

# Innovation for Economic and Environment Health: Achieving Corporate Carbon Neutrality

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## Abstract

In the transition to capital intensive economy, the large fraction of industrialization is pivoted mainly on generating profits with little attention to binaries of natural and social. The absence of sustainability standards, policies and promoting bodies have failed to articulate a common framework on economic, social and environmental conditions along the corporate value chain in Indian diaspora. This disconnect is the crux of the problem. Thus it's critical to identify the inter-linkages that influence trade-offs and synergies across the sustainability dimensions.

The first phenomenon would be to understand the encapsulation process over the Institutional behavioral approaches to corporate governance and Innovation. Indian corporate sector is struggling with innovation and undertaking risk has placed an extreme level of pressure on existing way business models in operation. This paper would tend to explore in understanding the mental disposition. The emphasis would also be to identify shift in the problematic chart of perceiving sustainability as a competitive advantage than as liability. This would tend to explore the behavior anomalies and their connect with new-found behavioral ascendancy towards reshaping the business models.

The second phenomena would be to understand how the support to design the Sector based and Goal Based strategies could assist in assessing Sustainability Risks & Mitigation frameworks for environment sustainability. The dynamic model for sustainability framework would help to map the indicators through corporate enablers leading to sustainability matrix. This exercise would assist to identify specific areas in the corporate life cycle requiring more attention. The following incised steps may help to identify:

1. Internal and External environment programmes those are meant to be implemented;
2. Assessment of Sustainability risks and challenges along value chain;
3. Corporate Returns on Environmental Investment and the impacts accrued;
4. Identify and assess appropriate objectives and thereby the relevant performance indicators and targets to be achieved that can lead to real output and in alignment with broad objectives for achieving national targets;
5. Result based SDG policy for corporates.

**Keywords:** Carbon Neutrality, absorb, regenerate,

## Introduction

Over the course of decades, a number of firms have started paying attention around understanding and managing their global carbon footprint. A number of factors weighing in,

while understanding the industry/sectors, geographic area and the degree of maturity the corporate is in for carbon related management issues. What one has to accept is, there is no globally acceptable standard for carbon neutrality and to encompass its constituents. The general tendency follows to largely reduce carbon along the operational and energy efficiency lines, offset with the residual emissions so that the net emission level approaches zero along the corporate value chain. Thus it narrows down for the companies to understand their management, decision making, identifying their boundaries, processes involved, time frame required and approaches / framework for net zero emission.

Primarily, three questions frame the debate about neutrality. Firstly, which emissions should an organization accept responsibility for? Should they focus simply on the direct emissions or they are also responsible for neutralizing some or all of the emissions that arise in its operations or from the use of its products?

Secondly, what strategy / framework should an organization follow to achieve neutrality? How far must a company should go in actually cutting their baseline emissions? And to what level leadership follow the neutrality to be achieved through the carbon offsets?

Thirdly, if and how the claims of neutrality should be linked to the organization's broader performance on climate. The claim of carbon neutrality is, after all, a statement of credibility along the climate leadership and transparency.

### **Setting the boundaries**

Determining where exactly a company's carbon responsibilities begin and end is not easy. Regulated emission reduction schemes offer some guidance, but these tend to set boundaries as narrowly as possible, typically covering only Scope 1 and 2 emissions (see box 1) as defined by the Greenhouse Gas Protocol. The very nature of a claim of neutrality however – as an absolute assertion of zero net impact – implies that a broad boundary has been embraced. The boundary setting process for a neutrality claim is, therefore, better informed by that used in corporate sustainability reporting – where companies consider their broader indirect (or Scope 3) emissions alongside their more direct emissions. There might even be some legal risk to embracing a narrow boundary, with regulatory bodies.

#### **Box 1: Greenhouse Gas Protocol Scopes**

**Scope 1:** direct greenhouse gas emissions, from sources owned or controlled by the company;

**Scope 2:** indirect emissions, caused by the generation of purchased electricity consumed by the company;

**Scope 3:** other indirect emissions that are a consequence of the company's activities, but are from sources neither owned nor controlled by the company. These include business travel, outsourced activities, the extraction and processing of purchased materials, and the use of sold products and services.

