

Strategies Responding to Climate Change: Some Indian and Global Understandings

Dr. Mohinder Kumar Slariya

Associate Professor Govt. Govt. College Chamba, Himachal Pradesh, India

Abstract: Climate Change is a reality now and one of the defining issues of 21st century and affecting almost all aspects of human survival. Climate change is adversely affecting lives and livelihood of people living on this planet. For example; from shifting weather patterns round the globe is threatening food production which largely affect food security, rising sea levels has always a risk of catastrophic flooding are few to count, but the reality is the impacts of climate change are global in scope and unprecedented in scale and drastically affecting present generation and will be more difficult and costly in future to cope. Every country has it's own strategy to cope the climate change and mitigate the greenhouse gases which is a great threat to climate change.

While proceeding on the road of development, India's strategy for tackling climate change was set out as one of the most important agenda in its National Action Plan on Climate Change adopted in 2008. Presently, almost in all developmental initiatives, Govt. of India across the country has adopted policies at planning as well as at execution level to mitigate climate change. Same is the case with big enterprises round the globe. The paper is an attempt to understand and analyse the strategies adopted by Govt. of India as well as by other countries at global level. The paper is based on secondary data available in form of official records of the enterprises as well as policy documents of various governments.

Key Words: Climate Change, Greenhouse Gases, Enterprises; Food Security; Strategic Plans

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I. SOURCES AND INTENSITY OF GHG EMISSIONS: AN INTRODUCTION

India could be a major electrode of greenhouse gases owing to its terribly giant population and hierarchical fourth globally in overall ranking behind the U.S., China, and therefore the EU and tributary around five.5 per cent of worldwide emissions (FIIA, 2009). India's greenhouse emission emissions area unit calculable to possess up by roughly fifty per cent, between 1994 and 2005 and putting it at the highest 5 emitters at international level. However, per capita emissions area unit significantly under those of either industrial countries or different major developing economies. for instance, in 2006 India's per capita carbon dioxide emissions from fuel combustion (not total emissions) were calculable at one.13 tonnes, compared to four.28 for China, 8.07 for EU-27, 19.0 for USA and four.28 for the planet average (IEA, 2008).

The largest bulk of India's emissions come back from the energy sector. In 1994 energy accounted for concerning sixty-one per cent of total CO₂e emissions – of which almost half came from electricity supply, twenty per cent from industrial fuel combustion and around eleven per cent from transport. Road transport accounted for nearly ninety per cent of transport emissions (the remaining 10 per cent coming back from rail, aviation and shipping). World Resources Institute (WRI) estimates counsel that the general contribution of the energy sector is rising (around sixty-six per cent by 2005). Of the opposite sectors, agriculture accounted for twenty-eight per cent of total emissions in 1994 (around twenty-two per cent in 2005), process emissions contributed around 6-8 per cent, waste disposal accounted for two per cent (rising to just about seven per cent in 2005), and land use and land use amendment accounted for one per cent (net carbon storage in 2000).

The emission intensity of India's economy in 2006, calculable at 0.34-kilogram carbon dioxide per US\$ GDP (at 'Purchasing Power Parity', 2000 prices), was roughly up to the emission intensity for EU-27 (0.33 kilogram CO₂) and below the planet average (0.49 kilogram CO₂) (IEA, 2008). A recently printed collation of 5 modelling exercises (MOEF, 2009) provides a variety of estimates for India's future emissions flight. Projections of per capita emissions in a pair of 031 can vary from 2.77 to five t carbon dioxide, whereas total emissions vary from four billion to seven billion t carbon dioxide. (Only one among the five exercises enclosed methane series emissions from agriculture, that could be a notable omission since this sector comprised twenty-eight per cent of India's total emissions in 1994).

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India's Strategy to Tackle Climate Change and Impact of GHG:

India's strategy for try temperature change whereas following development is about come in its National Action set up on temperature change (NAPCC), discharged in 2008. It includes a target to scale back the emissions intensity of India's economy (per unit of GDP) by twenty per cent between 2007-08 and 2016-17, additionally articulated within the Eleventh 5 Year set up (2007-2012). In 2009, India additionally committed to reducing the country's emissions intensity by 20-25% by 2020 from a 2005 baseline. By itself, Indian business had already reduced its emissions intensity by associate calculable 17.6% between 1990 and 2005 because it became a lot of productive. The initiative identifies eight core "national missions", that cope with mitigation of greenhouse emissions that are causing climate change as well as adaptation to climate change effects and playing detrimental role to mitigate climate change and reducing GHG:

- National star Mission
- National Mission on increased Energy Efficiency
- National Mission on property Habitat
- National Water Mission
- National Mission for Sustaining the chain of mountains Eco-system
- National Mission for a inexperienced India
- National Mission for property Agriculture
- National Mission on Strategic data for temperature change.

Globally all enterprises have three forms; initial will be named as individual owning (usually managing at own while not abundant cooperation or help of others). The second enterprises is in hand by a gaggle of householders, operating along below some style of partnership agreement. and therefore the last one is in hand by impersonal owner – the corporation (such enterprises area unit massive one and supported numerous types and degrees of claims upon the business). the primary two forms area unit basic and represent the non-public relationship of a person or cluster of men, however the third kind is relatively trendy invention, separates the owner or homeowners from the business associated brings into being an impersonal, intangible issue - an organization - within which the nominal possession is unconditional. purpose of mention worthy here that initial two forms aren't cathartic abundant GHG whereas the third one being massive is answerable for emitting a lot of GHG relatively.

