

Is it the atmosphere we grew up with - Paris 2015

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ABSTRACT: - Our present climate is showing the signs of weather instability, extreme natural disasters and thousands of lives. The cost of climate inaction in dollars and lives lost is continuing to mount. This year's natural disasters were just the beginning and we are handing over this climate to our children, our future generation. Is it the atmosphere we grew up with? The radically changed climate regularly brings unprecedented weather events where many of them are extremely destructive to every corner of the globe. The year 2014-15, we saw several natural disasters around the world, which renewed worries about global warming and related incidents threatening life on our planet. The UN Climate Summit 2015 also known as Paris 2015 aim is to unite all the world's nations in a single agreement on tackling climate change, with the goal of capping warming at 2C over pre-Industrial Revolution levels.

Keywords: - Global warming, COP21/CMP11 (known as Paris 2015) and Role of India.

I. INTRODUCTION

Our climate is absorbing a lot of heat day by day results global warming. When scientists add up all of the heat warming the oceans, land, and atmosphere and melting the ice, they find our climate is accumulating '4 Hiroshima atomic bombs worth of heat every second'. [1] Takaho Miura of Hirosaki University in Japan calculates that each year the moon's orbit expands by about 4 cm, Earth's rotation slows by 0.000017 second and the sun's rotation rate is slowing by 3 milliseconds per century (0.00003 second per year). According to their explanation, the distance between the Earth and Sun is gradually increasing because the sun is losing its angular momentum. [2] Then the question arise how the climate absorbing extra heat as the distance between sun and earth is growing. This warming is due to more heat-trapping in the atmosphere i.e. greenhouse gases - CO₂ emissions. Research says that humanity has dumped 1.2 trillion tonnes of CO₂ into atmosphere so far. Scientists say that our climate is gaining the energy of 1- Atomic Bomb worth of energy each day for every 3 million tonnes of past CO₂ emissions. That means approximately 4 Hiroshima atomic bombs worth of heat energy accumulating in the atmosphere every second. [3]

A simple calculation for the above explanation given below:

Humanity has dumped 1.2 trillion tonnes of CO₂ into our atmosphere from industrial era i.e. late 1700s. Each day for every 3 million tonnes of past CO₂ emissions adding 1 Hiroshima A- bombs energy to the atmosphere.

Now, 1 Trillion = 10⁶ million.

So, threat at the rate of 4, 00,000 A- bombs worth of new energy every day generated by our past emissions.

1 day = 86400 sec

So, approx. 4 + Hiroshima atomic bombs heat energy is adding to the atmosphere per second.

This climate change results the natural disasters. A natural disaster is a major adverse event resulting from natural processes of the earth; examples include floods, volcanic eruptions, earthquakes, tsunamis, and other geologic processes. A natural disaster can cause loss of life or property damage. [4] To deal with the climate change due to greenhouse gas emissions, UNFCCC Parties (Conferences of the Parties) (COP) are serve as the formal meeting annually to assess the progress in dealing with the climate change. The parties to the convention have met annually from 1995, to negotiate the Kyoto Protocol to establish legally binding obligations for developed countries about the global solution to climate change. [5] This year the 196 parties were met with the goal of joint action to cap global warming at 2C over pre-Industrial Revolution levels.

II. LITERATURE REVIEW

The objectives of the study have discussed about the greenhouse gas emission, global warming & its effects on earth. To tackle the coming environment challenges, effort of Paris 2015 leaders meet i.e. COP21/CMP11 (known as “Paris 2015”) conference outcome, India role on renewable energy, power sectors in India and a discussion is made about the role of world highest emitters to mitigate greenhouse gas emissions. The combustion of fossil fuels leads to the release of pollution into the atmosphere and that causes of the global warming. Rapid deployment of renewable energy and energy efficiency is resulting in significant energy security, climate change mitigation, and economic benefits. The incentive to use 100% renewable energy for electricity, transport or even total primary energy supply globally has been motivated by global warming and other ecological as well as economic concerns. Energy efficiency and renewable energy are said to be the twin pillars of sustainable energy policy to fight with the global warming. But many scientists believe that it is being too late to cap global warming at 2C over pre-Industrial Revolution levels. Their study says that if countries do nothing to reduce emissions, it will likely that the temperature increases exceed 4C. So, we individual and all countries would have to start working together to achieve the goal SOON.

III. METHODOLOGY

The following article is based on Internet-Based Research and outcome from the daily news. Few journals have referred on global warming & climate change, renewable energy- role of India.

IV. RESULTS AND DISCUSSIONS

A greenhouse gas (sometimes abbreviated GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. The primary greenhouse gases in Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, Chlorofluorocarbons and ozone. Without greenhouse gases, the average temperature of Earth's surface would be much colder than the present average of 14 °C (57 °F). [6] The heat radiation striking the Earth is reflected back out to space by clouds, ice and other reflective surfaces. The remaining is absorbed by the oceans, the land and the atmosphere.

The Industrial Revolution had a big part to play in the amount of atmospheric CO₂ being released. Even if we stopped burning all fossil fuels by tomorrow, our past CO₂ emissions will continue to add hundreds of thousands of A-bombs worth of energy each day for years. Global temperatures will continue to rise and extreme weather events will continue to get more extreme for decades. It will take nearly a century for enough of this CO₂ to be removed from our atmosphere to return our planet back to the temperatures and weather energy levels. [7] Since the outset of the industrial revolution in the late 1700s, the carbon dioxide concentration in Earth's atmosphere has increased by about 34%, most rapidly from about 1960 onward (Refer below graph). [8] But the question is – Are we going to stop burning all fossil fuels from tomorrow? - NO.