Embracing a broad boundary poses a number of practical problems however. Measuring emissions up and down the value-chain remains an inexact science, and attempting to trace every last gram of carbon uses up time and resources more valuably spent understanding – and reducing – a company's most significant emissions.

One company’s Scope 3 emissions may be inevitably another company’s Scope 1 emissions, and questions can be raised about the appropriateness of one company taking on responsibility for another company’s direct emissions. Unfortunately, there is no clear boundary-setting precedent to be found in the claims that have been made so far. Most companies that have embraced the concept have adopted relatively narrow boundaries (focused on Scope 1 and 2 emissions, along with business travel from Scope 3), but some have accepted responsibility for a variety of indirect emissions.

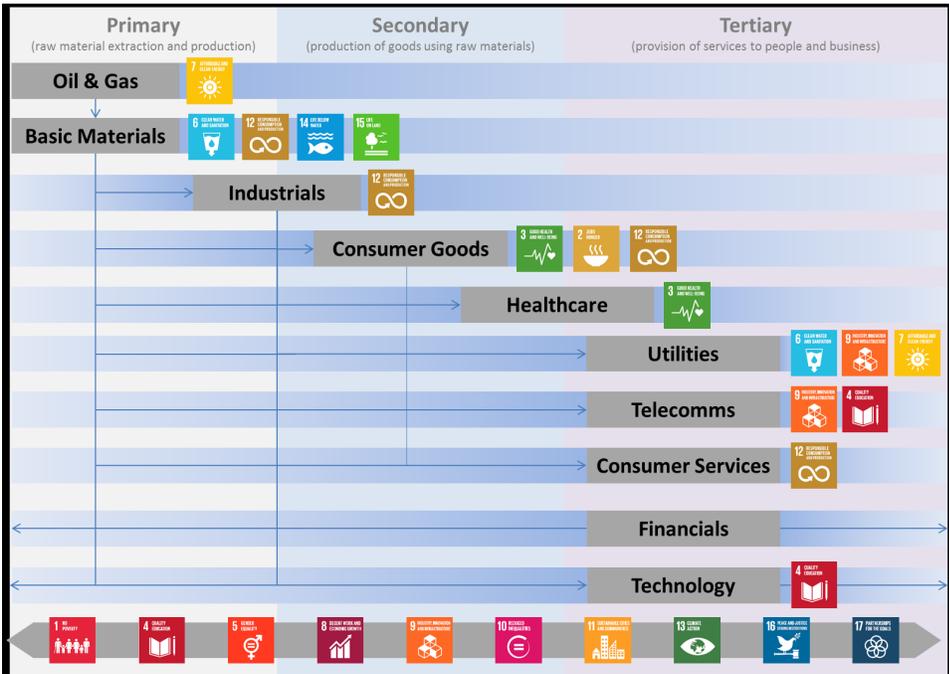
Expectations are also likely to change over time as our understanding of emissions throughout the value-chain improves and carbon footprinting methodologies develop. Rather than representing a fixed goal, therefore, it seems more sensible to view achieving carbon neutrality as a dynamic, ongoing process. Transparency about what is, and what is not, covered by any claim is, therefore, absolutely essential.

**Mapping the linkages and tools for high impact areas**

It is extremely important to identify the key industries/sectors responsible for high level of carbon emission. Those may be classified into the primary, secondary and tertiary list and their close nexus with the growth, risk and service enablers. As per the SDG goals the industries can be summarized under 3 headings:

1. With Nexus on Growth
2. With Nexus on Risk
3. The Enablers

The value chain linkages in a corporate life cycle determine whether the particular industry is directly or indirectly related to a single SDG or multiple SDGs with key the emphasis on the economy into primary, secondary and tertiary sectors (Fig.1). Therefore each sector represents a component in the value chain of another sector – whether downstream or upstream.



