Policy level transformations for enabling businesses in India to reorient their growth strategies

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Abstract

As we are witnessing growth proliferation in India in terms of GDP, so are its emissions of Green House Gases (GHGs) increasing exponentially. Understandably, the focus of international climate change mitigation efforts has shifted towards India and all eyes are on its policy changes to reduce the carbon intensity of its economic growth. Though India has not accepted (and possibly neither plans to accept in immediate future) any binding targets to reduce its emissions, post the Copenhagen Climate Conference, the nation has declared its stance of voluntary emission reduction. Consequently, central and state level policies and regulations are undergoing changes and modifications to gradually incentivize low carbon intensive options and to discourage higher fossil fuel based energy sources. This poses interesting challenges and opportunities for businesses in India. Undoubtedly a business-friendly regulatory regime will play a pivotal role to ensure the Indian economy continues to grow faster and so would pro-active climate change policies facilitate a low carbon transformation of India's economic growth story.

The aim of this paper is to propose policy level transformations for enabling businesses in India to reorient their growth strategies in line with a low carbon and sustainable development. Incentivizing clean technologies, renewable energy and environment friendly practices today faces the barriers of high costs, absence of technologies and myopic focus on short term profits for most companies in India. Thus this paper proposes alternative mechanisms, both economic and technical, which if implemented, would enable Indian industries and businesses to overcome the common prevalent barriers and help them adopt the low carbon intensive growth trajectories. We believe such an approach would be the right trigger for the country to move towards a sustainable future.

1. Regulatory policy changes/modifications

1.1 Innovative "revenue-neutral" carbon tax regime

As an alternative approach to the current system of no carbon tax, the government could adopt a "revenue-neutral" carbon taxation regime wherein the tax pulled in for carbon emissions can be given back to the society. The primary idea behind this concept is that the government will retain only a miniscule portion of taxes raised by taxing carbon emissions. Most of the taxes raised will effectively be returned to the society in various possible forms.

Two primary return approaches are

Dividend Approach

The government would return the revenues directly through regular (e.g., monthly) equal "dividends" to all citizens of the country. In effect, all stakeholders of society would receive equal, identical share of the total revenue pie. Entities using more energy or having a higher carbon footprint will have to shell-out higher carbon taxes which will be distributed among the masses. Such a policy would ensure eventual movement towards more and more efficiency in the economy as a whole, over a period of years. This mechanism would probably make the tax - progressive and would send out a direct message to the inefficient companies, they would either have to mind their ways or slowly bleed to death. Companies competing in the same space will have direct effect of the carbon tax on their bottom line. Thus, efficient usage of power and reduction of carbon footprint will be one of the primary sources of competitive advantage for the firms.

The concept can directly be extended at individual level as well by levying carbon taxes on fuel, electricity and goods. The higher consumption households will have to shell-out more money for their greater impact on the environment while the lower consumption households might in fact gain more than what they pay as taxes.

Thus, the society will have a decreased carbon footprint and the group of people having least impact on environment will stand to gain a lot from multiple quarters. The phases and plans for the rollout can be chosen by the government in line with its other policies.

Tax – Shift Approach

In another method, each rupee of carbon tax revenue would lead to a rupee's worth of reduction in existing taxes such as the payroll tax or state sales taxes. The benefits of the mechanism would therefore benefit whole of the society and change the tax regime for the common man. The amount of carbon tax collected would lead to a direct reduction of state taxes by same amount. For phase 1, companies paying carbon taxes will lead to a reduction in taxes for the common man. As carbon-tax revenues are included in the mainstream (with tax rates rising gradually but steadily, to allow a smooth transition), existing taxes will be phased out and, in some cases, eliminated. This "tax-shift" approach would also ensure that the carbon tax is revenue-neutral and could offer other benefits. For example, reducing payroll taxes could stimulate generation of employment.

The concept can also be extended to individuals. As more and more taxes are collected from the individuals for carbon, some regular taxes can be relaxed. The net effect will be lesser burden on the people who are contributing less to the environmental damage. This mechanism can turn out to be

an excellent motivation to reduce the environmental impact and will act as a deterrent for energy wastage.