In India all three varieties of enterprises area unit on the market and tributary to the national development and further as GHG. Like different countries it's continues to be suffered by the impacts of temperature change, and presently Indian businesses that specialize in India greenhouse emission Programme to manage their carbon footprints. temperature change is enjoying terribly role and currently as a reality it's inflicting coastal flooding, erratic precipitation, heat waves and increased ice mass melting within the mountain range area unit few to count.

Entrepreneur and GHG:

Corporate sector has to play a greater and more proactive role in mitigation and adaption and has to manage 14% of country's GHG emissions. It became more important when the enterprises have increased many folds and are increasing day by day to achieve 10% developmental growth in coming decade. Experts says that aggressive measures by entrepreneurs/businesses tycoons will remain the pivot for sustained action on climate change and *India Greenhouse Gas (GHG) Programme* is one such initiative which provides businesses a standardized method to measure and manage their emissions. This initiative has been launched in 2013 by the World Resources India (WRI), an NGO. The Energy and Resources Institute, a think tank, and the Confederation of Indian Industry (CII), an industry body-the initiative provides businesses with technical knowhow to measure their emissions, identify reduction opportunities, establish short and long-term reduction goals, tracks their progress based on protocol as per global standard etc.

A World Bank study estimates that developing countries like India will need between US\$70 and US\$100 billion per year through 2050 to meet current and future climate adaptation needs. India's current spending is approximately US\$4.4 billion, a huge shortfall that underscores how Asia's third largest economy is poorly equipped to overcome its adaptation challenges. With this huge shortfall it is very difficult to cope the situation and manage GHG emission. Another study conducted by *Central Research Institute for Dryland Agriculture (CRIDA)* has highlighted how climate change has already directly devastated over 27% of India's land mass with potential ramifications for communities, businesses and the country's development. Oxfam, an international NGO, predicts that climate change will inevitably hurt crop production, so hunger will worsen and incomes will be disrupted around the world.

According to Vivek Adhia, Senior Associate with WRI India's Climate and Energy Programme, "The programme assists India's corporate sector in achieving emissions reductions and improving operational efficiency. It brings in a mix of internationally consistent tools, standards and guidelines along with hands-on country-specific and locally relevant industry knowledge. Our primary focus is driving profitability with businesses increasingly looking at tangible benefits and impacts of GHG management."

Under the NAPCC, energy efficiency regulations and policy measures such as the *Perform Achieve Trade (PAT) Scheme* (which is expected to facilitate roughly US\$5.4 billion in efficiency investments), and regulated carbon dioxide emissions in the telecom and aviation sectors are bringing tangible changes.

Still, the wide disparity which exists regarding the capacity of Indian companies to respond to climate change makes things worse, say experts. While some sectors—such as cement and steel—have managed to control their GHG emissions, and are incorporating low-carbon planning into operations and product development, others like power generation lack innovative, industry-specific inputs in terms of technological, regulatory, and financial support to get to the same level of operational efficiency. And there is hardly any movement in this direction in India's myriad micro, small and medium enterprises.

WRI has found that while Indian businesses recognize the incentives of sustainable business practices, they are challenged by a lack of uniformity in GHG measurement guidelines and a national benchmarking system. The lack of clear policy and regulatory directives, limited access to clean technology, the absence of methods for foot-printing data and inadequate institutional capacity together act as constraints on the ability of middle management to measure and manage GHG emissions, the NGO suggests.

Exponential growth in India, poised to become the world's third largest economy by 2025 after the US and China, will require accelerated action on emissions. In a business-as-usual scenario, an upward spiral in the demand for resources will simultaneously raise the country's dependence on oil and coal imports. Electricity generation will need to be ramped up to meet increasing industrial and residential demand leading to a corresponding increase in GHG emissions, unless steps are taken urgently.

According to Adhia, promoting profitability and environmental sustainability could be a fine balancing act in a developing country like India which could be achieved by increasing the efficiency while using resources, consumption should be reduced by adopting more recycling and reuse of existing resources, and accelerate the adoption of clean technologies with an objective to optimize life cycle cost. In this context, Uday Gupta, Managing Director, Mahindra Sanyo Special Steel, says on GHG programme, "We've been closely working in the area of carbon foot printing through capacity building, understanding risks and opportunities, exploring mitigation steps and collaborating in the supply chain. The interconnectedness of business and climate change can't be overlooked." According to Santanu Roy, General Manager Corporate Planning at Gas Authority of India Limited (GAIL), stressed emphatically to build more awareness on climate change related risk to the Indian corporate sector, the programme can enhance its engagement with the government and regulatory bodies.

Experts of different fields have been agreed that Initiatives which develop an internationally consistent and locally relevant GHG measurement and accounting framework are the need of the hour and the strength of the programme lies in its synergy with key organizations and other stakeholders which ensures a consolidated response and added value, rather than a duplication of on-going initiatives. The participation of many government departments and representatives from the ministries of Finance, New and Renewable Energy, Environment, Forests and Climate Change, the Bureau of Energy Efficiency and NGOs and people working at grassroots level should come forward on the policy round tables organized by the programme gives it further heft. Nitin Pandit, head of WRI in India, states that with the voluntary participation of over 30 responsible Indian businesses, the GHG programme already manages over 14% of India's carbon emissions and the number is over 35% if only industrial and electricity emissions counts. The rapid adoption by industry shows the immense potential of the programme and how valuable its tools and processes are ensuring that India moves toward a greener economy.

