) top-down vs bottom-up approaches to climate governance and (b) market-based prescriptions such “cap and trade” versus the non-market based mechanisms such as carbon taxes, progressive phasing out of subsidies for fossil fuels etc. Indeed, different interest groups and levels of governments have taken different sides along the two axes. For example, local and state governments, courts, and community

activism-based groups have often favored non-market based approaches to dealing with climate change, while corporations, startups, national or central governments as well as multilateral forums have favored market-based approaches. Similarly, while courts, multilateral forums, and national as well as state level governments have favored top-down approaches, startups, civil society groups, and even businesses have advocated for bottom-up consensus building to come up with sustainable climate governance mechanisms.

The hallmark of 2023 is some sort of an emerging consensus between various interest groups and levels of governments on a blend of market and non-market based approaches as well as top-down-and bottom-up approaches.

For example, the European Union has implemented a cap-and-trade system, known as the EU Emissions Trading System (ETS), which is a market-based approach to reducing greenhouse gas emissions. The EU ETS sets limits on emissions from certain sectors, such as power generation and manufacturing, and allows companies to buy and sell allowances to emit greenhouse gases within these limits. The EU ETS is complemented by other non-market-based measures, such as renewable energy targets and energy efficiency standards.

One example of a market-based approach implemented in India is the Perform Achieve and Trade (PAT) scheme, which is a cap-and-trade system for reducing greenhouse gas emissions from the energy-intensive industrial sector. Under the PAT scheme, the government sets targets for reducing emissions from specific industries, and companies that exceed these targets can sell their excess emission reductions to companies that fall short of their targets.

The Lok Sabha (the lower house of the Parliament of India) recently, passed Energy Conservation Amendment Bill, 2022 focusing on establishing and development of “Carbon Credit Trading Market” in the country and empowering the union government agencies to issue carbon trade certificates to ensure a seamless carbon trading system. Implementation of such policies in high population countries such as India are likely to be a game changer in bringing down the GHG emissions, if implemented with strong monitoring and evaluation mechanisms.

India has also implemented a number of non-market-based approaches to climate governance. For example, the government has set targets for increasing the use of renewable energy, such as solar and wind power, and has implemented various regulations and incentives to encourage the adoption of clean energy technologies. The government has also implemented energy efficiency standards for appliances, buildings, and vehicles, and has implemented regulations to reduce emissions from power plants and other industrial sources.

The market for carbon credits increased by 164% globally in 2021, and it is estimated to reach USD 100 billion by 2030. India has issued 35.94 million carbon credits between 2010 and 2022, which is nearly 17% of all carbon market credits issued globally. However, to meet the international promise of carbon reduction India has prohibited exports of carbon credits and aims to set up a domestic market for the same. Carbon markets are expected to restrict the usage of fossil-fuel and providing new opportunities to businesses in trading carbon credits.

Consensus along the two aforementioned axes has shifted the focus beyond governance mechanisms towards implementation and performance.





THE FINAL STAND

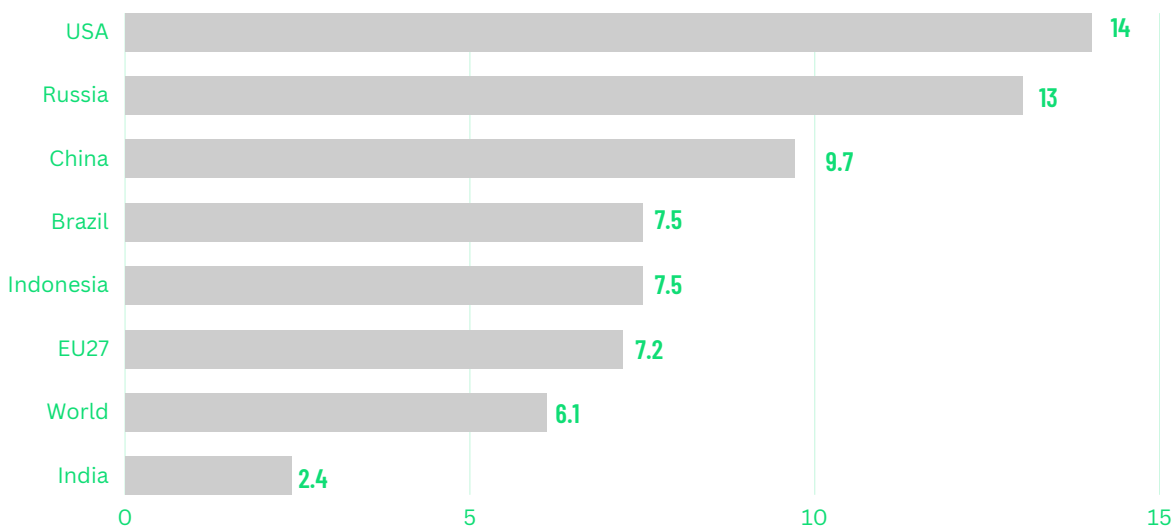
SUSTAINABILITY OUTLOOK 2023

With some sort of a consensus on policy mechanisms, the focus of climate action has shifted towards implementation, especially finance or the question of “who pays whom”? The questions of who should pay and by when, for climate action are likely to remain a central issue in the international climate negotiations, and it will require a careful balancing of the needs and interests of different countries and regions. However, there has been ongoing debate about the adequacy of the level of financial assistance provided by developed countries to developing countries for climate action. Some developing countries and civil society groups have argued that the level of assistance provided to date is insufficient to meet the needs of these countries, and that developed countries should do more to help them reduce their emissions and adapt to the impacts of climate change.



According to the Intergovernmental Panel on Climate Change (IPCC), the total costs of adapting to the impacts of climate change are likely to be significant, especially for developing countries. In its Fifth Assessment Report, the IPCC estimated that the global costs of adapting to the impacts of climate change could be in the range of \$70-100 billion per year by 2050, depending on the level of warming. These costs are likely to be disproportionately borne by developing countries, which may have limited capacity to pay for adaptation measures.

Per Capita GHG Emmissions (tCO₂e/capita)



Source: UNEP Publication - Emissions Gap Report 2022

The United Nations Framework Convention on Climate Change (UNFCCC) established the Green Climate Fund (GCF) in 2010 with a goal of providing \$100 billion per year in climate finance to developing countries by 2020. As of 2021, the GCF had mobilized a total of \$9.9 billion in pledges and contributions, falling short of its ambitions by a huge margin. This has indeed been a wakeup call and has exposed the limits of multilateral government action in organizing adequate resources for climate action. This in turn has led to three encouraging trends:



**ACT
NOW**

01 A more focused and strategic use of pooled government funds from developed nations reflected in the consensus around the Loss and Damage Fund in COP 26.

02 Enhanced reliance on the private sector to muster the funds to build adaptation and mitigation capacity in the developing world.

03 Enhanced focus on bi-lateral and/or mini-lateral cooperation towards Climate action.

04 A tangible consensus around the need for the adoption of evidence-based and transparent Environment Sustainable Governance (ESG) standards by investors as well as in private corporations to reduce their Carbon footprint.

Targeted Use of Pooled Government Funds from Developed Nations: The Loss and Damage Fund

The United Nations Climate Conference (COP 27) was marked by the establishment of a Loss and Damage Fund, which was seen by many as a key achievement of the conference. The fund aims to provide financial assistance to nations that are most vulnerable to and impacted by the effects of climate change. The creation of the fund represents the culmination of decades of pressure from developing countries, which have been particularly

vulnerable to and impacted by the effects of climate change. The creation of the fund represents the culmination of decades of pressure from developing countries, which have been particularly vulnerable to the impacts of climate change and have called for financial support to help them adapt to these impacts.

The establishment of this fund brings in a sense of urgency and sets a clear priority order among developing countries that require financial assistance from the developed countries. In many ways, this is an outcome of accepting the lessons learned from the under-achievement of the Green Climate Fund targets in 2020 and putting these lessons to good use in directing the funding where it is most needed on an urgent basis. By providing targeted financial assistance to address the most pressing needs of vulnerable countries and communities, the Loss and Damage fund may be able to more effectively address the impacts of climate change and reduce the risk of further losses and damages occurring in the future.

The Loss and Damage fund will initially be funded through contributions from developed countries and other private and public sources, such as international financial institutions. There is also an option for other major economies to contribute to the fund at a later date. The text of the agreement calls for the identification and expansion of sources of funding, which may include contributions from countries that are both high-polluting and considered developing under the relevant criteria.

Enhanced reliance on the private sector to muster the funds to build adaptation and mitigation capacity in the developing world.

The shortfall in funding for the GCF has led to ongoing discussions about how to mobilize additional resources for climate action, and has resulted in an enhanced reliance on the private sector to help muster the funds needed to build adaptation and mitigation capacity in the developing world.


The private sector has played a number of roles in augmenting the shortfall of contributions to the GCF and in supporting the fund's efforts to mobilize additional resources for climate action. One way in which the private sector has contributed to the GCF is through direct financial contributions. Some private sector companies have made voluntary contributions to the GCF, either directly or through partnerships with other organizations.


In addition to making financial contributions, the private sector has also supported the GCF through the development of innovative financing mechanisms. For example, the GCF has worked with private sector partners to develop mechanisms such as green bonds and blended finance, which can help to leverage additional private sector investment for climate action.


The Green Climate Fund (GCF) has invested \$3.9 billion across 45 private sector climate projects, and this investment has attracted co-investment totaling \$17.5 billion in private assets under management. This means that the GCF was able to use its public funds to mobilize more than four times the total capital invested. One way in which the GCF and similar funds can enhance the profitability of investor partners is by taking a first loss position, which can improve the expected rate of return for these partners.


GCF is one of the many blended finance mechanisms emerging across the world. Furthermore, private sector is taking an active role in financing adaptation mechanisms, which according to the World Economic Forum, is a \$2 Trillion market that the private sector cannot ignore.”

The private sector is likely to focus on key emission-intensive sectors, these are:

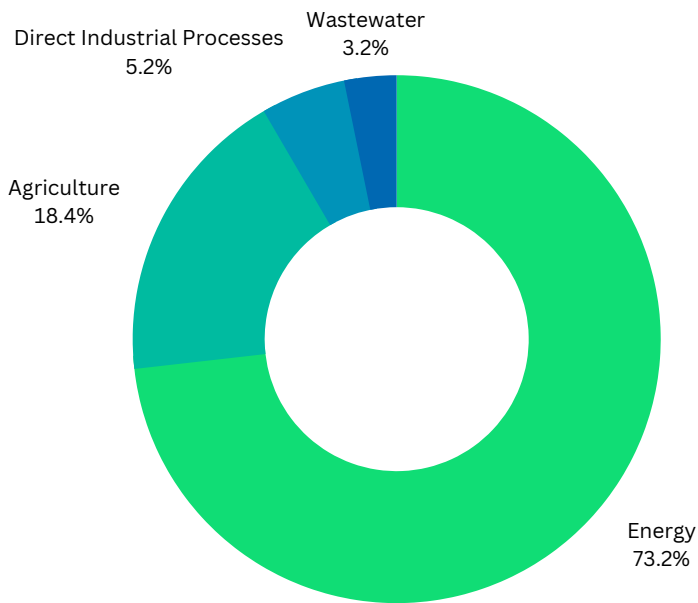
- 

Energy (electricity, heat and transport) contributing **73.2%**.
- 

Agriculture, forestry and and use adds upto **18.4%**.
- 

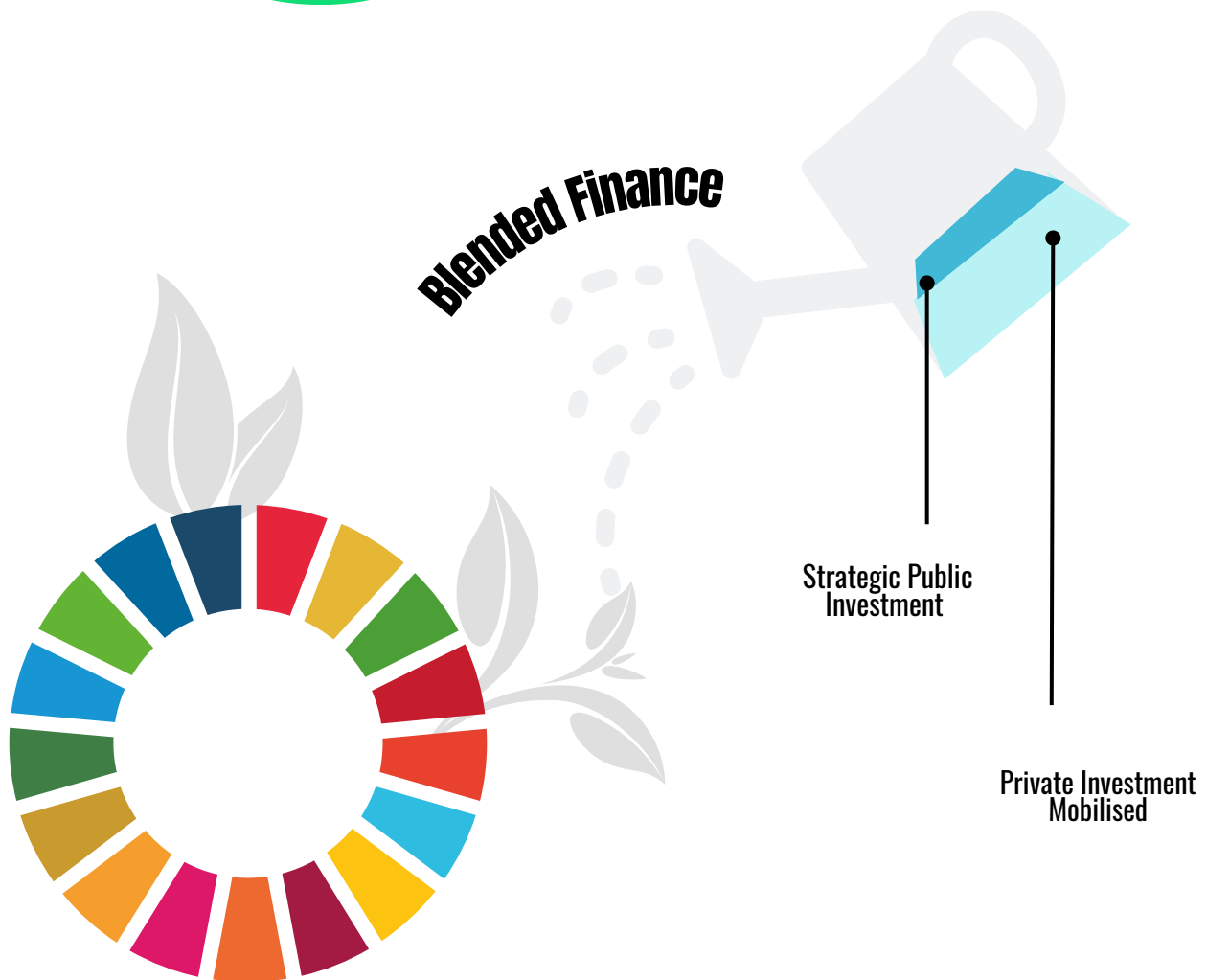
Direct industrial processes contribute **5.2%**.
- 

Wastewater and landfills together go upto **3.2%**



Share of Key Emission Intensive Sectors (in %)

Source: Our World in Data - "Emission by Sector" by Hannah Ritchie and Max Roser



Source: <https://www.ipeglobal.com/blogs/a-for-affordable-b-for-blended-a-booster-shot-to-provide-c-for-capital-budget-2022-23-115.php>

Enhanced focus on bi-lateral and/or mini-lateral cooperation towards climate action

The Intergovernmental Panel on Climate Change (IPCC) has noticed that international community has taken a narrow approach to keep global temperature below the agreed breach limit. Therefore, 2023 is an opportunity for making the required transformations involving varied sectors of the economy and diverse areas of human activity. The uneven implementation of agreed goals makes global environmental governance slow. The redline of 1.5-degree Celsius rise in temperature target is likely to be breached within a decade as per most scientific predictions, it clearly signifies that the future lies in the rapid implementation of mutually reinforcing governance mechanisms.

While it is true that multilateral organizations will continue to have an important role in shaping policy discussions and setting agendas, new types of multilateral forums and agencies are also emerging that are more focused on specific issues, agendas, and initiatives. Examples of these include the International Solar Alliance, the International Renewable Energy Agency (IRENA), and the International Biofuels Alliance, which is expected to be announced at the upcoming G20 meeting. Further multilateral governance mechanisms are now being seen as a starting point, with bi-lateral and mini-lateral

agreements between countries expanding on cooperation on climate action. In addition to forums such as COP, groupings like G20, the Indo-Pacific Economic Framework (IPEF), BRICS etc. will play an influential role in the climate agenda in 2023. The G20 presidency of India in 2023 is expected to promote the interests of developing countries in dealing with the climate crisis. India has identified climate change priority areas for the upcoming G20, including climate financing, circular economies, global food security, energy security, green hydrogen, disaster risk reduction and resilience, developmental cooperation, and multilateral reforms. It is crucial for G20 countries to concentrate on developing a robust policy and governance framework as it contributes to almost 75% of the total GHG emissions.

One a bilateral level, agreements such as the India-UK partnership for the Green Grids Initiative, The Green Strategic Partnership (between Denmark and India), Japan-Vietnam Environmental Policy Dialogue, Brazil-Germany Partnership on Climate and Renewable Energy etc. are likely to play a significant role in expanding on the work of climate action with greater speed and flexibility which is often missing in plurilateral agreements. In the background of the high-pitched geopolitical great power competition, unilateral and bi-lateral agreements are likely to proliferate further, for the purpose of the management of global commons.

WE
DEMAND
CLIMATE
JUSTICE

Consensus on the Utility of ESG Standards as a Self-Governance Mechanism for the Private Sector

There is a global policy consensus that Environmental, Social, and Governance (ESG) standards can serve as an effective self-governance mechanism for the private sector. This is evident in the adoption of various initiatives and regulations that promote the integration of ESG considerations into business practices. For example, the United Nations Global Compact, which is a voluntary initiative that encourages businesses to adopt sustainable and socially responsible policies, has over 12,000+ participating companies from over 160 countries (UN Global Compact, 2023). The Task Force on Climate-related Financial Disclosures (TCFD), which was established by the Financial Stability Board (FSB) and is supported by the G20, has developed recommendations for companies to disclose information about the potential financial impacts of climate-related risks and opportunities (FSB, 2022).

The EU Non-Financial Reporting Directive, which requires large companies and certain public-interest entities operating in the EU to disclose information about their environmental, social, and governance performance, has also been widely adopted (European Commission, 2017). These initiatives and regulations demonstrate the global policy consensus that ESG standards can support responsible business practices and contribute to sustainable development.

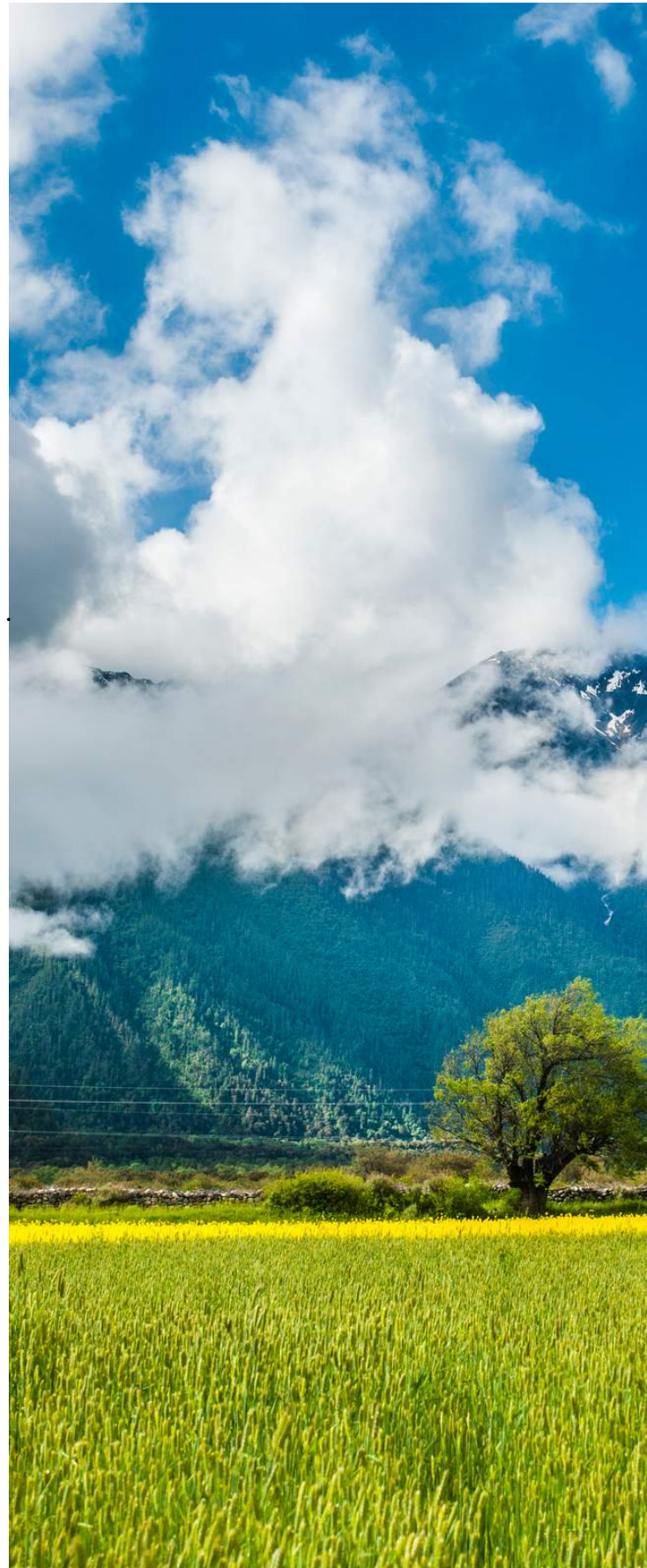
There is a growing body of research and evidence indicating that ESG standards can serve as an effective self-governance mechanism for the private sector (KPMG, 2020; MSCI, 2023). These standards provide a framework for companies to address and manage environmental, social, and governance issues in their operations and decision-making processes (International Finance Corporation, 2022). Adhering to ESG standards can help companies mitigate risk (UN Global Compact, 2023), enhance their reputation (Henisz, Koller, and Nuttall 2019), and improve their overall sustainability (Ernst & Young, 2022). There is increasing evidence that investors and stakeholders are considering a company's adherence to ESG standards when making investment and purchasing decisions (BlackRock, 2023; State Street Global Advisors, 2021). As such, many companies have chosen to report on their ESG performance in order to demonstrate their commitment to these issues (PwC, 2022). It is likely that the trend of increasing adoption and integration of ESG standards will continue to gain momentum in 2023. There are a number of factors that may contribute to this trend.

