

Focus: Climate Change

India is vulnerable to climate change impacts according to the Global Climate Risk Index 2018 released at the Conference of Parties (COP) 23 at Bonn, Germany. The mean annual temperature in India has increased by 0.56 degree celsius per 100 years between 1901 and 2007. Since the 1950s, India has experienced a variation in the intensity of monsoon and unseasonal rains. As per the Economic Survey 2018, climate change has the potential to reduce agricultural income by 15-18% every year. This percentage increases to 20-25% in unirrigated areas.

India has committed to reduce carbon emission intensity by 33-35% by 2030 from 2005 levels and to increase carbon sink by forestry projects along with an increase of renewable energy share in the overall energy mix of the country. The Indian Government has introduced various mechanisms such as the Perform, Achieve & Trade Scheme, Renewable Purchase Obligations, Clean Environment Cess, National Adaptation Fund and the National Clean Energy and Environment Fund towards renewable energy and energy efficiency. The National Electric Mission Mobility Plan (NEMMP) 2020 and the Faster Adoption of Manufacturing of

(Hybrid &) Electric Vehicles in India (FAME India) Scheme has been implemented to reduce dependence on oil and gas, while reducing vehicular emissions.

Of late, businesses are signing up for global voluntary initiatives such as RE100, EP100, internal carbon pricing, science-based targets and carbon disclosure projects to mitigate climate risks in a systematic and strategic manner by taking conscious steps towards it. India ranks second only after the US, in terms of the number of green technology projects and built-up area.

CII is of the view that the efforts of the Government in any sector or area of intervention are complemented or enhanced by Industry participation. India's planned efforts to mitigate and adapt to climate change has an inclusive approach towards sustainable development via the Public Private Partnership (PPP) model. There remains scope for strengthening PPP under each of the eight National Action Plan on Climate Change (NAPCC) missions as private sector and civil society organizations have the potential and competency in bringing innovative climate change resilient solutions. By leveraging Industry skills related to operational management, technical

expertise, efficiency and provision of innovative solutions, PPP models have the potential to maximize social welfare benefits while being profitable.

To recognize businesses' actions in combating climate change, CII has introduced a new recognition programme - Climate Action Programme (CAP) 2.0°. It aims to acknowledge credible action taken across all sectors to adapt to or mitigate climate change. The national level CII Climate Change Council keeps track of climate-related developments and spearheads policy advocacy with the Government via its industry-led specialized working groups.

From a holistic point of view climate change is being looked at as a profitable business opportunity for all the stakeholders with a potential to create green jobs and build resilience among Industry and society. Collaborative action is important, and CII will continue to facilitate the relationship between Government and Industry for India's sustainable future. ■

Chandrajit Banerjee

Director General
Confederation of Indian Industry

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Need to Accelerate Adaptation Measures Through PPP Model

India has been ranked as the world's most vulnerable country to climate change by HSBC in April 2018.¹ This is corroborated by the Global Climate Risk Index 2018 released at the Conference of Parties (COP) 23 at Bonn, Germany, which found India to be the world's sixth most affected country by climate change in 2016 with a toll of 2,119 deaths and estimated losses of USD 21,482.79 million due to the effects of climate change.²

Well-established impacts of climate change include increasing average global temperature and sea levels, changing precipitation patterns, as well as an increased intensity of extreme climatic conditions like storms and heat waves, posing significant risks of flooding, drought and declining agricultural productivity. In addition, climate change also poses specific risks to the Industry, whether it is in the form of physical risks such as effects of extreme weather events on infrastructure, process efficiency and worker health, regulatory risks such as carbon taxes or reputational risks associated with the use of carbon-intensive materials and processes as consumers become increasingly aware of the problem of climate change. It is, therefore, imperative that the Industry works proactively with the Government in addressing climate change.

While mitigation-related activity has already received some attention from the Government and Industry, adaptation still remains a relatively new field of work. However, as is made clear by the Global Climate Risk Index 2018 quoted earlier, effects of climate change are already being felt in India in a big way which highlight the need for urgent work to be undertaken in regards to adapting to such effects, along with the ongoing mitigation-related activity.