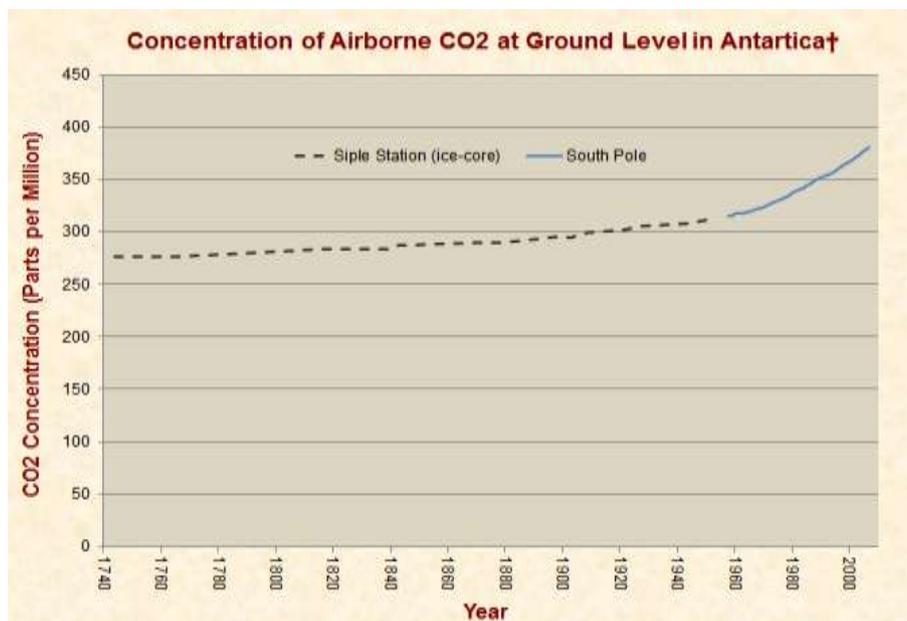


Fig.1

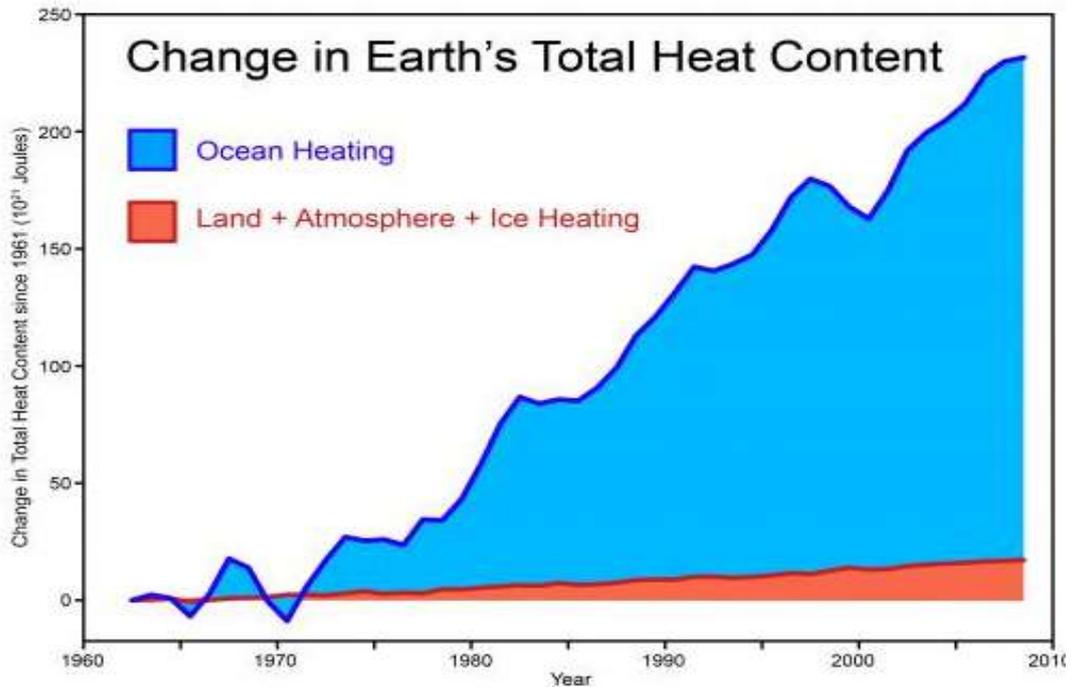


Fig.2

The lowermost layer of the atmosphere, which is called the "lower troposphere," ranges from ground level to about five miles (8 km) high. According to satellite data the average temperature of the lower troposphere increased by 0.60°F (0.33°C) between the 1980s and 2000s, mostly from 1997 to 2010: [9]