First, there is increasing recognition of the importance of ESG issues for the long-term sustainability and success of businesses. Companies are increasingly aware that ignoring ESG issues can have negative consequences, such as reputational damage, financial risks, and regulatory penalties. At the same time, there is growing evidence that companies that prioritize ESG issues can benefit from improved financial performance and increased investor confidence (KPMG, 2020).

Second, there is growing demand for ESG information from investors and other stakeholders. Investors are increasingly considering ESG factors when making investment decisions, and are seeking more information about a company's ESG performance in order to assess its long-term prospects (BlackRock, 2023). Consumers and employees are also becoming more conscious of the social and environmental impact of the products and services they purchase and the companies they work for (Henisz, Koller, and Nuttall 2019). This increasing demand for ESG information is likely to drive more companies to report on their ESG performance in order to meet the needs of their investors and stakeholders.

Finally, there is increasing regulatory and policy support for ESG integration. Many governments and international organizations have implemented initiatives and regulations that encourage or require companies to consider ESG issues in their operations and decision-making processes. For example, the EU Non-Financial Reporting Directive requires large companies and certain public-interest entities operating in the EU to disclose information about their environmental, social, and governance performance (European Commission, 2017).

The Task Force on Climate-related Financial Disclosures (TCFD), which was established by the Financial Stability Board (FSB), has developed recommendations for companies to disclose information about the potential financial impacts of climate-related risks and opportunities (FSB, 2022). These regulatory and policy developments are likely to further encourage the adoption and integration of ESG standards in the coming years.



CHAPTER 3

LIFESTYLE CHANGES AND INDIVIDUAL ACTION OUTLOOK 2023

According to the Emissions Gap Report 2020, more than two-thirds of greenhouse gas (GHG) emissions can be attributed to households' consumption and lifestyles. Individual climate actions will help reduce GHG emissions with the necessary speed and volume in concurrence with improved technologies. Countries have to focus on adopting policy solutions to promote sustainable lifestyle changes, mitigating the existing environmental inequalities, and cooperating with international standards.

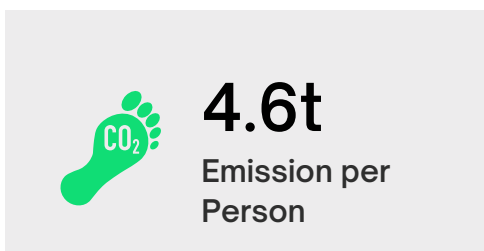
Having surpassed the “era of realisation”, 2023 is likely to be the harbinger of the “era of action” for environmental sustainability to fight climate change. The world is adopting best practices for a sustainable future. Initiatives such as the Mission LiFE or 'Lifestyle for Environment' launched in 2022 by PM Modi, are likely to have a monumental impact in GHG reductions in India. Similar initiatives across the world have the potential to serve as a springboard to a new sustainability equilibrium.



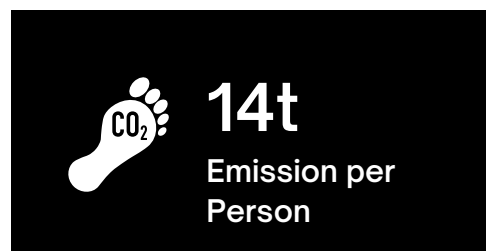
TACKLING ENVIRONMENT INEQUALITY

Those living in high-income countries are causing an inordinate share of emissions. The current global average lifestyle carbon footprint is 4.6t CO₂ emission per person, while in Canada the average footprint is more than 14t CO₂ per person, the United Kingdom has 8.5t, South Africa 4.6t, and India 3.0t CO₂ per capita. Overconsumption by one group comes at the expense of opportunities by others to meet their own needs; this is also applicable at the level of countries competing with each other. The carbon-intensive lifestyles of industrialised nations has and will continue to influence global consumption trends. In the upcoming years, the world must come together to devise a system that balances opportunities to meet requirements by taking limited resources and individual needs into account. It has to define a fair consumption space by fixing the carbon budget, where the "space" forms a range of lifestyle options and consumption choices with different combinations of goods and services that can be exchanged, substituted, and adjusted over time as the ecological balance shifts.

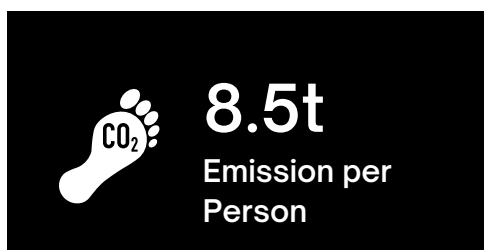
Global Average CO2 Footprint



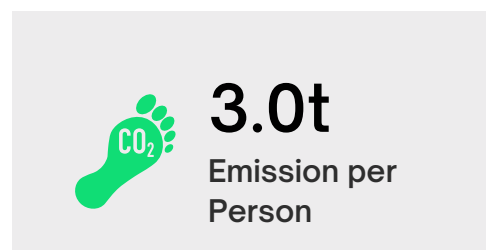
Canada Average CO2 Footprint



UK Average CO2 Footprint



India Average CO2 Footprint



LIFESTYLE HOTSPOTS

Four domains are pivotal when it comes to the impacts of consumption on environment i.e. food, housing, transport, and consumption of other goods and services.



No. 01 – Transport

In the majority of high-income countries, transportation is the lifestyle domain contributing the highest amount to overall lifestyle footprint. However, private cars and aviation are mostly responsible for emissions. The mobility needs should be met by adopting alternatives that cause less harm. For instance, 33% of the trips are done via public transport in Japan, while it is 9% and 15% in Finland and Canada, respectively. India has only 1.2 buses per 1,000 people, only 63 of the 458 Indian cities have a formal city bus system, and 15 cities have a bus or rail-based mass rapid transport system, therefore, the policy emphasis in 2023 should be on creating infrastructure, especially in transport, that provides access to sustainable choices.

Attitudinal shifts in favor of purchasing electric vehicles, adopting green public transportation systems, and incentivizing the behaviors of individuals using sustainable modes of transportation, are likely to continue and grow in 2023. This is likely to generate a steady demand for sustainable transportation infrastructure. Increasing fuel prices across the world are also likely to nudge peoples' preference set in favor of public and clean energy based transport, as long as these could be offered at affordable prices.



No. 02 – Housing

Non-renewable grid electricity is a significant source of lifestyle carbon footprints in all countries. Moreover, gas used for heating and cooking contributes substantially to the carbon footprint in countries like United Kingdom, Japan, and Turkey. High-income countries have larger average living spaces and higher living standards, which are reflected in their larger footprints. Particularly in Finland and Canada, this is evident.

In Canada, the housing footprint is noticeably higher, i.e., 3.1 tCO₂/capita/year, as a result of the relatively high consumption of carbon-intensive energy sources, such as natural gas. In Finland, the housing footprint stands at 1.6 tCO₂/capita/year, where a large portion of the heating energy (the largest portion of total energy consumption) is based on renewable energy sources.

Renewable electricity may be less efficient than non-electricity energy sources, yet electrification of direct domestic energy usage can support low-carbon lifestyles. Among high-income nations, Japan has the greatest electrification rate of direct energy use in the housing domain (51% compared to the lowest 22% in the United Kingdom).

The experience of a harsh winter in Europe, made harsher by the energy scarcity created by the Russia-Ukraine war, is likely to push the demand for greater self-sufficiency at the household level. This means that housing choices focused on distributed solar grids, rooftop solar installations, and peer-to-peer energy sharing enabled by blockchain are mechanisms that will gain rapid acceptability once the requisite technology and infrastructure becomes available.





No. 03 – Food

Until now, the climate anxiety has not been met with commensurate changes in dietary patterns. The global food system contributes 25% to CO₂ emissions. The highest environmental impact from food comes from animal products & fats, chocolate, coffee, and vegetable oils. Global meat consumption has increased by 58% between 1998 and 2018. According to an Oxford University study, the dietary emissions for meat-eaters are 50 to 54 per cent higher than they are for vegetarians and 99 to 102 per cent higher than for vegans (Scarborough et al. 2014).

Greater commercialization of meat substitutes and affordable pricing may influence people's overall food preferences in the near future. Indeed, the preference for vegetarianism and veganism has also increased. According to the Bloomberg Intelligence Report, plant-based food sales are expected to increase fivefold by 2030. In 2020, plant-based dairy and meat sales were over \$29 billion and were projected to increase to \$162 billion by 2030. This trend is likely to be on the upswing in 2023 and will contribute significantly towards lowering emissions.



No. 04 – Fashion

The introduction of fast fashion, along with decreasing prices of garments and the tendency to use them for shorter periods of time, has made "fashion" an emerging carbon footprint hotspot. On average, globally a person buys 5 kg of clothes per year. Fashion production makes up 10% of global carbon emissions and is the second-largest consumer of the world's water supply. If these trends continue, the Ellen MacArthur Foundation expects that the fashion industry alone will account for 26% of the world's carbon emissions by 2050.

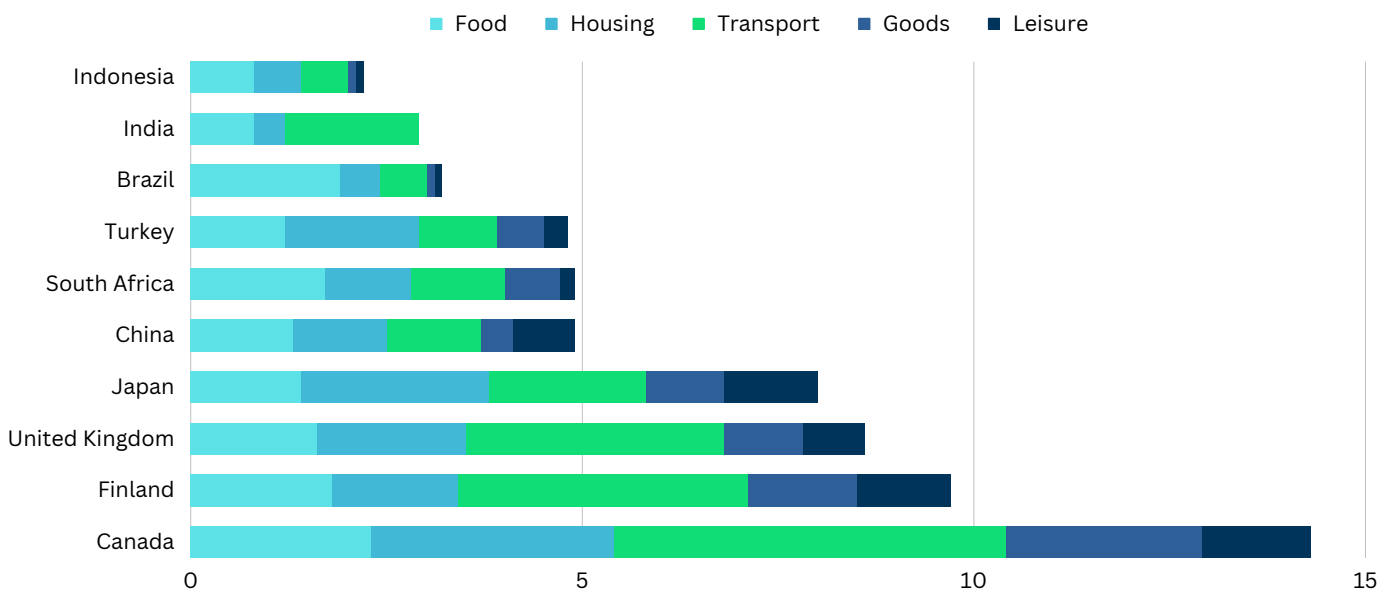
The first COVID-19 lockdown regulations had a big impact on the fashion industry. Spending on apparel across nine countries decreased. According to a study, more than half of the respondents (56%) on average across nine countries reported that their spending on apparel had decreased and 33% stated that their spending remained the same. Only 11% of the respondents indicated an increase in apparel consumption during COVID-19. The strongest decrease was reported in India (78%), China (71%), Iran (67%), and the UK (61%). However, as per the same study, the highest level of engagement with the practice of buying apparel for reduced environmental impacts pre-COVID-19 were recorded in Denmark (50%) and the US (42%) and the lowest – in India (13%) and Hong Kong-SAR (16%). The highest levels of engagement with the practice of buying ethically-made apparel pre-COVID were reported in Denmark (44%), Iran (37%), and the US (37%), and the lowest – in Hong Kong-SAR (14%) and India (15%).

Yet, a shift in consumer consciousness along with successive inflationary waves caused by the Covid-19 pandemic and the Russia-Ukraine War, have led consumer and producer networks to demand for a global circular economy for fashion and textiles. According to a UK-based study (Zhang, Zhang, and Zhou 2021), "in general, there is an improved cognitive and affective awareness of sustainability, but this does not automatically translate to purchase behavior. Policy interventions like taxes and subsidies are still needed to foster sustainability in the fast fashion industry."

In 2023 individuals, consumer groups, investors, and policymakers are likely to advocate more vociferously for conscious production and distribution, as well as cautious consumerism as a response to fast fashion. While the fast fashion industry is likely to continue growing until 2029, recent years have been a march towards forming of greater consciousness

towards circular economy models, which could, in turn, reflect in consumer behavior as well as legislation in favor of sustainable apparel. Changes in consumer preferences and legislation in the developing countries are likely to follow the developed economies, where already legislations such as Waste Prevention Programme for England, California Senate Bill 62, the French Anti-Waste Bill, the UK Green Claims Code, the German Supply Chain Due Diligence Act (Lieferkettensorgfaltspflichtengesetz, LkSG), the French Climate Label Bill, the German Green Button Label Law, and a spate of circular economy and waste reduction legislations in the EU, have been passed in the last two years and/or are going to be implemented over the next four years. This means a veritable shift away from fast fashion over the next decade in developed as well as developing countries.

Carbon Footprint & its breakdown between consumption domains (tCO2e /Cap/Year)



	Canada	Finland	UK	Japan	China	South Africa	Turkey	Brazil	India	Indonesia
Food	2.3	1.8	1.6	1.4	1.3	1.7	1.2	1.9	0.8	0.8
Housing	3.1	1.6	1.9	2.4	1.2	1.1	1.7	0.5	0.4	0.6
Transport	5	3.7	3.3	2	1.2	1.2	1	0.6	1.7	0.6
Goods	2.5	1.4	1	1	0.4	0.7	0.6	0.1	0	0.1
Leisure	1.4	1.2	0.8	1.2	0.8	0.2	0.3	0.1	0	0.1
Total	14.2	9.7	8.5	8.1	5	4.9	4.9	3.2	3	2.2

Source: Akenji, Lewis, and Sivan Kartha. 2021. "1.5-Degree Lifestyles: Towards A Fair Consumption Space for All." Hot or Cool Institute, Berlin.



MULTIPRONGED APPROACH

THROUGH
INTERNATIONAL
PARTNERSHIPS



In order to combat climate change through changes in lifestyle, we must take into account a variety of factors that influence carbon-intensive ways of life. Climate actions at the individual level needs be reflected in the mainstream policy landscape of this year. India, recently launched Mission LiFE (Lifestyle for the Environment) to bring individual behaviours to the forefront of the global climate action narrative. Mission LiFE envisions to replace the prevailing harmful consumerism with a circular economy and encourages individuals to take everyday climate action. The mission intends to establish and nurture a global network of individuals known as "Pro-Planet People" (P3) who are focused on adopting and promoting environmentally friendly lifestyles.

However, only empowering individuals may not be effective in achieving desired goals as individuals suffer due to others' involvement in public bad (i.e. negative externalities generated by others' actions), therefore groups need to be empowered through collective actions against climate change. 2023 will be the year of international partnerships and dialogue for lifestyle changes, taking place through horizontal and vertical alliances; the former will take place within national borders, while the latter will lead to partnerships across countries. The United Nations designated 2023 as the International Year of Millets at India's proposal (IYM). The move was supported by 70 nations. Millets grow well in conditions of low soil fertility and moisture, the crop is resilient and rain-fed that flourish in dry regions.

Growing millet is a step towards food security and sustainability. India will lead the global IYM 2023 celebrations and organise campaigns to promote millet cultivation and consumption.

This year will witness multipronged policy approaches that create awareness and demand more information along with incentives, by ensuring the availability & accessibility of low carbon options. Three lifestyle-shaping factors—Attitudes, Facilitators, and Infrastructure—can be the focus of future climate action. Whereas attitudes may represent pro-sustainability behaviour, facilitators are enablers who help intentions become actions, and infrastructure may influence lock-in participants' behavioural patterns. When all three variables are present and interact harmoniously, significant changes in lifestyle will occur. Initiatives like mission LiFE can incentivise individuals to take climate action at a personal level. The mass market will be impacted if current choices in lifestyle hotspots such as transportation, housing, food, and fashion are replaced with sustainable alternatives.

CHAPTER 4

SDG FINANCING OUTLOOK 2023



SDG FINANCE GAP

The pandemic followed by the Russia-Ukraine war has created an increased pressure on countries to finance sustainable development projects. The need for sustainable recovery to build back better (BBB) is, even more, real now. The immediate reaction of the Russia-Ukraine War and COVID-19 has been to rely on the traditional non-renewable resources of energy. According to OECD, the SDG financing gap in developing countries increased by 56% percent in 2020, totaling USD 3.9 trillion.

The SDG finance gap, while it has many levers including technology, proactive government policy, individual choices, and corporate strategy, depends on 4 sources of revenue:

- 01 Government revenue and spending
- 02 Private capital inflows
- 03 Remittances
- 04 Development finance

Each of these sources contributes significantly to how much resources are available to be spent in financing SDGs.