How GHG Emission can be Reduced: Some Measures:

- Making substantial inroads into India's fast growing greenhouse gas emissions will require major transformations in the energy sector.
- Policy and financial support must find ways of catalysing massive deployment in renewable energy, a broad and rapid uptake of energy efficiency opportunities, and a shift to higher efficiency coal plant to lessen the impacts of the country's planned expansion in fossil-fuel based capacity. These measures also have strong local and regional environmental co-benefits, and so align well with India's development priorities.
- The non-commercial energy sector is very large in India, and is characterised by the burning of biomass. This not only has major local health impacts but the release of 'black carbon' (or soot) also has important regional climate-forcing effects. A shift to cleaner cooking fuels could bring major development and climate benefits for India.

- Estimates of the incremental investment costs associated with shifting India onto a low carbon pathway vary significantly. It is clear, however, that delivering major transformation in the energy sector could very feasibly require tens of billions of Euros annually out to 2030.
- Several of the National Missions under India's National Action Plan on Climate Change provide a basis for policy measures targeting renewables – especially solar energy – and energy efficiency.
- India's target of 20 GW of installed solar capacity by 2020 is highly ambitious. Success in meeting this target will require international collaboration in technology development, support for development of a local manufacturing base and innovative financial mechanisms to enhance its commerciality.
- A number of key policy interventions are planned to boost energy efficiency activity, targeting large industrial users, small and medium-sized enterprises and households.
- India has signaled a policy intent to encourage a shift to cleaner transport modes and fuels, while in the forestry sector it is pursuing an aggressive program of reforestation under the National Mission for a Green India.

GHG Inventory System: New Invention:

A new institutional structure for GHG inventory and management would be useful at the national level. This will ensure a systematic approach to measure the impact of the mitigation policies and actions. Implementing such a system will be a challenge, as there is a lack of activity data and specific emissions factors. The interim report of the low carbon expert group suggests that these challenges can be overcome by collating activity data from various ministries, departments, and industries; performing quality assurance and control checks routinely; commissioning surveys to ascertain data gaps; developing emission factors for key emission sources; identifying uncertainties; and regularly reviewing the estimates (Planning Commission, 2011a).

GHG Mitigation in India: An Overview of the Current Policy Landscape:

1. A National Greenhouse Gas Inventory Management Authority to track the trends of GHG emissions from all sectors of the economy at national, state, district, and point-source levels. This authority should be housed under INCCA but operationalized under the Ministry of Environment and Forests.
2. A National GHG Inventory Management System for archiving, updating, and producing information on activity leading to GHG emissions or removals. The system would produce the trends of emissions or removals by sector at national, state, district, and point-source levels.
3. Designing mechanisms for voluntary disclosure of GHGs from installations managed by Public Sector Undertakings (PSUs)/corporates and from medium-scale enterprises to track the impact of their energy efficiency measures or GHG mitigating measures on their annual GHG emissions.

Although it remains to be seen how these institutions will be organized and whether they can effectively implement the GHG inventory and management system, some initial work is underway. Other parallel initiatives are also underway. For example, in early 2014, WRI India, the Confederation of Indian Industry (CII), and TERI established a voluntary industry-based platform with 27 of the country's largest companies to share best practices on GHG accounting.³⁷

II. STRATEGIES RESPONDING TO CLIMATE CHANGE BY OVERSEAS ENTERPRISES

Following are some overseas enterprises which formulated strategies to cope climate change and proved/proving fruitful:

Apple Inc.

Before going in detail about Apple, it is important to clarify the meaning of Inc. Inc. is the abbreviation for incorporated. An incorporated company, or corporation, is a separate legal entity from the person or people forming it. Directors and officers purchase shares in the business and have responsibility for its operation. Incorporation limits an individual's liability in case of a lawsuit.

Apple was founded by Steve Jobs, Steve Wozniak, and Ronald Wayne on April 1, 1976, to develop and sell personal computers. It was incorporated as Apple Computer, Inc. on January 3, 1977, and was renamed as Apple Inc. on January 9, 2007 and shifted its focus towards consumer electronics. Apple Inc. (commonly known as Apple) is an American multinational technology company with its' headquartered in Cupertino, California, designs, develops, and sells consumer electronics, computer softwares, and online services.

Apple is the world's second-largest information technology company by revenue after Samsung Electronics, the world's largest technology company by total assets, and the world's third-largest mobile phone manufacturer. In 2014, in addition to being the largest publicly traded corporation in the world by market capitalization, Apple became the first U.S. company to be valued at over US\$ 700 billion. As on July 2015, Apple employs 115,000 permanent full-time employees; maintains 453 retail stores in 16 countries; and also operates the online Apple Store and iTunes Store.

Strategies to cope Climate Change and reducing Greenhouse Gases

Apple improve life cycle of greenhouse gases by rethinking and rechecking the existing footprints all the time from design, product, process to facility and reduces upto 7% emissions every year. Since 2012, almost all operations are being run by renewable energy which means fewer carbon emissions in all Apple stores (450 stores worldwide). Apple is using micro hydro power, solar arrays, fuel cell farms, wind power, geothermal power etc.