From an administrative and political perspective, both mechanisms are a good choice because they don't require introduction of any new taxes as such if looked at in totality for the whole society. Since the government is not getting any additional revenue, it is just a form of tax restructuring to befit the environment. Thus, the government is unlikely to face any criticisms or opposition to the regime bill. Also, the carbon tax is easier to understand and implement than other complex market based mechanisms like the cap & trade. Carbon tax will help in overcoming the shortcomings of cap & trade and instead introduce a very direct and straight forward mechanism.

There are many countries which are practicing the carbon tax system. For example:

Finland enacted a carbon tax in 1990, the first country to do so[i]. The original system was based only on carbon content but it was subsequently changed to a combination carbon/energy tax in 2011. The current tax is €20/tonne of CO_2. In 1990, the figure was €1.2/tonne of CO_2.

Sweden enacted a tax on carbon emissions in 1991[ii]. Currently, the tax is $150 per ton of carbon. No tax is applied to fuels used for electricity generation. The industries are required to pay only 50% of the tax. The non-industrial consumers pay a separate tax on electricity. Fuels from renewable energy sources are exempted from the tax regime. As a result the tax led to heavy expansion of use of biomass for heating and industry.

Great Britain enacted a "climate change levy" in 2001 on the use of energy in the industry, commerce and public sectors[iii]. Tax revenues are used to provide cuts in employers' National Insurance Contributions and to provide support for energy efficiency and renewable energy; the Department of Environment, Food and Rural Affairs (DEFRA) states that the levy "entails on increase in the tax burden on industry as a whole and no net gain for the public finances." Rates are 0.07p/kWh for liquid petroleum gas, 0.15p/kWh for gas, 0.44/kWh for electricity and 0.12p for any other taxable commodity. There are various exemptions, for example, exemption for electricity generated from new renewable energy and fuel used for "good quality" combined heat and power.

1.2 Modified version of the existing Perform, Achieve and Trade (PAT) scheme

Along with energy generation, energy efficiency techniques offer a great potential towards energy security and sustainability. Particularly in a developing country like India, which has been dogged by problems of energy security, it is important to ensure efficient use of energy, both industrial and commercial. Achieving India's goals related to climate change will depend largely on how the country performs in enhancing energy efficiency.

The Perform, Achieve and Trade (PAT) mechanism introduced as a part of India's National Mission on Enhanced Energy Efficiency (NMEEE) is intended to be a market based mechanism to enhance energy efficiency in energy-intensive industries. The savings targeted through setting energy efficiency targets for the industries are approximately 10 mTOE (million tons of oil equivalent), translate into an avoided capacity of 5623 MW over a period of 3 years. The regulatory body, Bureau of Energy Efficiency (BEE) had initially identified 9 energy intensive sectors and over 600 industries (also known as Designated Consumers - DCs), which has now been reduced to 8 sectors and 477 DCs.

The mechanism is an encouraging initiative towards mitigating climate change and securing energy and thus resources, however, there are a few pitfalls that need to be addressed for it to succeed. The mechanism will introduce trading of energy saving certificates (Escerts) between consumers in order to achieve the total targeted energy savings with a higher achievement being rewarded through issuance of tradable Escerts and inability to achieve the target being penalized. At the outset, there is lack of clarity on the driving factors of the mechanism, which will influence its success. The most important ones are the following:

Setting appropriate targets

The targets for the DCs are proposed to be set based on their current Specific Energy Consumption figures (SECs). Whilst it was initially announced that fixed targets would be set across sectors, this has now been rightly revised to ensure that the targets are based on current SEC levels of the industry.

In the initial draft, the BEE has defined a target of 10 mTOE to be achieved through the mechanism that is then further divided and allocated to each sector. The targets for the DCs essentially decide the existence of the market, too low will kill the market and too high will lead to an undersupply of Escerts and general disbelief in the mechanism. To ensure a cap and trade mechanism as desired by the BEE, it is crucial to set the right target levels.

Additionally, the BEE has proposed a cluster-based approach (group of consumers in the same sector) with different historical SEC levels for setting targets to individual consumers. However, there is no transparency on the classification of individual customers into clusters and the targets for each cluster. It also does not mention if there will be due consideration for the processes followed by the consumers. For example, a cement industry can follow a dry process or a wet process and both of them have different levels of energy consumption. Penalizing one more than the other would not ensure fairness. Transparency and due consideration of processes in setting targets is essential to ensure a fair game for the consumers. Therefore, further clarity and detailed research is important to ensure that all the factors are taken into account.