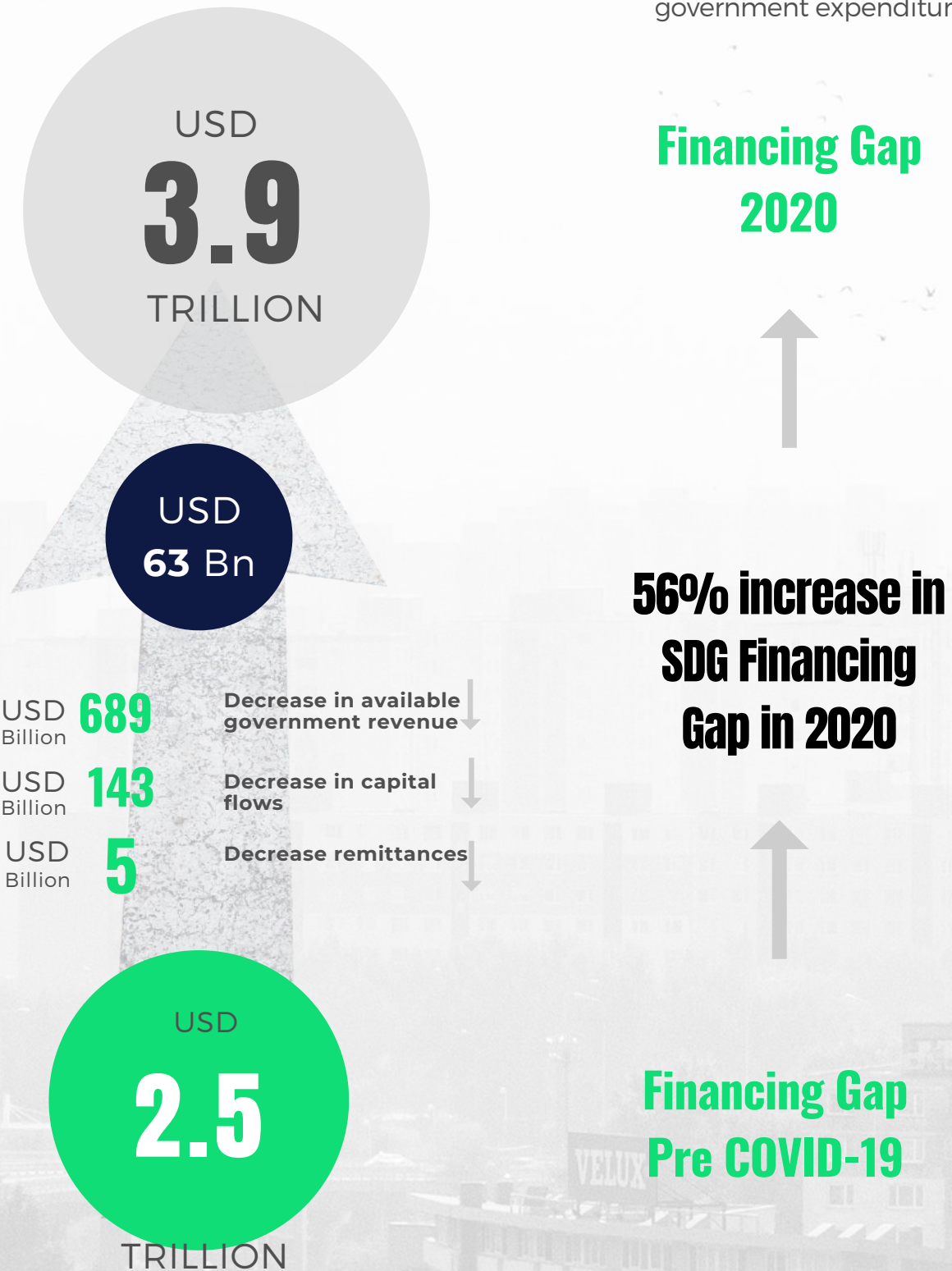
Despite swift policy responses, COVID-19 resulted in a significant drop in nearly all sources of financing for sustainable development in 2019-20.

A close look at financing SDGs through government revenues shows that COVID-19 created a 56% sustainable financing gap in 2020 and this was primarily because of two reasons (a) a decline in government revenues, and (b) emergency spending to combat the pandemic.

This resulted in the increase of the SDG financing gap from \$2.9 trillion to \$3.5 trillion in 2019-20. Will the Russia Ukraine war lead to a significant rise in the SDG financing gap? The answer may not be so simple.

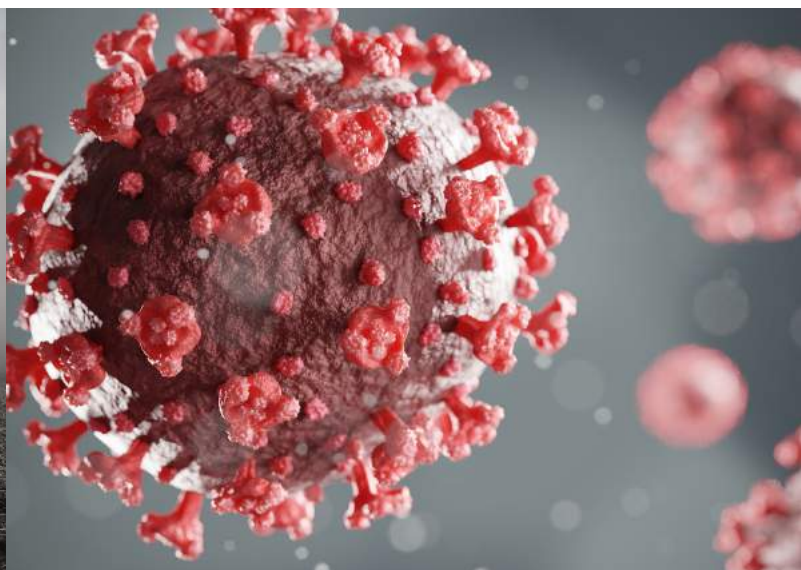
Some of the ideas that may lead to some progress may be related to (a) the use of blended finance; (b) targeted financing of projects impacting vulnerable populations; and (c) the reinterpretation and recalibration of discount rates in financing projects.

SDG Financing Gap Increased by 56% in COVID-19 largely due to a drop in available government revenues and international capital flows as well as an increase in government expenditures.



Source: OECD (2022), "Financing for Sustainable Development at a Tipping Point," in *Global Outlook for Financing Sustainable Development 2023: No Sustainability Without Equity*, OECD Publishing, Paris.

The war and covid have created a situation where the available government revenue (i.e. government revenue available after debt service payments) is expected to remain almost 20% below pre-pandemic projections into the foreseeable future.



In middle-income countries, government revenue will be lower by about USD 95 billion annually. Despite a steep decline government revenue are likely to remain the largest source of financing in the world, especially in developing countries.

Between 2020 and 2025, external debt service in developing countries is projected to reach **USD 375 billion** on average, already a jump from the **USD 330 billion** on average between 2015 and 2019. With 45% of their outstanding debt maturing by 2024, compared with 36% for all developing countries, low-income countries (LICs) are particularly exposed to rollover risk (OECD, 2022).

Yet, there are encouraging signals as well. Despite the war, the external private flows to developing countries (excluding China) declined by 13% which was much milder than anticipated.

In the first half of 2022, global FDI flows rebounded to **USD 972 billion**, recording the largest half-year levels since 2013. According to the UNCTAD Global Investment Trends and Prospects Report, “the part of FDI that is most closely correlated with financial markets has not yet lost its strength. Cross-border M&As and international project finance in infrastructure sectors may provide a floor to global FDI in 2022”.

Under the continued threat of the war, the likelihood of increasing capital flows into the Asia Pacific, Latin America, Indo-Pacific, and Africa are likely to increase while moving away from Central Asia, Eastern Europe and Russia

Agreements such as **Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)** and the **Indo-Pacific Economic Framework (IPEF)** offer a great potential in the region Indo-Pacific and APAC region to reap benefits of the supply chain transitions triggered after covid and the Russia-Ukraine War.

As far as remittances are concerned, besides Central Asian countries and Russia, remittances to low- and middle income countries (LMICs) have risen by 5% in 2022 and have withstood the global economic headwinds. While this figure is lower than the 10.2% increase in 2021, according to the latest World Bank Migration and Development Brief, it is likely to bounce

back in 2023 as expectations of the economies regarding the Russia-Ukraine War become normalized and countries begin to move to more sustainable supply chains.

Further, industries that require commodities as production inputs (such as manufacturing and construction) or that depend on fuel (such as airlines) have revised their earnings forecasts downwards. What this means is that there would be great investments in industries that have lesser dependence on non-renewable sources of energy and industries such as airlines, construction, and manufacturing will actively begin to look for sustainable alternatives.





The good news is that a sustainability boom is underway, with fast-growing supply and demand for sustainable finance and investment, that could shift trillions of dollars in the system towards the SDGs. COVID-19 served as a wake-up call to public and private actors about the impact of non-financial risk (i.e. global health, climate change, geopolitical instability, etc.) on financial performance.

The line between sustainability risk and financial risk is blurred. Investors recognise the need to limit future sources of market volatility and to seize investment opportunities.





PART II

PERSPECTIVE FROM ANIL JAIN

Member of Parliament of India (Rajya Sabha)

Sustainability is of utmost significance from the perspective of climate change and the environment. In 2015, at the Climate Change Conference in France, Prime Minister Narendra Modi asserted the responsibility of the developed nations to play a greater role in combating climate change due to their role as major polluters contributing to global warming. This statement was made in light of attempts made by the developed nations to place a greater onus on developing nations to act towards climate change. The developed nations have less population in proportion to their territorial areas and proportion to their contributions to global warming. They have a responsibility to support emerging economies in their development plans and assist them in tackling the challenges of climate change. The formation of a loss and damage fund in COP 27 to support vulnerable and least-developed countries can be considered a success in holding the developed nations accountable for their actions. Prime Minister Modi provided leadership to the developed countries to hold developed nations responsible for their actions in the subsequent climate summits.



In 2023, sustainability will take centre stage. A clean environment is essential to create a sustainable future.

Anil Jain

*Member of Parliament Rajya Sabha
at Parliament of India*



India's Path to Sustainability: India is an emerging leader in the renewable energy sector. The International Solar Alliance (ISA) formed under the leadership of India and France, is an example of an international climate partnership. India played an important role in bringing together the countries that are solar-rich and lie between the tropic of cancer and the tropic of Capricorn. The ISA is headquartered in India which signifies its important role in developing and implementing global solar energy initiatives.

Indian culture and tradition do not exploit nature. However, we process the raw materials provided by nature to put them to use. Indian culture and philosophy are rooted in the worship of the environment, the rivers and all its beings. The adoption of International Yoga day is an opportunity for India to showcase its rich heritage and culture to the world. How India utilizes the soft power gained through cultural exchange in a way that benefits the country is important.

For example, Ayurveda was considered an alternative medicinal practice until recently, Through AYUSH, ayurveda and other natural medicinal streams are provided with the same footing as Allopathic medicinal practices. Ayurveda is a lifestyle choice that aligns with nature and the environment. It is an eco-friendly choice that is more of a lifestyle option. The Ayurvedic philosophy is based on everyday practices in life that have nature and the environment as important components. Ayurvedic practices did not receive the same recognition as modern medicine due to the lack of importance given to them in the previous decades.

However, AYUSH practices are gaining more recognition due to the intervention by Prime Minister Modi in recognising and empowering AYUSH practices.

Secondly, as proposed by India the United Nations has declared the upcoming year of 2023 as the year of millets. Millets were a part of the Indian lifestyle and food habits in the yesteryears. Many delicacies can be made from millet. However, India was focused mainly on rice and wheat production and is dependent on foods developed from these grains. Millets are a much better nutritional option compared to rice and wheat.

India has worked towards providing recognition for millets on the global stage. Millets are marketed as an organic and sustainable option at supermarkets for higher prices. It is considered a sustainable and eco-friendly alternative. People can rely on organic farming to become self-sustainable and also encourage others to pursue sustainability through organic farming.

Again, an example of approaching change through culture in India is the Swachh Bharat Mission. Prime Minister Modi launched the Swachh Bharat mission in line with the sustainable goals for a healthier and cleaner transition of our environment. In 2019, the country became an open-defecation-free state. This is a positive step not only for the environment but also for the physical and mental health of the people. A clean and healthy environment can contribute to the overall well-being of an individual.

By 2023 India will become the fastest-growing economy. We will overtake China in the economic arena by the year 2023. If India continues to grow in this trajectory it could overtake the United States and become a global power. It is as we near 100 years of India's independence we are receiving "Amrut" (Ambrosia in English). This sweetness of 'amrut' and its benefits should be shared with everyone in the country.

Leadership in Technology: India is ahead in technology developments. It is one of the countries that has undergone digitization at a faster pace considering its huge population. During COVID and subsequently, at the vaccination stage, technological interventions made the process easier and accessible for people. Digital vaccine certificates are readily available to citizens and COVID test results can also be easily accessed digitally. Despite India's population, its digital success can be attributed to technological advancement in India. The Digital India Mission has even reached villages in which birth and death certificates and other documents can be digitally procured and saved.

Prime Minister Jan-Dhan Yojana is a testament to India's technological feat and digitization. Due to the direct benefit transfer scheme which enables citizens to access their pension and benefits directly in their accounts, the government has successfully eliminated middlemen and loss of benefits. It has also prevented fake pensioners and fake ration card holders from accessing these benefits as these accounts are also linked to Aadhaar. The Jan Dhan account has made the benefit-transfer process transparent and the money easily trackable.

India is also progressing in technological advancement in the space sector. Other countries are now relying on India to launch their satellites. Recently PSLV -C37 launched 104 satellites in a single mission. This is a testament to the leadership provided by India in the space sector.

Further, the development of nano-urea will revolutionize the Indian agricultural sector in the coming years. Increased production of indigenously developed nano urea could help us reduce the imports and reliance on imported urea. This could save the government a lot of money in foreign exchange and could empower village economies.

As I have noted, India is paving the road ahead and leading the world in food, agriculture, health, and many other sectors due to the strides it has made in technological advancement. We expect to see India rising in this trajectory in 2023 and the coming years.



PERSPECTIVE FROM VIRENDRA SINGH

Member of Parliament of India (Lok Sabha)

We have prioritized water since time immemorial. Rishis and sages, in ancient times, would engage themselves in the creation and nurturing of ponds, wells, and other water bodies. The idea behind such activities has always been water conservation, efficient utilization of water, and the prevention of abuse of our water resources.

Water conservation is one of the foremost agendas for prosperity in the modern world as well. Our Prime Minister, Shri Narendra Modi ji, has made all parliamentarians responsible to work towards this agenda. And this is a great responsibility that we have. In my own parliamentary constituency, I have worked on the issue of water conservation and have been working on it for decades. I worked, for example, in digging appropriate channels for the replenishment of the Murwa river which had dried up. We dug 66 km of channels from Prayagraj, all the way to Bhadohi and Banaras.



We get water from nature. As human beings, we can hardly create water artificially. Water conservation is a mission that India as a country has given superior priority to.

Virendra Singh

*Member of Parliament
of India (Lok Sabha)*

Now that river has water at a level of 4 to 5 meters at all places. This led to increased availability of water for irrigation and has led to an increase in agricultural output in the region! Our tradition has also been to conserve and harvest rainwater, and we must not lose these traditions. Water is a boon for us, but it can also be a bane if we do not respect it. On the one hand, we have many acres of land in our country where it is impossible to do farming. In fact, approximately 60% of our agricultural land just has a single type of crop and only in about 40% of the agricultural land can you grow at least two types of crops. We need to improve this and reverse this trend. Rotating crops and crop diversity is good for the soil. This is of critical importance.

It is critical for us to remember that the agricultural as well as the rural economy is at the base of our national economy in India. The reason that the rural economy has been the base of our national economy is because of their sustainable consumption patterns, savings, and investments. You will notice that farmers grow wealthy slowly, but when they do, their prosperity is steady. Farmers don't go from rich to poor suddenly. Their wealth generation model is sustainable. However, today, all over the world, we have a generation that outspends their earnings. It runs on fossil fuels. Such consumption patterns can only change with a cultural awakening. I am a firm believer that this cultural awakening can happen and is happening. Today, the youth spends a lot of money looking for jobs. What needs to be seen and appreciated by everyone is that the largest source of job creation in India, is and will be the domain of agriculture. As the world is struggling to produce more food for the

growing population, it looks towards India to meet its demand with a robust supply. All nations surrounding India, whether Bangladesh, or Myanmar, or even Pakistan, have severe limitations on their agricultural output. Our country has the right geography, the right culture, and the right attitude among the farmers to feed the world. Our farmers do not always look at producing food with pure profit motives. The farmer acts as a focal agent of economic, cultural, and political growth and progress. You should know, for example, that Bajra or millet is one of the most expensive grains in the world. I have been an advocate of the Swadeshi movement for many years, our country will benefit tremendously in creating the right ecosystem for the large-scale production of millets. The demand for coarse grains is increasing across the world. The green revolution gave us wheat and rice, but it was excessively water intensive. We need to go take measures to promote traditional agricultural practices and our government is taking momentous steps in this direction. We are also celebrating this year (2023) as the Year of Millets.

India has a vast potential for organic farming. Organic farming is now a global need. People now prefer organic food all over the world. The power of organic agriculture resides in our villages. I do not say that we should ignore the cities and urban growth, but we should remember that it is the power of the villages that sustain urban centers. I am confident that in times to come, our generations will understand and appreciate the power of the villages and our agricultural economy will only grow stronger. This will be the base of our sustainable growth.

PERSPECTIVE FROM AMB. FREDDY SVANE

*Ambassador, Royal Danish
Embassy in New Delhi*

In 2023, we can look forward to new positive developments for the next COP 28. The fact that COP 27 came to some conclusions, such as the loss and damage fund, is a step forward. The number of meetings, bargaining, discussions, dialogue, and arguments is immaterial when dealing with climate change. What matters are the results that evolve out of these meetings. In my view, COP 27 yielded important milestones that will impact how we deal with climate change in the coming years.

As to the emerging trends in sustainable development and climate change, there are two or three aspects worth highlighting. First and foremost, there's an overall understanding that technology has to be a driver of change. New and emerging technologies, trends in digitization, and all other aspects that come under the umbrella of technology have a prominent role in the path forward. When we look back at the beginning of COVID, we saw a global mobilization to develop vaccines at a never-seen-before speed. To facilitate faster solutions, we saw the breaking down of silos - in India, for instance, which is remarkable.



I believe we have to be great in whatever we do. There is something bigger beyond our national interests - the survival of humanity and our Earth. Future development can and should be achieved only through a green approach.

H.E. Freddy Svane
*Ambassador, Royal Danish
Embassy in New Delhi*

Secondly, the discussion of a loss and damage fund has divided the developing and developing world for many years. The loss and damage fund is critical to tackle and confront climate change holistically. While some countries have developed welfare-based societies using fossil fuels, we have aspiring nations trying to advance their communities and provide their inhabitants with the same lifestyles and opportunities such as that of these countries. However, they do not have the chance to develop their countries on the back of fossil fuels as we aim for a fossil-fuel-free society.

The Green Strategic Partnership shared by India and Denmark has a special feature - Denmark doesn't preach to India what it should or shouldn't do. I describe it as "we provide a menu card with different starters, main courses, and such. You are free to pick and choose." The only message we share with our friends in India is to develop your society in a better way than we did. We spent 200-300 years developing our societies, and countries such as India have less time. Do it smartly and in a green way.

Thirdly, there is a positive popular mobilization happening across the world. India has a young population that can contribute to innovation with new ideas, concepts, and ways of living. The Indian population is young, aspiring, and rooting for change. These are the three major trends I see emerging for the coming year.

Concerning the India-Denmark partnership, I would like to say that there are five S's guiding our collaboration. Firstly, 'scale' - the scale of India and the scale of challenges. Secondly, the 'skills' and techniques that Denmark can offer to solve some of the issues India and other countries are facing. Thirdly and importantly, 'speed'. We have to deliver on Sustainable Development Goals and also have to tackle climate change at a faster pace.

Fourth is the 'scope' of projects that we undertake bilaterally. Such projects should hopefully inspire instead of telling India what to do. Finally, 'sustainability'. Honourable Prime Minister Narendra Modi has brought the five S's to our Green Strategic Partnership. We will add to the relationship by being good, great, and green. Signifying we have to be good in our endeavours, good at sharing our learned experiences from developing technology, and be good to each other.

Recently, Prime Minister Modi announced the LiFE initiative in Gujarat. It is a global appeal to countries and all the citizens to take individual responsibility. Without prioritising individual responsibility, a brighter future might not be a reality.

PERSPECTIVE FROM ERIK SOLHEIM

*Senior Advisor, World Resources Institute,
Former Minister of Climate and the Environment
of Norway*

What are the top 2-3 trends for sustainable development in 2023?

Here are three trends I observe:

01

Energy independence. The tragic war in Ukraine will supercharge the shift to renewable energy. This is well captured in the latest report from the International Energy Agency. Europe wants to be independent of Russian fossil fuels. China, India and others wish to be less vulnerable to high and volatile energy prices. The world will turn to domestic energies to be more energy independent, that means a supercharging of solar, wind, hydro, green hydrogen and in the long run may be also nuclear.



Tech is critical for the green revolution. We need to harness all the opportunities arising from the fourth industrial revolution, the combined power of energy, bio and IT revolutions.

Erik Solheim

Senior Advisor World Resources Institute, Former Minister of Climate and the Environment of Norway

02

The shift to Asia. Green developments are no longer led from the West, but from Asia. China is dominating all products and value chains in the green economy. It produced 82% of all solar panels and 70% of all electric batteries in the world last year. Led by Prime Minister Modi India is also moving very fast to become the worlds second biggest solar nation and it will go big on green hydrogen with Adani, Ambani, ReNew, ACME and all the other industrial players betting big. The slogan of the Indian Uber, Ola, says it all: Tesla for the West, Ola for the rest. Europeans and Americans need to get up early in the morning if they want to be competitive.

03

The focus on business. The results of UN diplomatic efforts are underwhelming. Fortunately it is not diplomats but business which will save the world. Microsoft has promised to go carbon neutral and even compensate for all emissions in the history of the company. World biggest paper and palm oil company RGE in Indonesia has zero deforestation in its value chains and is protecting a huge rain forest in Sumatra. Huawei uses its high tech to protect nature in Europe and make solar energy more efficient in China. IKEA is world leader in circular economy. Danish Orsted turned itself around from oil company to one of worlds lead wind makers in a decade. So many other examples can me mentioned. The focus on ESG from shareholders and financial institutions will give those companies who dont want to play along no place to hide.



How can technology support sustainable transitions and impact the sustainability agenda in 2023?

Solar energy is now the cheapest energy everywhere in the world, shifting from coal to solar saves money. It may be particularly prudent to focus on the opportunities coming from seeing the interplay of the new technologies. IT can for example drastically improve the efficiency of the energy systems and save emissions and waste. IT can also be used to improve yields and reduce pollution in agriculture. The fourth industrial revolution makes a circular economy possible and can give us renewable energy, electric transport, better food systems, and more.