Apple reduces carbon footprint and contribute to tackle climate change problem and the practices adopted by Apple are reducing the impact on offices, retail stores and products and admit as follows:



i. Strategic Ethics of Apple to Date: *Apple believes true innovation must consider everything.* This tag line is self-explanatory and showing Apple's passion for innovation beyond the products and reflects this commitment in practices. As part of continuing mission to leave the world better than we found it, Apple is partnering with *The Conservation Fund* to protect and create the type of forests using for packaging. It has also developed a renewable micro-hydro project to provide power to data center in Prineville, Oregon and building a solar farm in China to offset energy used in offices and retail stores. Apple believes that it is their responsibility to make sure that while creating beautiful products, they are also taking care of the beautiful planet i.e. mother earth.

ii. Apple don't want to debate climate change, want to stop it: Apple understand that making as many products as we do have a significant impact on the environment. Carbon footprint is something about which they are always aware of, and it's something Apple is always working to address. It has found many ways to use energy and materials more efficiently in facilities, to get energy from cleaner sources, and to design some of the world's most energy-efficient electronic products. In fact, all product lines don't just adhere to ENERGY STAR standards, they surpass them. And while long way to go on the path of reduction of carbon footprints, the efforts are working. Even though Apple is manufacturing and shipping more products than ever, but the carbon emissions per product have been dropping since 2011.

iii. Not everything can be replaced. So we reuse and recycle: Apple consider it's environmental impact from the earliest stages of design and finding ways to create products that use fewer materials and last longer. The planet has a limited supply of clean water, so we make sure that the manufacturing processes reuse as much of it, as many times, as possible. Apple also help local suppliers to improve quality of re-use water and make it easy and safe to recycle.

iv. Apple leaves some important things out of the products with good reasons on humanitarian grounds: Many substances commonly used in the electronics industry can be harmful to people or the planet. So while designing any product with cleaner, safer materials to reduce and eliminate these toxins. As the suppliers are accountable, so Apple conduct factory audits, test components with independent laboratories, and verify the results in it's own lab. The mission to make sure anyone who assembles, uses, and recycles an Apple product can do so safely.

v. Significant steps have been taken so far and many more to come: For decades, Apple has been working to minimize the impact of company and products on environment. Since it is an ongoing effort, started long ago and in 2014, Apple converted 100 percent of it's U.S. operations to renewable energy, invested in the future of sustainable working forests, and designed several products to be beryllium-free.

Toyota

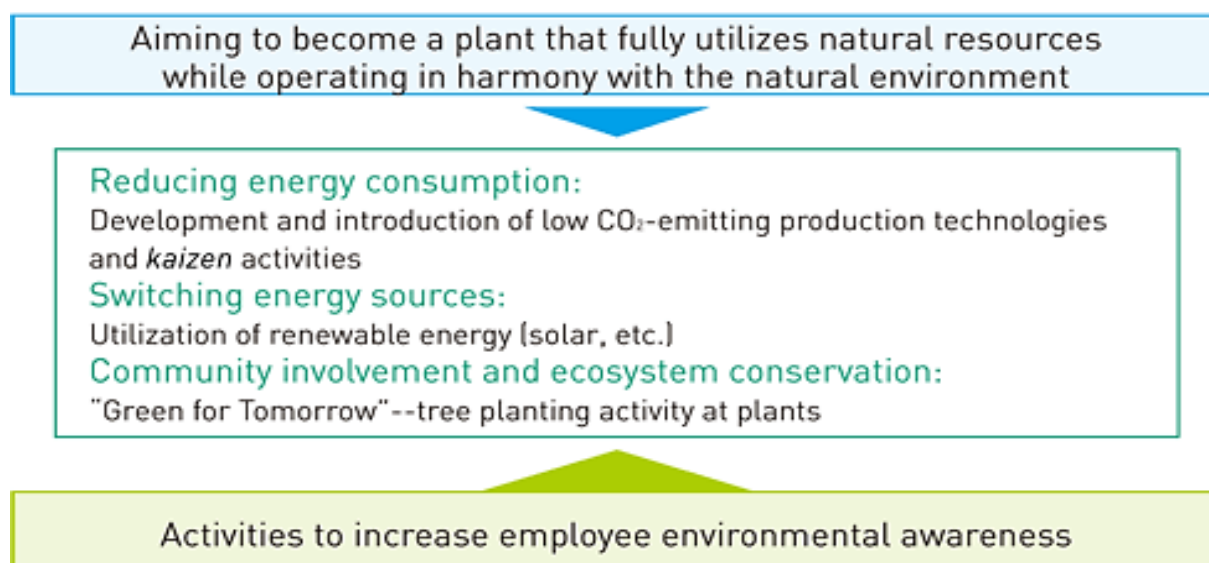
The company was founded by Kiichiro Toyoda in 1937 as a spinoff from his father's company Toyota Industries to create automobiles. Three years earlier, in 1934, while still a department of Toyota Industries, it created its first product, the Type A engine, and, in 1936, its first passenger car, the Toyota AA. Toyota Motor Corporation produces vehicles under 5 brands.

