

India's Initiatives on Environmental Safeguarding- Sustainability

Mainak Mukherjee¹, Surajit Mondal²

¹M.Tech Energy Systems, University of Petroleum & Energy Studies, Dehradun India

²Research Scholar, University of Petroleum & Energy Studies, Dehradun India

E-mail address: mainakmukherjee31@gmail.com

Keywords: Sustainability, Climate Change, Environment Management, Energy Systems, Energy Conservation

ABSTRACT. The report on sustainability initiatives across key sectors in India is written to highlight the current status of existing initiatives and also the future scope of initiatives that would be taken across key sectors in India. The report will showcase macro level information.

The general question in travelling in mind would be why sustainability is growing so much in prominence? Quite likely the substitute answer would be to combat the climate change and safeguard the environment.

The reason for choosing to write the report on Sustainability would be to increase the prominence of the initiatives that would reach out to various sectors, and hence can benefit the overall Indian sectors as a whole. Since climate change is a global issue, India's initiatives against climate change in the form of various mitigation and adaptation would count against this climate change as a whole.

1. INTRODUCTION

Sustainability in India is a challenge owing to immense change in the climatic conditions. Climate Change is a serious global environmental concern. It is primarily caused by the building up of Green House Gases (GHG) in the atmosphere. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture. Global Warming is a specific example of the broader term, "Climate Change" and refers to the observed increase in the average temperature of the air near earth's surface and oceans in recent decades. Its effect particularly on developing countries is adverse as their capacity and resources to deal with the challenge is limited.

Ever since industrialization occurred, there has been an increase in the burning of fossil fuels to meet the high energy demands. The use of such fuels causes emission of carbon dioxide (CO₂) and other greenhouse gases which lead to global warming. One way to alleviate this is to reduce the use of such fuels. An alternative method is to capture and store the emitted CO₂ to stop it from polluting the atmosphere. Over the last 100 years, global mean surface temperature has increased by $0.74 \pm 0.18^{\circ}\text{C}$. Amongst many engineering Geoengineering refers to modification of a planet's natural environment through various technologies to counter-act anthropogenic climatic change. CO₂ emitted from thermal power plants and CO₂ intensive industries is captured and stored in various reservoirs to lessen their polluting impact on the atmosphere. Carbon capture and storage (CCS) can provide an excellent transition from conventional to non-conventional methods of generating power, such as solar power, wind power, geothermal energy.

The key environmental challenges in India have been sharper in the past two decades. Climate change is impacting the natural ecosystems and is expected to have substantial adverse effects in India

2. BRIEF THEORY BEHIND SUSTAINABILITY

In Sustainability mitigation adverts to attempts to reduce or prevent emission of greenhouse gases. Mitigation necessarily mean using new technologies and renewable energies, making existing equipment more energy efficient, or changing management practices or consumer behavior. Protecting natural carbon sinks like forests and oceans, or creating new sinks.

Adaptation is making appropriate adjustments in existing nature and therefore requires a blended effort of technology and capital. Effective adaptation is driven by both policy and investment issues into the planning and decision-making processes. No one stop solution will adequately address effective adaptation. There are inbuilt uncertainties in the timing and magnitude of climate change.

Since global warming is the major challenge for our global society today. There is very little doubt that global warming will change our climate in the next century. Now there are international political solutions. Funding for developing cheap and clean energy production must be increased, as all economic development is based on increasing energy usage.

3. INITIATIVES IN INDIA

Self-Driven

Voluntary initiatives adds to an organizations both cost and energy saving measures. They are largely varying from renewable energy (RE) utilization to adopting measures in energy efficiency techniques.

With the increase in efforts against climate change, shifting into renewable energy is one of the most desirable and convenient option. Indian government had started its specific ministry “Ministry of New and Renewable Energy (MNRE), in 1992. Though this new name “MNRE” was adopted only in 2006.