Price of Escerts

BEE has not set any floor price for the Escerts or provided any indicative price for them. The price of the Escerts is a crucial factor as it decides,

a) DCs choice of investment to achieve the targets or to pay the penalty

The price of an Escert facilitates DC to make a choice between investing and paying a financial penalty. In fact, it would also decide the optimal investment for the consumer in energy efficient equipment or processes. By simple logic, it can be concluded that a consumer would not invest in a technology that would be greater than the sum of financial penalties and savings achieved through reduction in energy cost. Since the regulatory body intends to link the penalties to the market price of the Escert, setting a floor price is important.

b) Existence of a market

The PAT mechanism has defined the first period to be between April 2011 and April 2014, however there is still lack of awareness amongst the consumers regarding the mechanism and more importantly, a belief that a market may not exist.

In order to increase the confidence of the consumers in the mechanism, it is important to have a floor price and roof price for the Escerts. A floor price for the Escert will ensure the existence of a market and setting these would also ensure protection of the market against under supply or over supply of Escerts.

For the market to exist and the mechanism to succeed, BEE needs to provide an indicative price of the Escerts. This should be done by conducting a thorough research on the possible price range of the Escerts and ensuring that the targets set are appropriate.

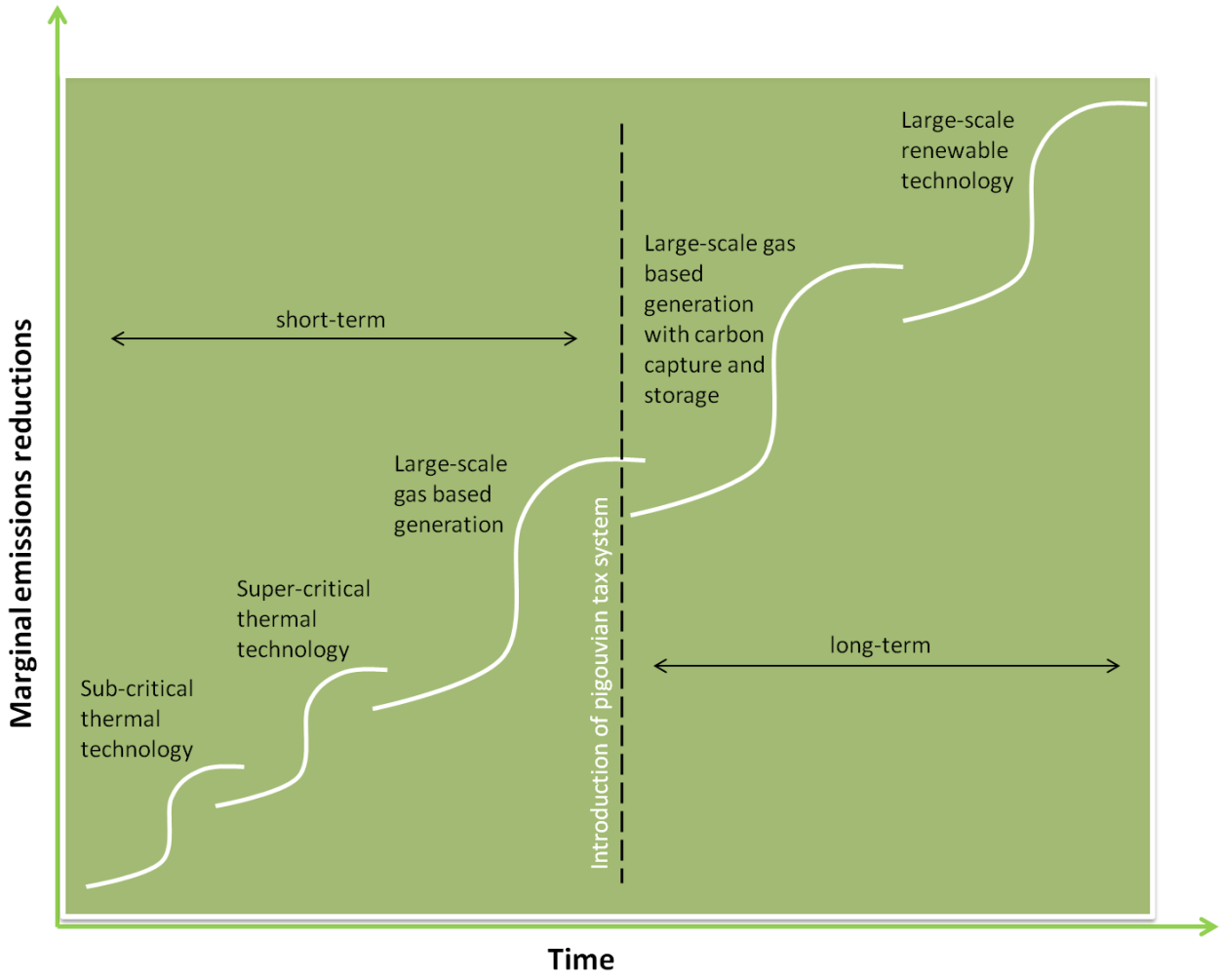
Penalties

The last and the most important factor for the success of the mechanism is the penalties levied in case of non-compliance with the targets. The initial penalties that were defined were inconsequential and thus were not an incentive for a DC to invest in energy efficiency solutions. The current level of the penalty, expected to be imposed, on the consumers are 2-fold, an upfront penalty of INR 10,00,000 and purchase of equivalent number of Escerts from the market. Consider a simple case wherein a consumer has missed the target by 1,000 mTOE and the price of the Escert in the market is INR 1,500. The consumer would have to purchase 1,000 Escerts from the market and pay a penalty of INR 10, 00,000 which would be equivalent to INR 25,00,000. An inconsequential penalty such as this would not push the consumer to implement energy efficiency solutions. The Escerts are awarded at the end of the 3-year period and there is no clarity on how the mechanism would function thereafter. In order to set up a trading mechanism, where Escerts are traded, it is important to have dynamic targets, a scope definition for the future and auction or allotment of certain number of Escerts. This would ensure a trading mechanism through the period rather than purchasing Escerts at the end of the 3-year window. In doing so, the regulatory body must refer to the EU-ETS and the CDM.