Toyota Motor Corporation is a Japanese automotive manufacturer with its headquarter at Toyota city, Japan. In March 2014 the multinational corporation consisted of 338,875 employees worldwide and, revenue-wise in 2014 it has been ranked eleventh-largest company in the world and it was the largest automobile manufacturer in 2012 (by production) ahead of the Volkswagen Group and General Motors. Toyota is the world's first automobile manufacturer to produce more than 10 million vehicles per year.

Promote Sustainable Plant Activities

Since 2007, Toyota has been pursuing sustainable plant activities, positioning the Prius-producing Tsutsumi Plant as a model plant, to bring the concept of sustainability into monozukuri. With the concept of "*a plant that fully utilizes natural resources while operating in harmony with the natural environment*," efforts are underway towards reducing energy consumption, switching energy sources, enhancing communication with local communities, and protecting ecosystems.

Concept Underlying Sustainable Plant Activities



Toyota introduced low CO₂-emitting production technologies and to conduct energy conservation activities in production areas in 2013 and also introduced renewable energy (photovoltaic power generation) systems in regions such as North America and Asia on the one hand and promoting afforestation activities at plant sites on the other. To date approximately 840,000 trees have been planted at Japanese and overseas sites.

Basic Approach to a Low Carbon Society

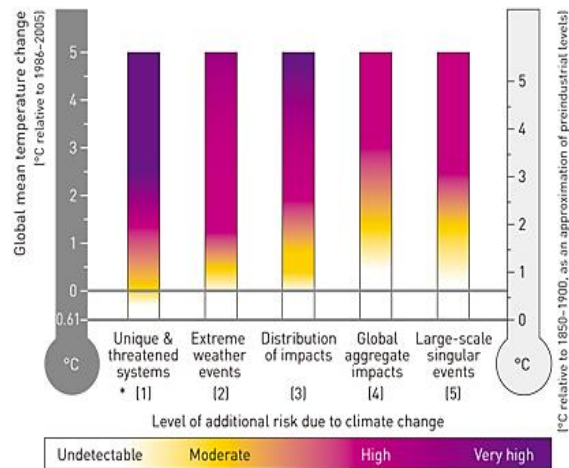
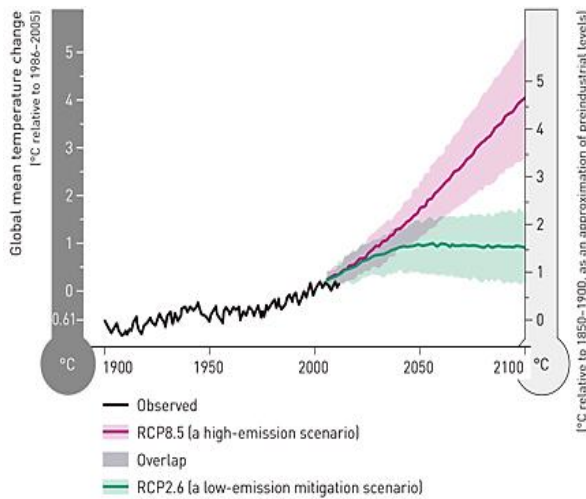
Just following the recommendations of 5th Assessment Report of IPCC in April, 2014 covering scientific assessments, climate change-related impacts, adaptation and vulnerability, and measures to mitigate climate change and gave more stress to reduce GHGs.

The report states that:

- warming of the climate system is unequivocal,
- it is virtually certain that the upper ocean has warmed, and
- it is extremely likely that human activities have been the main cause of the observed warming since the mid-20th century.

Examples of such weather events are increased frequency of heavy precipitation events and increased maximum wind velocity associated with tropical cyclone activity cause damage or delays to Toyota's business operations. Toyota taking action to reduce further global warming as a top priority and is working to reduce greenhouse gas emissions at all stages of the vehicle lifecycle, including development, design, production, logistics, and sales, as well as in all of Toyota's business areas.





Impacts of Climate Change



Source: [Ministry of the Environment, Japan] IPCC, 2014: Summary for Policymakers. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*

* Example of potential risks
 (1) Impacts on vulnerable systems [Arctic-sea-ice and coral-reef systems]
 (2) Events such as extreme precipitation, extreme heat and coastal flooding
 (3) Uneven distribution of impacts in each country and region
 (4) Impacts on biodiversity and the overall global economy
 (5) Large-scale and irreversible changes [sea level rises due to loss of the Greenland ice sheet, and ecosystem changes]

Toyota's Basic Stance Regarding Issues Related to Energy, Climate Change and Global Warming

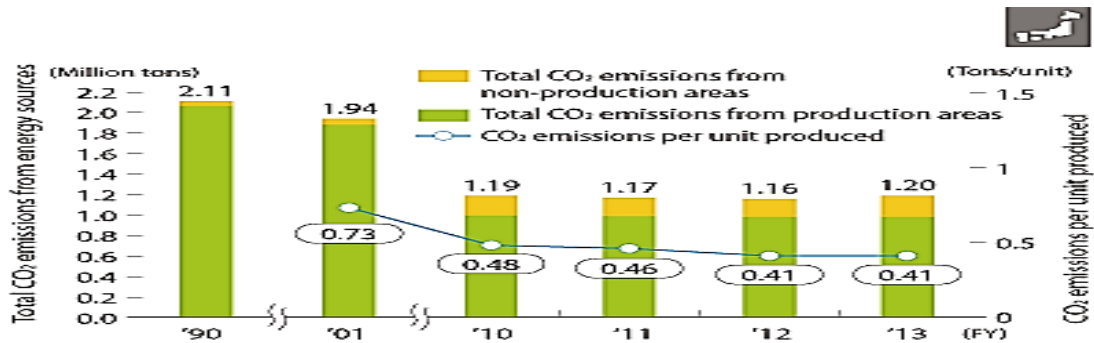
Development and Design	Production	Logistics	Sales
			
