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## Striking a balance between unbounded economic growth and sustainability



*Dr Abhijit Singh, Executive Director, Indian Ports Association (IPA), talks about how green sustainability and economic growth can coexist. He emphasizes that it's high time for maritime transport agencies both government and private to be responsive to resolve climate change issues, design and implement measures to lessen repercussions. The shipping industry handles 70 percent (<https://blogs.worldbank.org/transport/three-reasons-why-maritime-transport-must-act-climate-change>) of all world trade's value, so economic threats to this sector can cause a domino effect on other industries that rely on its services.*

### **Importance of sustainability and climate change**

Drive for sustainability is gaining a strong foothold and scripting new business rules across the globe and India is no exception. The consequences of climate change will impact the development challenges, particularly in countries like India, Bangladesh and other South Asian nations. Climate change related risks will increasingly affect the Indian subcontinent, including via sea-level rise, cyclonic activity, harsh sudden changes in temperature and precipitation patterns. India's urban population, projected to rise from 377 million in 2011 to 745 million in 2041, is already seriously challenging services and infrastructure in stressed Indian cities. Approximately 18 percent of India's population lives in 72 coastal districts. It comprises 12 percent of India's landmass. Indeed, most Asian cities with over 1 million inhabitants are already exposed to water-related hazards. Climate change will increase the risks of death, injury and ill-health and disrupt livelihoods in low-lying coastal zones due to cyclones and coastal and inland flooding, storm surges and sea-level rise. Increased river, coastal and urban floods could cause considerable loss of life and widespread damage to property, infrastructure and settlements. Melting Himalayan glaciers would reduce the downstream water supply in many of India's important rivers in the dry season, impacting millions. A warmer atmosphere will spread tropical diseases and pests to new areas. Climate change will seriously impact global food production as drought, increased unpredictability of precipitation, and rising temperatures would reduce global crops yields, while warming and acidification of the oceans would affect marine wildlife and fisheries.

### **Can we let economic growth and development happen at the cost of environmental degradation?**

The economic growth has come to be seen as a solution for all social and political problems, including poverty, social exclusion and environmental degradation. If India is asked to consider the cost of growth in environmental degradation and social exclusion, it is likely to respond that more growth and more technology are the solutions. Thus, sustainable growth taking full advantage of technology and innovation is a way forward. Sustainable growth, for its part, requires the creation of productive assets that conserve nonrenewable resources such as land, water and atmosphere and minimize environmental damage. The response to climate change has to be through both adaptation and mitigation. We must adapt our societies to prepare for some climate change risks. Mitigation efforts must be intensified given the early benefits they can deliver.

India has one of the lowest rates of energy intensity of GDP growth. India's historic and current levels of per capita GHG emissions remain the lowest amongst the G20 even though in volume terms it is now the third-largest GHG emitter in the world, after China and the USA. India continues to face massive development challenges to tackle which requires a high level of sustained economic growth. India's per capita GHG emissions remain a fraction of that of all major emitters and it does not want to pursue the environmentally harmful development as followed by developed countries in their process of industrialization. With the Government's focus on renewables and e-mobility, it is evident that our path to progress is more empathetic to climate vulnerability. India seeks to meet the climate change challenge by expanding the use of low carbon and renewable technologies and improving the energy efficiency of buildings, factories, ports, appliances etc. It is India's inclusive growth path which is integral to an effective climate change policy for India and studies in India show that low carbon growth pathways are consistent with inclusive growth. India's Nationally Determined Contributions (NDC) has three numeric targets for 2030: reduce emissions intensity by 33 per cent to 35 per cent from 2005 levels, achieve an installed power capacity of 40 per cent from non-fossil fuel sources and create an additional carbon sink of 2.5–3.0 GtCO<sub>2</sub>e from forest and tree cover.

### **How Oceans & Climate Change both are related? Is India sensitive to the issue of climate change?**

Oceans and climate are inextricably linked and oceans play a fundamental role in mitigating climate change by serving as a major heat and carbon sink. The ocean plays a central role in regulating the Earth's climate. The Fifth Assessment Report published by the Intergovernmental Panel on Climate

Change in 2013 (IPCC, 2013) revealed that it has thus far absorbed 93 percent of the extra energy from the enhanced greenhouse effect, with warming now being observed at depths of 1,000 m. The ocean and coasts provide critical ecosystem services such as carbon storage, oxygen generation, food and income generation. Coastal ecosystems like mangroves, salt marshes and seagrasses play a vital role in carbon storage and sequestration. Per unit of area, they sequester carbon faster and far more efficiently than terrestrial forests. When these ecosystems are degraded, lost or converted, massive amounts of CO<sub>2</sub>, an estimated 0.15- 1.02 billion tons every year, are released into the atmosphere or ocean, accounting for up to 19 percent of global carbon emissions from deforestation. The ecosystem services such as flood and storm protection that they provide are also lost.