To conclude, it is important for BEE and the related stakeholders to re-look certain clauses of the loosely defined PAT mechanism to ensure that there are long-term, sustainable solutions to the area of energy efficiency and climate change.

1.3 Pigouvian tax system to penalize high carbon intensive businesses

Adoption of short term strategies such as innovative carbon taxes and efficient energy/carbon trade mechanisms will not result in sustained emission reductions over the long term. This is because of diminishing marginal emission reductions from cascaded implementation of the short term regulatory policies. Emission reductions, similar to revenue returns (ROIs) exhibit diminishing marginal returns and are prone to reaching saturation after some time. In order to ensure sustained increments in reduction of emissions intensity of the country as a whole, long term policy would have to be radically different from the above short term propositions. In this regard, we propose the system similar to a Pigouvian taxation regime wherein industries would be forced to change their business models to low carbon intensive ones in order to avoid the tax penalties. For example, a thermal power company would gradually change its fuel mix and business portfolio from the present sub critical setup to future configurations of carbon capture and storage (CCS) and to large scale renewable energy (example: tidal).



The concept of the Pigouvian tax

Pigouvian taxation differs from conventional tax systems to the extent that over a period of time, it helps in reduction of consumption and production of the product it taxes. Popularly known as 'sin taxes', this system serves the dual purpose of decreasing the use of a product while creating additional revenue for the government[iv].

Since the 1920s, across the globe, the preferred form of taxation used to check environment related issues has been the Pigouvian taxation system. As per extensive research drawn out by John Norregaard and Valérie Reppelin-HillSince although Market Based Incentives (MBIs) prove to be more popular and politically accepted form of controlling carbon emissions, command and control approaches (CAC) have proven to be far more efficient in delivering proactive emission reduction quantities through drastic changes in business models. We infer this apparent contrast tracing the progress of the environmental revolution in the western world in the late 1960s and early 1970s[v].