<ul style="list-style-type: none"> Development of next-generation vehicles focusing on fuel efficiency improvements, and hybrid and plug-in hybrid vehicles 	<ul style="list-style-type: none"> Promote activities to reduce CO₂ emissions through development and introduction of innovative low CO₂-emitting production technologies, and daily improvement activities Utilize renewable energies considering characteristics of each country and/or region Management of GHG emissions from sources other than energy sources 	<ul style="list-style-type: none"> Promote CO₂ reduction activities by further improving transport efficiency 	<ul style="list-style-type: none"> Conform to the Energy Savings Act and reduce per-unit energy at the annual rate of 1%

CO₂ Emission Reduction Activities (Energy Saving) of Toyota Motor Hokkaido, Inc.

Toyota, aiming to become a leading environmental company is promoting its activities to improve quality at all levels. As a result it succeeded in reducing CO₂ emissions per unit in 2013 by 5.3 percent by promoting no-waste system which resulting as follows:

- In 2013 CO₂ emissions was reduced to CO₂ emissions to 1.29 million tons or less
- TMC has set CO₂ emissions reduction goals that include both production bases and non-production bases such as offices.
- In 2013 production line consolidation and installation of efficient air-conditioning units and chillers reduced annual CO₂ emissions from 1.20 million tons in 1990 to 0.41 tons per unit produced.

As a result, in 2013, CO₂ emissions per unit produced decreased to 0.76 tons (1.6 percent lower than the 2012 level), however 7.84 million tons of CO₂ emissions were produced from increased production volumes (3.3 percent higher than the 2012 level).



* Toyota Motor Corporation

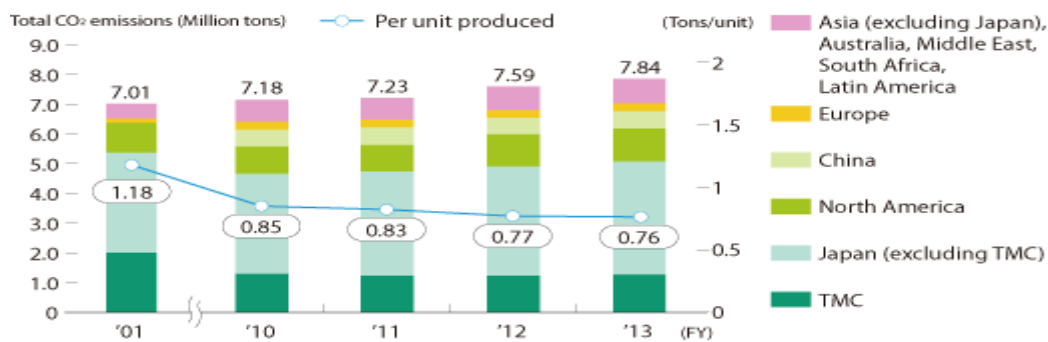
Note 1: For facilities in non-production areas for which FY1990 emissions data is not available, the oldest subsequent data available is used for the graph.

Note 2: Until FY2011, the total CO₂ emissions volume included emissions from production and non-production divisions (excluding the Toyota Biotechnology & Afforestation Laboratory and employee benefit facilities). Beginning in FY2012, the Laboratory was included as a non-production division.

Note 3: The CO₂ emissions were calculated using the Nippon Keidanren's FY1990 CO₂ conversion coefficient.

For more information on the conversion coefficient, please visit the webpage below: <http://www.toyota-global.com/sustainability/environment/data/data28.html>

Trends in Global CO₂ Emissions (from Energy Sources) and CO₂ Emissions per Unit Produced (Stationary Sources such as Plants and Offices)



* 120 companies (TMC, consolidated subsidiaries and other companies in Japan and overseas)
Find out more details

Japan: Companies listed in Groups 1-5 (including sub-subsidiaries; excluding Toyota Tsusho)

Overseas: Production companies and production/sales companies (excluding TMCAP in China)

Note 1: Companies for which FY2001 emissions volumes could not be determined, the oldest subsequent data is used

Note 2: The CO₂ emissions were calculated using the Greenhouse Gas (GHG) Protocol CO₂ conversion coefficient. Please visit the webpage below: <http://www.toyota-global.com/sustainability/environment/data/data28.html>

Promoting Low Carbon and Less GHG Production:

To achieve Toyota's global 5-year plan targets, the latest low- CO₂ production technologies have been adopted in new plants, while daily activities to reduce CO₂ emissions have been implemented in existing plants and contributing as follows:

- In 2008 Toyota Tsutsumi Plant installed a photovoltaic system rated at 2,000 kW (sufficient to provide power for some 500 households). During FY2013, the system generated 2,120 MWh of electricity.
- More focus on CO₂ emissions reduction through energy saving activities
- Reduce CO₂ emissions to 280,000 tons or less in logistics and transport operations
- Change of shipping port
- Promoting renewable energy in all plants
- Promotion of re-cycling based society
- Initiatives Aimed at Reducing Emissions to Improve Air Quality by using latest technologies

Arcelor Mittal

With an industrial presence in 19 countries, 115 million tones production capacity of crude steel and more than 222,000 employees across 60 countries, Arcelor Mittal is the leader in all major global steel markets including automotive, construction, household appliances and packaging, with leading research and development, technology, sizeable captive supplies of raw materials, and outstanding distribution networks.