However renewable energy is not the only option for combating climate change. Energy efficiency also plays a very vital role in saving energy and controlling emissions. Almost all industries are now undertaking measures to save energy and to control emission. Be it government or private concern, energy saving measures are highly involved. A separate government organization was formed in 2002, “Bureau of Energy Efficiency” (BEE) with a primary objective of reducing energy intensity across industries in India.

Governmental Initiatives

Various governmental organization, Public sector units (PSU), private firms are clubbed together under common goal of climate change mitigation and adaptation initiatives. From governmental driven schemes to international mechanism, most organizations are following norms and many of them are also taking up self-propelled initiatives.

India is the 5th largest power generator and also the 5th largest wind energy producer in the world. India is expected to install 20,000 MW of solar power by 2022. Economic growth, increasing prosperity, a growing rate of urbanization and rising per capita energy consumption has widened access to energy in India. The Government of India (GoI) has set a capacity addition target of 30 GW, which will take the total renewable capacity to almost 55GW by the end of 2017. This would include a 15 GW from wind power, 10 GW from solar power, 2.9 GW from biomass power and 2.1 GW from small hydro power.

The government has created a liberal environment for foreign investment in renewable energy projects. The establishment of a dedicated financial institution – the Indian Renewable Energy Development Agency, makes for renewed impetus on the promotion, development and extension of financial assistance for renewable energy and energy efficiency/conservation projects.

4. SUSTAINABILITY INITIATIVES

Renewable energy would elaborate about the various solar, wind, bio fuel, and small hydro initiatives taken up by companies under various sectors.

Energy efficiency would detail about the various energy conservation techniques from waste heat recovery devices, to power factor improvement, energy audits that are being taken up by organizations.

Table: 1 Thematic representation of Initiatives across sectors in India

Sectors	Voluntary Initiatives				Corporate Social Responsibility				Governmental Initiatives				International Mechanisms			
	RE: Solar	RE: Wind	RE: Biofuel/ Mass/Alt Fuels	EnCons	RE: Solar	RE: Wind	RE: Biofuel/ Mass/Alt Fuels	EnCons	RE: Solar	RE: Wind	RE: Biofuel/ Mass/Alt Fuels	EnCons	CDM			
Power	Y	Y	-	Y	Y	Y	Y	Y	Y	-	-	Y	-	Y	-	-
Iron & Steel	Y	-	-	Y	Y	-	Y	Y	-	-	-	Y	-	Y	-	-
Oil & Gas	Y	Y	-	Y	-	Y	Y	Y	Y	-	-	Y	-	Y	-	-
Information Technology	Y	-	-	Y	Y	-	-	Y	-	-	-	Y	-	-	-	-
Automobile	Y	Y	-	Y	Y	Y	Y	Y	-	-	-	Y	-	-	-	-
Cement	-	Y	-	Y	-	Y	-	Y	-	-	-	Y	-	-	-	-
Pharmaceuticals	Y	-	-	Y	Y	-	-	Y	-	-	-	Y	-	-	-	-
Chemicals	Y	Y	-	Y	Y	Y	Y	Y	-	-	-	Y	-	Y	-	-
Hospitality	-	-	-	Y	-	-	-	Y	-	-	-	Y	-	Y	-	-
Heavy Engineering	Y	-	Y	Y	Y	-	Y	Y	-	-	-	Y	-	-	-	-
Financial	Y	-	-	Y	Y	-	-	Y	-	-	-	Y	-	Y	-	-
Construction	Y	Y	-	Y	-	Y	-	Y	-	-	-	Y	-	-	-	-
Coal Mining	Y	Y	-	Y	Y	Y	-	Y	-	-	-	Y	-	-	-	-
Aluminum	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	Y	-	-	-	-
Railways	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	Y	-	-	-	-

Adaptation would detail about the various adaptation measures like rain water harvesting, water management, strengthening of existing infrastructure.

Resource conservation would detail about few of the initiatives to save the existing and ways how the organizations are reusing the existing sources.