What should be the top priorities for organizations and individuals to transition towards more sustainable economies, societies, and individual lifestyles?

Most important is the mental shift. The old model was win - lose. Any nation which wanted fast development had to base progress on fossil fuels and destruction of ecosystems was unavoidable. The 21st century is different. We have the win - win models - policies which are good for ecology, economy and peoples livelihoods all at the same time. Its interesting that the leaders of the two most important development nations are fully synchronized here. Both President Xi of China and Prime Minister Modi of India are focused on the opportunities for their nations coming from climate change and green development. Their vision is a positive environmentalism focused on hope and opportunities, not on despair and scaremongering. We shall aim at an ecological civilization.



PERSPECTIVE FROM AMB. ANIL TRIGUNAYAT

*Chairman, Confederation of Education
Excellence | Retd. IFS*

We are facing an existential threat. The challenge at hand is not taken seriously enough in spite of the numerous meetings or conferences held year after year. The rich, developed countries are unwilling to take on the responsibility for their contributions to the present crisis. The climate financing obligations of 100 billion dollars committed in the Paris Agreement have not been met. I consider this as a sort of protectionism or even a green apartheid. This remains a major challenge to tackling climate change. Another challenge is posed by the interest groups involved, such as the fossil fuel industry that has contributed more than 50% towards global warming. This requires decarbonisation efforts that begin at the source, from the point of extraction of energy sources till the time it is processed and made available for use.

SDGs are intricately linked to climate mitigation and adaptation. The pandemic and the Russo-Ukrainian war have impacted the SDGs significantly. Following these events, the focus on SDGs has taken a back seat. We live in a world of haves and have-nots. This puts a responsibility on the part of the polluters to take accountability.



The world we are moving towards is going to be technology driven. I believe, if we deployed available technology we might be able to maintain the current state of warming, even though it is not a sustainable solution.

Amb. Anil Trigunayat
*Chairman, Confederation of Education
Excellence | Retd. IFS*

The former Secretary-General Ban Ki-moon said that "We are using resources as if we had two planets, not one. There can be no 'plan B' because there is no 'planet B'." It is questionable if the countries would meet the Paris agreement goal to limit global warming to 1.5 °C - the minimum threshold set in 2015. It is possible that by 2031 we might breach the safe temperature threshold due to failure to limit global warming below 1.5 °C and cross all the limits. The impacts of climate change are already visible in the Arctic and Antarctic. Rising sea levels and changing weather patterns are affecting cultivation and cropping patterns. The disastrous effects of global warming are going to have an overarching impact on all areas of life. In my perspective, we should have signaled SOS yesterday, not today or tomorrow.

Role of Technology: The world we are moving towards is going to be technology driven. There is also the question of the transfer of green technologies and withholding of intellectual property rights concerning such technologies. Like the military-industrial complex, the countries that wield green technology have a certain advantage that they would like to retain. This puts developing countries and those with lesser resources to develop green technologies at a disadvantage. I would like to think of global warming and the use of technology as a catch-22 situation. At the risk of sounding pessimistic, I would say we are past the stages of mitigation.

The discussion on climate change mitigation and adaptation is also a discussion of energy transition. The role of interest groups like the transportation, shipping, and hydrocarbon industries has contributed to global warming the most in the last 80-100 years. The possibility of using green hydrogen, nuclear and other energy sources as replacements of fossil fuels in the shipping industry should be explored. This way, the shipping industry can undergo green transitioning. The production processes involved in the day-to-day consumption patterns also require the intervention of green technologies so that a transition can happen in these areas.

The use of plastic has already done tremendous damage to our flora and fauna. To prevent a similar scenario, we need to address the challenges that might arise in the transition from fossil fuels to electricity-driven mobility. When we look at technology-driven mobility - electrical mobility or electric vehicles, we often fail to take into consideration the disposal of electronic waste such as the batteries used in electric vehicles. The disposal, recycling, and reuse of electronic waste and its impacts should be studied and explored when we undertake large-scale transitions.



ONE EARTH,
ONE FAMILY, ONE FUTURE

The Role of Governments: The New Brazilian President Lula Da Silva has vowed to protect the Amazon rainforests by preventing deforestation. This promise is encouraging and a gift to the world. I hope this promise will be upheld by the Brazilian President. While large-scale changes, such as the protection of our ecosystems are necessary to compact climate change, we should also prioritize lifestyle changes. We cannot continue to produce, consume and carry on in the same manner if we want to limit global warming. In India, we love, respect, and worship nature. However, we are also culpable in many ways. Prime Minister Modi has declared "Vasudaiva Kutumbhakam" as the theme for India's G20 Presidency. These principles should be put into practice at an individual level to bring in change.

We should also look at incentivizing countries to transition to a greener future. The question is, who is going to incentivize? Those who can are also the biggest polluters. China, the US, Russia and the EU have the highest per capita pollution rates. A small island nation such as Fiji is rich in biodiversity, abundant in natural resources, and is akin to an oxygen tank due to its environment. The countries that require protection are the ones that face the most risk. Countries such as Fiji, and other small island developing states who are facing existential threats such as the smaller island nations should be incentivized to act on climate-resilient infrastructure and developments.

In the matter of supply chain transitions, we have an opportunity to move into more sustainable practices. The present war in Ukraine and the Pandemic in China have disrupted supply chains. China had control over 40-50% of global value and supply chains. Their manner of production and manufacturing are questionable as they have continued to contaminate the environment. We should consider the possibility of diversifying supply chains to reliable countries. Instead of debt financing, we should enter into partnerships that enable the transfer of technologies. If African nations weren't exploited and resources extracted for the benefit of developed countries, they can lead a sustainable, self-sufficient future. The disruption of supply chains has brought forth the importance of resilient systems that can withstand disruptive global events.

In recent times we have seen the weaponization of financial instruments, energy, food and fertilizer. It could be said that the military-industrial complex has weaponized all important aspects of life. In the event we head towards a Cold War 2.0, the one who comes out at the top will achieve superiority utilizing technological over military superiority. However, technological superiority also prevents the sharing of such technologies and their dissemination. The conflict between the US and China is not merely of geopolitics but of technological superiority.

India is leading the way through the International Solar Alliance, participation in the Coalition for Disaster Resilient Infrastructure (CDRI), setting renewable energy targets for 2030, and the net zero targets for 2070 in the global arena.

This could be a silver lining amidst the chaos of global warming. India's G20 Presidency is a big opportunity. However, India will also be chairing the Shanghai Cooperation Organization in 2023. The Asia- Africa Business and Social Forum was held in India this year. So there is a big opportunity for India to lead the change. Recently, the High-level Policy Commission on getting Asia to Net Zero launched a report on "Getting India to Net Zero" that focuses on advancing India's emission targets. India has already started to transition to renewable energy sources without receiving much external funding. I believe we can hold our leaders accountable for the commitments they have made. The launch of the International Solar Alliance is a tremendous opportunity on a global scale for India to take the lead. The G20 represents 85% of the global GDP. India can direct the focus to energy transitions and provide workable solutions that can be tailored to country-specific needs at the G20.



By leveraging the goodwill and good relations with member countries of the G20, it could be easier for India to take the lead in building a greener future. However, such a transition to greener energy sources would require more financing which could lead countries to increase their energy security by going back to coal, such as in the case of Germany. For instance, though Nigeria is rich in oil and gas, the country only produced 6000-7000 megawatts of electricity. As most African countries are energy deficient, we cannot expect them to move on from fossil fuels. Discussions on the responsibility to foot the bill for energy transitions oscillate between two sides - one that blames it on the centuries of colonization that prevents any progress and the other that asks if it was a mistake that they developed sooner. However, India will advocate for developing countries to receive adequate funding to meet the challenges of climate change. I believe India is a voice for Africa, Latin America and other developing countries in the global arena to facilitate funding, transfer of technologies and a moratorium on IPR on green technologies to enable a transition to a green future.

Notwithstanding the above, each country has to pursue a bottom-up approach from the grassroots level with the resources at hand instead of waiting for help to arrive. This approach has to be engineered into our everyday lives to successfully meet the difficult challenge presented by climate change and to limit global warming.

PERSPECTIVE FROM AMB THOMAS ARMBRUSTER

Former US Ambassador

(Views expressed here are his own and do not represent the US Department of State or any other organization)

What are the top 2-3 trends for sustainable development in 2023?

There are several competing trends creating cross currents.

Sustainability for me means my grandkids will have the same or better chance of seeing a pair of foxes on the trail, a bald eagle fly by, and a noisy flock of geese in the winter make their way south. And during vacations, to see vibrant, abundant coral with all manner of surprises hidden away. Moray eels, rays, sharks lazily patrolling the deeper water, and colorful parrot fish making a living on the reef. That future is in danger but not out of reach.



”
There has to be a better corporate mindset with an eye on the planet. Maybe that starts with a profound reckoning about our treatment of the planet and a new philosophical or spiritual understanding of the moral imperative to leave a sustainable planet to our offspring and the nature that will sustain them.

Amb. Thomas Armbruster
Former US Ambassador

One alarming trend is news of continuing collapses of species. Our canaries in the coal mine keep dying. The Alaskan crab industry collapsed with the loss of perhaps a billion crabs, prompting officials to close the Bering Sea Snow Crab 2022-2023 season. Bees live only half as long today as they did 50 years ago according to a University of Maryland study. The study adds genetics to the list of usual suspects like pesticides and viruses. Since bees are “semi-domesticated” and manipulated by humans, we have a role in the sustainability of bee populations whatever the cause. **“No bees, no humans” rings truer than “No humans, no bees.” They would do just fine without us.**

Humans are not immune to colony collapse. The journal “Human Reproduction Update” reports a 50% decline in human sperm counts over the last 46 years. Earth’s 6th mass extinction scientists say is underway, but red flags, tipping points, and dead canaries don’t seem to slow us down much.

A trend for some groups is headline-making stunts. Frustrated by a lack of progress, activists are ruining works of art or handcuffing themselves to public spaces. It’s likely these sensational protests will continue and get more audacious, but they risk alienating the mainstream in ways that mass rallies and other protests don’t. Better to plant a tree, clean up a beach, or donate to your favorite environmental NGO and get involved politically. Finally, a positive trend is a determined optimism among environmentalists who recognize that there is no alternative.

Either we presume a coming environmental apocalypse or we “go for broke” and try to heal the planet. Luckily, most say “Let’s fix this!” There are tremendous environmental success stories we can take heart in. The UN is tracking methane emissions from space. Coral reef studies are learning about coral resilience so new corals can be planted and thrive. Renewables outpaced coal for the first time in the US this year. Around the world, rewilding efforts are underway. And young people care about this issue. Giving the older generation a strategic reason to pursue optimism. The next generation has to be better stewards of the planet than we are. An energetic, optimistic, and motivated younger generation will do a better job.

How can technology support sustainable transitions and impact the sustainability agenda in 2023?

We hear notes from the future in uplifting scientific discoveries. Exciting progress on fusion energy that can light whole cities, microbes that eat plastic, and wind turbines that generate power without blades that kill migrating birds. Some scientists take their game-changing ideas and commercialize them. Some put the data out there and hope the public or private sector will follow up. It would be good to see investors and entrepreneurs not only focus on the next black swan I-phone app but also the next green technology.

The transportation sector was revolutionized by Elon Musk. Love him or hate him, the electric car era is underway thanks to Musk. Hydrogen holds promise, not just for cars, but aviation

Electric planes are ideal for the aviation training market. But again there are cross currents. Ocean-going commercial shipping needs incentives or punishments to make the switch to cleaner technologies, though there are designs for future cargo ships that incorporate wind.

The trucking industry showcases sexy new rigs, while slow rolling the introduction of new fleets.

Farming is also undergoing a shift. Regenerative agriculture holds promise and is essential after generations of the overuse of pesticides and fertilizers. Regenerative agriculture looks a lot like indigenous farming, with a holistic approach designed to improve soil, biodiversity, and sustainability throughout the agricultural network and food chain.

The waste industry, including CO₂ as a waste product, has a long way to go and not much time to get there. Infighting is counterproductive. One Harvard scientist objected to carbon sequestration, telling *Earth* magazine that **“By saying that carbon dioxide reduction will be big in the future, it reduces political pressure to sharply decarbonize today. My position is that people calling for the double-digit gigatonne scale carbon dioxide reduction, whether they like it or not, are aligning with the narrative and incentives from polluting industries and for-profit interests.”**

That is overthinking. We need to do everything these days to heal the planet. And if that is where Big Oil can contribute, let them do it. The benefits are real.

Carbon capture does exactly what it says, takes carbon out of the atmosphere. People can understand that this complex problem requires a multi-faceted approach that involves steep reductions in fossil fuels, alternative energy, and carbon capture.

Revolutions in energy, transportation, farming, and waste streams take time and people still have to make a living along the way. Governments and NGOs can help transition us to a more sustainable future with subsidies and grants that encourage the transition.



What should be the top priorities for organizations & individuals to transition towards more sustainable economies, societies, and individual lifestyles?



For corporations and shareholders the top priority is to change the definition of success. Why is that the medical profession's credo can be "First Do No Harm," the Police "Protect and Serve," and yet the corporate motto is still "Make More Money at All Cost." Corporate Social Responsibility tends to be corporate 5k runs for cancer awareness or adopting a stretch of highway to keep clean. A better corporate motto would be "First Repair the Damage." Figure out how your corporation impacts the environment and mitigate the damage. Some companies do. Big stores accept and recycle your used laptop. But try taking your plastic soft drink bottle back to their factory. People want to do the right thing, but it is not always possible.

Extractive industries like mining, seafood, and timber do enormous damage, but those industries are more adept at greenwashing than taking responsibility for the damage they do.

Which brings me to democracy. Only in countries where you can protest, vote, take a polluter to court, lobby, and learn about abuses to the planet in a free press do you have a chance of effecting change. We need democratic norms and democratic countries cooperating to get the job done. Otherwise, we will have cases like the Soviet Union's undercounting (lying) about their whaling statistics for years, leading to the decimation of southern ocean whale populations.



Today, Chinese “ghost fleets” are wiping out fish stocks around the world. Democracies do a better job with international norms and rules. Humans have a deep responsibility given our impact on the planet. It is to our detriment if we are left with fewer wild places and a loss of the astonishing biodiversity this planet enjoys. (Deep sea mining should be banned precisely because we don’t know what species we would wipe out.)

Humans are related to animals and have a common ancestor and common home on Planet Earth. Animals laugh, love, create, adapt as best they can, and provide for their offspring.

What is truly unique about humans is our ability to transport life from Earth elsewhere in the Universe. We are clever critters. Someday, humans may reach another habitable planet. Knowing how to be good stewards of this one, and respecting the plant, animal and marine life that is here, is a prerequisite for success elsewhere. If we can figure out how to keep this remarkable planet green and blue and healthy, perhaps we can support life systems elsewhere. And our grandkids will not only see foxes, bald eagles, and moray eels, but also marvels on other worlds.

PERSPECTIVE FROM AMB. MATTHEW WILSON

*Ambassador and Permanent Representative of
Barbados to the United Nations, Geneva*

1. What are the top 2-3 trends for sustainable development in 2023?

A closer interaction between the climate world, the trade world and the finance world. Just like we had seen over a decade ago with the trade development specialists being brought to the table through the WTO Aid for Trade initiative, I expect that certain movements, such as the Bridgetown Initiative led by Prime Minister Mia Amor Mottley of Barbados, will continue to gain momentum. A second trend is that developing countries will reassess how they can better use trade policy to truly benefit from the green transition. From looking at tariff structures and economic incentives to investing more in green and blue hydrogen and using solar, marine and wind energy to power industry.



I expect many countries of the Global South, including small island states, to recognize the need to retool their economic and trade policies more towards the circular economy.

AMB. Matthew Wilson

*Ambassador and Permanent
Representative of Barbados
to the UN*



How can technology support sustainable transitions and impact the sustainability agenda in 2023?

Technology is the key that can unlock possibilities. It can help countries leapfrog over polluting and inefficient processes and land in that sweet spot where profitability, policy and people can co-exist. From using waste or abundant products such as seaweed to transform into plastic substitutes, to powering a more transparent platform of tracking the proliferation of new green standards, technology- if equitably available including through access to green finance- can support a global sustainability transformation.



What should be the top priorities for organizations and individuals to transition towards more sustainable economies, societies, and individual lifestyles?

One, ensure vulnerable countries and communities have access to the green finance needed to orient their economies towards a circular transition; two address production and consumption patterns; and three invest in micro, small and medium enterprises to improve their systems by investing in sustainable methodologies and processes to assist them in meeting the array of new public and private standards that are appearing annually.

PERSPECTIVE FROM SURESH KUMAR

*Former Chief Principal Secretary to Chief Minister, Punjab
Indian Administrative Services (Retd.)*

In the recent past, there have been two things that affected us badly. Firstly, the COVID-19 pandemic that has not yet turned endemic, and secondly, the ongoing war in Ukraine. There are new variations of COVID virus and the spread of new infections occurring in China, Europe, and other countries. The true impact of COVID-19 in sub-Saharan countries is unknown. These events have exposed the inadequacies of existing system structures, policies, and programs concerning sustainability. This is a positive development amidst a crisis. Before these events, sustainable policies and programs were not prioritized by governments. The human response to this crisis will have a significant impact on our future and provide insight into our true nature.

In India, the sustainability code remains undefined. The governments at the state and national levels do not adequately factor in the sustainability code - a framework of instructions and requirements concerning sustainability - in the various infrastructure projects, service-oriented projects, and the projects that are beneficiary oriented - such as Direct Benefit Transfers (DBT). Sustainability should be recognized in the political and public policies of governments. The pandemic has also highlighted we need more than whatever was done ever before.



We have to recognize the value of data and data advocacy in creating investments and policies in critical sectors such as nutrition, health, and education.

Suresh Kumar

Former Chief Principal Secretary to Chief Minister, Punjab, Indian Administrative Services (Retd.)

What should be the top priorities for the government and the private sector?

The strong economic and social capacity of the Indian system helped us navigate through and succeed in containing the pandemic regardless of the weakness of the existing structures and systems of governance. Health and education sectors were severely affected and had a direct impact on vulnerable populations. Before the intricacies of climate change are addressed, the needs of India's most vulnerable populations should be taken care of. Their food, healthcare, and educational needs should be given priority.

During the pandemic, the plights of migrant laborers came to public attention. Their plight and experiences during the pandemic are examples of the inadequacies of existing systems in meeting the basic needs of a large group of the population. A large number of the Indian population moved from one state to another for jobs and other needs. During the pandemic when the local governments were provisioning rations and controlling the health services, migrants were often left out. Due to the absence of ration cards, health cards, Ayushman cards, and membership in other social security schemes in the hands of the migrants, they did not receive the services and benefits distributed by the local administration during the pandemic.

A similar example is the experience of migrant students during the Ukrainian war. Approximately 20,000 medical students were stranded on the roads and traveling to border countries on foot to escape the war.

The vulnerabilities in the distribution of services at the ground level need to be adequately addressed while trying to combat the impacts of climate change.

To put the climate change impact in a real context, in Punjab, there are three river systems, the Sutlej, Ravi, and Beas. These rivers had approximately 35 million acre-feet of water at any given time. In the last decade, there has been a reduction in the water capacity in this river system. Drying of water courses has resulted in the non-availability of adequate water for agricultural and industrial purposes, commercial use, and for drinking, and dependence on groundwater has increased. This is a problem in a state that has water-intensive crops and is known for its agricultural production. Identifying the problems related to water availability, soil quality, and food production have to be prioritized to tackle the visible impacts of climate change, particularly on vulnerable populations.

One of the other inadequacies in our existing mechanism is the unavailability of sufficient data when it comes to climate change and other sectors. The data is often collected and stored but is not readily available to policymakers. The unavailability of data can result in people getting dropped out of services that are implemented for their benefit. The impact of climate change on livelihood and natural endowments needs to be monitored and documented. Data availability and access can help in decision-making that will ensure quality food security even when food systems are affected by the non-availability of water and reduction in soil quality.

Another area that has to be prioritized in the coming year is the need for expertise. As per our constitutional provisions and laws, only political executives are empowered to make policies in India. For informed policy-making practices, a large amount of information, knowledge, and expertise has to be accessed and utilized. There is a need for expertise to deal with the various facets of climate change. The pandemic COVID-19 also highlighted the need for expertise in policymaking. To efficiently manage climate change and frame climate change policies, people trained in those areas need to be consulted and involved in the policy-making process. There has to be a collective effort on the side of politicians, bureaucrats, and experts to come together to tackle the challenge.

A common man or voter cannot be held responsible for not participating in political processes without considering the climate change agenda or prioritizing climate change during the elections. Former US President Donald Trump had declared climate change as a non-threat even though he held one of the highest offices responsible for making public policies. At a time when people in positions of power are unwilling or unable to recognize the threat of climate change, the common man should not be blamed for failing to take cognizance of such changes. Surely the politicians come to power for a limited period of 5-6 years at the minimum. This might limit their vision only to the immediate future resulting in policies that have short-term impacts and fail to address long-term future challenges. The judiciary and bureaucracy, the two permanent wings of the government, should take cognizance of the lack of action at the political level or in the private sector to facilitate and encourage sustainable decisions.