Being a largest producer of steel in North and South America and Africa, a significant steel producer in the Commonwealth of Independent States (CIS) region, and have a growing presence in Asia, including investments in China and India, Arcelor Mittal is the largest steel producer in the EU, with significant operations in France, Germany, Belgium, Spain, Luxembourg, Poland, the Czech Republic and Romania.

Global challenges and opportunities

- In 21st century world is facing enormous challenges because of increasing pressures on natural resources
- Changing lifestyle in the developed world is compelling everyone to develop/grow more which further responsible for increasing environmental problems including GHGs
- Both issues have a direct impact on businesses, as well as governments, civil society, and individuals

In view of above challenges, steel as a part and parcel of modern life one cannot think build buildings, roads, bridges, railways, cars, and many domestic appliances simply etc. Steel has the potential to be one of the world's most sustainable materials, because it's strong, flexible and can be endlessly recycled. Innovative steel products are helping to reduce carbon emissions in vehicles and buildings, construct smarter cities, and generate renewable energy but it also emits carbon.

Arcelor Mittal being world's largest steel and mining company, has a responsibility to reduce carbon and GHGs from its inception to final use by the consumers. It is developing sustainable development framework at entrepreneur level as well as it should be good for society, good for our stakeholders and good for environment. To achieve mentioned targets following efforts are being made:

- Introduction of energy policy through a framework of good practice which is compatible with ISO 50001 by re-using high-pressure gases (known as flue gases) from the blast furnaces to drive electricity generators.
- Energy savings of \$200 million every year by 2020, compared with 2007.
- Reduction of carbon footprints in all mining operations to less than five per cent
- Support global initiatives to reduce emissions through carbon reduction targets, and emissions trading schemes.
- Calculation and reporting of greenhouse gas emissions from steel plants using the guidelines based on Greenhouse Gas Protocol to Worldsteel Association.
- Since 2013, methane gases is being captured and used to produce electricity in Kazakhstan which avoids the release of these greenhouse gases.
- Follower of the most established frameworks i.e. European Emissions Trading System (EU ETS) in the vital interest of stakeholders.
- Overall reduction in greenhouse gas emissions amounted to 206 million tonnes of carbon dioxide equivalent (CO₂e) in 2014.
- Investment in research and new innovations and more efficient methods to produce steel which reduced 50% emissions in last 40 years.
- Since 2013, new research programme called Low-Impact Steelmaking (LIS) is focusing on some important new approaches to the existing steelmaking process and reducing carbon and GHGs and proceeding toward more resilient world.

Coca Cola

The Coca-Cola Company is an American multinational beverage corporation and manufacturer, retailer, and marketer of non-alcoholic beverage concentrates and syrups, its headquarter situated at Atlanta, Georgia. The company is best known for its flagship product Coca-Cola, invented in 1886 by pharmacist John Stith Pemberton in Columbus, Georgia and at present it has 130,600 employees. At present its product could be found in over 200 countries worldwide, with consumers downing more than 1.8 per day.

Coca cola understands climate change as one of the most critical challenges facing by the planet. Global climate change is happening and human-caused greenhouse gas emissions are a crucial factor. The possible implications of climate change which needs immediate action are on:

- Biodiversity
- Water Resources
- Public Health
- Agriculture

- People
- Communities
- Ecosystems

If these components are affected by climate change then it could have direct and indirect effects on business. Because by harming global agriculture, changing weather patterns could limit the supply or increase the cost of ingredients used in products. Extreme weather could impair bottling plants, disrupt supply chain and affect consumer demand. Perhaps most seriously, climate change could seriously limit water resources. That is why Coca-Cola believes in reducing system's emissions and adapting to climate realities are crucial—for business as well as for a sustainable future by reducing greenhouse gases by setting following targets:

- In 2008, company set the goal of *growing business without growing system-wide carbon emissions* in manufacturing operations through 2015, using 2004 emissions levels as baseline.
- Since then and through 2011, sales volume has increased 35 percent and emissions intensity—the ratio of emissions to sales volume—has improved by 17 percent.
- In 2011, greenhouse gas emissions relating to the system's manufacturing increased by 3 percent compared with 2010—from 5.19 million metric tons to 5.32 million metric tons—and were 11 percent higher than our 2004 baseline.
- Attribute the increase to a 6.2 percent increase in indirect emissions caused by the generation of the electricity.
- Direct emissions from manufacturing—decreased 3.7 percent in 2011.
- Installation of bioethanol sources being used for CO₂ in sparkling beverages and reduced the release of 126,000 tons of CO₂ into the atmosphere
- Introduction of energy efficiency in entire business system and has improved efficiency by 33 percent since 2004.
- Regulating by water stewardship policy of the company is committed to reduce operational water footprint by 75% and relative water use by 40% by 2020 by raising awareness of water sustainability, tackle water use in supply chain and continue protecting watersheds.