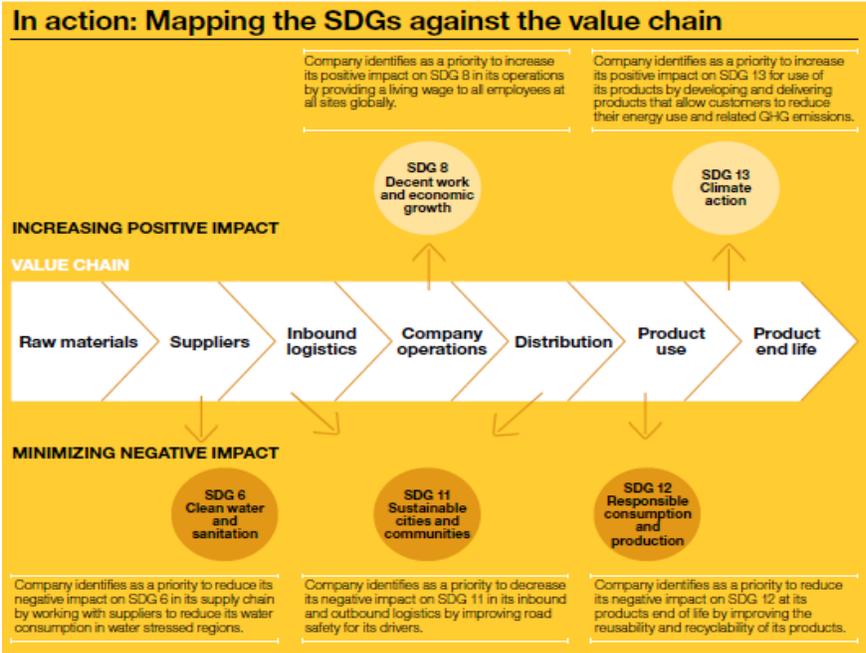
**Fig 1**

The categorization of sectors / industries further into primary, secondary and tertiary, on the basis of their core operations tend to put them into the split of high / least resource intensive industries.

Thus in order to get an in depth knowledge of how the corporate life cycle affects the natural, social and economic ecosystem, the mapping process is recommended to understand the context into account. This would mark the proximity of operations and those segments of the value chain with close relation to geographical areas that has low performance or emit high level of carbon in comparison to relevant SDG. As with regards to the labor intensive industry / corporate operations or supply chain and with poor enforcement of labor rights and standards, would likely define an area of potentially high impact such as coal industry. Thus the mapping process should include the internal and external stakeholders to identify concerns and views which may tend to relate to the corporate’s current or potential impact across the goals.

**Goal based approach**

In order to understand the impact left by stage of the province life cycle into the environment, the goal based approach is helpful to assist with the mapping of the SDG goals along the value chain. The goal specific strategy may be internal to corporate and would across the industries across different sectors. The mapping would help to identify the impact caused by the particular components in the value chain and see if they are in harmony with the other compartments in the value chain. This would help the executives of the company in turn to identify the key SDG goals being affected by the operations carried out by the corporate / industrial segment. Accordingly, the various social and environment related programmes may be initiated by the corporates, which can be further aligned with their CSR policies. The mapping through the goal based approach can be particularly helpful in choosing the right kind of projects the corporate may look into invest into as part of their green contribution initiative.



**Fig 2**

**Calculating Return on Investment over Risk Metrics**

The corporate would not invest into the projects / operations to turn into low carbon emission unless the financial gains, productivity from the projects / operations doesn't not determine the output in terms of real values. Thus the matrix can be divided into value and footprint dimensions across 3 components:

1. Net monetary value savings from all the sustainability related initiatives
2. Need to calculate productivity gains from sustainability
3. Design Risk Metrics; to draw the crucial stages of SWOT analysis underlining the negative, positive and neutral impacts of life cycle stages in Internal and External environment.

### **1. Financial (Internal and External measures)**

The easiest to measure, with the market evaluated the performance, such as return on capital or stock price from a profitable line of sustainability products. The corporates would not tend to take extra burden on embedding sustainability along the corporate value chain unless they identify the potential gains in terms of monetary values coming out of the operations.