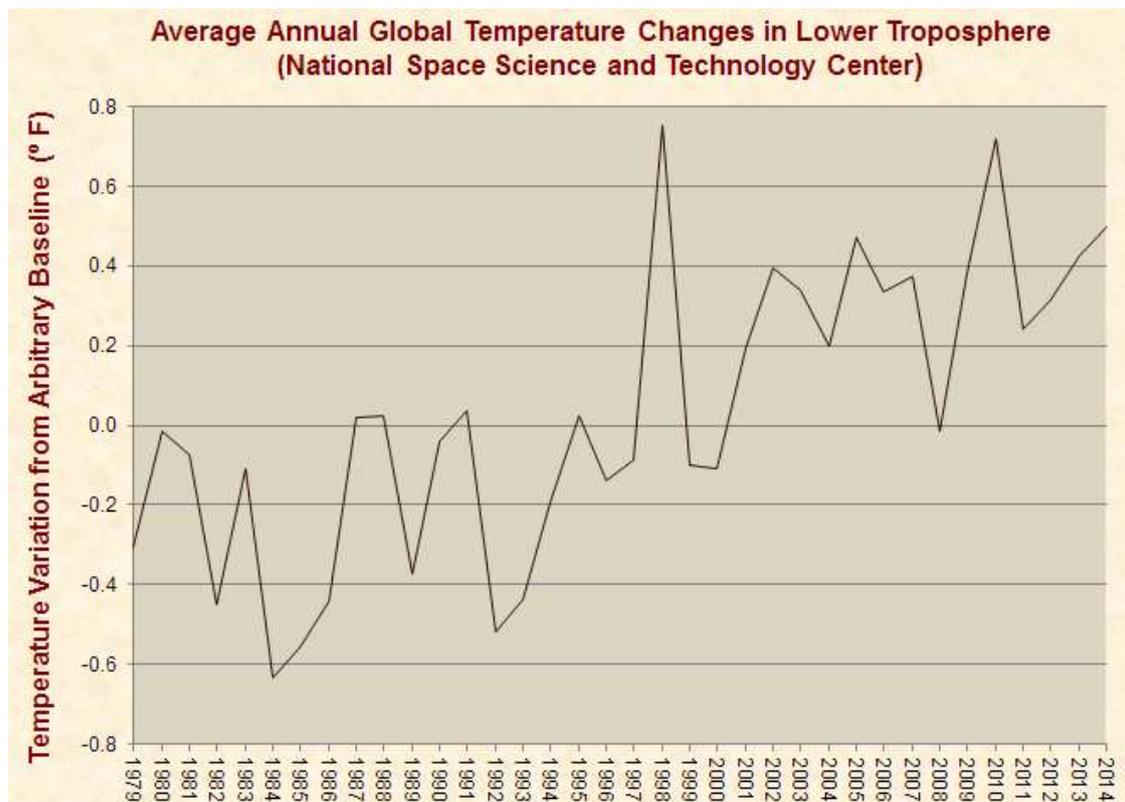
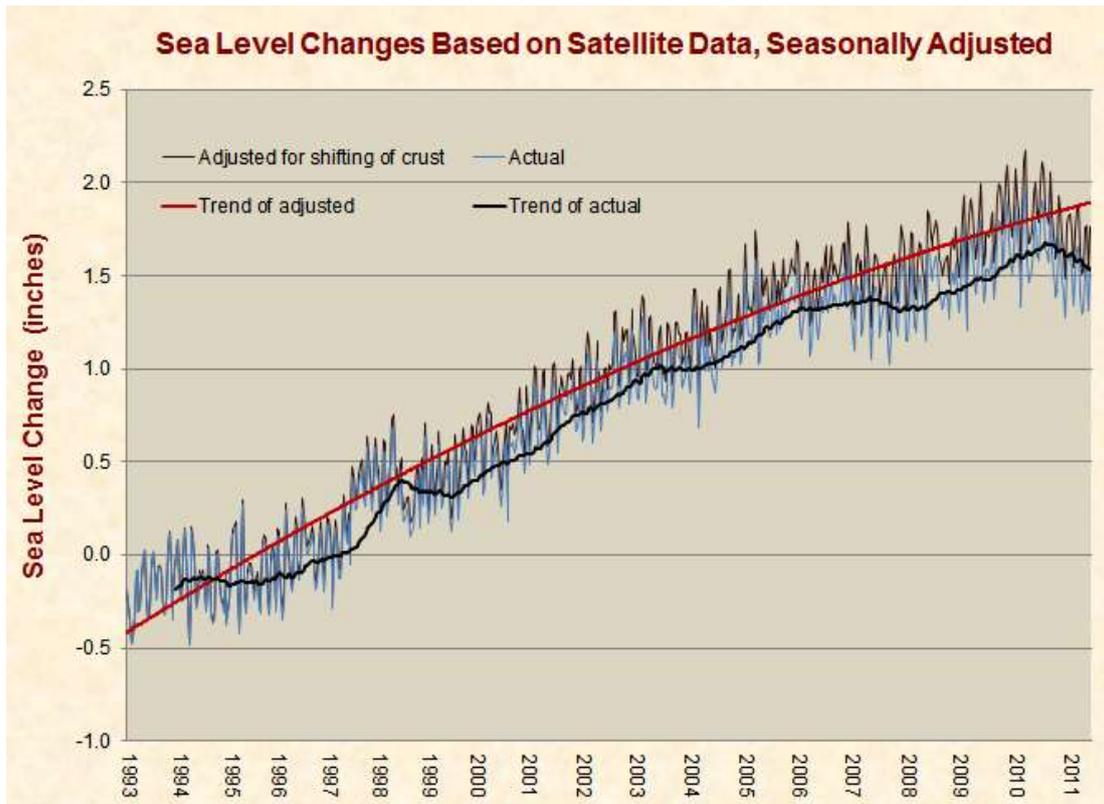


Fig.3 Troposphere



Sea Level Fig.4

How will climate change in the future - timescales of a decade?

Scientists have made major advances in the observations, theory, and model testing of Earth's climate system; to give estimates of how global or regional temperature trends will evolve decade by decade into the future. Few factors to consider are like Firstly, we cannot predict how much CO₂ human activities will emit in the near future, as this depends on factors such as how the global economy develops and how society's production and consumption of energy changes in the coming decades. Finally, natural variability can modulate the effects in temperature trend.

Taken together, all model projections indicate that Earth will continue to warm considerably more over the next few decades to centuries. If there were no technological or policy changes to reduce emission trends from their current trajectory, then further warming of 2.6 to 4.8 °C (4.7 to 8.6 °F) in addition to that which has already occurred would be expected during the 21st century. [10]

The billiard ball model: the impact of climate change on development goals[11]

The researchers have also stated that climate change will directly impact with agriculture (Food Security), Health, Energy and Water resources. It will influences disease patterns, food, water, sanitation which in turn affect health outcomes. Infant mortality is closely linked to under nutrition and food insecurity, both affected by climate change.