From the perspective of the private sector, investment in adaptation to a particular

¹HSBC (2018): Fragile Planet: Scoring climate risks around the world. Available at: <http://www.sustainablefinance.hsbc.com/our-reports/fragile-planet>

²Global Climate Risk Index (2018). Available at: <https://germanwatch.org/en/14638>



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Past President, CII

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and Industry to work hand-in-hand to accelerate climate change adaptation in India. The Government has already identified objectives and priorities for adaptation activities under the National and State Action Plans on Climate Change³ (NAPCC and SAPCC, respectively) and also set up a central fund to support these activities under the National Adaptation Fund for Climate Change (NAFCC).⁴ The private sector can play an important role in the implementation of such projects by ensuring that objectives are achieved in a cost-effective and efficient manner by utilizing technical and management know-how available in the private sector, as well as innovation spurred by private competition.



climate-related risk only yields a return if and when that risk occurs. If the likelihood of a risk occurring is not reliably known or has a significant value far in the future, it may be beyond the considerations and timeframes applicable to present investment decisions. This is in contrast to the investment in mitigation activity, like improvement in efficiency of energy use, which can reduce costs and increase profitability in the short term.

The Government, therefore, has an important role to play in providing a framework of incentives and regulations, where necessary, to make private-sector participation in adaptation projects viable, which makes a Public Private Partnership (PPP) model an excellent platform for the Government

To sum up, combating climate change requires innovative and transformative thinking and public-private partnerships (PPPs), which can present exactly the sort of solutions needed. Well-structured PPPs bring to the table the finest qualities of the public and private sectors, extracting innovation and efficiencies while providing the right regulatory support and apportioning risks. Furthermore, climate change will create new markets for adaptation-relevant products and services for the industry, and early involvement in such markets has the potential to translate into an important competitive advantage in the near future. ■

³MoEFCC: <http://www.moef.nic.in/ccd-napcc>; <http://www.moef.nic.in/ccd-sapcc>

⁴NABARD: <https://www.nabard.org/content.aspx?id=585>

Harnessing Private Sector Investment in Research and Development for Clean Technologies

India's investment in Research and Development (R&D) activities, despite having tripled in the last decade, is low in comparison to other developed and emerging economies. India's investment in science, measured in Gross Expenditure on R&D (GERD), is stagnant at 0.6 to 0.7% of GDP and is much lower than that of US (2.8%), China (2.1%), South Korea (4.2%) and Israel (4.3%). Insufficient funding from both public and private sources prevents innovation and research moving from the embryonic stage to deployment in the markets. These factors point to the need for identifying financial arrangements that will strengthen India's R&D investment and accelerate the development, transfer, deployment and diffusion of climate-friendly technologies.

Insufficient investment in R&D and allied issues such as lack of investment stability and enabling policies (relevant to R&D, investment and procurement), intellectual property rights, technology identification and prioritization, lack of political will and market framework will hamper India's low carbon development.

As a founding and steering committee member of Mission Innovation, a global initiative of twenty-two countries and the EU to accelerate global clean energy innovation, India has committed to doubling



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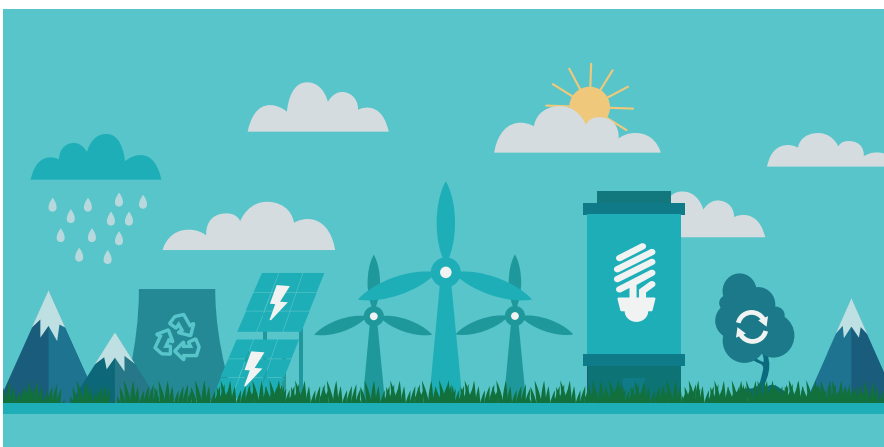
Government investments in R&D for clean energy technology by 2019–20, as compared to baseline investment of Rs 470 crore in 2014-15. However, India's target of spending 2% of GDP on R&D, of which cleantech is a key element, is unlikely to be achieved without an increase in private sector investment.