The general emphasis is largely on solar and wind, and very less work is done on the alternate fuels, and small hydro sources. Though small hydro has its sets of limitation of place, construction and economy, alternate fuels is also a genre which holds a lot of potential. Organizations should pick up quickly on the biomass/Biogas/Bio fuel sources to replace the existing fossil fuels.

Table 2: Existing capacity of renewable energy in India. (All government / Private Initiatives)

Source	Capacity(MW)
Wind Energy	23444
Small Hydro	4055.36
Biomass	1410.20
Biomass from cogeneration	3008.35
Solar	3743.97

Thermal Power Plant Emissions in India

Table 3. Few emission figures from power plants in India

S. No.	Thermal Power Plant	CO ₂ (Thousand ton)	SO ₂ (kg)	NO (kg)
1	Dadri	6413.07	49.32	33.08
2	Rihand	13049.07	83.58	64.49
3	Singrauli	18185.23	74.07	81.71
4	Sipat	6142.32	49.57	31.62
5	Kutch lignite	807.08	39.73	4.16
6	Chandrapur	14938.09	196.53	41.68
7	Dahanu	3812.31	22.37	11.75
8	Kahalgaoon	7319.83	30.77	24.11
9	Simhadri	5979.83	31.95	29.29
10	Neyveli lignite	12443.43	443.44	58.02

5. Common trends observed across sectors in India for sustenance.

Table: 4 Common trends of energy saving across sectors

Sectors	Common Trends
Power	Energy efficiency by promoting energy audit (Boiler efficiency, regenerative burners, VFD in motors, Pump and compressor efficiency), and implementation of renewable energy resources (largely solar). Governmental sectors are heavily increasing scope of renewables.
Iron & Steel	Greater emphasis lies in energy conservation techniques (Waste heat recovery, air preheating, energy saving through fuel replacement), though renewable applications are slowly picking up.
Oil & Gas	Equal amount of emphasis on both audit, conservation (reduction in gas flaring, improving power factor, by installing correction devices) and renewable sources
Information Technology	Energy conservation in buildings (Lighting, HVAC, DG set) through certifications and huge emphasis on renewable in the upcoming years
Automobile	Greater importance given to energy conservation techniques (waste heat recovery devices, VFD's, efficient oil)
Cement	Greater emphasis lies in energy conservation techniques (waste heat recovery devices around air preheaters, kilns, VFD's in motors)
Pharmaceuticals	Energy conservation methods are high, (HVAC systems, lighting, compressors) though renewable applications are coming into picture gradually

Chemicals	High importance given on energy conservation and management,(HVAC systems, compressors) renewable scope is seen increasing
Hospitality	Energy conservation in hotel buildings,(Lighting, HVAC, DG sets) through certifications and emphasis on renewable in the upcoming years
Heavy engineering	High importance given to energy conservation and management (VFD's in motors, cooling towers, pumps, power factor correction devices). Renewable applications are also coming up.
Financial	Energy conservation in office buildings(Lightings, HVAC,DG), through certifications and emphasis on renewable in the upcoming years
Construction	Energy conservation in buildings(Lightings, HVAC, DG's), through certifications and emphasis on renewable in the upcoming years
Coal Mining	Energy conservation techniques are emphasized heavily(conveyors, cranes, Continuous miners), but big renewable plans is pretty much into use
Aluminum	Energy conservation techniques are emphasized(conveyors, cranes, motors) , higher renewable plans are planned out
Railways	Equal importance to both energy conservation (power factor correction devices, regenerative breaking systems, fuel injection systems, Traction and non-traction) renewable applications.