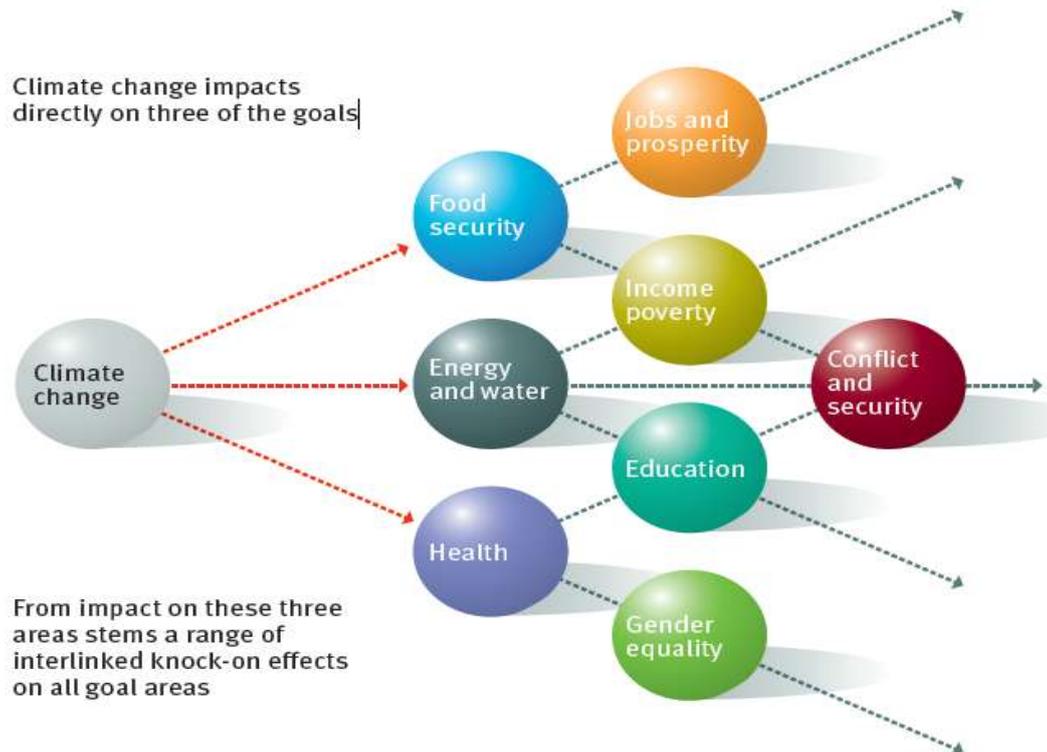


Fig.5

Global security

Climate change is also likely to affect global security. According to the defense experts' climate change will increase conflicts, humanitarian crises and refugee movements. The Pentagon refers to climate change impacts as a "threat-multiplier" which aggravates poverty, political instability and social tensions.

Ecosystems and biodiversity

A strong climate agreement is essential to protecting ecosystems and biodiversity. With climate change of up to 2C average warming, conservation strategies will be more challenging and expensive, but if temperatures rise further more major interventions will be required, such as deliberate relocation of species or major ecosystem engineering projects, and in some cases they will be impossible. Prevention of emissions reduction is cheaper and more effective than a cure.

The 2015 United Nations Climate Change Conference, COP 21 or CMP 11 is being held in Le Bourget, Paris, France from Monday, November 30 to Friday, December 11. [12] It is the 21st yearly session of the Conference of the Parties (COP) to the 1992 UNFCCC (United Nations Framework Convention on Climate Change) and Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP 11). [13]

UNFCCC is an international environmental treaty negotiated at the Earth Summit in Rio de Janeiro from 3 to 14 June 1992, then entered into force on 21 March 1994. [14] The Kyoto Protocol is also an international treaty, which extends the 1992 UNFCCC that commits State Parties to reduce greenhouse gases emissions, based on the premise that (a) global warming exists and (b) man-made CO₂ emissions have caused it.

The first meeting of the Parties to the Kyoto Protocol was held in Montreal, Canada in December 2005, in conjunction with the eleventh session of the Conference of the Parties (COP 11). The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. There were 192 Parties (Canada withdrew effective December 2012) to the Protocol. [15] The Protocol's first commitment period started in 2008 and ended in 2012 (Canada withdrawn). A second commitment period was agreed on in 2012, known as the Doha Amendment to the protocol.

Parties to the Convention that are not Parties to the Protocol are able to participate in the CMP as observers, but without the right to take decisions. The functions of the CMP relating to the Protocol are similar to those carried out by the COP for the Convention.

The Canadian government formally withdraw from the Kyoto Protocol on 12 December 2011. Canada was committed to cutting its greenhouse emissions to 6% below 1990 levels by 2012, but in 2009 emissions were 17% higher than in 1990. Environment minister Peter Kent cited Canada's liability to "enormous financial penalties" under the treaty unless it withdrew. [15-1] The Canadian environment minister, Peter Kent said that "The Kyoto protocol does not cover the world's largest two emitters, the United States and China, and therefore cannot work. It's now clear that Kyoto is not the path forward to a global solution to climate change. If anything it's an impediment." [15-2] (Refer Fig. 6)

Later on China signed Kyoto protocol on 29 May 1998, entry into force on 16-Feb-2005. USA signed on dated 12-Nov-1998 but not yet approved. But USA is the annex-I party of UNFCCC. [15-3]