From a private sector perspective, investments are driven by their economic feasibility, which means investments with a negative or uncertain Net Present Value (NPV) or long payback periods will not find any takers in the market. However, if an investment has public benefits or positive externalities, such that accounting these externalities into the investor's traditional cashflows yields a positive present value,

commonly referred to as the Net Social Benefit (NSB) of the investment, it makes sense to undertake this investment from a macro-economic perspective. This is typically true of cleantech investments in the R&D stage, where technologies may not yet be marketable or have reached commercial economies of scale.

It is clear that in addition to direct investments, an important role of the Government is also to facilitate private investment in such projects that have a negative NPV, but a positive NSB value associated with them. A good example of this is the energy transition programme of the German Government known as 'Energiewende', which provided a system of Government subsidy over a period of twenty years for the production of energy from renewable sources in order to make this viable in the market. To keep the subsidy system efficient and spur technological innovation, the subsidy progressively reduced over the subsidy period as commercial economies of scale were reached and better technologies emerged.

Innovative approaches like these and other collaborative efforts between the Government and Industry can play an important role in harnessing private sector investment in cleantech R&D. This will be key to achieving India's targets of increasing the share of non-fossil based energy sources to 40% of installed electric power capacity and reducing emissions intensity of GDP by 33-35% (as compared to 2005 levels) by the year 2030, as communicated in its Nationally Determined Contribution (NDC) under the Paris Agreement, as well as enabling its transition to a cleaner and more sustainable economy in the long run. ■



Key CII Recommendations for Climate Change

Investment in R&D

The Draft National Energy Policy of India recognizes the need for climate-related technology and stresses on the importance of Research and Development (R&D) in case of unavailability of relevant technology. In India, investment in R&D, by both the private and public sectors does not compare favourably with those in other developed and emerging economies. According to the Economic Survey 2017-18, India's spending on R&D in terms of percentage of GDP has been stagnant at 0.6 to 0.7% in the last two decades, which was much lower than other developed and emerging countries such as the US, China, South Korea and Israel.

In India, private investments in R&D have severely lagged public investments. The Government has been the primary source of R&D funding and a primary user of these funds as well, whereas in most countries, the private sector is entrusted to carry out the spending in R&D. Concerted effort needs to be made by the private sector to bring in innovation to combat climate change and reduce dependency on foreign technology that is associated with rather complex issues of Intellectual Property Rights. Therefore, India needs to redouble its efforts to make improvements in science and R&D.

CII is of the view that the Government's role in enhancing the pace of innovation in climate-related R&D is highly significant. It is recommended that India increase its efforts to harness private sector investments in R&D by promoting and strengthening Public-Private Partnership (PPP) models. It is also recommended that India must develop strategies to increase its R&D investments by partnering with other countries. The India-sponsored International Solar Alliance (ISA) is a good example of procuring available technologies from the international market. India should provide a pro-active policy approach for technology induction both by procurement and incubation.