The conditions, under which Pigouvian taxation as a concept flourished in the 60s and 70s, would be prevalent in India in the long term. We believe this forms the underlying rationale behind suggesting a Pigouvian taxation form to control carbon emissions.

The conditions are as follows

- Environmentalists do not play a major role in policy development of the country
- Industry will respond by adopting radically different business models only on imposition of something as strict as a Pigouvian tax
- Creation and regulation of non-traditional mechanisms to tackle modern day problems seems to be lacking

Given these circumstances, it's of consequence to prove how the Pigouvian system of taxation is more relevant in India today than permits.

Taxes and limits/permits, in principle, are very similar policy instruments. They depend on price signals and incentives for corporate or emitters to reduce the costs that they impose. If we implement a Pigouvian tax system, it would involve setting a charge per unit of emissions equal to the total value of only the damage caused by an extra unit of emissions. This signals the true social costs to the organization responsible for the damage, which then has a financial motive to reduce emissions up to the point where the profit/loss due to reduction in emissions is equal to the damage involved. However, if we enforce limits on consumption or production, a regulatory authority would necessarily need to allocate quotas equal to a determined aggregate quantity of emissions. These limits are usually defined by tenure and tradable. Trading of permits among emitters will lead to a market determination of cost of emissions which may or may not be adequate or representative of the marginal social cost of damage caused due to the actions of the corporate world.

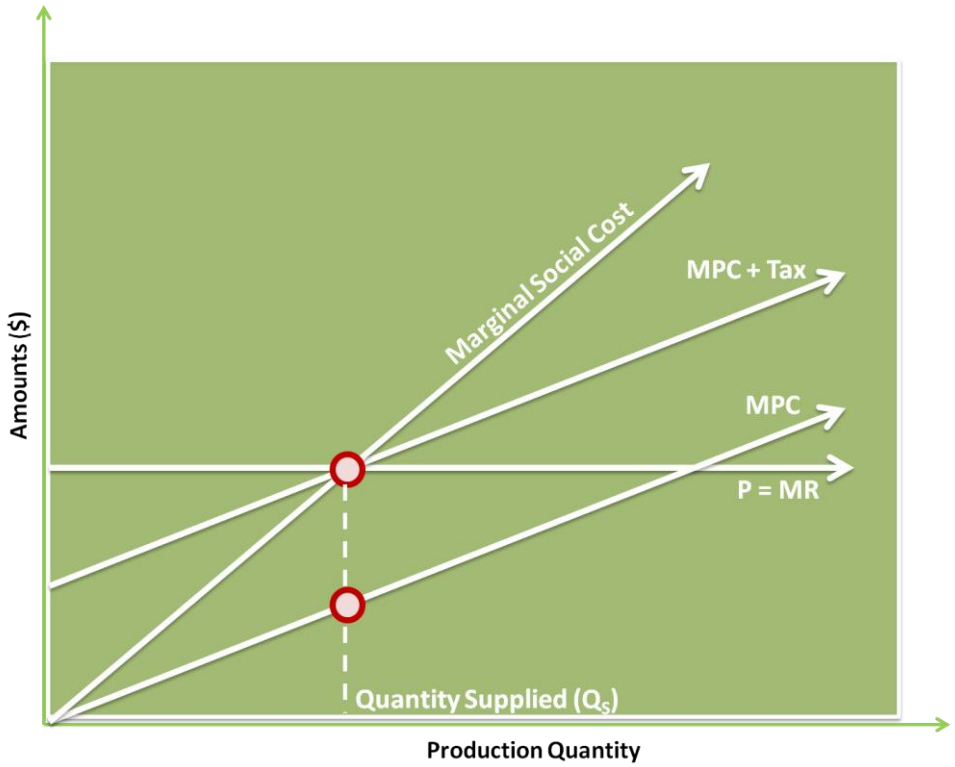
Apart from helping set the right prices for the cost of damage caused by increased emissions, Pigouvian taxation also helps in controlling production of goods that are a social burden on society. Secondly, the costs are internalized which leads to lesser burden of regulation on government authorities. Since the tax is directly paid for and in conjunction with the production consumption activity of the companies, their management and audit by authorities becomes simpler. It definitely adds to the government's revenue sources which could be used to developing incentives as well for organization proactively fighting carbon emissions.