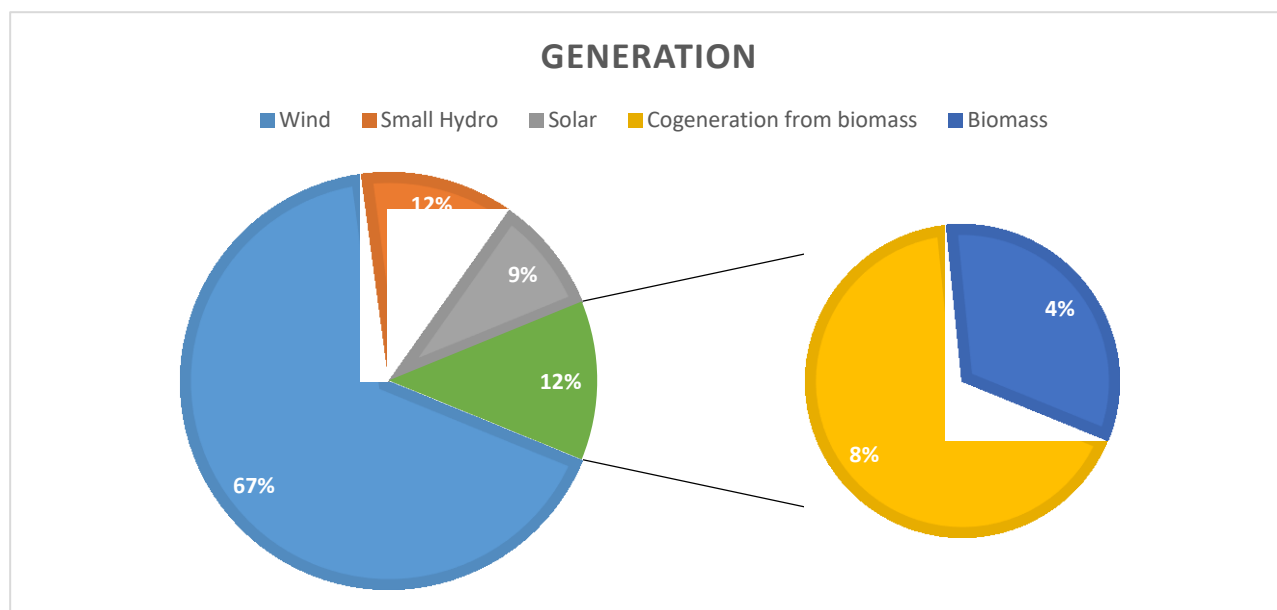


Fig 1: Existing % capacity of renewable energy in India. (All government / Private Initiatives)

