

Towards a low carbon society research paper examples

[Parts of the World](#), [Europe](#)



A brief analysis of goals and challenges

ABSTRACT

The contemporary world of today is faced with several environmental problems that increasingly threaten our continued existence. At the heart of all such environmental effects is pollution, primarily carbon based emission. Realizing the need to reduce these emissions, the world nations have together decided on the transformation to a low carbon society. Power generation and transport are particularly the main sources of emission and the world therefore has to consider moving away from fossil fuels to renewable sources through technological development. In order to achieve this, the world nations have decided to reduce emissions and have also put in place an ambitious plan to reduce emissions to pre-industrialization levels by 2050. Local, national and international partnerships have been formed for research and knowledge sharing, in order to attain a low carbon society, with low emissions. Although the goal looks difficult, the EU has shown that it isn't impossible to scale down emission levels. However the challenge is to ensure sustained development, and the participation of all stakeholders in making this transition.

- INTRODUCTION

The earth is facing several, serious environmental problems that have become to threaten our future wellbeing. Climate changes when combined with other problems like overpopulation, can affect more people than that of a global war. The rampant deforestation and environmental changes has led to agricultural-rich regions being transformed to desert waste diversity. The indiscriminate use of pesticides and agriculture has harmed living creatures,

including man. The world of today is faced with an increasing problem of pollution that may be also attributed to energy consuming cities. Ozone in our atmosphere filters the radiation from the sun, by blocking the cell-destructing ultraviolet (UV) region of the spectrum. It was in the 1970s that the negative effects of Chlorofluorocarbons (CFCs) and certain other chemicals, on ozone layer was learnt [1]. Chemicals mainly used in aerosols and refrigeration caused considerable destruction to ozone in the stratosphere, due to which harmful UV radiation passed through. A large ozone hole above Antarctica was noticed in 1985, which grew larger and deeper each year. Of late ozone depletion over the Arctic has raised worries. Gases like carbon dioxide, methane and refrigerants trap heat in the lower atmosphere of the earth by the greenhouse effect. Due to this the earth becomes warmer as the heat is not able to escape. Therefore a concerted global effort is absolutely essential to check the rising emissions and rein in the temperature increase.

Figure 1. Emission of CO₂ raises the average global temperature

- DISAPPEARANCE OF THE GREEN COVER

Industrialization through excessive energy consumption has led to higher global CO₂ emissions, contributing to global warming. There is clear indication of the progress of climate change throughout the globe. The Intergovernmental Panel on Climate Change (IPCC) had in 1995 reported on the threat of global warming, pointing to the role of human emissions behind the changes. Global warming gives rise to several harmful effects which have consequential changes. Heat waves, frosts, storms, loss of forests and species extinction are some of the undesired changes brought by climate

changes. Climate change may rightly be attributed to governmental and institutional failures [2]. Subsidizing fuel has resulted in over usage of fossil fuels and thus more Greenhouse gas (GHG) emissions. Carbon emissions cannot be isolated from the rest of the social and economic infrastructure as it is interlinked. Trees have a crucial role in the global carbon cycle. Trees serve as the natural and the largest land based mechanism for removing CO₂ in the air. Trees are capable of storing up large amounts of CO₂. Forests can absorb about ten times the amount of CO₂ absorbed by crops or grasslands. It has been estimated that about 2.8 tons of CO₂ can be absorbed by an acre of forest. The carbon present in the system is released as CO₂ when the trees are burnt. The CO₂ generated by human beings by the burning of fossil fuels cannot be fully absorbed when forests are reduced. With over 50 million acres of rain forest destroyed each year, CO₂ levels increase by about 0.4% each year. In order to reverse the alarming situation, the global community has decided to move towards a low carbon society (LCS). The destruction of forests also contributes to global warming.

An interesting aspect of CO₂ emissions is that CO₂ emissions from many countries belonging to the Organization for Economic Cooperation and Development (OECD) has decreased, with the emission from EU decreasing by 3% and the US by 2% which may mostly be attributed to low economic conditions in many countries and high oil prices. Nonetheless the emissions increased in China and India by 8.9% and 6% respectively in 2011 [3].

Since 1992, when the Earth Summit of the UN was held in Rio de Janeiro, there has been an increase in 50% of anthropogenic CO₂. This in turn has

led to an increase of CO₂ concentration in the atmosphere by 10%, with the concentration increasing from 356 to 392 parts per million (ppm). It should be noted here that from 2000, a cumulative emission of 420 billion tons of CO₂ was emitted through human activities. It has been suggested that the goal of limiting global temperature rise to two degree centigrade above preindustrial levels is only possible when cumulative CO₂ emissions between 2000 and 2050 do not exceed 1000 to 1500 billion tons. However with the current global increase in CO₂ emission levels, it is very likely that the cumulative emissions would cross this level in the next two decades. The world is therefore determined to enforce CO₂ emission cuts and work together in achieving LCS.