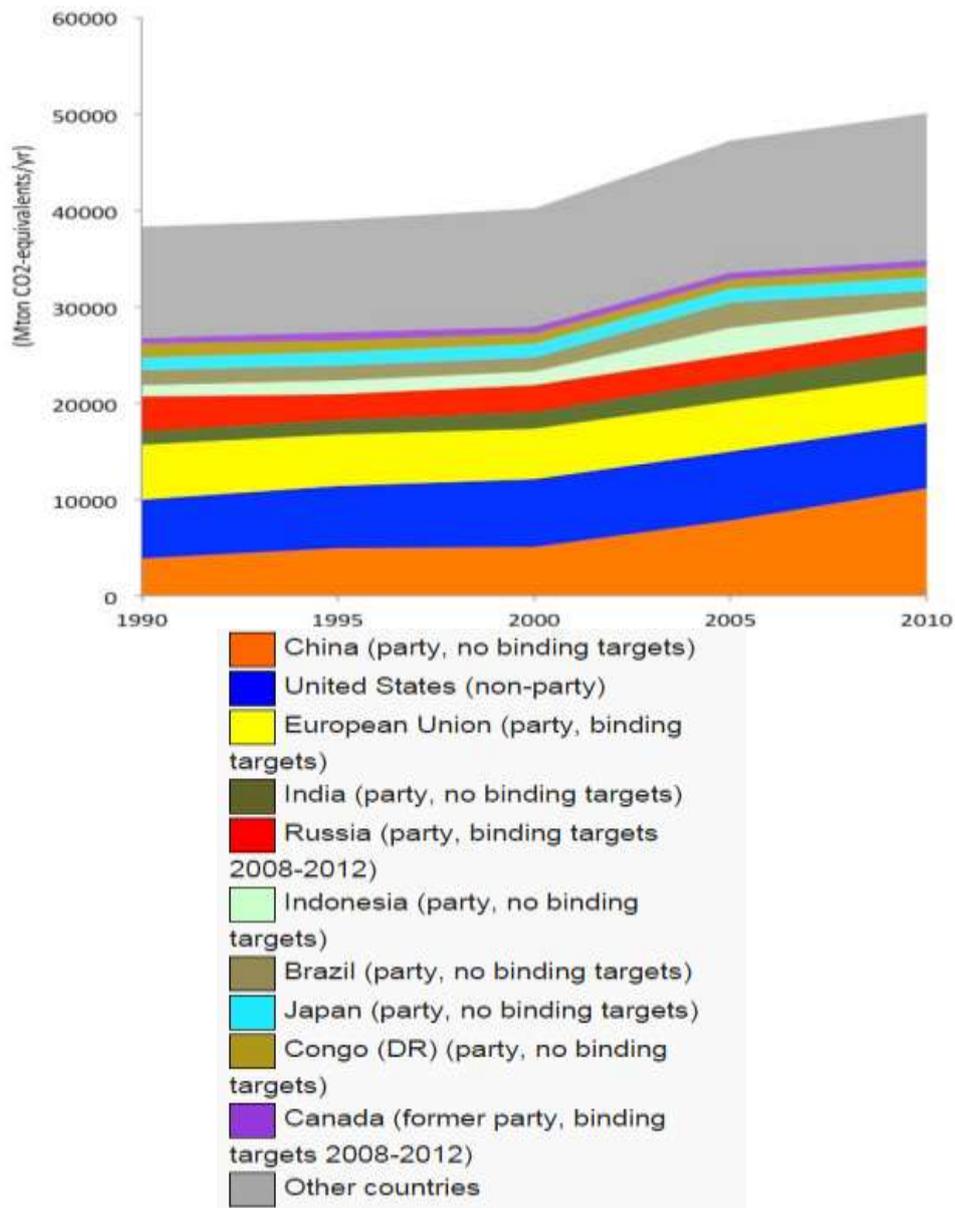


Fig. 6

In summary,

As discussed, the CMP meets annually during the same period as the COP.

UNFCCC entered into force on 21 March 1994,

COP 1 - 28 March - 7 April 1995, Berlin

Berlin

Kyoto Protocol entered into force on 16 February 2005 i.e. 1st meeting of CMP (CMP1) and in the same year from 28 November to 9 December 2005 in Montreal, Canada, COP 11 took place.

So, in 2015 conference is COP21 or CMP 11.

Let's see the schedule for yearly conferences of the United Nations Framework Convention on Climate Change (UNFCCC).

1. 1995: COP 1, The Berlin Mandate
2. 1996: COP 2, Geneva, Switzerland
3. 1997: COP 3, The Kyoto Protocol on Climate Change
4. 1998: COP 4, Buenos Aires, Argentina
5. 1999: COP 5, Bonn, Germany
6. 2000: COP 6, The Hague, Netherlands
7. 2001: COP 6, Bonn, Germany
8. 2001: COP 7, Marrakech, Morocco
9. 2002: COP 8, New Delhi, India
10. 2003: COP 9, Milan, Italy
11. 2004: COP 10, Buenos Aires, Argentina
12. 2005: COP 11/CMP 1, Montreal, Canada
13. 2006: COP 12/CMP 2, Nairobi, Kenya
14. 2007: COP 13/CMP 3, Bali, Indonesia
15. 2008: COP 14/CMP 4, Poznań, Poland
16. 2009: COP 15/CMP 5, Copenhagen, Denmark
17. 2010: COP 16/CMP 6, Cancún, Mexico
18. 2011: COP 17/CMP 7, Durban, South Africa
19. 2012: COP 18/CMP 8, Doha, Qatar
20. 2013: COP 19/CMP 9, Warsaw, Poland
21. 2014: COP 20/CMP 10, Lima, Peru
22. 2015: COP 21/CMP 11, Paris, France
23. 2016: COP 22/CMP 12, Marrakech, Morocco , a major city in the northwest African nation from November 7-18, 2016.[16]
24. 2017: COP 23/CMP 13 , COP 23 is expected to be held from November 6 - 17, 2017. (COP 23/CMP 13).[17]
25. 2018: COP 24/CMP 14 , COP 24 is expected to be held from November 5 - 16, 2018. (COP 24/CMP 14).[17]
26. 2019: COP 25/CMP 15 , COP 25 is expected to be held from November 11 - 22, 2019. (COP 25/CMP 15).[17]

Graph "Conference of the Parties (COP)":



Fig.7

Plenary Session at COP 21 Summit in Paris

The 2015 United Nations Climate Change Conference, COP 21 or CMP 11 is being held in Le Bourget, Paris, from November 30 to December 11. COP21/CMP11 otherwise known as “Paris 2015” was a crucial conference that to be signed in 2015, [18] [19] and implemented by 2020, [20], as it needs to achieve a new international agreement on the climate, applicable to all countries, with the aim of keeping global warming below 2°C by 2100, as compared to before the industrial era. 196 countries meet to sign a new climate change agreement.

Researchers in the UN Intergovernmental Panel on Climate Change 2009 have agreed on that this is necessary to avoid serious climate catastrophes, and that such a result in turn requires greenhouse gas emissions to be reduced by between 40 and 70 percent by 2050 compared with 2010, and reaching a zero level in 2100, [21]

France serves as a model country for delegates attending COP21 because it is one of the only developed countries in the world to decarbonize electricity production and fossil fuel energy while still providing a high standard of living. [22] As of 2012, France generated over 90% of its electricity from zero carbon sources, including nuclear, hydroelectric, and wind. [23] By producing fewer greenhouse gases, France’s advanced technologies, mostly powered by nuclear power systems, [24] have demonstrated one of the safest and cleanest energy systems in the world.

The purpose of the meeting was to continually assess the nation’s progress in dealing with climate change and every so often, negotiate agreements and set goals for reducing greenhouse gas emissions that are the primary drivers of climate change. Previous memorable meetings include COP3 in Kyoto, Japan, which brought about the Kyoto protocol; COP11, which generated the Montreal Action Plan; and COP15 in Copenhagen, which was largely deemed a failure because a binding agreement wasn’t reached.

The goal of Paris in December was very clear-cut, to achieve a legally binding agreement, with universal participation among all the nations, to keep global warming below what most scientists say is the critical threshold of 2°C of warming.

This will not be an easy goal to reach, since planet already has been warmed by 0.85°C since 1880, according to the latest Intergovernmental Panel on Climate Change report in 2014, and many scientists say the gases we have already emitted into the atmosphere will “lock us in” to around 2°C warming. Therefore, it will take significant reductions in emissions in the future, especially from the largest emitters such as the United States and China, as well as commitments to sustainable developments from all countries, which must be financed by the developed (i.e. rich) nations.

What needs to be agreed?