Recently, the Supreme Court of India entertained a petition that challenged the “freebies”, which refers to denote the various welfare schemes implemented by the state and central government. Freebies were always opposed by the bureaucracy. The discussion in the political arena regarding the freebies is a good thing as it indicates a realization that the programs or actions, which are not economically or environmentally sustainable, should not be taken up. Bureaucrats and the judiciary have a responsibility to advise for corrections in decisions or policies that could do more damage to the environment or the economy. This is where the need for a sustainability code arises. It is the duty of the bureaucracy and the judicial authorities to see that in matters of governance that impact the common man, particularly the next generation, the sustainability code should be defined and factored into the decision-making processes.

What is the role of technology in furthering the sustainability agenda?

Public policies that focus on sustainability have not received enough attention in the past. Innovations and technology are now driving development, growth, and progress globally. The technologies such as Artificial Intelligence, information, and communication systems help to create new systems and restructure or redesign existing systems towards a more environmentally friendly or sustainable model. Such technology-driven change cannot be rejected or refused by the private sector or governments.

New technology might appear difficult in the beginning but often it helps to reduce costs. Technology creates new jobs, particularly, skilled jobs. Technologies also help conserve and use minimum resources and maximize production. Production mechanisms can be redesigned with the help of technology to produce more from limited resources.

Technology had a huge impact on dealing with the COVID-19 pandemic. In the history of research and medical sciences, we have not produced a vaccine that is effective across the world in a short time. Technology has a huge role to play in healthcare systems and education. However, there is an apprehension of a digital divide due to poverty, illiteracy, lack of connectivity, and so on. During the pandemic, technology was able to surpass this divide by facilitating online education and the dissemination of information through digital modes. Technology enables global access to people and makes people aware of their rights and entitlements, the schemes, and the programs they are eligible to receive benefits. They can also access many products and services through online networks. The technology has also helped to bring transparency to government programs and policies. The direct-benefit transfer scheme is a technology-driven program.

Final Thoughts: Sustainability has three pillars: planet, people, and profits. The first pillar is the protection of our environment and our planet. We must protect our natural resources. We need to reduce air, water, and plastic pollution from causing further damage to our ecosystem. Plastic pollution has increased to the extent that

microplastics are present in water, animals, and our subsoil systems. Governments and society should take remedial measures to prevent the destruction of our environment through appropriate policies. The second pillar is the people. Creating a good environment also means keeping people healthy by providing access to good services and infrastructure that ensures a good standard of living. Governance systems should take into consideration the common man's education, health, water and sanitation requirements, and food and nutrition security for creating a sustainable future and environment. The human resources of the country should be protected by meeting their basic survival needs. The third pillar is the economy. The economy should grow with full regard to the conservation of natural resources, development of human resources, and protection of investment with due profits and return on investments. Governments should promote investments in the sectors that are critical for human survival. This can be done by promoting economic and fiscal policies and implementing financial laws and regulations that allow people a safe margin of profit.

Government should give clear directions in this regard, and promote investments in education, job creation, food security, healthcare, and social security.

The common man is not fully aware of the various implications of climate change and even the uses and benefits of data. Their lack of knowledge and understanding results in skepticism of data and the processes that involve data collection and use. People should be made aware of the changing data methodologies and frameworks to inspire confidence in data systems. The government is the largest data repository of public data. This public data should be digitized and used for evidence-based policy formulations and their faster implementation.

However, there is a lack of rules and regulations to manage the data. The security of such data is also a major concern. The Digital Personal Data Protection Bill is under consideration by the Indian parliament. There have to be protective mechanisms in place for sharing of data that enable data privacy and confidentiality. Data policies should fully cater to national security concerns, and should not be left open to mere political or bureaucratic interpretations. Data protection policies should have clearly defined provisions that also take into consideration the commercial value of data. Having properly defined laws and policies would facilitate easier and safer sharing and utilization of data. Data-empowered policies can provide more accurate results and increase productivity with a minimum if any, damage to the people, planet, and economy.

These are the prospective areas that I believe should be focussed on in the upcoming year to build a resilient and sustainable future.



PERSPECTIVE FROM CURTIS J. RAYNOLD

Former Secretary, UN Secretary-General's Advisory Board on Disarmament Matters

Concerning the sustainability agenda, the three prominent trends that I expect are the increased use of renewable energy, nuclear, wind and solar. In the past year, the production of Solar and wind energy has increased almost exponentially by 23% and 12%. In the construction sector, quite a bit of resource is being consumed. There is a move towards more sustainable, green building technology. This trend could take off in 2023 and has already made significant strides in 2022. The third possible trend is in the increased use of electric vehicles and the reduction in the use of carbon fuels. In the past year, General Motors and Volvo have introduced policies in line with the climate agenda. In the case of Volvo, they have introduced policies to produce only electrical vehicles by 2030. General Motors has pledged to produce zero-emissions vehicles by 2035. Among other developments, these are the three biggest trends that I see for 2023. A lot of these trends are already in motion, and this will continue into 2023.



I think that each individual should adopt sustainable practices in their daily lives. I think each person who adopts sustainable practices will add up to produce a positive, cumulative effect.

Curtis j. Raynold

Former Secretary, UN Secretary-General's Advisory Board on Disarmament Matters

The sustainability agenda to combat climate change cannot be advanced without technology. Sustainability and technology go hand in hand. They are essentially two sides of the same coin. To make effective progress in the sustainability agenda you need ongoing research and development to remove some of the constraints on the parameters of sustainability. So technology plays a very critical role. It is unimaginable to have increased sustainability in various practices without technology. Without technology, the climate action agenda and sustainability journey would have been like walking in the dark.

Organizations, individuals and other stakeholders should keep their focus on the climate agenda despite the constraints placed by the ongoing war in Ukraine. We have to keep our eye on the target and increase our pursuit of sustainability through some of the trends that we discussed earlier. I would like to think that the war is temporary and that it would not significantly impact sustainability in the not-too-distant future.

Sustainability education and creating awareness are of utmost importance. Alongside pursuing sustainable development, and sustainability in general, governments, individuals, NGOs, and other stakeholders must emphasise sustainability education. This (education) and knowledge production can produce the biggest impact on climate change.



PERSPECTIVE FROM JOHN DICKSON

*Chairman, World Trade Centers Association's
Committee on Peace and Stability*

The narrative from COP 27 is that not much has happened in terms of reducing emissions, and many have expressed a sense of despair about the state of the environment. However, it's important to consider the unique perspective of the United States, where individual freedom is a core value. The country's federal system allows each state to address ecological and climate change issues independently, potentially leading to the development of effective solutions.

In the United States, bureaucracy has traditionally been limited and controlled by the citizenry, which enables a very different kind of perspective on issues such as the environment and climate change. This is reflected in the 10th Amendment of the US Constitution, which states that only specific responsibilities are assigned to the federal government, and everything else is left to the states and the people. This means that each state in the US has a different situation ecologically and with respect to the environment and climate change, which allows them to address such issues independently and as they see fit. The best models can be taken and applied elsewhere.



Within the climate change conversation, there is not a large focus and awareness of a sustainable economy. A sustainable economy cannot be achieved through a socialist model or where the power is at the center.

John Dickson

*Chairman, World Trade Centers Association's
Committee on Peace and Stability*

We have a federal system and the US Constitution in the 10th Amendment says only what's written specifically in this document is the responsibility of the federal government. Everything else is to be left to the States and the people. There is nothing in the constitution that governs education, health and human services, and transportation. Basically, the purpose of the Constitution was to regulate interstate commerce and to take care of national defense. This preface is to say that every state in the US has a different situation ecologically and with respect to the environment and climate change. This allows the states to address such issues independently and as they see fit. The best models can be taken and applied elsewhere.

At the global level, there is a concentration of power in multilateral bureaucracies which isn't healthy or effective. The farther you are from the source in creating solutions, the more expensive and inefficient you become. Therefore, the trend toward these larger institutions handling everything is not going to yield the best outcomes. This concerns me with respect to the United Nations which is the preeminent multilateral institution that weighs in on environment and climate change. I think it is dangerous to give too much authority to unelected bureaucrats.

For example, when you engage in work around the forum of Latin American presidents who are elected leaders, you can actually do something substantial compared to dealing with elaborate bureaucracies. These elected leaders are not encumbered by political considerations. This makes them free to do good and to help find solutions for people.

However, in Latin America, the political world is personality driven. The end of their presidential terms could mean the end of their presidential mission, and often the projects undertaken are not carried forth by their predecessors. That's also a limitation of the Latin American system. So we need to look at the capabilities and limitations of each system and then assess how they can contribute towards sustainable development.

As someone who has associated closely with free trade initiatives, one of the reasons for my involvement with the World Trade Center Association is that it supports and empowers Small and Medium Enterprises (SMEs). Multinational corporations eliminate any competition. In trade policy, you need to work with the power centers. But it is the SMEs that really drive and stabilize the economy.

Stable economies, mean stable jobs, stable investments in healthcare, the environment, and a whole range of goals that we consider as part of the sustainability agenda. Our first focus therefore should be to stabilize the economies through open trade with a special focus on the development of small-scale enterprises. Within the climate change conversation, there is not a large focus and awareness of a sustainable economy. A sustainable economy cannot be achieved through a socialist model or where the power is at the center.



Additional issues that most institutions do not discuss:

When it comes to technology for energy such as electric vehicles, I believe it's not sustainable as the batteries are not recyclable. For the production of batteries, the mining and processing of rare minerals have to be conducted. The environmental impacts involved in production and processing are not adequately measured. Therefore, we have to be guarded with technological breakthroughs and not rely on new technologies and AI as the final solution.

When we are addressing climate change we also need to address China. At the moment, China is one of the major polluters contributing to carbon emissions.

Another aspect that needs addressing is the banning of private jets. To take part in COP 27, more than 400 private jets were flown to Egypt. A private jet puts out two metric tons of carbon pollutants in the air per hour. The average carbon emission for a human being is approximately 1-4 tons.

While the leaders are gathering at COP to discuss climate change, they are contributing to carbon emissions. These are two serious issues that need to be addressed in the climate change discourse.



PERSPECTIVE FROM WILHELM KRULL

*Founding Director, The NEW INSTITUTE,
Hamburg | Former Secretary General,
Volkswagen Foundation*

In view of the mounting crises ranging from global warming and climate change to environmental degradation, loss of biodiversity, political conflicts and wars - all of these complemented by growing social inequality as well as high degrees of uncertainty and complexity - it is of the utmost importance to maintain a sense of confidence and focus our efforts on three things:

01 To take on our responsibility to develop new ideas and viable concepts that can pave the way for an urgently needed transformation of our modes of production, our lifestyles, and societies at large;

02 To recouple economic development with social and economic well-being by paying due respect to the regenerative capacity of our planet;

03 To foster research and innovation policies that reflect on the risks and opportunities of the current state of affairs and courageously try to open up pathways to viable solutions for a sustainable way forward.



Our political and economic systems will have to fully subscribe to the principles of sustainability and radically prioritize what is in the public interest.

Wilhelm Krull

*Founding Director, The NEW INSTITUTE,
Hamburg | Former Secretary General,
Volkswagen Foundation*



How can technology support sustainable transitions and impact the sustainability agenda in 2023?

As we urgently need to change course in the direction of a more just, ecologically sound, and economically sustainable future it is indispensable for us to carefully consider the role and function of R & D in taking us forward on our way towards decarbonisation by systematically putting social and environmental matters at the core of our efforts. Thus we can hopefully make sure that through courageously realizing our creative potential we can avoid falling victim to the usual rebound effects of technical innovations, and instead strengthen longterm resilience.



What should be the top priorities for organizations and individuals to transition towards more sustainable economies, societies, and individual lifestyles?

The largely manmade destruction of crucial resources of life on earth has created numerous existential problems that can only be solved by rapidly getting prepared to tackle them simultaneously at various levels - individually, institutionally, and nationally as well as transnationally - if we do not want to suffer massive hardship in the years to come. We are called upon to change our mindsets - and subsequently change our behaviour - individually as well as within our organisations.

PERSPECTIVE FROM AJITABH SHARMA (IAS)

*Managing Director, Jaipur City
Transport Services Limited, India,*

The COP 27 that concluded in Egypt was successful in formulating the loss and damage fund. However, taking into consideration the agenda that was set for the conference, it could be said that the conference did not end on a positive note. There was a lack of consensus concerning the adoption of mitigation and adaptation policies. As emerging economies and developing regions are the most affected due to global warming, a consensus has to be reached in terms of funding and financing. This is the biggest challenge I foresee for 2023.

India has a comprehensive climate policy that addresses both mitigation and adaptation measures. The focus on increasing the use of renewable energy sources, as well as exploring new forms of energy, and taking steps to reduce the impact of climate change on society, demonstrate a clear plan for addressing global warming and its future impacts. However, it could be argued that some of these policies may not align with the goals and agreements established at the COP27 summit.



When it comes to individual action for climate change, I would focus on the interaction of the individual with the service provider. Such an interaction has an impact on our lifestyles.

Ajitabh Sharma (IAS)

*Managing Director, Jaipur City
Transport Services Limited*

2023 is shaping up to be a challenging year for organizations, businesses, and financial markets, as the effects of climate change and emissions regulations become increasingly prevalent. The impact of one industry's emissions can have a ripple effect, affecting a country's economy and its people.

Multinational companies and financial institutions may struggle to keep up with the varying trends and policies of different countries. Mitigation, adaptation, and making up for historical loss and damages are all critical areas that require funding. Even the COP27 summit saw a significant level of disagreement over the allocation of financial resources for the fight against global warming.

Regulations will have significant ramifications for banks and financial institutions. For example, a bank that finances infrastructure projects but also has investments in high-emission industries could face serious repercussions in the future. This poses the question of which portfolios should be financed or retained and which should be divested, as seen with Standard Chartered's recent decision to pull out of three coal projects in Southeast Asia. More financial institutions and organizations are likely to be faced with such decisions in the future.

Multinational companies, business groups, and industrial houses based in India, and of Indian origin now have their footprints in Africa, Europe, North America and America, and the constraints on financial markets and climate change regulations may restrict their growth. The adoption of technology for the mitigation of carbon emissions and the use of green bonds and carbon markets can provide new opportunities for these organizations and institutions to thrive in the face of these challenges.

Role of Technology: One of the most effective ways to reduce emissions is by implementing new technologies. However, the implementation of such technologies is met with significant challenges, particularly in terms of the time and financial resources required. To address this, carbon trading can be considered as a potential solution to invest in sustainable segments that can effectively reduce emissions. More fundamentally, in order to adopt technology in industries and finance them efficiently, it is necessary to conduct a thorough assessment of the varying levels of financing required for different sectors and to prioritize the allocation of funds accordingly. The allocation of financial resources for technology adoption is and will continue to be a major challenge in the current year and in the foreseeable future.

In order to achieve the most optimal level of emissions reduction, it is crucial that we establish a clear and efficient allocation of financial resources. This includes identifying the most efficient use of resources to reduce emissions, and ensuring that each dollar invested is directed towards companies that demonstrate the highest potential for emissions reduction. For example, if company X invests a billion dollars and reduces Y's amount of emissions, and another company invests the same amount of dollars but reduces a higher quantum of emissions. An efficient allocation of financial resources would result in each dollar going to that company. Industries such as iron, steel, and gas require significantly larger investments compared to thermal power plants or solar farms for a similar level of emissions reduction. It is essential that we identify these sectors and allocate financial resources accordingly, in order to achieve the most efficient and effective mitigation of climate change.

Additionally, it is important to note that the implementation of these technologies not only requires financial resources but also the support and cooperation of various stakeholders such as governments, private sectors, and communities. The lack of coordination and collaboration among critical stakeholders can also hinder the successful implementation of these technologies. Therefore, it is crucial that we establish a strong and effective mechanism for cooperation among these stakeholders to ensure the successful implementation of these technologies and the mitigation of climate change.

The Role of Policy Action:

As companies adopt new technology, they might become less competitive. In such cases, they should be provided with policy support. Identifying industries and businesses that require such policy support is important. Another key policy intervention is in terms of distributional economics, where a high-emitting small enterprise is regulated by the government.

Moreover, policies will have to be sensitive towards disadvantaged or marginalized consumers who might have to bear the brunt if a carbon tax is imposed on, say, a thermal power plant. Ultimately, a poor farmer or a BPL household will have their electricity tariff raised in such a situation. Therefore, governments have to come up with a distributional subsidy reform. This could work in the following manner: for instance, if a carbon tax is imposed on coal, then the revenues arising from such a tax should be applied to reduce the unequal distribution of the burden on the end customer.

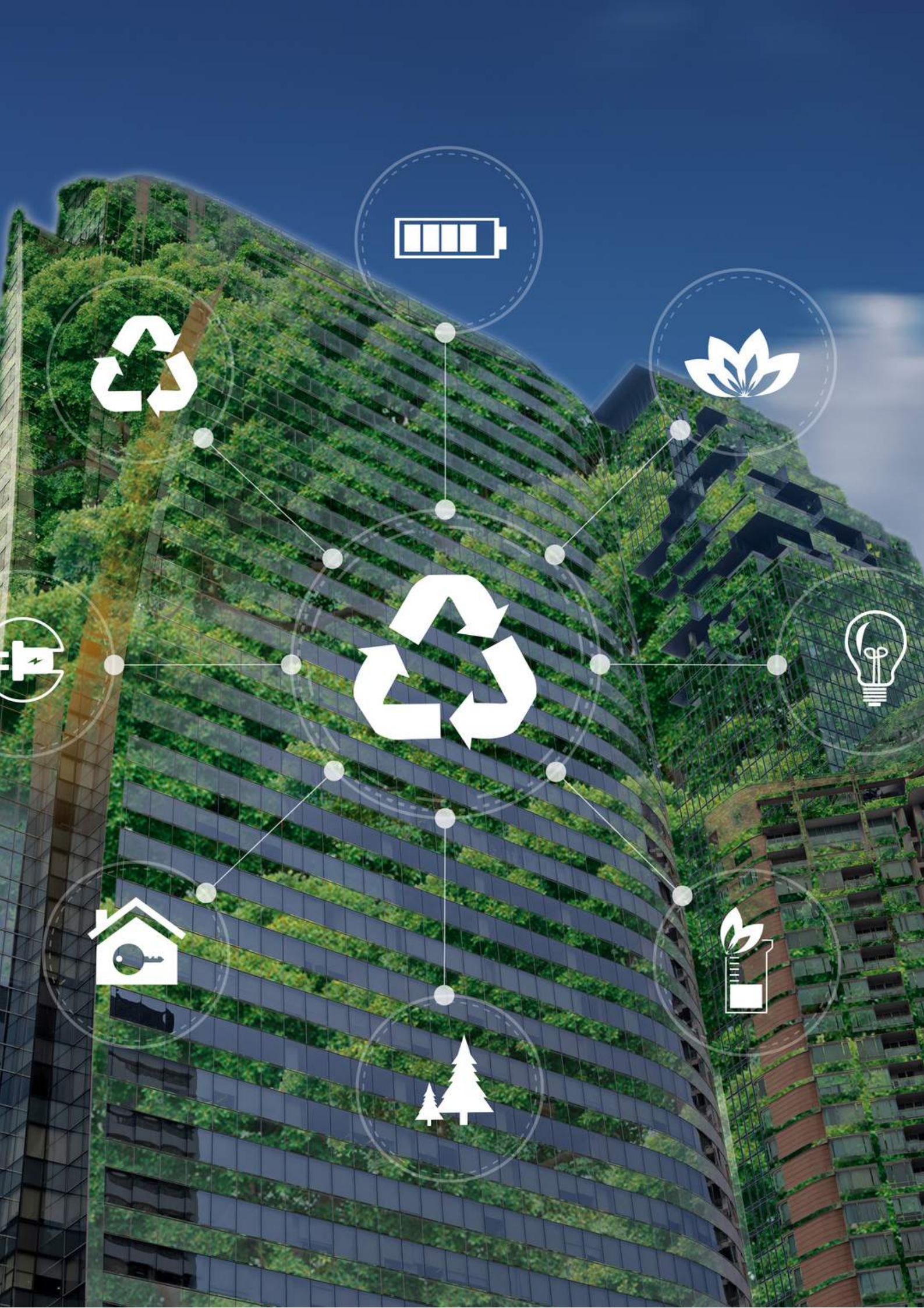
Taxing products that have a higher carbon footprint is another idea worth considering. The revenue from such taxes could be directed towards people who are impacted by emission reduction policies or climate change.

Essentially, there is a need to identify a few segments both on the supply side and on the demand side and accordingly fine-tune the policies in due course of time. This means identifying the industries and businesses that will be most affected by climate change policies, and making sure that the policies are designed to support them in a way that is sensitive to the needs of marginalized and disadvantaged consumers. This will ensure that the burden of climate change policies is distributed fairly, and that the policies are effective in reducing emissions.

The Role of Organizations:

I have extensive experience working with government-owned public utilities as well as interacting with the investor-owned utility sector, particularly within the energy sector. In the power generation and transmission sector, it is imperative to understand the strengths and weaknesses of both government-owned and private investor-owned companies.