In working towards a low carbon society, alliances have been formed among nations reiterating the need for global cooperation in realizing it. Thus we have the Asia Pacific Economic Cooperation (APEC), the Association of South East Asian Nations (ASEAN), the European Union (EU) and the United Nations Framework Convention on Climate Change (UNFCCC). The global emissions of CO₂ rose by about 3% in 2011, hitting an all time high of 34 billion tons [4]. The top 5 emitters are China (29%), the US (16%), the EU (11%), India (6%) and Russia (5%). These emissions do not include emissions due to biomass burning like that occurring in times of forest fires as occurrences and figures are uncertain.

Low carbon society, also referred to as low carbon economy or fossil fuel economy is a concept that identifies an economy that has minimum green house gas emissions. Reducing GHG emissions require increasing energy

efficiency of production. However there are several legal and institutional barriers apart from financial lacking and information gaps for achieving this. To achieve LCS, the forestry operations are to be focused on low-impact practices and re-growth. Land use change including deforestation is responsible for 75% of GHG emission from Southeast Asia. By avoiding further deforestation, the ASEAN regions can contribute to about 40% of the total carbon dioxide emission reduction target of 2050. Reducing carbon dioxide emission through forest conservation efforts, can offer a new and important approach to climate change mitigation in Asian and Pacific forest countries.

- LCS-RNet

In order to achieve the goals of global emission cuts, the G8 Environment Ministers had a meeting in Kobe in 2008, where they emphasized on the need for a research network that would help to achieve LCS. In line with this, the International Research for (LCS-RNet) was set up in 2009. As nations respond differently to the diverse pressures, LCS-RNet compares political, strategic, and research responses. Identifying and sharing experiences and solutions relevant to LCS remain a primary goal of LCS-RNet. At the 4th Annual Meeting of the LCS-RNet in Oxford, a key challenge of maintaining momentum towards a LCS was considered. The key findings [5] include:

- Technology development and behavior change:

A transformation of the energy system is required that involves the promotion of energy efficiency and savings. Innovative approaches integrating energy supply and demand also need to be in place. The public acceptance and successful deployment of technology options rests on

accelerated innovation, cost reduction, appropriate risk sharing arrangements, and higher local benefits. Behavior research has shown that people are capable and willing to change the way they consume energy.

- Green growth and climate financing:

Despite the present financial hardships the Organization of Economic Cooperation and Development (OECD), countries can see economic recovery through green growth policies directed at achieving LCS. In developing countries, the green growth policies can enhance-low carbon investments. Mobilizing private capital for capital intensive energy system transformation technologies would be a key challenge. There is a need for policies to ensure de-risk investment in low carbon technologies, which could help to bring in funds.

- Carbon value and coordination of policies:

Promoting investments in low carbon projects at all levels require innovative financial mechanisms like carbon budgeting systems. Although establishing a global price for carbon would be ideal, the varied perception of equity between north and south, is an obstacle for achieving the global price. There needs to be strong networks for exchanging resources and for transferring knowledge and technologies.

- Science and policy role in transition to LCS

Scientific evidence is crucial and has immensely contributed to the policy-making process in several countries. Countries can benefit by exchanging knowledge and science, as it has relevance to policy-making. Promotion of evidence based understanding would clarify the way in which risks are managed and mitigated.

- International collaboration for enhancing low carbon activity

Many developing countries are achieving progress through appropriate planning, implementation and assessment mechanisms focused at climate and energy planning making. Partnerships between funding agencies, researchers, businesses and governments, together with a global dialog with all relevant stake holders, can stimulate green growth.

Figure 2. G8 Environment Ministers meeting in Kobe in 2008

- EFFORTS UNDERTAKEN BY GLOBAL COMMUNITY

The international community has emphasized on the urgent need to reduce greenhouse house emissions by half by 2050. This is essential to keep the global mean temperature change within two degree centigrade with regard to preindustrial times. This ambitious target can only be achieved through the development of low carbon societies in Asia, as Asia will account for more than half of the global population and such emission by 2050 [6].

Establishing low carbon societies in Asia requires designing and setting up comprehensive methodologies and policies, based on knowledge, resources and needs of each country. The framework for developing low carbon societies include:

- A scenario development through global, national, regional and city-scale models
- Institutional architecture
- Resources management
- Efficient low carbon transport system

Through integration of above factors, policy roadmaps can be conceived which can facilitate a transition to Asian low carbon societies, aided by low

resource usage and strong economic growth. Meeting future energy needs has to go hand-in-hand with climate change controls. Although there is a consensus on the need for achieving this, there is often a debate on how it should be achieved. The pathway to achieving a low carbon society should take into account the current and potential technological options, while incorporating a strategic and integrated energy plan [7].