Ambitious action before and after 2020

A strong legal framework and clear rules

A long term approach

Public finance for adaptation and the low carbon transition

A framework for action

Vulnerable countries demand 1.5°C warming limit

Small island nations such as the Philippines, Bangladesh which are extremely vulnerable from rising sea levels, believe that the goal of keeping temperature rises to no more than 2°C will not prevent widespread damage and force people from their homes. So, they demand 1.5°C rather than the 2°C target.

A report explores the impact of climate change in Latin America and the Caribbean, the Middle East and North Africa, and Eastern Europe and Central Asia and finds that warming of close to 1.5°C above pre-industrial times is already locked into Earth’s atmospheric system by past and predicted greenhouse gas emissions. Without concerted action to reduce emissions, the planet is on pace for 2°C warming by mid-century and 4°C or more by the time today’s teenagers are in their 80s. [25]

PM NarendraModi's speech at the Plenary Session at COP 21 Summit in Paris



COP - Day 1 at the Paris COP21 summit on climate change , 19:15 - Indian Prime Minister, NarendraModi, speaking at the Leaders Opening event, promising his country will produce 40% of its energy from 'non-fossil fuels' by 2030.

In a speech at the opening of the COP21 climate conference in Paris on Monday, Indian Prime Minister NarendraModi addressed the COP 21 conference in Paris and cautioned world against any unilateral steps that will lead to an economic barrier in the battle against climate change. He said his country would add 175 gigawatts of renewable energy by 2022 and enlarge its forest cover.

He called on developed nations to fulfil their responsibility to make clean energy affordable and available to the developing world. He addressed that India and other developing nations want developed countries like the U.S. to commit to greater reductions in the amount of greenhouse gases they emit.

Mr.Modi said that developing countries were looking at advanced nations to contribute 100 billion dollars annually by 2020 to help them transition towards clean energy. “They must fulfil their commitment in a credible, transparent and meaningful manner,” he said.

India is also among the 20 countries, including the U.S., Canada and China that have pledged to double their investments in clean-energy research and development during the next five years.

Later on Monday, Mr. Modi also spoke at a “Mission Innovation” event hosted by President Barack Obama and Microsoft co-founder Bill Gates, where the multi-billion dollar program was unveiled. “The advanced countries must leave enough room for developing countries to grow. And, we must strive for a lighter carbon footprint on our growth path,” he said. “For that we must come together in a partnership to bring clean energy within the reach of all.”

India role on renewable energy, power sectors in India.

As per the data source from Renewable Energy Policy Network for the 21st Century, the global Status Report’ statistic of total world energy consumption by source given that; [26]

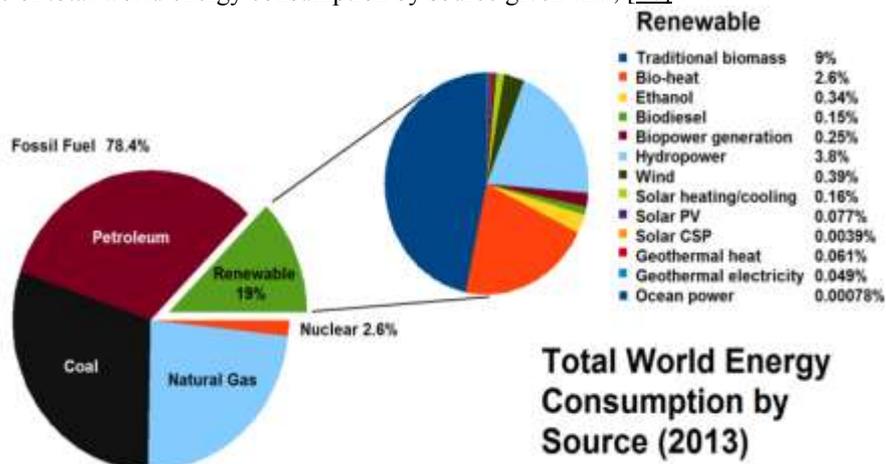


Fig.8

The electricity sector in India had an installed capacity of 278.734GW as of 30 September 2015. Renewable Power plants constituted 28% of total installed capacity and Non-Renewable Power Plants constituted the remaining 72%. During the year 2014-15, electricity generation in India was 1,010 kWh with total electricity consumption (utilities and non-utilities) of 938.823 billion or 746 kWh per capita electricity consumption. Electric energy consumption in agriculture was recorded highest (18.45%) in 2014-15 among all countries. [27]

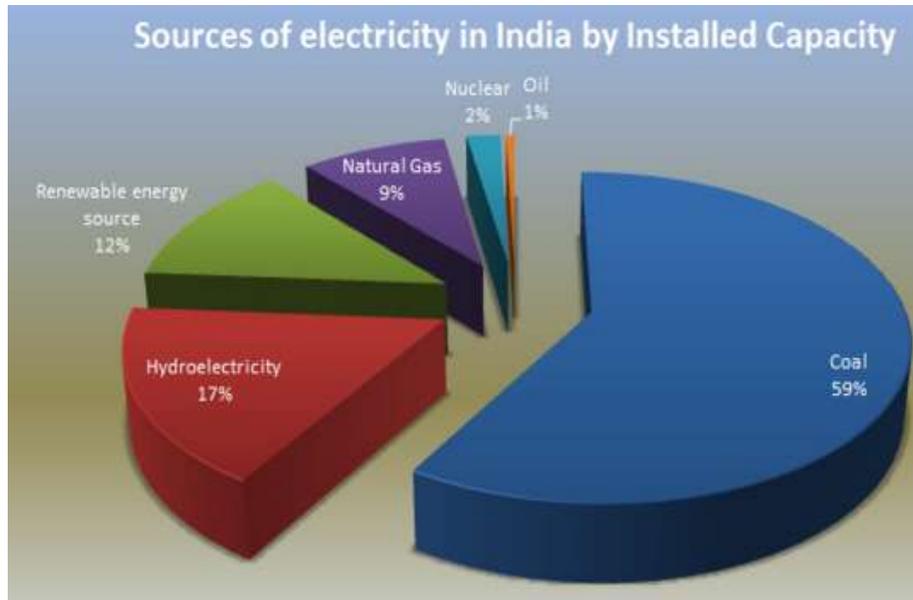


Fig.9

The power sector as a key sector required to be focus as to promote sustained industrial growth. Some initiatives have taken by the Government of India to boost the Indian power sector. They are like: [28]