However, implementation of these taxes is not easy, especially in a country like India. Vested lobbies would work tooth and nail to prevent the implementation of such taxes. Some economists argue that use of these taxes may lead to potential inefficiencies in the market. At present there are limited best practices to refer to since few countries have actually adopted Pigouvian taxes in the area of carbon emissions. The new formed tax may be conceived as regressive given the current world scenario where the alternatives may be equally expensive or difficult to switch to (for example: gasoline)

Lastly, there has been no credible evidence as to the effectiveness of the advantage of Pigouvian taxation in controlling emissions. Denmark, Finland, Norway and Sweden have had a form of Pigouvian based carbon taxes since the 1990s, but there seems to have been no decline in emissions in these countries. On the contrary, in Norway, emissions have actually increased by 43% per capita.

But still, some of the issues can be addressed through efficient taxation system design.

How to design a Pigouvian Taxation System



- The taxes need to be set in such a way that it is more cost efficient for the firm to reduce pollution than to pay the taxes (taxes are set higher than the Marginal Social Cost - MSC)
- Tax rate (t) is fixed at the point where MB=MC, which is the optimal level
- Internalizing MSC in decision making, leading a reduction in output Marginal Benefit equals the Private Costs + Social Costs
- Assuming that all polluters contribute to the social damage in the same manner, equi-marginal principle requires that MC of cost control be equalized across firms to achieve an emission reduction at the lowest cost possible.

However, from a design perspective, it is essential to keep in mind the following pitfalls or road blocks on the way

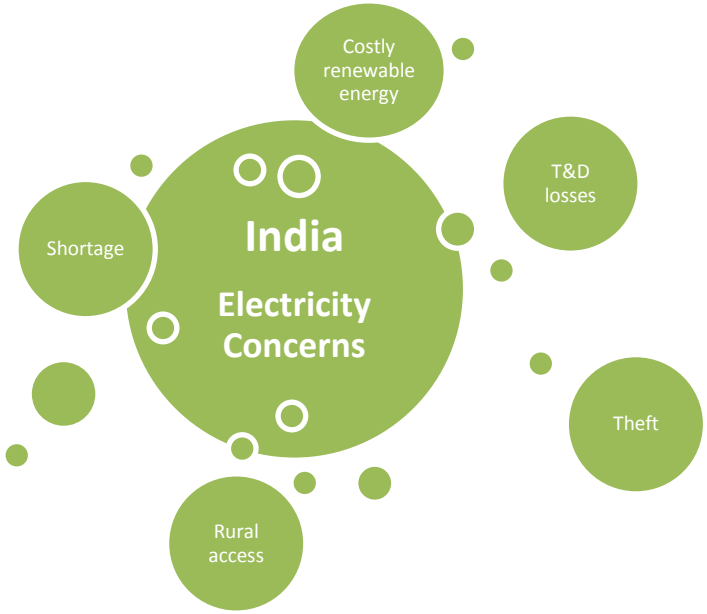
- It is usually difficult to measure MSC. Inaccurate design may lead to distortion in tax rates
- Lack of a proper information system, transparency in reporting and corporate governance guidelines and audit practices may lead to information asymmetry which could lead to wrong incentives being provided to the wrong companies

2. Technological changes and adoption of new climate friendly technologies

2.1 Integrating renewable energy, energy efficiency and smart grid technologies for greater common benefits

The country registered base load electricity shortage of around 8% and peak load electricity shortage of around 10% in 2010-11. With transmission and distribution losses as high as 30-40% of the generation, power cuts are fairly common in most parts of the country. Although 80% of rural India has electricity connection, a meager 53% of rural households actually get access to electricity.