Planning for Strategic Adaptation and Resilient Indian Industry

India is one of the most vulnerable countries in the world in terms of changing climate and its impact. The effects of climate change, particularly scarce water resources and flooding, are already presenting major challenges for India's industrial development and it is anticipated that extreme climatic events will occur more frequently in the future. Despite extreme predictions related to climate scenarios, industrial planning in India is not equipped to handle the impact of climate change. This is likely to result in a significant increase in industrial losses and damage. Therefore, it is necessary for India to build resilience in the industrial sector if it wants to ensure sustainable growth. 'Strengthening resilience of India's private sector: climate change adaptation in industrial areas' was one such project undertaken by GIZ India and the Department of Industrial Policy and Promotion (DIPP) of the Ministry of Commerce and Industry in India, which had the primary objective of enabling key decision-makers and planning authorities to plan and design existing and new industrial areas to be more climate-resilient.

CII recommends that the Industrial belts should undertake climate change vulnerability assessment and prepare a roadmap to build climate resilience. Although few leading Indian industries and some industries in the coastal areas conduct vulnerability assessment and climate risk analysis, activities from few leading industries is not the solution. Such assessments need to be done in every sector on a regular basis. It is essential to change developmental plans to ensure sustainable development.

Phasing Out Fossil Fuel Subsidies Except LPG

A fossil fuel subsidy is any Government action which lowers the cost of fossil fuel energy production, raises the price

received by energy producers or lowers the price paid by energy consumers.

While the Government has declined the energy subsidies significantly, subsidies still favour fossil fuels more than renewables. In FY 2015-16, the subsidies on coal, oil and gas were greater than INR 58,000 crore as compared to INR 9,311 crore of renewables. This is not well-aligned with several Government objectives such as reducing harmful air pollution and tackling climate change through its Nationally Determined Contribution (NDC), both of which require less fossil fuel use, particularly coal.

CII is of the opinion that fossil fuel subsidies should be eliminated completely. One of the most urgent reasons to eliminate fossil fuel subsidies is the rapidly dwindling carbon budget. Support for fossil fuel production adds to the risks of carbon lock-in as well. Fossil fuel subsidies essentially function as a negative carbon price as the true cost shifts onto the poor via climate and health impacts, whereas the fossil fuel industry gets paid for this privilege. These subsidies also take public money away from other uses. The public money going to fossil fuels should go to social spending, health and development, clean energy, energy access for the poor, or other areas important to them. By phasing out harmful fossil fuel subsidies, India can reallocate its spending to where it is required the most (providing targeted support to the poor).

Implement Climate-smart Agriculture and Nurture Forest Landscapes

Climate-smart agriculture is an approach to transform and reorient agricultural development across the new realities of climate change. Increasing climate variability, extreme weather events and rising temperatures pose challenges to India's food and nutrition security. Experts quote that change in agricultural productivity patterns because of climate change could

reduce annual agricultural income by 15-18% on average, and between 20-25% for unirrigated areas.

According to the Agriculture Policy: Vision 2020, implementation of water-saving technology is one of the thrust areas to act upon. In India, inter-cropping, multi-cropping and crop rotation are a few practices presently undertaken to act against climate change but that is not enough to become climate resilient in agricultural practices. To achieve food security and agricultural development goals by 2030, adapting to climate change and lowering emissions will be necessary.

Similarly, forests are valuable large reservoirs that absorb carbon and store it in soils, trees and foliage. According to the latest study from ISRO, the current intact forest landscapes in India consist of blocks larger than 10 sq. km, covering an area of 34,061 sq. km. A total of 47 protected areas represent 7,129 sq. km of the area under intact forest landscapes. Thus, the total area covered by the intact forest landscapes accounts for about 1.1% of the country's natural forest area currently protected. It is estimated that 4.4% of the area of intact forest landscapes fall inside the existing protected areas. Hence, an additional area of 26,932 sq.km of intact forest landscapes remain outside of protected areas in India.

India witnessed one of its worst droughts in 2014 and 2016. Climate-smart agriculture should create readiness to deal with such extreme weather conditions and weather uncertainties that are becoming the new normal. In terms of policy, it is necessary that the National Action Plan on Climate Change (NAPCC) should be in synchronization with the Agriculture policy which is presently lacking.

CII recommends incorporating plans for farm ponds, bundings, trenching, mulching and other practices for conservation of soil moisture, using appropriate seeds and on-farm inputs (to avoid debt situations) and having better access and control over required water resources in the Agriculture policy document.