### **2. Strategic (Internal and External)**

The black box of valuation, this reflects the firm's improved ability to create value and manage risks. These are extremely tough to measure as they revolve around the brand reputation, corporate innovation and employees. This may further be divided into Sector Specific and Goal specific.

### **3. Operational (Internal and External)**

This metric captures the direct bottomline impacts. This metric represents specific changes in the cost or revenues associated with an activity.

Prons:

### **4. Environmental (Internal and External)**

This is the end stage metrics, and the recipient of the overall impacts cause by the emission across the company's value chain. This defines the Internal and External environmental health caused by the firm.

The tracking and managing risk metrics could be challenging for any company. They should focus on only the tracking those Metrics which are critical to meeting the strategic, financial and operational objectives of the company's sustainability initiatives. The tracking of the data can help build a strong case for the the investors.

## **Integrated Management System and Compliance**

The corporate's needs to identify the set of compliance standards which they need to implement in their Integrated Management system. The system can be classified further into value and footprint dimensions. Along the value chain the processes can be divided as per the

### **Value Dimensions**

1. Knowledge development and management

2. Performance
3. Health and Safety

### **Footprint Dimensions**

1. Materials and Waste
2. Energy and Climate
3. Water and Waste Water

These values can be assessed along the six focal areas in the value chain:

- Raw Material outsourcing
- Production
- Logistics
- Retail
- Usage
- Waste Disposal

Along each process in the value chain the integrated management system focus on carbon density, which would help to understand the carbon emission at each process in the value chain. This would be helpful to set the baseline of carbon emission.

### **Calculating carbon neutrality along corporate life cycle stages**

The ambition to have zero net impact on climate is a powerful one, and a goal of neutrality has the potential to drive ongoing change within an organization. The carbon neutral framework should focus across the processes involved in the corporate life cycle. The processes would include the social and environment related projects which the corporate may tend to invest into.

This definition builds upon the inclusion of operating energy and embodied energy, and also reflects the carbon costs associated with the corporate's location. This requires a calculation of the personal carbon emissions associated with the means and distance of travel of all employees and visitors to the building. This is referred to as Scope 3 Carbon due to Indirect Emissions (organizational travel). It is felt that at the present time, Operating Energy accounts for approximately 70% of the carbon emissions associated with a building. Thus the efficiency along the operations line may help to curb the emissions the line.

The internal and external factors in the form of scope levels 1,2 and 3 involved in the corporate life cycle may be divided into various stages of product life cycle. The further division may be:

1. **Mapping:** the mapping stage will help to identify the various sustainable development indicators involved. It would also help to identify the key inter-linkages among the various disciplines.
2. **Drivers: The corporate returns on Environment investment.** The drivers will help to establish the technologies, Innovation for low carbon emission and define baseline to identify the level of carbon emission from that particular life cycle and thus revise the benchmarks.

3. **Impact:** the assessment of the impact caused to social, environmental and economic aspect. The stages would attribute to attain the Sustainable development life cycle over the length of time.

Under the scoping emissions set out, including stationary combustion emissions, process emissions, discluding factory emissions and fugitive emissions. There are 3 phases involved in the corporate life cycle.

**Phase 1 (Site Energy):**

1. Raw Material Production (evaluate the Water, Carbon and social responsibility)
2. Raw Material Transportation
3. Manufacturing
4. Product transportation
5. Construction / Installation

**Phase 2 (Operating Energy 80-90% emission)**

- 1. Deconstruction**
  - 2. Reuse, recycle, energy recovery**
  - 3. Final disposal**
1. Industrial waste and by-product
  2. Waste Logistics and processing
  3. Logistics of Finished Goods

**Phase 3 (Occupant Travel)**

1. Employee Mobility

**Carbon Neutrality** within corporate stages = Operating Energy + Site Energy + Occupant Travel:

Thus the overall equation builds upon with setting the baseline of the total carbon emission by the company, which would further take the below equation into consideration for carbon neutrality. The baseline can be set for any particular year by considering the **reporting** and **monitoring** of carbon equivalent gases (CO<sub>2</sub>e) taken into account along the value chain.