In the UK, a meeting of the UK's Royal Society focused on transforming UK as a low carbon economy in a few decades, reiterated its responsibility and contribution to the global efforts. The meeting called for an urgent sustained action on following plans:

- Focus on overhauling of all existing buildings so as to reflect energy efficiency and saving through incorporation of latest technologies.
- A reliance on electricity generation by low carbon sources including wind and marine energy
- A considerable increase in research and technology development and support for the development of low energy sources.
- A major investment in the development of relevant skills and research programs. Fiscal and regulatory reforms are also essential that involves higher carbon price effected through environmental tax reforms or carbon trading schemes

The EU on its part to reduce the GHG emissions has implemented short term goals of reducing emissions by 20% below the 1990 levels by 2020. The EU also has long term goals of higher emission cuts by 2050. The roadmap to achieving this suggests that the EU should cut its domestic emission by about 80% below that of 1990 levels [8]. It intends to reduce emissions by

40% in 2030 and by 60% in 2040. Among the main sectors identified as responsible for EU emissions are power generation, transport, buildings, construction and agriculture. However data show that the EU is on track to achieving its target. By reducing its emission levels even while expanding its economy, the EU has shown that emission cuts and economic growth can go together. In 2010, the combined GHG emissions from all its 27 member states was about 15% below its 1990 levels, despite its GDP growing up about 46%. The European Environmental Agency (EEA) also estimates that 2011 emissions further fell to about 17.5% sub-1990 levels.

Figure 3. Sector wise fall in emission in EU

- ROLE OF BUSINESS COMMUNITY

However realizing these cuts require the cooperation from business communities and firms which need to see their own interests too in the transition to low carbon society. The business community should initiate voluntary and self-judged action in developing technology and production process that are directed at reducing CO₂ emissions. These include [9]:

- Innovations in energy-saving technologies: Business communities require to remain competitive at regional and global markets, through environment friendly technology. Thus they need to balance their interests with their corporate social responsibility.

- Reliance on renewable energy source: Businesses should ensure implementation of local, national and international requirements in their approach to move away from fossil fuels. Through financial and human resource contributions, businesses should contribute to local research centers focused on low carbon technology development.

- Spread of clean energy technology: Businesses should spread clean energy technology and management systems to developing countries through their MNC subsidiaries. They should adopt a cooperative stance in licensing and joint development of clean energy technology and production process.
- Government policy formulation: Businesses should play a respond to government's fiscal and financial incentives towards R&D and enforce international trading regulations that are in favor of clean energy technology.

- BARRIERS TO ACHIEVING LOW CARBON SOCIETY

Realizing low carbon societies require cooperation of the developing countries on a global scale. There are several barriers including economical and technological ones that are against CO₂ emission-reduction efforts, which render CO₂ emission-reduction efforts ineffective. However, it is expected that when the mutual benefits associated with shifting to low carbon economy become apparent, such efforts would be very successful [10]. Developing countries should be provided considerable incentives for cutting their emissions. Developed countries could help developing countries to see economic growth and reduce pollution.

There is no doubt that the concept of low carbon society is needed to stabilize future global climate. Realizing substantial cuts in emission across several decades is still a haunting task. History shows that industrial growth is always associated with high energy usage, mainly from fossil fuels that are responsible for carbon emissions. Significant cuts in CO₂ emissions in the past were only evident during uneasy times like wars, recessions, and other events leading to economic chaos like the fall of the Soviet Union. Thus

decarbonization brings up inherent challenges apart from sector-based challenges like those prevailing in the energy and transport sectors [11]. Radical decarbonization efforts are essential in the power generation sector too where electricity need to be produced with low carbon emission. In fact the heart of transformation efforts may be attributed to the energy sector as it accounts for over four-fifths of the total CO₂ emissions and close to two-thirds of the entire GHG emissions. An abundant supply of low carbon electricity can in turn help reduce CO₂ emissions in the transport sector, with the introduction of efficient electric cars and vehicles and in aviation. The aspiration to seek non-fossil fuel is realizing fruits at a slow but steady rate. The share of renewable energy used, doubled from 0.5% in 1992 to 1% in 2004. Although it took twelve years to increase 100%, it reached the 2.1% mark or another 100% in 2011, just another six years. These figures when interpreted in terms of avoided CO₂ emissions meant that 0.8 million tons of CO₂ emissions from fossil fuel generation and road transport had been avoided in 2011.

Figure 4. An electric car

CONCLUSION

In our quest for low carbon society we should always ensure that such societies are always realized subject to sustainable development. Priority should be given to sustainable development that should only be achieved through poverty reduction, inclusive development, environmental conservation and protection, sustainable management of natural resources and preservation of cultural and social values across the countries.

Sustainable low carbon societies should only be realized through absolute regard and respect for human rights and dignity, transparency and full accountability, free flow of information and social justice. According to Dr. Tim Foxon, an expert on low carbon societies pathways, all countries need to innovate their lifestyle patterns of production and consumption, and appropriate social infrastructure, apart from technological and scientific innovation [12].

A consensus among climate science practitioners is that a business-as-usual attitude would raise the global temperature by about 6oC by 2050. Adapting to climate change is an important challenge, particularly for developing countries. Multi-governmental efforts are underway to reduce CO2 emissions, but the scope of the pledged actions depend on the policy making community. Acting on climate change also raises more questions than answers [13]. Governments and businesses of today have a broad range of choices with regard to climate change initiatives. Although small scale programs and philanthropy are important, audacious thinking and large scale programs are important to achieve LCS.

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