As per the UN Emissions Gap Report 2019, total GHG emissions grew 1.5 percent per year in the last decade (2009 to 2018) without land-use change (LUC) and 1.3 percent per year with LUC, to reach a record high of 51.8 GtCO<sub>2</sub>eq in 2018 without LUC emissions and 55.3 GtCO<sub>2</sub>eq in 2018 with LUC. GHG emissions growth was 2.0 percent in 2018 and there is no sign of a peak in any of the GHG emissions. GHG emissions are growing globally, despite progress in climate policy, as the countries where emissions are declining are not able to offset the growth in emissions in other countries. India, accounting for 7 percent of global emissions, unfortunately, continues to have growth in emissions of 3.7 percent per year in the last decade and 5.5 percent in 2018. Though climate change is a global phenomenon it is with local consequences. There are both external and domestic dimensions to India's Climate Change policy which has been articulated through two key documents. One is the National Action Plan on Climate Change (NAPCC) adopted on June 30, 2008. The other is India's Intended Nationally Determined Commitments (INDC) submitted to the UN Framework Convention on Climate Change (UNFCCC) on October 2, 2015. The NAPCC has an essentially domestic focus. The INDC is a statement of intent on Climate Change action announced in the run-up to the Paris Climate Change summit held in December the same year.

Prime Minister Modi has been one of the world leaders who has taken a keen interest in Climate Change issues. Under his leadership, India decided to adopt a more pro-active, ambitious and forward-looking approach in the run-up to the Paris Climate summit. This is reflected in the country's INDC. It links India's commitment to ecologically sustainable economic development with its age-old civilizational values of respecting Nature, incorporating a sense of inter-generational equity and common humanity. The targets India has voluntarily committed itself to are unprecedented for a developing country.

India played a major role in assuring the success of the Paris Climate Summit and Prime Minister Modi's personal intervention in the adoption of the landmark Paris Agreement was acknowledged by several world leaders. His initiative on the setting up of an International Solar Alliance for promoting solar power worldwide was welcomed.

### **Contribution of Major Ports on green sustainability without compromising on efficiency**

Port being an interface between sea and hinterland, marine pollution by the shipping activities gets extended at the ports too. About 30,000 plus vessels of various sizes and types call Indian Ports annually and over 300,000 fishing vessels of various sizes and types are engaged in fishing operations in coastal waters of India that are highly congested and dangerous to safe navigation and a cause for the pollution. Safe and green governance over the maritime domain which accommodates a plethora of maritime activities is a challenge. Evaluating pollution impacts on ports, approach channels and in around ports requires consideration of numerous sources of pollution such as marine vessels, trucks, locomotives, and off-road equipment used for moving cargo, dredging activities, port expansion, handling of hazardous cargo etc. International transport (aviation and shipping) representing around 2.5 percent of GHG emissions. Shipping contributed 2.8 percent of global CO<sub>2</sub> emission and 15 percent and 13 percent of global NO<sub>x</sub> and SO<sub>x</sub> emission from anthropogenic sources. The shipping emission in Ports represents 2 percent of total shipping emission.

Weighing in the environmental perspective for sustained growth, the government has started focusing on making Major Ports across India cleaner and greener through two agenda - one is 'Green Ports Initiatives' related to port ecosystem environmental issues and second is 'Swachh Bharat Abhiyaan' to promote cleanliness at the port premises. Some of these initiatives are:

- Preparation and monitoring plan for Green Sustainability
- Acquiring equipment required for monitoring & mitigating environmental pollution
- Acquiring dust suppression system, stockpile enclosures, Wet fogging, surface wetting etc
- Setting up of sewage/wastewater treatment plants/ garbage disposal plant
- Setting up projects for energy generation from renewable energy sources
- Prohibition of disposal of almost all kind of garbage at sea and setting up of shore reception facilities at public places
- Trees plantation in and around port premises, beautification and cleaning of parks
- Cleaning and repairing of all drainages and stormwater systems