1. Lever 1: Identify the emissions alongside the value chain in corporate product life cycle. These projects could be directly the SDG goals based ones.
2. Lever 2: Invest outside the corporate emissions boundary. The corporate can look to invest into various project profiles that could be solar, wind, low emission vehicle, forestry etc..
3. Lever 3: offsetting carbon with a credible provider

**The Carbon Neutrality Overall equation:**

(Corporate carbon emissions reductions made) - Process 1 & 2 (Balance with Goal based projects and projects implemented through CSR) - Process 3 (Offset with credible carbon provider) = Net Zero impact

The Net Carbon benefit for a corporate can be calculated as:

Net Emissions reductions = Baseline emissions - project / operations related emissions

The baseline emissions are generated when we take the cumulative carbon emitted by the corporate till the particular year. The project related emissions are taken into account that would help to reduce on carbon emissions.

### **Institutional Behavior Assessment and Lifelong learning approach**

The regional perceptions of the carbon neutrality varies among industries / sectors in Europe and other western countries holds greater upside potential contrary to countries like India where the concept is at growth stage. However the various schemes launched by the government still focuses on carbon reduction through renewable energy than neutrality. Given this, the extraction and high natural resources dependent industries are least likely to opt neutrality as their goal. It's ironic that a country so proud of its ancestral innovations seems to have had its creativity frozen in time. While the world has moved on to significant and disruptive innovations that impact humanity, our appetite has been ostensibly satiated by the apocryphal stories of zero, and random, low-impact jugaads. Even the R&D undertaken by big companies seems to yield marginal results. It is quite unfortunate that ranging from listed companies to unorganized enterprises, innovation seems an afterthought in the Indian corporate. The Indian corporate is somehow reluctant to break these socio-cultural barriers.

To improve this, the knowledge development at works place an important role to link the key aspects of climate change and the carbon outflow during the life cycles. It also emphasizes on how the change in an individual's approach can motivate his innovation for low carbon in the involved process. The Individual learning and maturing environment has a circular loop role play in the organization development. It's a to and fro relationship. The top-down approach plays a significant role in taking the lead on implementing the low carbon emissions methodology. The concepts of Lifelong learning has major role to play in the Institutional Behavior assessment. The lifelong learning plays a crucial role to understand how the flow of information from top to bottom can help play a major role in the transition to low carbon emission. It's quite important for the organizations to consider the sustainability from the lens of competitive advantage than as liability.

#### **- Hunting for bargain versus premium payers**

The innovation demands a long term investment and further to be sustainable it depends on the markets ability to pay off the premium. The bargain hunting may exemplify boons of capitalism but it's a curse for innovation, specially when it comes to sustainability. Even at the top of entrepreneurship pyramid in the large corporates, there is no role model for the MSMEs to follow. Thus this bargain of low cost over innovation, on the pretext of improved efficiency, is persistent in manufacturing sector even today, specially the automobiles.

### **- Investment in knowledge development at workplace:**

Innovative enterprises require investment back into their employees. The corporate segment experiences Indian government's cumbersome policies and bureaucratic hurdles ensured venturing into manufacturing requires bribery than the innovative ideas. The reason why we continue to be at the lower end of the business chain, also the prime reason why it doesn't challenge our cognitive development.

**- Risk Averse vs Safe Players:** the risk averse nature has been genetically embedded in the Indian corporate sector. The insecurity of innovation payoff and lack of research supported actions and the minimal risk undertaking capacity of the institution executives further adds to the chaos. Thus the behavior development of non-risk activities forms a major part of the economy. Further the Indian corporate sector heavy dependence on the technology transfer, the initiative on risk tradeoff is extremely low adhering to the risk averse behavior. The flow of innovation from bottom-up or the other way is almost non-existent / not promoted in the Indian corporate sector. God forbid if the word Innovation will someday become a 'taboo'.

### **Low Carbon Policy approach**

The Government of India has also remained a staunch supporter of coal. The current energy policy places a silo approach on meeting energy demand through alternative resources in form of solar, wind energy, biomass and nuclear energy while simultaneously curbing on carbon emissions through this initiative.