Forecasted Carbon Dioxide Emission in India

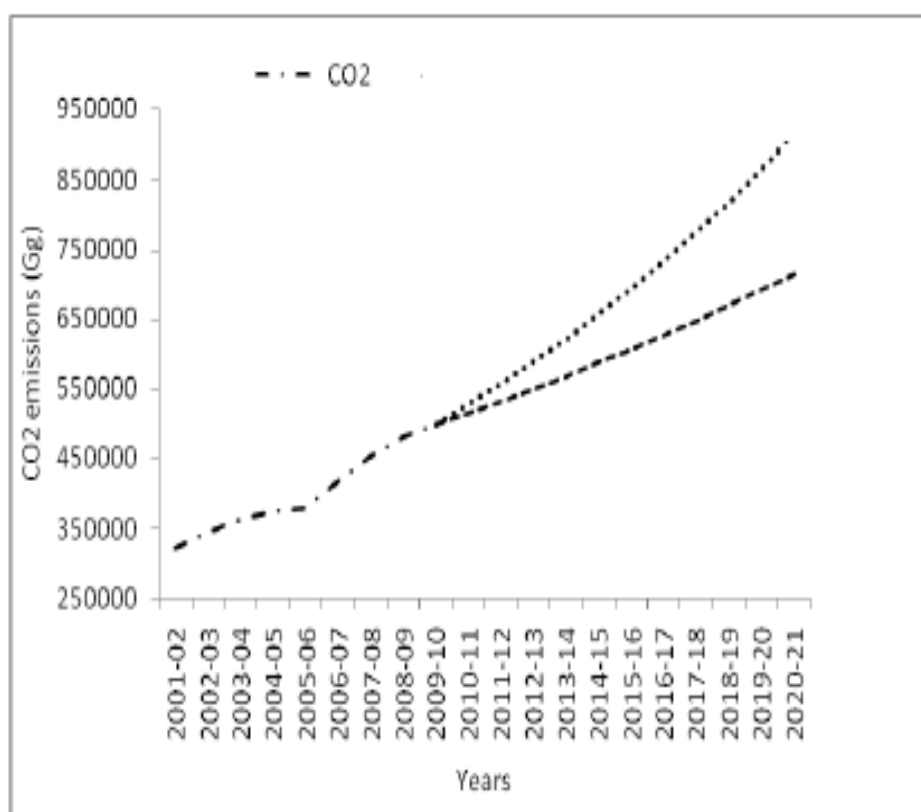


Fig 2. Projection of Carbon Emissions in India

6. Sectoral Analysis for Sustainability in India

Table 5. Highlighted Below are the few amongst the many sustainability initiatives taken up in India across various sectors.

Sectors	Renewable Energy	Energy Efficiency	Adaptation	Resource Conservation
Power	Power companies in India, basically the generation units, have undertaken various initiatives, few of which are voluntary and few government driven. Government organization NTPC, has been working on the front of solar, Small hydro, biomass, and also plans to take up projects on biodiesel, MSW to energy. Private concerns like Tata Power have also been investing on Solar, Wind and small hydro. Similarly companies like Reliance Power, Adani Power and Torrent have already invested in Solar and Wind.	Energy efficiency is a key issue that requires to be addressed, hence Power companies are taking active steps in ensuring proper usage of power and minimize wastage. Various techniques adopted across most power companies are installation of drives to motors, reduction of stack SPM in using flue gas conditioning technique, VFD's in pumps, fans and blowers, Electrostatic precipitators for emission control, Efficient NOx burners, Proper coal settling pits, enhanced HVAC systems, are few mentionable techniques	The most common adaptation techniques amongst power companies are strengthening of transmission and distribution tower and lines, strengthening of infrastructure like boilers, cooling towers, conveyors. Rainwater harvesting is adopted by few companies, also ensuring proper storage house maintenance.	Various resource conservation techniques are using of air preheaters, using of electrostatics precipitators, carbon dioxide scrubber and regenerators.
Iron & Steel	The Iron and Steel Sector companies have also started using renewable technology. Tata Steel has already implemented Solar PV on site, SAIL also have introduced Solar application at their sites and is also utilizing bio-diesel, Jindal Steel has also been pushing the	Iron and Steel industries are highly energy intensive hence energy saving becomes a primary objective. The most common techniques followed in Iron and Steel industries are, Using of regenerative burners for	The most common adaptation techniques amongst Iron & Steel companies are strengthening of transmission and distribution tower and lines, strengthening of infrastructure like blast furnace, Rainwater harvesting is adopted by few companies.	Amongst Iron and Steel industries slag disposal, blast furnace gas and dust reused in sinter plant, BOS dust reuse. Waste water usage, and pre heaters in furnaces.