Within the internal functioning of the organization, we have to be aware of the strengths and weaknesses. For instance, if the carbon footprint of a financial institution or lending agency that is active in a niche segment becomes part of their credit rating, then the sourcing of external funds, borrowings etc becomes a challenge. Therefore, organizations have to align their working principles and internal policies with the climate agenda and sustainability goals.



For example, the government of India has given a mandate that all city bus authorities should have a plan in place to transition towards electric mobility. In a corporation such as Jaipur City Transport Services Limited (JCTSL), which is a bus operating service, this means that it increases the cost of operation. An electric bus is different from a diesel-run engine. So such corporations need to build their capacity while retaining staff and upgrading the vehicles and technical capacity to handle such machines.

This requires an internal reorganization and reformation to develop a new ecosystem. External considerations come into the picture in the event of environmental regulations or carbon markets start affecting the top and bottom line of production for example in operating a glass industry. External factors could also be easy borrowing or borrowing at lower interest rates due to the implementation of disclosure of carbon emissions and attaining ESG benchmarks. Knowledge of such factors would provide an organization with an upper hand if they are prepared early for the upcoming changes.

For instance, new financial instruments such as green bonds, ESG-linked bonds, and carbon credits are emerging, providing opportunities for organizations and institutions to mitigate their carbon footprint and adapt to climate change regulations. India, for example, is exploring the possibility of carbon markets and carbon trading.

However, businesses in India that are 30–35 years old are often unaware of the developments concerning ESG standards and emissions reductions and their consequent impact on financial markets and their own organizations.

Once there is a change in policy in the sphere of financial institutions it will be reflected in the debt and bond markets which will have a broader impact on all industries. So organizations have to build capacity at their core management by introducing roles such as chief sustainability officer.

Such an officer will have a broad role including in HR, marketing, operations, and financial segments of an organization. They will have to take into consideration the long-term sustainability of the firm which will include financial sustainability and environmental sustainability.

When discussing the role of organizations in sustainable development, one recurring concern is that of greenwashing by businesses. For instance, owning an electric car at a higher cost and operating it at a lower cost still contributes to carbon emissions. In terms of life cycle analysis and circular economy, there are different cost implications for seemingly sustainable options. Irrespective of that, it is the consumer and the larger society that bears the cost. The marginalized people who cannot afford essential commodities should not have to carry such a burden.

Therefore, we have to be very careful about what kind of dispensation we provide and give not only to the big industries, businesses, or financial organizations but also to the people at the grassroots level and how their household is impacted.



Priorities for India: India has a high share of the agricultural economy and it contributes to the GDP. Therefore we have to ensure that our water-energy-food nexus remains robust. With India's increasing population, food security is going to be a big challenge. We have to focus on low-water-consuming crops, high-productivity crops and GM crops. In broad policy terms such initiatives might be a good idea, but in terms of their impact on agricultural households, many policy initiatives do not work out to be as good as they may look on paper. If the various practices and technologies that are being adopted for irrigation and farming, are sustainable for the agricultural laborer or farmer, is a question that requires serious consideration. That level of planning and policy insight is currently absent. Policy think tanks and organizations should aggressively work towards studying the granularity of the implications of our policy interventions.

For instance, renewable energy can be handled in a distributed manner through smaller grid distribution and smaller transmission networks. By equipping smaller households with microgrids and solar rooftops we will be able to provide energy security. Having such a distributed system can reduce the impact of natural disasters and the cost of mitigation policies. We require such distributed solutions not only in the energy sector but also in the water sector. It could be extended to the education and health sector as well. The policy's impact on individuals and its effect on all aspects of an individual's life should be taken into consideration during policy formulations.

PERSPECTIVE FROM PROF. BAYLOR FOX KEMPER

*Professor of Earth, Environmental, and
Planetary Sciences Brown University*

What are the top 2-3 trends for sustainable development in 2023 (including risks, opportunities, and general trends)?

The fusion reaction news from the Lawrence Livermore National Laboratory has captured the imagination of many, but our near-term challenges are pressing and will have greater influence on when we arrive at net zero. The high fuel prices this winter are driving difficult policy choices, and I sincerely hope that most turn toward accelerating the deployment of renewables rather than trying to expand fossil fuel production or distribution to address this uncertainty in a more permanent and cleaner way.



Climate change is a problem where the cost-benefit analysis is skewed in time--today's economic benefits come at the expense of future generations' costs and suffering--and traditionally government and collective organization actions have been the only way to safeguard against that kind of problem.

Prof. Baylor Fox Kemper

*Professor of Earth, Environmental, and
Planetary Sciences Brown University*



How can technology support sustainable transitions and impact the sustainability agenda in 2023?

Energy storage facilities remain a limiting factor, or at least a perceived limitation, for the transition to renewable energy in most locations. There are many technological developments underway or potentially underway that will soon provide robust solutions to this problem applicable in different locations with different needs. Because of the possibilities, many governments and private sources worldwide may invest in developing these technologies fruitfully.

In the USA, there remain significant political hindrances related to zoning and licensing of new energy systems. Paradoxically, many of the laws being used to limit growth in clean energy were put in place to safeguard communities against dirty energy sources and other aspects of the petrochemical industries. It will take a concerted effort among political, scientific, and citizen groups to change these laws to ease the energy transition without opening the way for pollution.



What should be the top priorities for organizations and individuals to transition towards more sustainable economies, societies, and individual lifestyles?

Most individuals are not in a position of monetary or political power, but actions that can be made to affect government and corporate decision making should be taken. Individuals are only one emitter among many, so individual lifestyle and consumer choices have correspondingly little effect, but collectively changing lifestyle and the connected boycotts and changing market interest can drive cleaner corporate decision making and forego the need for regulation-driven change.

PERSPECTIVE FROM DR. CHRISTOPHER SCHWALM

Director, Woodwell Climate Research Center

(Note: The views expressed in this section are solely those of the author and do not necessarily represent the views of Woodwell Climate Research Center)

From my perspective—and this is solely my perspective, not that of Woodwell Climate—there will be a reckoning on climate action in 2023. At present considerable effort is devoted to internalizing climate risk in regulatory frameworks and corporate disclosures. ESG investing, climate finance, and recent developments centered on the SEC in the United States all seem to be based on the idea that retooling the world’s economy is a technocratic concept. Unfortunately, that is not the case. There is also a political dimension to managing climate risks. In the United States we have already seen political pushback on how financial service actors are conceptualizing climate risk. Recently, for example, Vanguard Group Inc left the Net Zero Asset Managers initiative that aims to achieve net zero carbon emissions by 2050. More pushback will occur if ESG funds fail to deliver on their targets, both climate and economic. Simply put, there is a lot of greenwashing and resultant friction amongst the various actors that could slow down the momentum of climate action.



I believe we have a chance to accelerate change by working towards social and cultural transformation. Through digitalization, there could be more transparency and dissemination of information that could contribute towards cultural shifts in communities around the world.

Christopher Schwalm

Director, Woodwell Climate Research Center

There is also an implicit assumption that we will be able to solve the issues pertaining to climate change in a timely fashion. However, a just and timely climate transition might take too long relative to current levels of climate ambition. Attempts at transitioning faster towards a greener future will likely become a source of friction between and within governments globally as this process will most certainly create climate winners and losers.

Nonetheless, a cultural shift in terms of lifestyle changes, though harder to implement, would help create a more durable solution. Climate change is going to get worse before it takes a better turn. The frequency of climate-related disasters could inspire the political and business sectors to collaborate and deliver just and faster solutions. At the most recent COP events, there has been a failure to emphasize the need to decarbonise away from fossil fuels at a faster rate. There is also simultaneously this widely held assumption that hydrocarbon-driven economies such as Saudi Arabia and Russia will willingly give up their incumbent status and corresponding geopolitical heft. That this is a misplaced idea can be seen by examining the ongoing conflict between Russia and Ukraine. The conflict had a significant impact on energy markets such that President Biden asked Saudi Arabia to increase oil production to deal with price volatility. A request that was politely declined.

Literacy and advocacy are two tools that could shift cultural norms to enable positive climate action. There is a 50% likelihood of us surpassing the 1.5-degree limit in the next five years. Encouraging or subscribing to veganism, for example, will not be able to contribute significantly to global climate action.

There is a misalignment between the speed at which climate action should occur to avoid dangerous levels of global warming and the time scales required for changing cultural norms. From a mitigation perspective, a transition from industrial agriculture and meat production to plant-centered diets could have a positive impact. However, it is unrealistic to rely on such processes due to present-day consumption trends. In developing economies, meat consumption scales are connected to their GDPs. According to the living standard in OECD countries, approximately one in four individuals might follow an environmentally conscious diet while the rest are focused on development. Globally only roughly 80 million people are self-described vegans. Therefore, it will be hard to see behavioral shifts happening with a velocity that will be materially relevant over the next 5 to 10 years in which we will surpass the 1.5-degree limit of the Paris Agreement.

On the other hand, regulation and lobbying inherently different from the existing set-up of the world economy are necessary when it comes to the private sector. There is a belief that the business sector can both help formulate regulations that will preserve existing business models while being an active player in the climate transition. Regrettably there is a lot of corporate doublespeak around concepts such as sustainability, ESG and other climate instruments. Unless corporations sincerely protect and propagate the meaning of these concepts, their climate action policies might just become an exercise of greenwashing. If the private sector can however uphold its commitments to green transitioning by protecting the concepts of sustainability and climate financing - that might be a form of activism in itself.

We also need moral clarity about what we should and shouldn't do for our collective future. Normative statements are needed to tackle climate change effectively. We have failed to facilitate such change or action in the most recent COP 27.



Unless we can bring ourselves to the point where such a normative perspective is going to take priority, it will be hard to facilitate long-term change. Social movements that make way for behavioral changes, while slow, are substantial to accelerate cultural and lifestyle transformation in line with sustainability. Decarbonization through electrification of transport, and blitzscaling of solar and wind power are all necessary in the move forward. In 2020 and 2021 there was indeed a rise in the production capacity of solar and wind energy sources. Even though in the right direction, the pace of change is still too slow.

A final point concerns climate insight. The knowledge encoded by the IPCC might not be accessible to a town supervisor. Technology and digitalization could reduce the gaps in information sharing. Climate risk-related information should be communicated in a way that is relevant to local communities and should resonate with their needs. Closing the knowledge gaps at the local level by fostering awareness and climate literacy could be incredibly impactful in the long run.



PERSPECTIVE FROM DR. KAPIL NARULA

Economic Affairs Officer at United Nations Economic and Social Commission for Western Asia, Beirut.

I would look at the upcoming year 2023 through the lenses of energy and climate. An important trend for the next decade, particularly for 2023, will be energy transition. The global clean energy transition is becoming a defining aspect of the 21st century. The scale, speed and technical complexity of this transition are unmatched in history. Such a transformative transition brings along its challenges and opportunities. Green technologies offer new opportunities in this domain. The three areas where the energy transition will happen in the next decade are electric vehicles, batteries for storage and clean energy from hydrogen. These technological developments also require substantial funding.

The Role of Technology: Like finance and policy, technology is an enabler for a sustainable energy transition. However, technology might have precedence over the other two areas because, without technology, a green transition might be impossible. Technology powered by digitalization and artificial intelligence-backed technologies have large potential in this domain. We are witnessing a phenomenal speed in the evolution and development of technologies.



A commitment to a zero-waste lifestyle is a message I would like to propagate. Making sustainable choices and putting them into practice can also help save money.

Kapil Narula

Economic Affairs Officer at United Nations Economic and Social Commission for Western Asia, Beirut.

Recently released ChatGPT is an example. The ChatGPT is a natural language processing tool driven by AI technology that optimizes language models and facilitates dialogue. This technology allows you to have human-like conversations in chat form that opens up a whole new world. DALL·E 2 is a similar AI technology that allows you to generate images and art. These new technologies are the result of digitalization and are powered by the data generated by users worldwide. The data generated is stored and harnessed by AI and can be used to develop new tools and insights. This opens up a large new domain for exploration. However, there is a downside to these technologies that are linked to sustainability. The data generated have to be stored in data centres which are big consumers of power. Bitcoin and other new-age financial exchange mediums consume a lot of power and require extensive data storage facilities. This leads to the extraction of critical minerals and processing of such minerals which is not sustainable. While I believe technology will be at the forefront of sustainable transition for the next decade, there are always two sides to the coin.

The Role of Government: At the highest level governments have the most important role when it comes to taking responsibility for climate action. Commitments made by governments should be followed by regulations and legislation to make climate action enforceable. Net Zero goals and targets set by the governments should be translated into actions. Increasing energy efficiency and energy conservation are two areas that governments should prioritize. Governments often focus on increasing supply to meet the energy demand. However, focussing on demand-side interventions by prioritizing the reduction in energy demand over energy supply.



This is an area where governments could make a long-term impact.

The Role of the Private Sector: At the next level, businesses and organizations have a significant role. The private sector and organizations are ambitiously setting net zero targets to reduce their emissions. This sector is trying to innovate by finding solutions to move away from fossil fuel-powered growth. By adopting ESG standards and providing emissions disclosures businesses can contribute to climate action. Climate-positive start-ups and companies are integrating climate action into business strategies. However, we need to be wary of greenwashing by companies and businesses.

The Role of Individual Action: Consumers have to ask the right questions to hold such companies accountable. Lastly, As everything is demand-led, lowering your consumption by making lifestyle changes can be impactful. Demand drives supply. Therefore we should aim to adopt a simple lifestyle and be mindful of our consumption patterns. Meat-based diets are emission intensive compared to plant-based meals. Adopting a simple and low-consumption lifestyle can make a difference. Similarly, fashion and consumerism also have an impact on global emissions. Reusing, repurposing, and maintaining electronic products for long-term usage and sustainable fashion choices matter in the long run.

PERSPECTIVE FROM PROF. ILAN KELMAN

*Professor of Disasters and Health,
University College London*

Two sustainability trends that I suggest for 2023 are:

01 Lower priority of long-term sustainability actions due to other crises. Everyone has suffered from the continuing COVID-19 pandemic and we are still recovering, including due to the long COVID epidemic. The world fears nuclear weapons use by Russia as part of its invasion of Ukraine. Stress accelerates over cost-of-living and precarious jobs as the world's economy continues its tailspin. People understandably have day-to-day living worries and priorities that should but are not designed to, include sustainability.

02 Despite the difficulties, increased awareness that long-term doomerism is inaccurate. Human-caused climate change lacks realistic scenarios of human extinction while the science is clear that human-caused climate change rarely causes forced migration or disasters including conflicts.



We do not have an easy future, but nor is the hopelessness of doom narratives supported by evidence.

Ilan Kelman

*Professor of Disasters and Health,
University College London*

THE TOP PRIORITIES FOR SUSTAINABILITY IN 2023 ARE:

01

Reduce consumption of all forms.

02

Do not permit human-caused climate change to dominate or distract from full sustainability agendas, instead ensuring that it retains an important role within wider and deeper sustainability contexts.

03

Tackle the mis-spending of the resources we have, notably on fossil fuel subsidies, weapons, and the accumulation of more riches by the already super-rich. Ultimately, we have the knowledge and resources we need for sustainability. Priorities are tackling the known inhibitors to success.

Further, technology could support improved sustainability in 2023 by backing people's actions. We can hope that social media might be used more for information and inspiration, rather than misinformation and hate. This pathway's likelihood is another question; the key here is what could be done.

Similarly, rather than prioritizing the latest technology and assuming "smart" everything or "high-tech" only, a balance should be sought to combine the latest options with medium-tech and low-tech, including more vernacular, traditional, and local technologies. Then, we could use the best of all technology available while filling in the gaps that each form has.

PERSPECTIVE FROM SHELLI BRUNSWICK

COO, Space Foundation

Despite the challenges and instability, we face in the U.S. and abroad, 2023 will be a significant year in terms of innovation and global collaboration in the space sector and its applications for sustainability. The \$469 billion global space ecosystem is forecast to grow to \$1.4 trillion by 2030. This translates to jobs and opportunities in a wide variety of disciplines, for people of all backgrounds, as there is truly space for all.

Additionally, scarce-to-find top engineering talent will be more widely available as the tech industry course corrects through layoffs; techies will seek new, meaningful work in the rapidly evolving space industry. They'll find their chance to change the world and collect a sizable paycheck at the same time!



The theme of partnership for the greater good will take precedence over ego to allow for progress, and ethics will play a more prominent role in ensuring our advancements are used to benefit humanity.

Shelli Brunswick
COO, Space Foundation



In 2023, we will also see private industry's ongoing pursuit and development of space technologies- from extending space tourism options to fully leveraging patents from NASA's Technology Transfer Program. Many of these technologies will help transition to a green economy. AI and Digital Twin technologies also will be applied in remarkably innovative ways to help us make new discoveries in space. Quantum technologies will find their place as well. All of these things will have a profound impact on our lives on Earth. This also means significant steps taken to take the sustainability agenda forward using space technology in monitoring, mitigation, and adaptation in response to climate change.

To make magic happen, tech companies will work more closely with government agencies, aligning on projects and funding. Additionally, we will see countries set aside their differences- at least in the space sector- to collaborate on research and development that can change the course of our future. The theme of partnership for the greater good will take precedence over ego to allow for progress, and ethics will play a more prominent role in ensuring our advancements are used to benefit humanity.

PERSPECTIVE FROM DIVYA SHARMA

*Executive Director, Executive Director, India,
Climate Group (runs Climate Week NYC)*

What are the top 2-3 trends for sustainable development in 2023 (including risks, opportunities, and general trends)?

Globally, we are at the cusp of a huge transition to net zero carbon economies. Sectors such as industries, transport, energy, and the built environment will be seeing the most robust and long-term transitions to renewables, while simultaneously moving away from fossil fuel-based economies. The loss and damage fund promised at COP27 should be formally instituted before the next COP or taken up at COP28. Our experience of running the EV100, RE100, and EP100 campaigns tells us that businesses and corporates should and will take a larger role in accelerated climate action by committing to ambitious energy transition targets.



”
While sustainability is beginning to make business sense, individual choices will still shape demand and help create the market through sustainable practices. The choices around not using plastic, proper waste management, buying electric vehicles, and using public transport, are all going to shape the society of the future.

Divya Sharma

Executive Director, India, Climate Group

Our experience from the Under2 Coalition - a global network of more than 270 states and regions - tells us that subnational governments will be the conduit to national-level directives and policies on sustainable development goals. They will catalyze the action and implementation in the lower rungs of governance such as at the state, municipal and district levels. 40 subnational governments within the coalition have already pledged to net zero, and the coalition itself is working on the transition towards being 100 percent net zero.

How can technology support sustainable transitions and impact the sustainability agenda in 2023?

The global energy transition needs accelerated deployment of energy efficiency and renewable energy technologies. The earlier and wider these technologies can penetrate the market the better and quicker the transition will be. There are a host of questions yet to be looked at around the scalability and cost of technologies, particularly for low- and middle-income countries. However, boosting innovation in tech has the potential to make that happen. If demand is generated and sustained through large businesses and supportive government policies, innovation and reduction in costs can happen simultaneously.

What should be the top priorities for organizations and individuals to transition towards more sustainable economies, societies, and individual lifestyles?

At Climate Group our mission is to 'Get it Done'. There has been a sense of disappointment at several fronts within the climate negotiations. Cop27 raised several questions on lots of talk and no action. This is a decade of action and showing the impact. It has to be a collective effort, however a big onus is on governments across the world to not just acknowledge the differential responsibilities but also learn from economies like India who have taken ambitious steps internally to project their leadership on climate action externally.

Climate Group works with global businesses and subnational governments, and we can say with confidence that the potential to change how business is done and how industries will be run in the future is immense and definitely green.

PERSPECTIVE FROM MANISH CHOURASIA

*Managing Director at Tata
Cleantech Capital Ltd*

What are the top 2-3 trends for sustainable development in 2023 (including risks, opportunities, and general trends)?

With an increased commitment towards Net Zero under COP27, the investment opportunity in sustainable development will continue to grow. The push for these investments is arising not only from the government but also from the ambitious goals set by corporates throughout the world. Despite price pressure on renewable energy projects due to supply-side issues, growth is likely to accelerate in 2023 with both solar and wind installed capacity expected to cross 1,000 GW each. Focus on the adoption of storage technologies will be more exemplified. Commissioning of the proposed large Green Hydrogen projects will not only open up avenues for accelerated adoption of adoption of Green Hydrogen but also will increase the demand for renewable energy.



It is the responsibility of individuals and organizations to adopt sustainability as a way of life by adopting renewable & green technologies wherever possible.

Manish Chourasia
*Managing Director at Tata Cleantech
Capital Ltd*



Although a large requirement for sustainable development is emerging from emerging economies, it will largely be dependent on the capital flow from the developed world to these geographies.

How can technology support sustainable transitions and impact the sustainability agenda in 2023?

Technology has played a key role in sustainable transition thus far. Technological advancement in renewable has resulted in a reduction

in prices by 50% - 80% in renewable energy in the last decade. The improved economic viability of renewable energy has led to accelerated adoption globally. For example, from a small base of 27 GW in 2009, the installed capacity of solar has crossed 800 GW by 2021 - over a 30-fold rise in 12 years. Rapid technological advancement has also made possible an adoption case for electric mobility and energy efficiency, but it is still far away from its true potential. But there is no room for complacency. The world is yet to make significant inroads in hard-to-abate sectors and enhanced technological support is imperative for sectors such as Green Hydrogen, energy storage solutions, and carbon capture and storage.