- The Government of India announced a massive renewable power production target of 175,000 MW by 2022; this comprises generation of 100,000 MW from solar power, 60,000 MW from wind energy, 10,000 MW from biomass, and 5,000 MW from small hydro power projects.
- The Union Cabinet of India approved 15,000 MW of grid-connected solar power projects of National Thermal Power Corp Ltd (NTPC).
- US Federal Agencies committed a total of US\$ 4 billion for projects and equipment sourcing, one of the biggest deals for the growing renewable energy sector in India.
- On 20 January 2015, a Memorandum of Collaboration (MoC) was signed in New Delhi between all Indian Institute of Technology (IITs) and Oil & Natural Gas Corporation (ONGC) to work towards a collective research and development (R&D) programme for developing indigenous technologies to enhance exploration and exploitation of hydrocarbons and alternative sources of energy.
- The Reserve Bank of India (RBI) has notified to include renewable energy under priority sector lending (PSL). Therefore, banks can provide loans up to a limit of US\$ 2.36 million to borrowers for renewable energy projects.
- The government had revised the National Solar Mission with the electricity production target of 100,000 MW by 2022. The government has also sought to restart the stalled hydro power projects and increase the wind energy production target to 60 GW by 2022 from the current 20 GW.

The initiative of government shows that Indian power sector has an investment potential of Rs. 15 trillion (US\$ 237 billion) in the next 4–5 years, thereby providing immense opportunities in power generation, distribution, transmission, and equipment. The government’s immediate goal is to generate two trillion units (kilowatt hours) of energy by 2019. This means doubling the current production capacity to provide 24x7 day electricity for residential, industrial, commercial and agriculture use.

Role of - United States and China - The highest emitters

On November 11, 2014 the United States and China announced a bilateral agreement to cooperate on clean energy development and mitigate greenhouse gas emissions. For the United States, the new target seeks to reduce emissions by 26 to 28 per cent from 2005 levels by 2025, while China committed to peak emissions by 2030 and endeavour to meet its target sooner than that (The White House, 2014). Both targets are a significant step forward for climate negotiations for 2015, as the two highest-emitting countries have made important commitments to address their greenhouse gas emissions and, more importantly, to show a cooperative approach that will seek to build trust and facilitate energy transition globally.

The new target for the United States seeks to reduce emissions by 2.3 to 2.8 per cent on average per year between 2020 and 2025 (The White House, 2014). The new plan will be submitted to the United Nations Framework Convention on Climate Change (UNFCCC) as the U.S.

For China to meet its new target, it will promote non-fossil fuel energy generation to supply 20 per cent of the country's energy needs by 2030. This will require between 800 gigawatts and 1,000 gigawatts of nuclear, wind, solar and other zero-emission power generation by 2030, a significant increase from its current energy generation from coal-fired power plants. The commitment signals "the end of the coal era" and the rising prominence of other energy generation sources, primarily natural gas and renewables alongside the use of clean, energy-efficient technologies. [29]

World Greenhouse Gas Rankings by Country

While Canada represents only about 2.3% of total global GHG emissions, it is one of the **highest per capita emitters** (per individual/person) and is in the 9th spot on the Top 10 GHG Emitting Countries List.

LIST OF TOP 10 GHG EMITTING COUNTRIES					
Rank	Country	CO2 Emissions	Area(km2)	Population	Emission/person
1	China	8,240,958	9,640,821	1,339,724,852	6.2
2	United States	5,492,170	9,826,675	312,793,000	17.6
3	India	2,069,738	3,827,263	1,210,193,422.0	1.7
4	Russia	1,688,688	17,075,400	142,946,800	11.8
5	Japan	1,138,432	377,944	128,056,026	8.9
6	Germany	762,543	357,021	81,799,600	9.3
7	Iran	574,667	1,648,195	75,330,000	7.6
8	South Korea	563,126	100,210	48,875,000	11.5
9	Canada	518,475	9,984,670	34,685,000	14.9
10	Saudi Arabia	493,726	2,149,690	27,136,977	18.2
	WORLD	33,508,901	14,894,000	6,852,472,823	4.9

CDIAC/UN 2010 estimates.

Fig.10

Is our earth safer now after the conference COP21 – Outcome of the conference?

December 12th, 2015 – Nearly 200 countries reached a climate accord that some analysis have called a "Turning Point" in human history designed to drive the world towards 100 per cent clean energy. For the first time in history almost all the countries have made a public commitment to reduce or, curb their earth-Warming greenhouse gas emissions. The agreement recognises climate action plans pledged by over 185 countries, including the highest emitters like China, US, India. It also acknowledges differences between developed and developing countries and recognises the need for developed countries help developing countries in pursue with the clean energy. It demands a once in five years review of emissions reduction pledges to ramp up targets and calls for capping of greenhouse gas emissions as soon as possible. The deal again commits \$100 billion a year for the developing countries from the rich countries by 2020 with a promise to increase it beyond that. But, Paris conference does not force countries to cut their emissions fast enough. According to government officials the conference is success but according to scientists and activists the current actions are not sufficient to cut emissions to hold back the rise in temperature capping at 2C. They stated that without any confirmed action during emission there will be a worsen change in climate in the coming decades.

Presently the Paris accord will need to be ratified by the legislative bodies of all the countries that participated in the negotiations. Different countries have different mechanisms. In India, this is typically done through a vote in Parliament. [30]

Many scientists believe - 'It may be too late':

The Union of Concerned Scientists, a group of over two thousand scientists, has concluded that global warming is beyond dispute, and already changing our climate. The last 30 years have seen the warmest surface temperatures in recorded history, and the past several years have been among the warmest on record. Scientists have concluded that human activity, primarily the burning of fossil fuels, is the major driving factor in global warming. [31] Here's a dark secret about the earth's changing climate that many scientists believe that it's too late to stop global warming. "At present, governments' attempts to limit greenhouse-gas emissions through carbon cap-and-trade schemes and to promote renewable and sustainable energy sources are probably too late to arrest the inevitable trend of global warming," Jasper Knight of Wits University in Johannesburg, South Africa, and Stephan Harrison of the University of Exeter in England argue in their study. Two scientists who believe we are on the wrong track argue in the current issue of the journal Nature Climate Change that global warming is inevitable and it's time to switch our focus from trying to stop it to figuring out 'how we are going to deal with its consequences'. [32]

Many scientists believe that the Earth's temperature may continue to rise even if carbon dioxide emissions were reduced to zero; it is very possible that the Earth's atmosphere could continue to warm for hundreds of years even after emissions of greenhouse gas carbon dioxide have been halted. The researchers simulated an Earth on which, after 1,800 billion tons of carbon entered the atmosphere, all carbon dioxide emissions suddenly stopped. The carbon itself faded steadily with 40 per cent absorbed by Earth's oceans and landmasses within 20 years and 60 per cent soaked up at the end of the 1,000 years. [33] The Princeton University research suggests that even if carbon dioxide emissions came to a sudden halt, the carbon dioxide already in Earth's atmosphere could continue to warm our planet for hundreds of years.