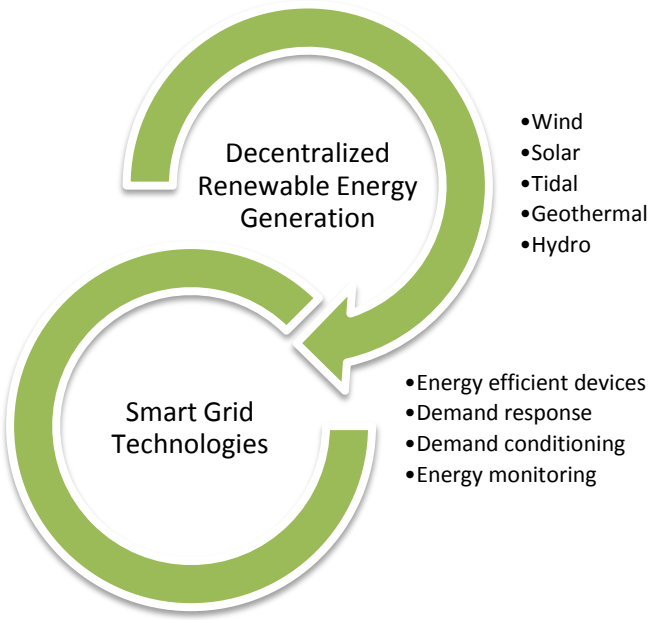
In order to sustain country's high GDP growth rate, it is imperative to meet this energy demand in the most efficient way. Mega and ultra-mega thermal power plants may offer a quick fix solution right now. But due to limitations on the supply of fossil fuel resources and the huge environmental costs of using them, this may not be the most sustainable solution.



Renewable energy sources (wind, solar, tidal, geothermal, etc.) offer a more sustainable solution to tackle the energy demand-supply gap of the country. However, for a developing country such as India, large scale deployment of these costly renewable energy generation sources is not financially viable. Being a tropical country, India receives good insolation round the year, which can be converted into electricity by using large scale solar PV plants. The country also boasts of many high wind potential sites, which have already been tapped throughout the country for wind energy generation. Modern high capacity utilization wind turbines should be used to replace the outdated Wind Turbine Generators at the high wind sites. Country's vast coastline will attract the currently immature technologies: Tidal and Wave energy generation in future.

Lower IRRs, longer payback periods and low capacity utilizations deter power project developers to voluntarily take up renewable energy generation.

The most sustainable way to attack this problem is a 2 fold solution which entails the following:



Decentralized renewable energy generation

The best way to harness the true potential of renewable energy projects is to set up small to medium scale decentralized renewable energy hotspots. These are localized renewable energy power projects (not necessarily connected to the grid) set up to serve the local communities. For example, a cluster of 5 villages can be served through a solar PV plant located centrally to the villages. This would solve multiple problems

a) Electricity could be provided to remote locations which are cut off from the main grid

b) Large substations and HV transmission lines need not be set up as grid connection is not required leading to cost reduction.

c) T&D losses would be reduced due to local generation and consumption of electricity

Use of hybrid technologies such as wind-solar hybrid plants will help increase the reliability of renewable energy projects.

Adoption of smart grid technologies

The financial viability of renewable energy projects can be improved by adopting energy efficiency and demand side management (DSM). By using contemporary energy efficient appliances, processes and by undertaking DSM employing advanced demand response and demand conditioning techniques, the overall load on the grid can be reduced significantly. These will in-turn lower the effective payback periods for renewable energy generation projects.