The new restrictions, known informally IMO2020, reduce the allowable percentage of sulfur in fuel from 3.5 percent to 0.5 percent. Compliance resulted in an additional \$25 Bn to \$30 Bn in fuel cost for container liners from 2020 through 2023. The Indian government has also taken many steps for a consistent and smooth implementation towards compliance with the Global Sulphur Cap {0.5 percent mass/mass max.} IMO regulation effective from 1<sup>st</sup> January 2020. Indian Oil Corporation Limited (IOCL) has already started supplying Global Sulphur cap compliant fuel oil and is at present available on the west coast of India. Complete supply by Hindustan Petroleum Corporation Limited (HPCL) & IOCL is also expected this month. By selling environmentally friendly services effectively, liners can share these costs with customers as well as promote the ultimate objective of the greener supply chain. More efforts to be made to link Corporate Social responsibility of ports with United Nations Global Impact Programme on the environment and with the principle of sustainable development based on the immediate and long term social and environmental consequences of their activities.

Concept of Smart-Green port is being promoted which envisages a zero or negligible emission port with a very high level of efficiency in operations and energy savings. Smart in terms of operations and Green in terms of energy usage & waste management would make ports sustainable without any compromise with productivity. In fact, this strategy leads to not only reducing the carbon footprint of ports but also increase the efficiency and thus productivity of ports. Adoption of technologies and innovations in areas of digitization and energy systems has the ability to transform ports completely.

Combining different digital technologies, such as IoT, AI, Blockchain, Bigdata, Automation etc., offer opportunities to create highly efficient port operations along with improving transparency and removing trust-deficit in information sharing among different stakeholders. Apart from making operations highly efficient through digitization and automation, we must also focus on the kind of energy we use in our operations. Also innovations into waste management and environment conservation, ports can lead the sustainability endeavours. Like reuse of waste material in civil construction, use of biodegradable products for the production of manure/fertilizer, efforts also to be made to clean plastic from marine ecology, promote clean ecology for aquaculture and animal husbandry, coral reef restoration etc.

### **What are the other technological interventions in the marine sector that could help in curbing the climate change problem?**

Geo-engineering could be the next big thing happening in oceans that could completely revolutionize our fight against climate change. Although it is still at the concept stage, advocates claim that it may eventually become essential if the world wants to avoid the worst effects of climate change. There are many environmental agencies under government and scientists from various institution already working on it to evaluate the merit of these concepts which are very much relevant to the maritime industry. The



Geo-engineering can be defined as a deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change. The Royal Society report classified geoengineering methods into two categories:

- Carbon Dioxide Removal (CDR) methods, which reduce the levels of carbon dioxide (CO<sub>2</sub>) in the atmosphere, allowing outgoing long-wave (thermal infra-red) heat radiation to escape more easily; and
- Solar Radiation Management (SRM) (also known as Albedo Modification (AM) ) methods, which reduce the net incoming shortwave (ultra-violet and visible) solar radiation received, by deflecting sunlight, or by increasing the reflectivity (albedo) of the atmosphere, clouds or the Earth's surface.

Geo-engineering involves various techniques which include Ocean fertilization (through iron, macro-nutrients, nitrogen & phosphorous), carbon storage in the ocean or injection on to the sea bed, macro-algae cultivation, artificial upwelling and down-welling, enhancing ocean alkalinity, increasing oceans albedo (reflectivity), ocean thermal energy conversion and deep water cooling.

The international climate context has changed with the implicit acceptance of negative emission requirements in the 2015 Paris agreement. Most of the climate models analyzed by the IPCC that limit the global atmospheric temperature increase to 2 °C require negative emission technologies (NETs) to achieve that goal. The Ocean Thermal Energy Conversion (OTEC) is the one on which maritime sector can look forward to and invest. OTEC exploits the difference in temperature between the surface and deep layers of the ocean to generate electrical power. However, its engineering application in the marine environment has only been demonstrated at a pilot scale. Successful projects in Japan and Hawaii have produced net power but several orders of magnitude less than a typical power plant. Depending on the scale of implementation, OTEC could indirectly sequester carbon by altering the surface temperature and circulation of the ocean. It may also indirectly increase the uptake of CO<sub>2</sub> from the atmosphere by bringing nutrient-rich deep water to the surface of the ocean.

*Dr Abhijit Singh is the executive director of IPA, an association that acts as a think tank to the Ministry of Shipping, and also hailed as the Centre of Excellence (CoE) helping major ports achieve eminence in their operations & management thus contributing to the growth of the economy and the country at large.*

*The views and opinions expressed in this article are those of the author and do not necessarily reflect the views of Indian Transport & Logistics News.*

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