At least 300 million of India's 1.25 billion people live without electricity. Another quarter-billion or so get only spotty power from India's decrepit grid, finding it available for as little as three or four hours a day. The lack of power affects rural and urban areas alike, limiting efforts to advance both living standards and the country's manufacturing sector. And its energy infrastructure is in dismal shape. The obsolescence of its power grid was demonstrated by a massive 2012 outage that left more than 600 million people in the dark and drew attention to a utility sector in disarray, with an estimated \$70 billion of accumulated debt. Such growth would easily swamp efforts elsewhere in the world to curtail carbon emissions, dooming any chance to head off the dire effects of global climate change. If those people rely heavily on fossil fuels such as coal to expand the economy and raise their living standards to the level people in the rich world have enjoyed for the last 50 years, the result will be a climate catastrophe regardless of anything the United States or even China does to decrease its emissions. He was exultant at the passage of a bill in March to guide expansion of the country's domestic coal-mining industry, saying it would boost the economy and create thousands of new jobs. India consumes around 800 million tons of coal a year and could more than double that number by 2035, according to the World Energy Outlook from BP. To meet that demand, and to limit coal imports, Goyal plans to increase domestic coal production to 1.5 billion tons a year by 2020, from 2015 levels of 660 million tons. India's energy supply, overall carbon emissions would nearly double: from around 2.1 billion tons in 2014 to more than four billion tons by 2040, according to the International Energy Agency. Foreign companies are lining up to invest in India's renewable-energy sector (Softbank, of Japan, recently announced it will invest \$20 billion in solar projects in India). But actually building all these new projects will be extremely expensive, requiring a level of fiscal discipline and political will that India's fractious, corrupt government has seldom achieved. The democratic structure in India imposes lot of political challenges and thus the government has

limited power to compel the states to implement and enforce clean-energy mandates, beyond the promise of central-government largesse. Rules requiring utilities to use a minimum amount of renewable power have mostly been ignored.

(<https://www.technologyreview.com/s/542091/indias-energy-crisis/>)

## **R2AO (Recircular.Regenerate).Absorb.Optimize Model**

The R2AO framework may help to identify the levels of different capitals involved along the corporate life cycle. The framework may further be divided into three principles. The principle one may involve the Natural Capital. The principle two may tend to involve the Human Capital and Manufacturing Capital. The principle three may involve the Economic and Social Capitals.

### **1. Natural Capital**

### **2. Human Capital + Manufacturing Capital**

### **3. Economic + Social capital**

The capitals at the 3 stages would tend to define the corporate life stages and how to circular the capitals in the loop.

The closed loop system for low carbon transition had to be circular in nature, a model designed around recyclable, re-manufacturable and reusable to maximize the use of material already extracted from ground. This concept revolves around the circular economy, a disruptive business innovation model that places key emphasis on the need for manufacturers to manage material flows and bring back first life products for additional cycles. This forgotten vector could play a pivotal role in low carbon society. The production of raw material accounts for nearly 90% of carbon emission, and waste accounts for nearly 3%. To account for nearly 80-90% cut as laid out by IPCC, one has to address the emissions at both these stages. The principle of circular economy calls for circular use of finite resources, maximum utilisation of resources taken into use, the elimination of negative system effects.

Applying these principles will lead us to rethink entire industry. As with the mobility sector, new car sharing technologies- where bookings, checkouts, and payments all are managed through a smartphone -could boost that rate significantly. This higher utilisation could make it more economically feasible, to use cars with an all electric driven train and made out of light weight reusable material, since the higher upfront costs for these technologies are paid back over many more miles. This high- value car, in turn, is more economical to reuse, remanufacture, and recycle. So a positive loop of higher utilization, low-carbon energy, and less material consumption is created.

A third to half of the carbon mitigation opportunities are additional to the one in focus on climate debates, making circularity an additional opportunity in the gigatons. Many of the circular economy opportunities are not captured by the carbon price (tax) or by other actions in focus on climate debate. The policies around circular economy are not in much discussion and the policies around it are still in it's infancy. The detailed intervention to remove market failures and allowing inherently opportunitites to be captured. Since its inception with industrialization, the linear economy has created massive lock-ins. As a result, there are so many agency issues built

into the material and product flows that a carbon price alone won't be effective. Progress has already been made in shifting the direction of the energy system. Now we need of the hour is to address the material flows that underpin our industrial engine. The circular economy could be the missing vector needed to meet our climate targets.