What should be the top priorities for organizations and individuals to transition towards more sustainable economies, societies, and individual lifestyles?

Climate change and ecological imbalance are global problems, which can only be addressed with global cooperation for which each segment of the society, including the corporate world and civil society, will have to collaborate and contribute their bit. Today there are a number of business solutions, which are “in the money” thanks to exponential improvement in green technologies.



PERSPECTIVE FROM RISHI MADLANI

*Head of Climate & Sustainable Finance and Bloomsbury Ward
Councillor & Chair of LB Camden Pension Committee*

Climate will continue to take center stage in 2023. Across the ESG umbrella, COP 27 was a disappointment in many ways. It didn't get quite to the level of ambition and created the same momentum we would have liked at this stage of climate change discourse. Yet, an interesting outcome of COP 27 is that businesses are taking into consideration the evolving trends in sustainability and climate change and are looking to embed sustainability in their practices. Nature and biodiversity are emerging at the forefront of business considerations and practices. Businesses are also beginning to consider their impact on the environment and the possible transformations that can be pursued across their real estate and supply chains. While the investable solutions remain unclear, this is a developing opportunity. A recent report on climate and biodiversity by ShareAction, a British NGO, rated the performance of banks concerning nature and biodiversity quite poorly. There is an increasing amount of activism on these agendas.



To make progress we have to be authentic in what we do. Whether it is science-based targets on climate action or whether you're thinking about the impacts and the outcomes of the work you're doing across social development.

Rishi Madlani

*Head of Climate & Sustainable Finance |
Bloomsbury Ward Councillor & Chair of LB
Camden Pension Committee*

As we emerge from social measures such as lockdowns and mandates, healthcare and its impacts also remain a key theme for the coming year. The pandemic and the subsequent lockdowns have people more aware of the “s” in ESG, of social issues. As Extreme weather patterns are impacting many communities around the world we will see a rising awareness in people with respect to climate measures. Whether we use the language of climate justice or transitions, people are going to pay more attention to climate measures in 2023.

Role of Technology: When it comes to the role of technology in the climate agenda, I think intelligent technology will be key to tackling some of the sustainability challenges. Without technology and data, we can't find solutions to help people. This requires our technology providers to be the best in class. We're seeing some developments in this regard from the Amazons of the world where they're setting higher climate standards for themselves. It's a bit easier to retrofit or to retrospectively offset all your emissions when you're a newer company. However, it's good to see such attempts at the leadership level in companies. I would like to see a race to the top on this rather than a race to the bottom that we normally see.

More importantly, technology is a solution provider. In some surveys, we've done with SMEs we have found that often they are unaware of where and how to address climate change. They want to contribute to reducing climate change but they are concerned about inflation and their supply chains.

In such a circumstance, the question remains, how can they effectively contribute to combating climate change? I think technology can really help with providing solutions for these problems. Artificial Intelligence can predict and help customers find out where their biggest emissions are from. There are banking apps and services such as Cogo that help you identify the source of your carbon emissions. These services could be deployed in the SME space. Data and technology are key to the challenges in sustainability that are present in our economy. Unless the journey is made easier, this challenge is not going to be won over. We are losing the challenge at the moment. We need to go at a faster pace by embedding climate justice at each step to make it easier for communities.

Key Trends: The inflationary trend expected in 2023 is both a threat and an opportunity. Climate is steadily taking hold as a key issue in the minds of voters and communities. However, when something else happens such as Putin's illegal invasion of Ukraine, high inflation or a challenging economic climate people's priorities change. In this year, this particular economic situation where we've increased energy and fuel prices provides you with an opportunity to actually change behaviors. Earlier it wasn't trendy to talk about energy efficiency and retrofits. However, as it gets colder here in the UK, people are opting for double glazing as they become more aware of the heating inefficiencies in their homes. They are focussed on saving money as the cost of energy keeps rising. This is the same for businesses and consumers alike.

Similarly, with petrol prices you see an increasing amount of people getting electric vehicles. It is good to see that trend accelerate. Ten years ago, I was looking at the Norway EV adoption charts and wondering when the UK will reach such a stage. I see that happening now. Initially, when I first started pitching electric vehicles, it was looked at with skepticism. Now there is a massive quantum shift in attitude about these things. There is a window of opportunity in these crises and in these difficult situations to move towards more sustainable solutions. These circumstances can also provide good business opportunities.

The Role of the Private Sector and the Government: Businesses are now seeking leadership positions in this move towards sustainability. This also has created the risk of greenwashing ESG investments and business practices. There is also a new term “social” washing - which is attributed to when people overlay their contributions to social causes.

SMEs that have not yet adopted climate strategies can strategize to embed climate agenda into their practices. Recently, at the council of London Borough of Camden where I am a councilor, we changed our constitution to include climate and biodiversity as a check on every decision made at the council. This means whether it's a discussion on the housing department or adult social care we have to take into consideration the kind of vehicles, buildings, and supply chains that are used in the process.



PERSPECTIVE FROM JONATHON CUMMINGS

*Steering Committee Member, Alliance for
UN South South Cooperation*

As we look towards addressing sustainability in 2023 and beyond, one of my key recommendations is the integration of private financing as a means to combat climate change, promote sustainable development, and address issues of sustainability. The recent COP27 summit resulted in the creation of a loss and damage fund, which will ensure that developed countries and international NGOs take responsibility for addressing the challenges faced by vulnerable nations. Another trend to watch for in 2023 is the increasing participation of the private sector in climate initiatives.

Furthermore, I anticipate a growing involvement of regions beyond Europe, North America, and other developed nations in the sustainability agenda. In 2022, for example, the Middle East and North Africa Climate week was held, and there is increasing interest from countries in Southeast Asia, Africa, and other regions to have their voices heard and participate more actively in discussions on the climate agenda.



I believe that developing countries should have more voice in the international sphere as they are more vulnerable to the impacts of climate change than developed nations.

Jonathon Cummings

*Steering Committee Member, Alliance for
UN South South Cooperation | Alliance
Manager, Deloitte*

Developing nations have consistently expressed concerns about bearing the brunt of the impacts of climate change, despite having contributed less to its acceleration. It is imperative that all nations play a role in addressing climate change and promoting sustainability. Developed nations, in particular, have a greater responsibility to address this issue, given their greater contributions to climate change.

In the coming year, there is likely to be an increased focus on the Arctic region. The melting of the polar ice caps is making previously inaccessible natural resources available, leading to interest and potential claims from countries such as the United States, Canada, Russia, and some European nations. However, the presence of profitable resources in the Arctic region has the potential to create conflicts and competition among nations.

The ongoing war between Russia and Ukraine has placed significant strain on energy production, fossil fuel supply chains, and various sectors of the economy. In recent years, we have also been dealing with the impacts of the COVID pandemic and global food shortages, and the possibility of an upcoming recession. Additionally, oil prices have risen as a result of the war. Given these conditions, it has become increasingly important for many countries to reevaluate their options for energy sources and production. Transitioning towards cleaner, renewable sources such as solar, wind, and nuclear energy is a positive development in this regard.

The world is currently facing significant challenges as a result of ongoing conflicts surrounding fossil fuels and energy capabilities.

Despite Russia's significant oil reserves, the sanctions imposed by the United States and Europe have forced the country to explore other options. Additionally, countries within the OPEC are also key players in the global fossil fuel supply and production.

The United States has significantly increased oil production within its borders. Meanwhile, countries in Africa, such as Nigeria, possess their own oil reserves. Even if they lack the necessary infrastructure, they can still increase production and export to other countries that have the infrastructure in place. While I am an advocate for the use of renewable energy in the medium to long term, in the short term, countries must explore alternative options to meet their immediate energy and oil requirements. This presents an opportunity for smaller nations, but they require financial investment to jumpstart their oil industries. To meet short-term demands, countries could look to regions such as the Middle East and North Africa (MENA) and Africa for new avenues of production.

The Biden administration recently announced a \$2 trillion infrastructure development plan for the United States. As a developed country, the plan aims to move the US towards clean, renewable energy sources, electric vehicles, solar panels, and other similar initiatives. However, making such choices is relatively easier for a country like the US than for a developing country. For smaller, developing nations, creating the necessary infrastructure for basic necessities such as water and food takes precedence over the climate agenda. At the root of these issues are capital and funding. It is easier for developed nations to prioritize the climate agenda and ignore the development needs of smaller, developing countries.

We know that most of the global carbon emitters are developed countries. Due to their developed nation status, they have the luxury of pursuing more sustainable green pathways that are time and money-consuming.

The industrial revolution of the past contributed to the economic growth of developed nations but also led to a significant increase in carbon output, which has contributed to global warming and the rise of greenhouse gases. It is imperative that developed nations take a leadership role in guiding the world towards a more sustainable way of building capital and promoting development. In recent years, new technologies such as cloud seeding, which can induce rain, have been developed to address issues such as drought and water scarcity. However, it is important to consider the potential unintended consequences of these technologies when they are used. Additionally, the advancement of technologies such as artificial intelligence, cloud computing, robots, and other new technologies should be utilized by nations to build a sustainable future. These technologies can be shared or sold to emerging markets to promote economic growth, but ultimately, their use should prioritize the betterment of humanity. We don't have to repeat the mistakes of the past and we have the technology to make a transition towards a greener and more sustainable future.



PERSPECTIVE FROM ISABELLA BERTANI

Founder and Chief Client Strategist, BERTANI

With constant new and evolving geo-political impacts from around the world, the resultant impact on the global economy and global trade has been significant. Businesses, industries, and countries must continue functioning in spite of these disruptions and adapt accordingly including taking an approach to sustainability with these geo-political changes in mind. Both Covid-19 and the war on Ukraine have both had and will continue to have long term and lasting consequences.

Global organizations are rethinking their global strategy when it comes to production, and in particular the impact these disruptions have had on supply chains. It has been these disruptions that have been most consequential. This rethinking has included the need to move closer to their markets in order to mitigate the risk to supply chain. Covid-19 had a detrimental impact on the costs of supply chain.



Climate change tips the scale unfavourably further towards developing nations. From a recovery perspective, we have to look at the micro and macro aspects of supply chain transitions to apply solutions that will lessen the gap between developed and developing nations.

Isabella Bertani

*Founder and Chief Client Strategist,
BERTANI*

This was further aggravated with the emergence of the war in Ukraine with two of the biggest consequences, particularly in Europe, being on energy costs and foreign exchange which have impacted negatively on the costs of production and logistics. Although we are seeing a stabilization of this with governments looking for alternative solutions, the effect of these volatility of these variables has had a detrimental impact on organizations with operations globally resulting in a change in approach to global markets. One such change we are seeing is organizations are moving closer to their markets. Whereas prior they may have manufactured their product in their home jurisdiction and shipped to the market, organizations are evaluating opening full production facilities in those markets. By approaching globalization with the view to create more sustainable operations, the result will be more resilient and adaptable to confronting future global shocks to the economy.

To mitigate increasing costs arising from global events we need to be prepared and calculated in our approach. However, from an overall global outlook this can have different implications.

The challenge with supply chain transition is that when supply chains changed or adapted to different circumstances to for example, reduce shipping costs, this in turn could endanger the livelihoods of a particular population while providing opportunities for another. When livelihoods are threatened, healthcare, food security and other aspects of everyday life are also threatened. As a result, the challenge for organizations is to address these changes in the supply chain transition and the resultant impact on communities.

There is undue stress and an imbalance in the global economy as a result of the COVID-19 Pandemic, the war in Ukraine and previous geo-political events. However, the impact is more visible in developing nations, as opposed to developed nations and the resultant recovery can take longer.

An important question is how you recover from these losses when the economy was not in a good state even before these geopolitical stressors emerged. This requires us to factor in the stresses that each geopolitical impact has had on the economy, particularly on developing nations and aim to find an equilibrium. The economic imbalances created by these stressors on developing and developed nations are significant. New technologies can be helpful in finding solutions to such challenges.

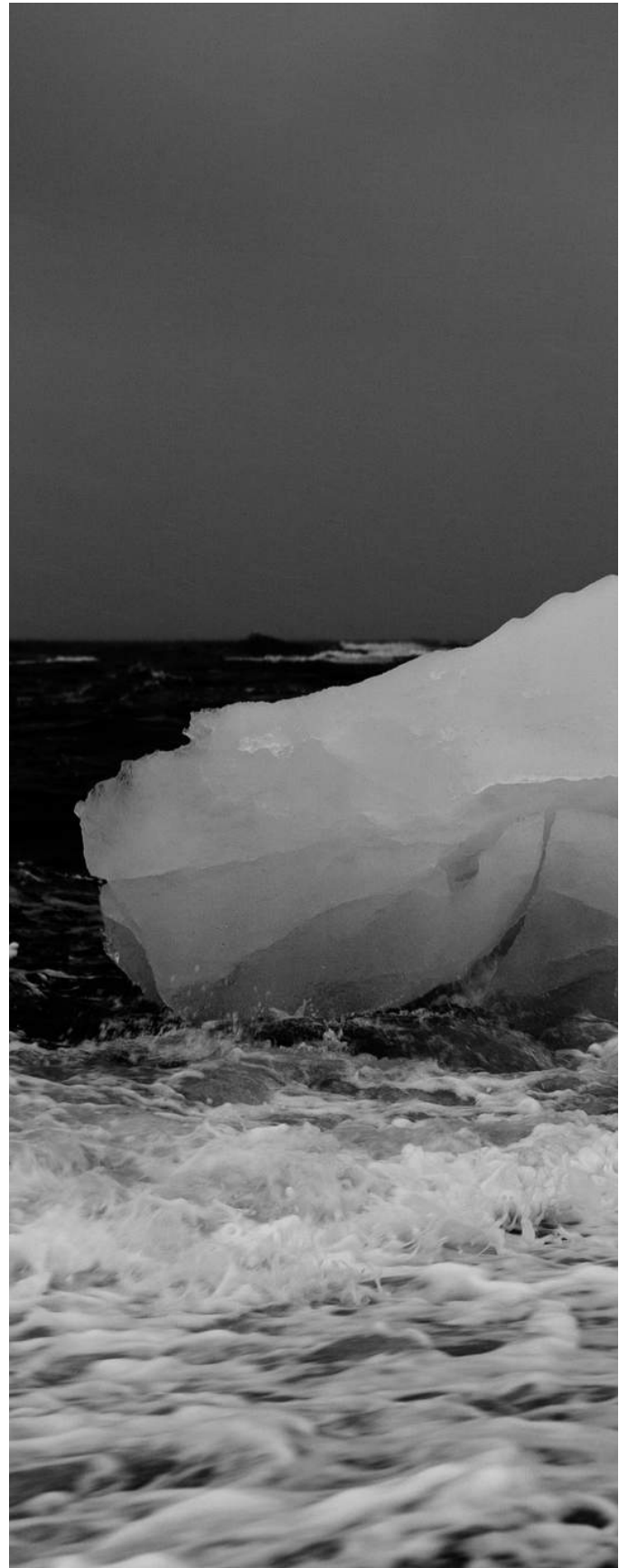


The Role of Technology: The role of technology to support sustainable transitions and impact the sustainability agenda for 2023 is key. Not only can technology be used to create new ways of approaching challenges, but can also be used to measure the change and progress, to monitor changes in legislation, and to evaluate the cost and benefit of change and the resultant impact on economies. If we consider, for example, climate change and the environment alone, technologies are emerging through the creation of “smart building systems” that reduce the carbon footprint of a building. Technology can perhaps develop alternative energy sources and assist in energy sustainability. Europe is still reliant on traditional sources of energy which have been disrupted by war. We should study and research the various ways technology can be applied to mitigate these risks. Similarly, technology can also be used or aid in reducing food waste and creating efficient food systems. Robotics and technology are being used to monitor the health of crops and the environments and locations in which they grow. Hence, technology is a crucial component of our communication systems that enable the exchange of knowledge.



When considering the top trends for sustainable development in 2023, the most obvious trends in will be on the adoption of sustainability principles by organizations and how do they meet these challenges, with regards to the environment, and climate change.

Climate change requires not only global cooperation, but also the buy in at all levels of government in each respective country. How do we ensure that climate change goals are not only being monitored, but that the infrastructure and budgets required to realistically make changes are being adopted by all levels of government? How can we successfully monitor and regulate the human impact on the environment? Who will monitor such an impact and how are we going to finance such an undertaking? Consequently, an important challenge in the coming year is to focus on the monitoring, regulation and financing of climate change impacts. We discussed earlier the concern for industries and organizations of reliable supply chains. Climate change has a significant impact on supply chain systems. Creating sustainable supply chain mechanisms is also necessary for reducing the carbon footprint of an industry or organization. Thus, the challenge and priority when it comes to sustainability for organizations will be to set climate goals and standards that are congruent with their goals for efficiencies as they face other barriers.





Nonetheless, the most important priority for is human capital, which should be a given. Human capital, healthcare, climate goals, food supply chains and supply chain of logistics all revolve around various technologies. The difficulty arises in monitoring the boundaries of human-technology interactions and the regulation and implementation of rules. For organizations, the priority should be human capital. From an industry perspective, you cannot function without human capital. Therefore, creating a healthy and sustainable environment that contributes to the well-being of their employees should be a top priority for organizations.

Top Priorities for Organizations: Due to the impact of COVID on employees, the workplace and environment have seen a momentous change. The work-from-home culture has altered the dynamics of the employer-employee relationship and the importance of a workplace. Organizations and employers have a big influence on the lives of employees. This puts a responsibility on organizations to influence and instil climate goals and sustainable living practices in their employees. Organizations can lead the way by setting climate standards within the organization and ensuring that such standards and goals are met. Leaders of organizations have a responsibility to lead responsibly. By empowering the individuals that are part of our organizations, we can help in meeting the climate goals faster.

The Role of Individual Action: On the personal side of contributions to a sustainable future, we each have the responsibility to educate ourselves. Every day is a learning day and we learn from each other because not one of us has that solution. The minute we think we've got the solutions to this, it's the minute we fail. By constantly learning and evolving, we will have changed some of our personal behaviour. The impact we have is not always the most obvious. People get very preoccupied with their personal recycling or personal contributions to sustainability, yet we live in a world of excess and that excess is driving many of the problems the earth is now facing.

PERSPECTIVE FROM DUSHYANT THAKOR

*Senior Vice President at Invest India and Senior
Advisor at WAIPA*

Invest India, the National Investment Promotion and Facilitation Agency was created with the primary objective of encouraging investment in the country. Its experts, specializing across different countries, Indian States and sectors, handhold investors through their investment lifecycle right from pre-investment to after-care.

As the global conversation surrounding climate change and the need for sustainable development has evolved, Invest India is well placed to align with these important trends. Today, sustainability is a fundamental component of Invest India's agenda and the organization is committed to incorporating sustainable practices into its investment promotion strategy.

India has implemented various safeguards to ensure that investments are conducted in a manner that is protective of the environment and is moving towards an ecosystem with sustainability at its core. As a case in point, the Government of Kerala in its new draft industrial & commercial policy focuses on Environmental, Social and Governance (ESG) criteria. The 21 focus champion sectors have a focus on ESG & Sustainability in the policy. This policy serves as an example of how Indian states are increasingly adopting a sustainable approach for investments, thus making it increasingly difficult to bring forward unsustainable investment projects in India.



"Sustainability is a fundamental component of Invest India's agenda and the organization is committed to incorporating sustainable practices into its investment promotion strategy."

Dushyant Thakor

*Senior Vice President at Invest
India and Senior Advisor at WAIPA*

In the North-East region of India, sustainable investments are defined by their lifestyle, which is a reflection of what economic progress should look like in terms of everyday living habits. This reflects the growing awareness among local communities of the importance of sustainable development and the need to protect their natural resources. Invest India welcomes investments in sectors approved in the FDI policy and aims to achieve the most sustainable results possible. This commitment to sustainability has been acknowledged by several awards, including the UNCTAD Investment Promotion Awards for promoting Investments in Sustainable Development in 2018.

Since 2014-15, Invest India has been gradually intensifying its focus on sustainability and came out with its sustainability framework in 2017. During the initial days, when the industry was showing interest for developing the Electric Vehicle ecosystem, Invest India dispatched teams across the country to hold discussions with automotive companies, associations and think tanks to support Central & State Government in drafting EV policies & incentive schemes. This is an example of how Invest India is identifying sectors with high growth potential and working to promote sustainable investment. Its core sectors, which have a direct influence on sustainability, are now receiving more attention after COVID-19.

With India emerging as one the most favourable investment destinations, a global demand for investible projects gave birth to the idea of the India Investment Grid (IIG) platform.

IIG is a dynamic interactive platform that showcases opportunities from Government and private project promoters across India. IIG has been accessed by users from 197 countries and registered more than 4.9 million pageviews. IIG currently hosts more than 15,100 opportunities worth over USD 2190 billion. IIG also exclusively hosts the National Infrastructure Pipeline, a repository of infrastructure projects worth over USD 1,795 billion to facilitate real-time tracking of projects and partnerships with private players for project development. Additionally, it is also India's only platform showcasing Stressed Assets and also hosting Corporate social Responsibility (CSR) opportunities in partnership with states and premier technology institutions.