	peddle on Solar technology and is setting up plants in Rajasthan	lean gas at hot strip mill, Coal moisture control, Coke dry quenching, recovery of flue gas, Heat recovery from sinter plant Heat recovery from slag, Blast furnace gas recycle.		
Oil & Gas	Oil & Gas companies have been taking initiatives on renewable front. IOCL have worked on solar, ranging from solar plants, rooftop installations and even solar lanterns. Simultaneously IOCL have also installed wind farm. ONGC too have shown great intent in renewables, with solar applications. From campus, buildings, townships. ONGC is also investing in wind energy, and they already have an existing wind farm in Gujarat. ONGC has pushed the envelope with offshore wind farm project. Apart from this, HPCL has also implemented in wind energy and has commissioned it in Rajasthan.	Oil & gas sector energy conservation techniques are broadly classified into green buildings, energy auditing , HVAC systems monitoring, Techniques to reduce gas flaring,	In this sector, few of the common trends observed are rainwater harvesting, promotion of carbon neutral event, reinforcing rig infrastructure, and proper maintenance of pipelines.	Oil & Gas has spill prevention techniques, proper discharge of oil, providing safe drinking water. Certain portions being used for by product manufacture.
Information Technology	IT sector in India are rapidly developing trends in introducing renewable energy for consumption IT is one of the most promising sectors who are working and implementing plans and targets. Infosys has made huge commitments, as it plans to use renewable energy as its primary source. From implementation of solar panels across its campuses, and investment plans Infosys is laying a very strong foundation for renewable energy. Amongst others Wipro has largely taken initiatives too. Solar PV installation, and plans to increase their total consumption up by 23% by 2015. TCS has also implemented Solar rooftops and plans to increase capacity.	IT sector being a less energy intensive compared to heavy engineering, power, iron & steel, yet promoting energy efficiency is key. Commonly the buildings are LEED certified. Proper maintenance of DG sets, energy efficient lighting fixtures, proper luminance, HVAC system monitoring.	Most IT companies are promoting green technology, and is raising awareness. Most of the IT company buildings are LEED certified or IGBC. Generally all buildings are earthquake resistant up to certain scale. IT companies have also encouraged change in environment policy and have adhered to various changing rules pertaining to e-waste management	E-waste is a big issue that is addressed in various forms. Also paper waste, food waste are given to MSW to energy plants.
Automobile	Automobile sector in India, have already started harnessing renewable energy. Ashok Leyland with an established wind farm, uses as an alternative. Maruti Suzuki plant at Manesar has installed solar and is also planning to increase its capacity for larger application. Tata Motors has also invested in developing wind plant. Mahindra & Mahindra have installed solar plant and is also working of bio-diesel research.	Auto Industry is also an energy intensive sector. Most corporate buildings are LEED certified and IGBC certified, HVAC systems and cooling towers maintenance. In the manufacturing plant, using of brushless DC motors, electric traction technology, waste heat recovery devices, and LED usage.	Auto companies in India have also raised green awareness campaign and have focused on creating green belt. Water reservoirs and carbon neutral events are majorly conducted out by most auto companies.	Various kinds of waste heat recovery devices, water recycling, air preheating, oil circulation are carried out.
Cement	Cement Industries in India are working towards including renewable energy application in their processes. Companies like ACC are planning to increase their renewable capacity up to 9%, as ACC currently has 3 wind farms in Tamil Nadu, Maharashtra and Rajasthan. Lafarge cement too is advancing in renewable energy application using biomass in their processes. RAMCO cements too are having wind farms installed which are	Cement sector is highly energy intensive, and hence a lot of efforts are made to promote energy efficiency techniques, close circuiting of cement mills, insertion of coal mill, optimization of fuel mix, and waste heat recovery from preheater, clinker cooler, kiln, motor efficiency at primary and secondary crushers.	Cement industries in India have also promoted green initiatives and have also worked in favor of policies on environment. Green belt, water management are initiatives. Along with this strengthening infrastructure of Vertical mills, grinding units and CPP.	In cement industry, using of air preheaters, waste heat recovery devices, water recycling, are common techniques.