## **Sector specific strategies**

The measurement of emissions intensity is not standard and varies from industry to industry. Emissions intensity may be defined as the ratio of emitted GHGs to a measure of economic activity. The different sectors and industries have different level of carbon emission along the value chain. Most of the industries are heavily Resource reliant and rest of them may not be completely dependent. Thus the level of carbon equivalent gases emission vary across the different stages of the value chain. Keeping the principles of circular economy in mind, stretching laing the material value of the product as well, the principles for low carbon emission can be implied. The industries such as coal are heavily reliant on natural resources, whereas automobiles are reliant more on water and energy. The stepwise compliance based sustainability principles would help to set the benchmark of the carbon emission with a baseline. It's quite important to set the baseline of the emission target in order to quantify the level of emission.

The mapping of the environment, economic and social development based program of the corporates with the sustainable development indicators. The mapping of the components of the projects involved in corporate life cycle will help them to closely understand the various sustainable development indicators involved at one single stage. For ex: a stage involved in automobile may not only involve the SD indicators relevant to economic and environment specific but also SD 4 relating to the individual and corporate Lifelong learning for the constant knowledge development. Furthermore the corporates should not only align themselves with the national targets for meeting the renewable energy demands but also simultaneously work on the circular economy principle, with maximizing the use of healthy materials, without extracting the virgin ground resources usually defined as Volatile Organic Compounds (VOC), where the goods are designed to be recycled.

## **Current scenario of India with carbon emission**

India is placed as an emerging economy on the global energy consumption plate, which continuously struggles to meet with its energy demand for the exponentially rising population. On its heart, is the coal based energy policy which powers the 77% of the electricity generated and the future outlook shows that coal will continue to dominate the country power demand, with the best scenario that coal will still be powering the India's electricity generation with the tune of 60% by 2040. These numbers are not necessarily problematic but when put into the context of conditions plaguing in the coal sector, the notion of low carbon emission may necessarily question the policies in place. The rise in carbon emission due to coal fired electricity generation was highest in India due to still existing heavy reliance on coal. India, with one of the poorest coal quality, ranks third worst in the world in context to coal plant efficiency. These circumstances lead to larger volumes of coal being burnt to produce necessary energy benchmarks, leading to excessive carbon emissions.

While talking about the climate change, the focus tends to shift on the power sector. It is important to recognize that 44% of the Indian carbon emission comes from electricity generation. The transportation sector accounts for 10% of total green house gases and waste management processes are linked to 3.5%.

The low carbon economy index 2015 by PwC shows that electricity generation in India rose 8.2% in 2014, whereas the corresponding global figure was only 0.5%. The report marks the double digit growth in demand for coal as per consumption increased in line with 7.4% growth in GDP, compared to global GDP growth at 3.3%.

India's contribution amounted to almost one third of the total global emissions. With the share stood large at 157 million tonnes of CO<sub>2</sub>, substantially out of 572 million tonnes, the world's leading polluter for decades. There is a stark growing proportionality relationship between the energy consumption and emissions growth. The emission growth in every major country trailed consumption growth, Indian emission growth (8.1%) alone outpaced consumption growth (7.1%), pointing to greater carbon content in its fuel mix. Though the current regime is adopting one of the most ambitious policies in the world for renewable energy programmes but coals still remains at the heart of energy policy in India, 455 of 1199 coals based plants worldwide are to be set up India. But India's size, and the consistent rise in its emissions growth puts India in a league of its own. This trend is unlikely to abate since projections show India is set to grow faster than any other major economy, propelled by a massive, coal-fuelled, Chinese-style industrialisation drive.

In order to curb its reliance on coal and fulfil its Paris obligations, India must look into alternative energy resources. India has made a significant push towards the low carbon economy transition by pushing its renewable energy footprint by 350% over past one decade and plans to double its existing renewable energy by 2022. While its push towards renewable energy is important, India must continue to take holistic approach towards climate change.