Energy and Climate Change:

For Coca-Cola, carbon management is a strategic priority and see business benefits resulting from ongoing investment in energy efficiency and low carbon technologies. By 2020, it aims to reduce relative emissions from operations by 40%. Following leadership role in tackling climate change by:

- increasing our energy efficiency of our operations
- switching to cleaner energy sources
- reducing emissions in our value chain
- championing low-carbon technologies
- promoting awareness and action
- adapting to climate change
- Recycling awareness and education campaigns, as well as anti-littering and clean-up initiatives.
- To reduce indirect emissions HFC-free coolers (hydrofluorocarbon) as energy management device has been installed.

Tata Group

Founded by Jamsetji Tata in 1868, the Tata group is a global enterprise, headquartered in India, comprising over 100 independent operating companies. The group operates in more than 100 countries across six continents, with a mission *'To improve the quality of life of the communities we serve globally, through long-term stakeholder value creation based on Leadership with Trust'*. Sixty-six percent of the equity share capital of Tata Sons is held by philanthropic trusts, which support education, health, livelihood generation and art and culture. In 2014-15, the revenue of Tata companies, taken together, was \$108.78 billion. These companies collectively employ over 620,470 (2015) people.

Each Tata company or enterprise operates independently under the guidance and supervision of its own board of directors and shareholders. There are 30 publicly-listed Tata enterprises with a combined market capitalisation of about \$134 billion (as on 31 March 2015). Tata companies with significant scale include Tata Steel, Tata Motors, Tata Consultancy Services, Tata Power, Tata Chemicals, Tata Global Beverages, Tata Teleservices, Titan, Tata Communications and Indian Hotels.

Tata group continue to encourage companies to:

- Demonstrate responsibility and sensitivity to biodiversity and the environment in which they operate by being proactive to conserve, restore and enrich it systematically and continuously
- Comply with regulations relating to environment, constantly upgrade technology and apply state-of-the-art processes and practices with institutional arrangements that will comprehensively address larger issues and goals on climate change and global warming
- Continually illustrate performance in preventing pollution, ensure the optimum use of resources, and minimise harmful impacts of products and production processes, materials movement and its delivery throughout its supply chain
- Create sustainable livelihoods and build community through social outreach programmes in health, education, empowerment of women and youth, employee volunteering, that can be measured in terms of their having more lasting benefits, serving a larger national or regional purpose, and also making it more meaningful to all involved in the endeavour
- Find ways to enhance human, social, natural capital as complementing financial growth of the enterprise with explicit goals and processes to sustain the effort

Tata Group, Climate Change and Greenhouse Gas Emission:

In wake of climate change, Tata group understands the challenge and making it integral part of processes from concept to execution. The broad idea is to develop a common approach to the critical questions confronting the group's businesses on the environmental front, and formulate policies that can deal effectively with issues that impact climate change.

Across the Tata group, there has been considerable progress in terms of developing abatement strategies, increasing awareness and determining best practices. Several new business opportunities have emerged, such as green power from Tata Power, nanotechnology applications from the innovation centre of Tata Chemicals and the supply of special steel for offshore wind farms by Tata Steel Europe. A climate change policy has been articulated at the group level. The carbon footprint of the 50 largest Tata companies has been estimated and their carbon management strategy articulated and early estimates indicate that specific emissions can be brought down by 10-15 per cent by abatement measures.

Strategic collaboration and engagement is undertaken with institutes (such as IISc and IITB), forward-thinking companies and global organisations (such as UNEP/UN Global Compact Caring for Climate Initiative) and concentrate on following:

- Evolving knowledge on climate science.
- Collaborative projects on sustainability (greening Bombay House, electric vehicle systems, green townships, improvements in steel processes, etc).
- Generating knowledge and sharing best practices for evolving a strategic tool for climate change
- Exploring technical solutions for a low-carbon economy.
- The group is a part of the Prime Minister's Committee of Low Carbon Strategies for India.
- Adaptation of consumption-based approach and to incentivize low-carbon technology.
- Use of fossil fuels, non-renewable resource.
- To sustain a high quality of life for generations to come by concentrate on the products they make and the way they manage their operations.

III. CONCLUSION

India's climate mitigation policy landscape is active and ambitious. It is essential, however, that these plans be operationalized and implemented on the ground. According to the Planning Commission's working group (for the 12th 5-year plan) on climate change, the "optimal way of achieving overall climate change goals would be to integrate the objectives of the NAPCC and the domestic mitigation goal in the development strategy of the respective sectors. In the area of adaptation, this calls for specific policy initiatives across a wide variety of sectors, particularly in the areas of agriculture, water, health, coastal management, forests and other ecosystems, energy including renewable energy, and infrastructure and climate change assessment." The government of India has estimated that Rs 2.3 trillion (US\$ 37 billion) would be needed to fulfill the objectives of the eight national missions of NAPCC in the 12th 5-year plan. While it is important to have access to climate financing and technology, a proactive approach to removing some of the implementation barriers to these plans is necessary. This calls for better vertical integration at all governance levels (national, state, and local) and horizontal integration of concerned line ministries and departments. A systematic approach for tracking the progress and impact of mitigation actions by way of a new institutional structure for a GHG inventory system at corporate, city, state, and national levels is an important way forward to ensure effective and integrated planning and implementation of India's low-carbon development plans. The GHG inventory system, for example, could

be designed to track both GHG emissions and other related key impacts including water, energy, and air pollution to facilitate an integrated approach.

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