	helping the company cut emissions and reduce dependency on grid.			
Pharmaceuticals	Pharmaceutical companies in India are fast adopting renewable technology as an alternate source for energy usage. Dr. Reddy's Lab has already implemented rooftop solar and is planning to increase their renewable consumption through open access.	Various energy conservation techniques followed in pharmaceutical companies like Dr. Reddy's, Pfizer, Cipla are adopting green chemistry, solvent recovery, water and energy audits, green buildings, HVAC systems.	Pharmaceutical companies in India have also been majorly working on adaptation front. Pharmaceutical companies are extremely crucial as they serve as a lifeline to the society. Storage of raw materials, water and chemicals at proper places during times of crisis is extremely important. Pharmaceutical companies ensure that there is no hindrance in production process and supply.	Reduction of toxicity, varying chemical level, proper catalyst usage, water recycling.
Chemicals	Chemical Industries in India are rapidly adopting renewable technology. Key players have already invested into renewables, Tata Chemicals is planning for wind power installation, also Aditya Birla Carbon has already set up solar PV plant in Rajasthan and is planning for wind plant in Maharashtra.	Chemical industries are energy intensive industries, hence require various energy saving techniques. Few of the common energy saving techniques are improved catalyst usage for efficient reactions, enhanced spray technology, Blowers and Fans with VFD.	Amongst the various chemical companies in India, adaptation initiatives are increasing scope of rain water harvesting, plantation of tree, proper storage of chemicals, reducing harmful releases, by dumping underground or reusing.	As chemicals are extremely hazardous, reusing them is difficult as most of them are reacted components. Water filtration is done by maintaining high levels of precaution.
Hospitality	Hospitality sector in India is one of the most flourishing sectors. Utilizing renewable energy sources is also becoming common amongst this sector. Companies like ITC is utilizing 5% wind energy across hotel business. Similarly Taj Hotels and Palaces are using 6.91% (2013-14) of their total energy from renewable sources.	Various energy saving techniques are followed by companies in this sector. The common point being all buildings are LEED certified, having proper lighting (luminance level), HVAC systems which are being audited time to time.	Indian Hotel Industry has been initiating techniques like water storage, green building certifications, and earthquake resistance.	Waste food, clothes, rubbish are generally disposed of to Waste to Energy plants. Many units have water treatment plant.
Heavy Engineering	Organization falling under this category are highly energy intensive and utilize a huge amount of energy for the purpose of manufacturing. The total dependence is on conventional sources, companies under this sector are now adopting alternatives to save energy. Bharat Forge is now utilizing bio fuels for all its working units. BHEL has also implemented solar plants for its own consumption. Thermax has focused on biomass and waste to energy applications, Punj Lloyd is also working immensely in the solar domain, with solar PV, and Solar powered water treatment plants.	Since there is a huge consumption of energy in this sector, various energy saving techniques are being taken up by these companies. Few of the common applications are like replacing condenser pump with energy efficient pump, installation of better and advanced cooling towers, Introducing VFD's in crane and fan operations, increased use of welding inverters, proper conditioning of motors, Trigeneration, waste heat recovery devices.	Amongst Heavy Engineering industries, strengthening of infrastructure, like boiler units, furnaces, manufacturing units, cables, towers, transmission and distribution lines, water reservoir, green plantation and promoting carbon neutral events.	In heavy engineering, waste heat recovery devices, scrap material reuse are found to be very common.
Financial	Financial companies in India have shown great intent in promoting renewable energy. YES BANK, ICICI bank, HSBC has been working on various clean energy projects, and has also adopted international market mechanisms. Organizations like SIDBI, NABARD have been following the governmental guidelines as well as have supported CDM projects.	Financial sectors are less energy intensive, and hence the energy efficiency is largely concerned around HVAC, cooling tower monitoring, DG set inspection and lighting.	Financial companies in India have been promoting environmental awareness, and is also doing water conservation promotion in public forums, Building certifications, earthquake resistance to high rise buildings are also been taken up.	Financial bodies generate a lot of paper waste. Which are somehow reused for further purposes.
Construction	Recently over the last few decades, real estate business in India has evolved tremendously. Various construction companies have invested highly and now as all sectors are striving towards	Construction sector too is highly energy intensive. A commonly observed energy efficiency measure taken up by construction sector is external walls	Construction sectors major emphasis lies in the changing geological features of soil. The foundation of any building is extremely important owing to earthquake and toxicity levels	Construction companies also tend to give away a lot of wastes, in terms of raw materials, scraps, and unused materials. These can be used as