The corporate life cycle principle over the circular economy posits over the healthy materials approach is quite important in order to achieve sustainability and sustainable development. This necessarily calls for action to be placed at final output and the input in form of raw materials to product life cycle. In addition to investing in solar and wind plants, it should also invest in clean coal plants, managing its upcoming energy transition in order to curb on carbon emissions.

## **Conclusion and Recommendation**

**1. Establish an investment fund for energy efficiency in buildings:** This fund would be used to support additional initial investment costs for energy efficiency in buildings and could be financed through levies of energy use above the national average or baseline for that particular building type in the country. In this way, the fund would provide additional incentive for reductions among high energy users. This fund could also be financed by redirecting investments in increased energy production avoided by reduced energy demand in buildings. Such a fund could also be supported with seed financing provided under NAMA.

**2. To set up national regulation** that effectively aims at implementing energy efficiency investments in new buildings and renovates the existing ones. The supplementary investment costs would no longer be optional and that would be carried forward from the investment phase to the utilization phase with the increased building costs. These preliminary costs would be offset by abridged operational costs.

### **3) Embrace the boundary**

Complying with the greenhouse gas standards a company embrace the emissions across the scope 1, 2, 3 levels. In the spirit of the Zero net impact with a practical boundary-setting, I recommend companies should accept that claiming neutrality implies responsibility to consider and address broader value-chain emissions, including indirect emissions be explicitly considered as part of the neutrality process.

### **4) Demonstrate a broad understanding of your entire carbon footprint prior to making any claim of neutrality – and ensure that your claim covers a relatively significant set of emissions**

A transparent understanding of the company's full carbon footprint is essential as a prerequisite for any claim of neutrality, regardless of what boundary is set. This does not mean that companies should chase every gram of carbon in their value-chain, but rather that they are able to broadly disclose and discuss where their biggest indirect emissions lie. Questions remain about the appropriateness of a company making a limited claim of neutrality (i.e., regarding its "manufacturing operations") when the associated emissions are relatively trivial compared to other emissions in its value-chain. If companies claim neutrality for relatively insignificant sets of emissions, the concept risks losing its legitimacy.

### **5) The strategic hierarchy for neutralization**

This could be used to achieve neutrality by a hierarchy that prioritizes the avoidance of emissions, through energy efficiency, the replacement with low- or zero-carbon alternatives, and then the use of carbon offsets. Offsetting will play an important role in any neutrality strategy, but a claim of neutrality will ultimately be judged on the company in question being able to demonstrate a declining emissions baseline.

### **6) Sustain and exhibit responsible leadership on carbon neutrality**

Any claim of neutrality brings with it some risk, but unqualified claims are riskier than others. While it may technically feasible for a company to achieve neutrality through a strategy of 100 percent offsetting, this would not represent the spirit of leadership embedded in the term. True climate leadership is indicated by companies rethinking in disruptive innovation; engaging with their suppliers, peers and customers; and developing products and services that will thrive in, and help bring about, a low-carbon economy. While linking such actions directly to a claim of neutrality remains problematic, any company that wishes to position itself as a brand leader on climate change, needs to embrace them.

### **7) Neutrality as a long-term commitment – and an ongoing, dynamic challenge**

As the stakeholders interest in full corporate life-cycle emissions grows – and methodologies for measuring and allocating responsibility for such carbon emissions develop – we can expect the rules of the game for claims of neutrality to change. A commitment to neutrality must therefore be a long-term commitment.

### **8) Sustainability as competitive advantage than liability**

The regional perceptions around sustainability for low carbon emission needs to reflect in the business strategies. As long as the businesses considers it as liability the successful transition towards carbon neutrality will charm only in the books.

**9) 'No one size fits all':** The corporate's have to build their knowledge around disruptive innovation / Sustainability business strategy towards carbon neutrality would differ among industries and sectors even with allied interests and so the scope and emission levels arising from a particular project / operation.

**10) Cross Sector partnerships:** This would help the industries to understand the issues of joint concerns.