That doesn't mean nations should stop trying to reduce their carbon emissions, because any reduction could lessen the consequences. Many people don't realize that we are committed right now to a significant amount of global warming and sea level rise...the longer we wait to do something about it, the more change we will have. Ultimately it is up to each of us, as individuals and families, to take action to slow down and eventually reverse global warming through everyday awareness of our energy use, and attention to ways we can conserve electricity and minimize fossil fuel usage.

What we can do?

The goal is to bring global warming under control by curtailing the release of carbon dioxide and other heat-trapping "greenhouse" gases into the atmosphere.

We can contribute to this global cause with personal actions. Our individual efforts are especially significant in countries like the US and Canada, where individuals release over 10,000 pounds of carbon dioxide per person every year.

We can help immediately by becoming more energy efficient. Reducing our use of oil, gasoline and coal also sets an example for others to follow.

Reduce electricity usage around the home.

The largest source of greenhouse gases is electric power generation. The average home actually contributes more to global warming than the average car. This is because much of the energy we use in our homes comes from power plants which burn fossil fuel to power our electric products.

To reduce the amount of electricity used in our homes:

- Switch to energy efficient lighting
Replace the familiar incandescent light bulbs with compact fluorescent bulbs. For each CFL bulb replacement, you'll lower your energy bill and keep nearly 700 pounds of carbon dioxide out of the air over the bulb's lifetime. CFL bulbs last much longer and use only a quarter of the energy consumed by conventional bulbs. LED bulbs are also energy-saving, but have a narrower range of application. Advances in LED bulb technology, however, are leading to more applications for these bulbs in the home. LEDs are more efficient than CFLs and do not have issues surrounding disposal, as do the CFLs.
- Improve the efficiency of home appliances
Home appliances vary greatly in terms of energy-efficiency and operating costs. The more energy-efficient an appliance is, the less it costs to run. You can lower your utility bill and help protect the environment.
- Buy energy-efficient appliances when shopping for a new appliance
Do this especially when shopping for a major appliance such as a refrigerator, dishwasher, or air-conditioner – select the one with the highest energy efficiency rating. By opting for a refrigerator with the

Energy Star label — indicating it uses at least 15 per cent less energy than the federal requirement — you can reduce carbon dioxide pollution by nearly a ton in total.

- Reduce energy needed for heating
According to the U.S. Department of Energy, heating and cooling systems in the U.S. emit over a half billion tons of carbon dioxide into the atmosphere each year. Much of the energy used for heating our homes is wasted, and yet the prevention is, in many cases, simple and inexpensive.
- Reduce energy needed for cooling
Air conditioners alone use up to 1/6th of the electricity in the U.S. and, on hot summer days, consume 43% of the U.S. peak power load. You can reduce much of the need for air conditioning, and enjoy a cost savings benefit, by using 'passive' techniques to help cool your home.

Improve vehicle fuel-efficiency

The second largest source of greenhouse gases is transportation. Motor vehicles are responsible for about a third of all carbon dioxide emissions in the U.S. and Canada.

- Practice fuel-efficient driving
Every gallon of gasoline burned puts 26 pounds of carbon dioxide into the atmosphere. You can boost the overall fuel-efficiency of your car as much as 30% by simple vehicle maintenance and attention to your style of driving.
- Buy a fuel -efficient car
Even more important is the choice of car or truck you buy. If you buy a new car that gets 10 more miles per gallon than your old car, the amount of carbon dioxide reduction realized in one year will be about 2,500 pounds. The new hybrid cars, using efficient gas-electric engines, can cut global warming pollution by 30% or more.
- Recycle air conditioner coolant
If your car has an air conditioner; make sure you recycle its coolant whenever you have it serviced. You can save thousands of pounds of carbon dioxide each year by doing this.
- Drive less
You'll save energy by taking the bus, riding a bike, or walking. Try consolidating trips to the mall or longer routine drives. Encourage car-pooling.

V. CONCLUSION

There are plenty of studies on how bad climate change could get in the decades ahead. But how do we actually stop global warming- or, at least slow down? The world has to cut emission 41% to 72% by 2050 – and START SOON. On our current course, it's unlikely that we'll stay below that 2C limit. Global average temperatures have already raised 0.8C over the past century, as humans have burned fossil fuels and cleared forests and put more heat trapping greenhouse gases in the atmosphere. If emissions in 2030 are still above today's levels, then 2C goal becomes impossible. Cutting emissions will require a huge technological push. We'll also need to pull carbon out of the atmosphere and the technology to pull carbon out of the atmosphere is still unproven. A tree can absorb as much as 48 pounds of carbon dioxide per year and can sequester 1 ton of carbon dioxide by the time it reaches 40 years old.

Investing effort today is always good for our future and for our future generation, then why not invests for future environment. We individual and all countries would have to start working together for a change. But the real fact is - Rich and poor countries still can't agree – How to share up emissions cuts?

“So the question now is whether we will have the courage to act before it's too late. And how we answer will have a profound impact on the world that we leave behind not just to you, but to your children and to your grandchildren.” - US President Barack Obama, Georgetown Address, June 2013.

“We are the first generation to understand the consequences of a high carbon economy on the planet, on future prosperity and, in particular, on the most vulnerable around the world. Let us be the generation that stands up and takes the responsibility conveyed by that knowledge.” - Christiana Figueres, executive secretary, UN Framework Convention on Climate Change May 2014

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