	usage of alternate resources of energy, construction companies too have started adopting initiatives. House of Hiranandani has adopted the hybrid wind-Solar systems into their working field. DLF India has also been sourcing wind energy and have plants in Gujarat and Karnataka.	being made of hollow blocks, this provides insulation against high day temperature. Again automatic switching of lights, DG set functioning , transformers functioning, line losses control, proper cabling are all energy efficiency techniques.	underground. Measures against earthquake, proper laying down of underground cables, additional attention to building floors below ground levels, water conservation and green belt.	utilities
Coal Mining	Coal mining companies in India have started using renewable energy application in few of their areas. Most key players have already rolled out plans. Coal India limited is planning to invest immensely into solar projects with the help of MNRE. They already have implemented solar projects, and is planning a huge investment. Organizations like Neyveli Lignite has also implemented wind projects in tamil nadu, and are planning solar projects in Rajasthan.	In Coal Mining industry energy saving plays a crucial role. There are various ways by which these companies are saving energy. A common connection amongst all coal mines is the installation of LV distribution lines to prevent from hooking. Other ways like periodic overhauling of engines, and regular inspection of filters, hoses. Usage of DG sets at mining sites is very common hence to ensure proper dispatch DG sets are regularly audited.	Coal Mining industry have been promoting green belt and water harvesting initiatives. Coal mining companies have also taken up initiatives in raising public awareness.	In mines, coal beds comprises methane, which can be used in various industrial applications.
Aluminum	Aluminum industries in India are also plunging into renewable energy implementation. Since Aluminum manufacturing is a highly energy intensive process, hence to supplement the working energy system, renewables are slowly being introduced. Organizations like BALCO (Vedanta) have set up 169 biogas plants in association with CREDA. Organizations Such as NALCO, have started using wind energy and presently has around 98 MW capacity(2014) , also NALCO has started with solar rooftop facilities at their office building and townships	Aluminum being a high energy intensive industry, opportunity for saving energy is high. Various technical processes are seen to be common across both the organizations noted here. These common energy efficiency techniques are replacement of smelter with point feeder prebaked technology, by dry scrubbing in fume treatment plant for emission control, replacing trap in boiler HFO tracing lines, and using VFD in fans for cooling towers.	Aluminum industry have been promoting green belt, environment friendly initiatives and water harvesting initiatives. Aluminum companies have also taken up initiatives in raising public awareness in public forums	Amongst aluminum industries, their wastes are consumed by various other industries like beverage, auto for processes.
Railways	Indian railways has laid a good foundation of renewables, and has implemented various projects. Wind and solar projects are already being installed. Railways is widely supported by MNRE for renewable projects. Indian railways also has started research on alternate fuels like biodiesel, are being worked upon.	Railways is a energy intensive sector, as huge amount of electricity is consumed. There are ways in which energy saving is carried out. Adoption of 3-phase propulsion systems, adoption of static converter , using auxiliary power unit, Installation of power factor correction devices, Regenerative braking system, energy efficient rolling stock technology are few of the energy saving technologies.	Indian railways have also focused on various adaptation initiatives .Rainwater harvesting, water storage and conservation, strengthening of bridges, strengthening of overhead lines, strengthening of infrastructure like stations, workshops, car sheds.	Introduction of bio-toilets, water storage and recycling units, food wastes and other wastes are recycled or used in waste to energy plants.

7. CONCLUSION

Since Climate Change has been such a threatening issue over the last few years, it's high time to take adequate steps in encountering it. Emphasis lies in keeping the global temperature below the 2degree Celsius which was previously set through U.N. conventions, greenhouse gas emissions will have to drop by 40-70% by 2050.

In the first decade of the 21st century, emissions rose by 2.2% per year, for which countries with population and economic growth like China and other parts of the developing world are highly responsible. The U.N. is working toward a far-reaching new global climate pact, to be completed in late 2015 and to take effect in 2020. But the major challenge has been getting rich and poor nations to agree on a plan at a common platform.

Therefore it can be hoped upon that countries would agree to the challenges and would unite together to combat this global threat

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