The projects are now being mapped against SDG Goals. In collaboration with multilateral institutions and Central ministries, Invest India is engaged in creation of a pipeline of climate smart investment opportunities.

UNDP has developed the SDG Investor Map for India in collaboration with Invest India & Niti Aayog. The map brings out 18 Investment Opportunity Areas across sectors like Education, Healthcare, Renewable Energy, Food & Beverages and Financial Services. Invest India has joined forces with the World Economic Forum to identify policy measures for increasing sustainable investment in India. Invest India is also the president of the World Association of Investment Promotion Agencies (WAIPA) and is working with national investment promotion agencies to share best practices and to create a shared repository of information on sustainable investments & Climate FDI.

SUSTAINABILITY OUTLOOK 2023

This is an interesting year for Invest India as India is holding the G20 presidency and Invest India is holding the WAIPA Presidency. Invest India has brought together the IPAs of the G20 and Guest countries into an action group focusing on Investable Projects to meet SDGs; Digitization; Climate Change, Energy Efficiency & Decarbonization; Future of Work, Skilling & Gender Balancing and Global Value Chains.

In conclusion, Invest India is actively working to promote sustainable investment practices in India and on a global scale. The organization is working to align investments with the United Nations Sustainable Development Goals (SDGs) and is collaborating with other national agencies, international organizations, and government bodies to create a shared repository of information on sustainable transitions and financing. Invest India is also working through WAIPA to assist Developing countries and LDCs to package sustainable projects efficiently and effectively to attract institutional investors.



Priorities for India:

To attract investments, we need to be ESG compliant. Irrespective of the compliance status of other regions of the world, India needs to showcase its ESG compliance to attract investment. It may even be said that ESG disclosures and compliance is going to be one of the key differentiators which will drive FDI for the next couple of years - up to 2030 and beyond.



PERSPECTIVE FROM SUJATHA UG

Senior Advisor, WAIPA | Strategy Consultant, Invest India

The present-day investment environment is focussed on sustainable climate transitions and this is the topic that is dominating the boardrooms of big corporations. Invest India, as an Investment Promotion Agency, is committed to incorporating these trends into its agenda and identifying common challenges in driving investment into projects that focus on Sustainable Development Goals (SDGs). Currently, sustainable investments are still going to developed countries mainly due to the ease of access for such projects to investors. Projects from developed economies are well structured to attract institutional investors.

However, developing countries and least developed countries (LDCs) need assistance to help them adapt to the shift in the investment priorities of investors and to build their capacity to attract and retain investments in sustainable projects. They also need tool kits, frameworks and structures to efficiently and effectively package them to attract institutional investors. Under India's G20 presidency, Invest India is engaging with all of the investment promotion agencies of G20 countries to create clear actionable engagements.



It is the MSMEs and startups that will be leading the growth chart in the next century. Invest India is working towards capacity building in the MSME sector to fill the gaps in investment.

Sujatha UG

Senior Advisor, WAIPA | Strategy Consultant, Invest India



The G20 countries, representing 85% of world's GDP and 75% of the total trade, are currently at varying levels of economic development. Their investment priorities may also vary, with some countries focussing on new investments in sustainable projects and looking to phase out labor-intensive projects out of their country. The Government of India is focussed on moving up the value chain in our labor-intensive services through initiatives like "Make in India" which will help us to utilize our human capital effectively. The IPAs of G20 countries are engaging to collaborate and create a unified definition of sustainable projects, establish a common framework and rating system for these projects, to create toolkits for micro, small, and medium enterprises (MSMEs) and corporations to facilitate investments into these projects.

While big corporations with their wherewithal, have the ability to engage the governments directly to ensure successful investments, our aim is to develop a pathway to plug in the MSME sector into the mainstream of the global investment flows. This, is a critical part of promoting the SDGs. We are also creating a shared repository of information on sustainable transitions and financing, which may take the form of an interactive digital platform showcasing investable projects that could attract investors.

As India currently holds the G20 presidency and is also holding the World Association of Investment Promotion Agencies (WAIPA) presidency, we are quite well-positioned to drive the sustainability agenda and promote the idea of investing in SDGs in a real way.

PERSPECTIVE FROM ANKIT TODI

DGM Sustainability, Mahindra Group

There are numerous developments occurring within the realm of sustainability at present. A fundamental shift is taking place in how individuals and companies perceive sustainability. Climate change and the environment are no longer being relegated to the periphery; they are now at the forefront of businesses' concerns. Previously, sustainability was viewed as a functional aspect that was required for compliance purposes; however, it is now being recognized as a core focus.

Businesses are increasingly incorporating sustainability and climate change considerations into their long-term strategies. This is evident in the shift towards greener portfolios and the growing emphasis on sustainability initiatives within the government sector. In India, the implementation of the Business Responsibility and Sustainability Report (BRSR) in 2023 serves as a regulatory compliance mechanism for companies to adhere to these sustainability standards.



**Technology is not an
impediment, but an enabler
of the sustainability agenda.**

Ankit Todi

*DGM Sustainability, Mahindra
Group*

National policies are promoting sustainability initiatives such as green hydrogen, electric vehicles, and other sectors, which not only contribute to mainstreaming the sustainability agenda but also present economic opportunities.

Furthermore, there is growing recognition among stakeholders, particularly the investor community, of the potential for value creation in sustainability. Several sectors, including electric vehicles and EV battery production, material circularity, non-circular business models in waste management, sustainability reporting and disclosures, and sound water management, present significant entrepreneurial opportunities.

Investment and attention is flowing into various areas within the sustainability space. Indeed, there is a lot of attention and growth potential in sectors of green hydrogen, EVs, and renewable energy. These are beginning to gain momentum and are expected to see more developments and larger companies emerging in the near future. Technology is playing a key role in enabling companies' sustainability strategies.

The Mahindra Group is exploring a new framework for understanding the Group as a whole, which includes upskilling stakeholders involved in the ecosystem and focuses on two key tenets: Environmental, Social, and Governance (ESG) and technology.

Climate change, its impacts, ethics, and inclusion are central to the ESG focus, while technology plays a critical role in enabling value creation.

Sustainability and tech go hand in hand. Many of the solutions to combat climate change will be technology led. Lithium-ion batteries are an example. There is a lot of tech-driven development happening in that space to make the batteries more efficient, and reduce the emissions from the tech sector and EV platforms. The current generation of vehicles is digitally operated to a large extent compared to older mechanically operated vehicles. When it comes to data measurement and reporting systems, several innovations are happening in the SAS for data emissions and data measurement that are completely tech-enabled. Another example of the application of data-driven changes is in the sphere of water.

Some companies are enabling IoT devices for different kinds of measurement to reduce waste, for new processes in terms of water harvesting and recycling, etc. The carbon credits market is also tech-enabled. Therefore technology is not an impediment, but an enabler of the sustainability agenda.

Further, the transition of supply chains is a critical area that has gained increasing attention globally and in India, as large companies take action to reduce their carbon emissions. It is imperative that not only these companies, but also their supply chains, transition to more sustainable methods. Another area of focus is the development of new circular and sustainable businesses.

The Mahindra Group, for instance, operates India's first auto recycling business called CERO and has also ventured into the solar energy sector. The primary objective is to provide climate solutions for operations and the industries in which the company operates. An extension of this principle is the regeneration of nature, which includes activities outside of the company's immediate operations for commercial reasons. Sustainable agriculture is one such area of focus that the Mahindra Group is associated with. The Group has a platform called Krishi that promotes sustainable agriculture both locally and globally. Food security is a concern that is receiving increased attention in light of current events such as the Ukrainian crisis. Additionally, food production is responsible for a significant amount of emissions. Therefore, the focus on better agricultural practices is an area of interest. Lastly, the Mahindra Group has been involved in tree planting and afforestation efforts for decades. The Group has planted approximately 20 million trees as part of this initiative.

Another focus area is on new circular and greener businesses. Going forward, these factors will be the priorities for companies. The regulatory mechanisms related to sustainability, transparency, and disclosure requirements are crucial for sustainable transitions. In conclusion, to effectively integrate sustainability into a company's operations, it is essential to have leadership buy-in and to focus on actionable items such as renewable energy and energy efficiency.



PERSPECTIVE FROM RANDHEER SINGH

*Director - Electric Mobility and ACC Program at NITI Aayog
Member of Technical Advisory Group, TAG*

Sustainability as a principle and concept has been around for more than a decade and a half. Concerning the aspect of battery storage, new innovations will be brought forth which will contribute to more sustainable electric mobility in the future. When we say more sustainable, there will be developments related to lithium. Lithium-based technologies are going to dominate for a decade and from 2027 onwards we might see future technologies that rely on beyond lithium. Therefore, the use of and production of efficient electric vehicles is going to be one of the biggest trends in 2023 which will be carried over from this year. The coming decades will see a transformation of the mobility and transport sector.



We have to achieve the goal of 1.5 degrees celsius to achieve a sustainable future. For achieving this target, one of the low-hanging fruits that could be acted upon is the switch to electric mobility.

Randheer Singh

*Director - Electric Mobility and ACC Program at
NITI Aayog | Member of Technical Advisory
Group, TAG*

In the industrial sector, switching to green hydrogen is a possibility that could be explored. The steel industry contributes to around 10 to 11% of greenhouse gas emissions. Green hydrogen is used and deployed in shipping, aviation taxing, and deep mining trucks. If the efficiency of green hydrogen can be increased from 27% to at least 50%, then it may find more uses in the mobility and transport sector as well. Green hydrogen could be used in industries as a fuel.

Another upcoming development is renewable integration. Renewable integration is not merely about the kind of power or energy that is used because India has one of the lowest per capita consumption of energy in the world. According to the SPF projections available up to 2070, this is going to increase multifold in the next 10 to 15 years. In such a situation it would be difficult for India to achieve its net zero emission targets if we don't switch to battery storage and pumped hydropower storage for renewables. These are the trends that are expected to be seen in 2023.

All these transitions and trends are technology driven. Since the commercialisation of lithium-ion in 1991, the price has gone down by 92% at the cell level due to the development in technology. The increased life cycle and productivity of lithium ions can be utilized in the mobility segment. We also have a lead acid battery which could be a cheaper solution. The switch to lithium-ion was made possible by technological development. When it comes to semiconductors, Moore's law states that

the number of transistors in a semiconductor microchip increases every two years which reduces the cost and increases the speed of computing. This has resulted in technological developments at a faster pace.

We are also living in a connected world. Everything is connected one way or another. We are going to see the convergence of technology in our daily lives. Most of the technology involved in our everyday use evolved from the automobile industry. The convergence that is happening at the technological front and human interaction could be called 'digitization' in layman's terms. We are going to see an interconnected world driven by technology.

The finance sector is heavily impacted and influenced by technological developments. At present we have UPI transactions which are undergoing further developments to make the service more feasible and easy. Features that are being tested include availing services and undertaking transitions even in the offline mode. India also has one of the highest rates of cash transactions close to Japan. Recently RBI has launched a digital rupee that can be used in contactless transactions. These developments are powered by technology.

In India, AT&C losses are at around 17% at present and this should be brought down to at least 11%. This is a high margin of loss. We are using blockchain technology to track the losses and pilot projects have been deployed in this area. able futures by reducing their emissions.



However, blockchain has to be deployed at a large scale and also to our neighbouring countries. This is a technological disruption that is going to happen in the near future.

For organisations, one of the priority areas could be identifying the most sustainable supply chain vis-à-vis quality. In my division, which is that of electric mobility, we are preparing metrics for certain critical components to identify the available supply chain and quality. We aim to identify the emissions produced by this supply chain. Companies and organizations have to shift towards more sustainable supply chains that produce fewer emissions. The most sustainable supply chain will be the one that has good quality and fewer emissions. If the quality is bad but the emissions are nil your product will not have value. If your emissions are high but the product is of high quality it will not be sustainable in the long term as it does not align with the net-zero targets of your organization and country.

At present, fourteen of the twenty most polluted cities are in India. This has to be a larger concern for everyone. If organizations want their employees to work with full efficiency they have to provide healthy environments. Employee efficiency is decreasing due to pollution. Therefore, organizations should focus their efforts on building sustainable solutions at the earliest.

PERSPECTIVE FROM AMBER POLK

Assistant Professor of Law, Florida International University - College of Law | Former Teaching Fellow, Stanford Law School

What are the top 2-3 trends for sustainable development in 2023?

In terms of renewable energy development, one of the biggest trends that should begin to see some fruition in 2023 is offshore wind in the United States. The U.S. has lagged other global leaders in Europe and Asia in offshore wind development. 2023 should see the start of operations at two offshore wind projects, Vineyard Wind and South Fork Wind, located in the Atlantic Ocean off the northeast coast of the U.S. Despite opposition from local communities under the guise of environmental conservation, these projects should mark the first successes of the Biden Administration's commitment to 30GW of offshore-wind-generated electricity by 2030.



Our climate problem is primarily an energy problem. Harnessing energy in electricity and in transportation is what improves the human living condition. it should be developed in such a way as to stop the destabilization of Earth's climate.

Amber Polk

Assistant Professor of Law, Florida International University - College of Law | Former Teaching Fellow, Stanford Law School



In terms of plastics, consumer waste, and pollution, the European Union has recently proposed a new and ambitious rule to tackle the problem of waste generated in consumer packaging. Following the decades-old adage of "reduce, reuse, recycle," the new rule would require the identification of unnecessary consumer packaging waste and outright ban its use, while shifting necessary consumer packaging to be either reusable by the consumer or recyclable in a financially viable way. This is an important step forward in developing a circular economy, not only in the E.U., but globally as well.

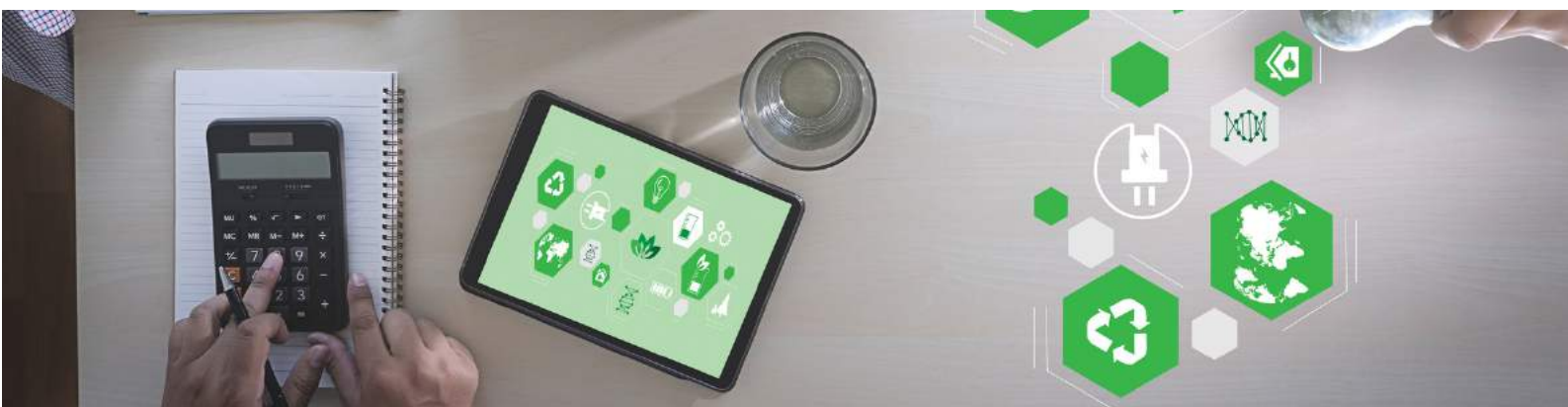
How can technology support sustainable transitions and impact the sustainability agenda in 2023?

In terms of offshore wind technology, it is crucial that these projects be engineered to withstand severe climate events, most importantly hurricanes. What used to be a one-in-one-hundred-years' storm is now significantly more common, and building based on improper risk assessment with insufficient technology can turn a massive success in the realm of renewables into a catastrophic crisis which costs lives.

What should be the top priorities for organizations and individuals to transition towards more sustainable economies, societies, and individual lifestyles?

It is hard not to place climate at the top of the list of environmental priorities. A stable climate around 350ppm of carbon was the condition upon which humanity has risen to the heights of society that we have now. Destabilization of Earth's climate threatens this without question.

The improvement to the human living condition is now so conditioned for populations in developed countries that it is politically a "need" in those countries (i.e. constituents in developed countries will not voluntarily significantly reduce their standard of living and therefore their energy consumption). Justice does not permit the denial of such improvements in living conditions to those populations living in developing countries. So, our need for energy will not decrease in the foreseeable future. It is absolutely crucial that energy, in electricity and transportation, be developed in such a way as to stop the destabilization of Earth's climate. Carbon capture will be needed in the long run as the road to decarbonization will likely take more than a generation.



PERSPECTIVE FROM JASMINE MEHTA

Sr. ESG and Climate Corporate Consultant, Fellow Global Policy Insights, and Co-Chair Indian Women in International Relations

Sustainable development is arguably the most comprehensive prescriptive term used to tackle the issues of climate change and the resulting issues of migration, conflicts for resources et al, ultimately leading up to existential crisis for many small island and oceanic states in the foreseeable future.

Dialogue and diplomacy on sustainable development between states and the private sector has recently garnered attention from other actors including investors and citizens, beyond civil societies. As the threats of climate change including, but not limited to, physical risks like heat, floods, cyclones etc. have exacerbated in most pockets of the world, the awareness and demand for an immediate remedial response has surged by global citizens.



With systematic reforms, a balance of regulation and de-regulation will help accelerate the sustainable development agenda.

Jasmine S. Mehta

*Vice President, ESG & Climate Sales, MSCI |
Fellow, Global Policy Insights | Co-Chair,
Indian Women in International Relations*

Since UNFCCC's Copenhagen summit in 2009, developed and developing states are slowly but surely making serious changes in domestic and foreign policies, to harness sustainable development opportunities with a capitalist lens. This trend is here to stay for the next few decades at the least. The private sector and the public sector both individually and through partnerships are leveraging highly sophisticated data and technology such as artificial intelligence, geo-spatial imagery etc. in identifying and managing risks and opportunities. State budgets are increasingly focusing on spends to accelerate sustainable development, and in tandem changing behavioural patterns towards sustainable impact through prominent topics on renewable energy, recyclability and reusability.

The more formidable policies are ones promoting adoption of renewable energy but the lesser known ones have been implemented at grass root levels in sustainable farming and agriculture, which is incidentally the second biggest sectoral emitters. Genome technology is for one a possible game changer, if effectively scaled up and regulated to advance sustainable agri-businesses. On the other hand, increasing availability of mock meat and collective behaviour to shift from real meat consumption for environmental reasons among others is the start of a massive global movement. Innovation in technology and its application is at the centre of influencing global citizens to adopt a sustainable lifestyle.



Emerging regulations at the state and local level is the epitome of sustainable development with a cascading effect from the EU to China, India, and the US – the largest economics and GHG emitters alike. Regulation is kicking in and will slowly but surely create a solid impact. And with favourable funding from investors and lenders who seek to grab alpha in the decarbonization journey, we will witness a paradigm altering adoption of sustainable development in all shapes and forms this decade.

PERSPECTIVE FROM GIULIA MARZETTI

*Coordinator sustainability and energy
at the European Union*

As a UN Sustainable Development Goals (SDGs) advocate, Giulia is passionate about using technologies to build a more sustainable and equitable world. Throughout her career, Giulia has spoken to UNFCCC COP24, COP27 GSTIC and has had many more engagements with the EU and UN on the Sustainable Development Goals (SDGs).

What are the top 2-3 trends for sustainable development in 2023 (including risks, opportunities, and general trends)?

The falling of renewable energy production prices is leading to an increasing share of renewable energy sources in our grid. This is a continuation of broader trends in the last decade. Despite this, the unpredictability of renewable energy sources and recent geopolitical developments have pushed countries to go back to coal.



Energy efficiency and storage will be the biggest opportunity in 2023. Something I want to see more of in 2023 is more sustainable food options & to align goals and operations with broader national and international sustainability targets.

Giulia Marzetti

*Coordinator sustainability and energy
at the European Union*

More sustainable materials options will be on the rise. Another risk is that costs and many materials are still in development.

.On a corporation level, decarbonisations efforts will start to make their way into the annual budgets of corporations. Similarly, ESG reporting will be increasingly under scrutiny with legislation possibly expanding into scope 3.

How can technology support sustainable transitions and impact the sustainability agenda in 2023?

I see the priority for technology would be to decarbonise processes and assets. The focus should be to embed the twin green and digital transition in corporations and government strategies as well as operations.

The European Commission's twin digital and green transition is ever more valid. Investment in R&D as well as uptake of those innovations is however crucial.

Top priority for organisations: we see ever more stringent sustainability regulations on corporations.

Top priority for individuals would be twofold:

01 Understand where in one's life we can make sustainable changes (whether food, transportation, consumptions etc.) reducing one's carbon footprints

02 Start advocating for systemic change in one's community and government.



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