Cleaner reliable energy services would enable farmers and agribusinesses to increase food production and engage in value-added processing. Therefore, it is recommended that new technologies such as solar food dryers and solar water irrigation should be used that will allow farmers living off-grid to replace expensive diesel generators with cheaper and cleaner technologies. However, as the solar agricultural market is still in the early stages of development, there are several barriers that the farmers face such as relatively high technology costs, limited awareness of the benefits, lack of appropriate policy incentives and limited access to finance for farmers and technology suppliers to boost affordability. It is necessary to work on these issues and make solar technology more accessible to the farmers.

It is recommended that efficient conservation plans should be prepared in fine-scale mapping of biodiversity within intact forest. Also, the role of key stakeholders such as Gram Sabhas and other village assemblies should be strengthened through enactment of key policy measures to scale up the implementation of strategies under the Green India Mission.

Scaling up of NMEEE and Maximum Utilization of Renewable Energy

Energy efficiency is a key to ensuring a safe, reliable, affordable and sustainable energy system for the future. It means that every gigawatt saved by increasing energy efficiency is a gigawatt that didn't have to be produced. Energy efficiency is currently one of the most cost-effective methods of giving back a portion of what we take to the environment.

On the other hand, renewable energy is becoming increasingly affordable as prices fall. In India, utility-scale renewable energy is now cheaper than or on par with fossil fuel plants.

CII feels that while this is a leap towards sustainable growth and development, greater effort is needed to move to a more efficient use of energy in order to meet climate goals. The need of the hour is to

increase the adoption of energy efficiency and low carbon technologies in the Micro, Small and Medium Enterprises (MSME) sector as well as large industrial sectors such as steel and power. It is recommended that most of the energy-intensive commercial buildings should come under the umbrella of PAT as they are left out of the regime. By adopting an energy efficient lifestyle, a positive momentum is expected towards the transformation of global energy systems that will achieve our common climate change and sustainable development goals.

Putting a Robust Price on Carbon or it's equivalent

A price on carbon helps shift the burden of damage back to those who are responsible for it, and who can reduce it. Instead of dictating who should reduce emissions where and how, a carbon price gives an economic signal and polluters decide for themselves whether to discontinue their polluting activities and reduce emissions, or continue polluting and pay for it.

Scientists believe that about 1.5 degree celsius of warming is already locked in through the amount of greenhouse gas emitted and expected to be emitted in the coming years. The world will have to adapt to the changing climate while bringing down emissions. That means it is necessary to build resilience into all development activities and increase financial support for preparedness and prevention. Therefore, a robust carbon price will allow flexibility to investors in terms of when and where to invest in low emission or alternative technologies, creating efficiency by providing an incentive to reduce emissions where it is most effective.

CII recommends that public and private organizations are required to invest in disaster preparedness, scale up renewable energy deployment and energy efficiency projects, city planning and development, and provide decision-makers with the tools and data required for informed decision making. It is important to factor in important carbon pricing co-benefits as carbon price does not only reduce greenhouse gases, but also reduces air pollution and raises revenue that

can be invested for a double dividend and a just transition to a low carbon economy. It is also recommended that more emissions should be priced at a much higher level in order to reach the temperature goals of the Paris Agreement.

Build Low-carbon and Resilient Cities

It is anticipated that the building sector will rapidly increase in the next 20 years with an increase in population and affluence. And with the changing climate, it is necessary to understand the climate vulnerability of various cities with different geographical locations in order to build climate resilience.

There is a huge potential for enhancing energy efficiency and greenhouse gas mitigation measures in the upcoming building sector in India by adopting Energy Conservation Building Code (ECBC) 2017. ECBC is a compliance code that sets parameters for builders, designers and architects in the construction industry to integrate renewable energy sources in building design with the inclusion of passive design strategies. This code would help to optimize energy savings with the comfort levels for occupants and prefers life-cycle cost

effectiveness to achieve carbon neutrality in commercial buildings. ECBC provides current as well as futuristic advancements in building technology to further reduce energy consumption by buildings and promote low-carbon growth.

It is recommended that India should adopt a systematic approach that would undertake climate impact assessments, identify risks and vulnerabilities and take into account the governance profile of the cities. With effective land use planning and implementation of ECBC (2017), cities can be built taking into cognizance sustainable growth and development of the locations. They can open up access to jobs and opportunities for the poor and reduce pollution. Smart solutions to infrastructure and services in area-based development should be applied in order to make cities a better place to dwell. For example, making areas less vulnerable to disasters, using fewer, efficient, durable and recyclable resources and providing cheaper services.

Augment Affordability of Electric Mobility

The transport sector is one of the major contributors of CO₂ emissions. As per 2012–13 data, the transport sector was

responsible for 14% of India's energy-related CO₂ emissions. An assessment carried out by the Central Pollution Control Board (CPCB) surveyed that 75% cities are at very high risk of PM10 levels. Out of these, 50% of cities have critical level of NOx as well.

Electric vehicles (EVs) are expected to drive significant behavioural changes in the Indian market and going forward its increase in adoption will lead to new business models in the mobility value chain. Taking this into account as a wide opportunity, India has set a target of selling zero-emission vehicles by 2030. As per the National Automotive Board, currently there are a total of 152,161 electric vehicles on the roads in India.

The Government has ordered industries to provide solutions in the form of fully electric, zero emission vehicles as part of their initiative. However, buyers are still hesitant to purchase these climate-friendly vehicles because of the high price and lack of charging facility network. It is necessary that the creation of charging infrastructure goes hand-in-hand with the EV volume growth. It is anticipated that with proper infrastructure in place, demand growth will be higher, leading to significant reduction in costs required for acceleration and adoption of EVs. ■

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Indian Industry needs a goal-oriented, innovative measure to combat climate change mitigation and adaptation. The deployment of clean technologies and the circular economy approach will help to resolve current climate change problems.



Ajay Kapur
*Co-Chairman, CII National Committee on Environment and
 Managing Director & CEO, Ambuja Cements Limited*



Indian Industry recognizes the need to support the Government’s commitment to the Nationally Determined Contributions (NDCs) made at COP21 in Paris. However, agreed sectoral policies and a clear path to achieve them, is required.

Ajay S Shriram
*Past President, CII and Chairman, CII-FBN India Chapter Council, Chairman, CII Building & Land Committee and
 Chairman & Senior Managing Director, DCM Shriram Limited*

Unsustainable lifestyles and methods of production and consumption have caused climate change. Its reversal is imperative if we want to move towards a low carbon and sustainable development pathway. Even small steps can go a long way!



Vikram Kirloskar
Vice President, CII and Vice Chairman, Toyota Kirloskar Motor Private Limited



Businesses cannot overcome the complexities of climate change by themselves. Proactive engagement and collaboration with Governments, academicians, NGOs and civil society will help devise climate-friendly solutions for the short, medium and long term.

Balasubramanyam Rajagopal
Member, CII and President, DSM India

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Climate change knows no boundaries. Indian Industry leaders acknowledge that environmental degradation and climate change pose new risks as well as opportunities for their companies' competitiveness, growth and development, and are therefore turning the climate challenge into a market opportunity.

R Mukundan

Chairman, CII-Institute of Quality Advisory Council, Chairman, CII National Committee on Environment and Managing Director & CEO, Tata Chemicals Limited



I firmly believe that all stakeholders need to work in partnership to advance climate action. Businesses can make a meaningful contribution by spearheading innovations for a low carbon growth path, supporting mitigation and adaptation efforts of stakeholders and making investments in future-ready technologies. ITC has undertaken a symphony of efforts such as expansion of renewable energy, large scale afforestation, green buildings and reduction in specific energy consumption among others to combat climate change.

Sanjiv Puri

Member, CII and Managing Director, ITC Limited

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For suggestions please contact Priya Shirali, Corporate Communications at priya.shirali@cii.in

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