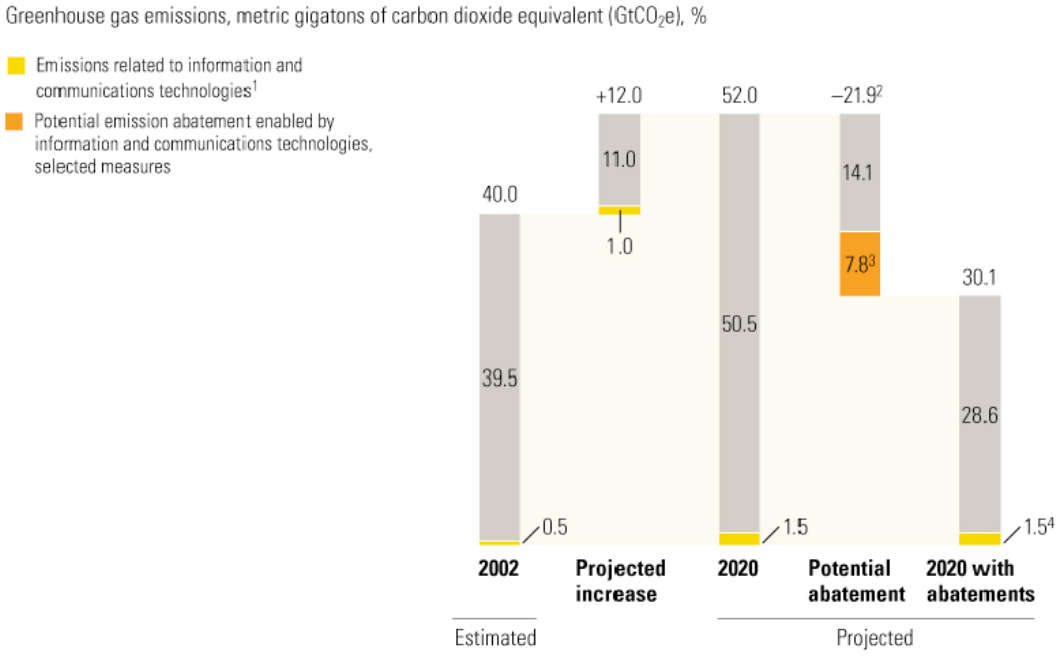
All this paraphernalia would eventually form a part of a larger ecosystem termed as “Smart Grid”. This smart grid will broadly be a fully automated, widely distributed energy delivery network characterized by a two-way flow of electricity and information, capable of monitoring and responding to changes in everything from power plants to customer preferences to individual appliances.

Some of the basic elements of this smart grid would include smart metering, direct response system, decentralized/ localized power generation and utilization. The backbone of this grid will be formed by ICT solution.

Some of the other benefits of this system would be reduced transmission and distribution losses, enhanced power quality, increased reliability, improved efficiency, better peak load handling capability, reduced power thefts and so on.

2.2 Information and Communications Technology (ICT) solutions for low carbon development

The most significant contribution of the ICT industry towards mitigating climate change is the introduction of the internet, process automation and communication technologies. The internet has transformed the way the world communicates. Today, the internet touches almost every aspect of business and has significantly reduced the amount of paper used or the extent of travel undertaken. Other ICT technologies with their potential for reducing cycle time, increasing process efficiency and reducing energy, fuel consumption have grown to gain pan industry applicability and acceptability. A McKinsey study[vi] reveals that ICT technologies could help to eliminate 7.8 metric gigatons of greenhouse gas emissions annually by 2020 (figure below)- equivalent to 15 percent of global emissions today and five times more than the estimated emissions from the ICT sector itself.



[1]Includes laptops and PCs, data centers and computing networks, mobile phones, and telecommunications networks.
[2]Includes emissions abatement of 17.1 metric $GtCO_2e$ reflected in McKinsey's global abatement cost curve; some double counting with additional measures is possible.
[3]Includes emissions abatement of 2.9 metric $GtCO_2e$ reflected in McKinsey's global abatement cost curve, plus additional abatement of 4.9 metric $GtCO_2e$ from estimates in this study.
[4]Includes effects of known technological innovation in 2020 forecast; does not include effects of any additional abatement potential related to information and communications technologies.

The major technology interventions contributing to greenhouse gas reduction are presented here.

Reduction in paper usage through implementation of Enterprise Resource Planning tools

ERP tools integrate an organization's management and process information with the help of a software application. An ERP system facilitates the systematic flow of information across business units, along with making a provision for tracking of information flow and creation of summary reports. SAP, Oracle, PeopleSoft and Invensys are a few major companies that provide ERP software. The implementation of ERP systems has brought down organizational paper consumption significantly, owing to the reduction in usage of hard copy invoices, memos, meeting notices, record books, etc.

Reduction in travel emissions through tele-conferencing

The carbon dioxide emission from air travel varies between 0.40 $kgCO_2$ per passenger mile to 0.60 $kgCO_2$ per passenger mile depending on the flight distance[vii]. Without the introduction of the tele-meeting facilities, reduction of business travel would have been a major challenge. Internet phones, live meeting software, video conferencing devices create a virtual meeting atmosphere and ensure smooth communication, without hampering the value of face to face meetings. The widespread adoption of these technologies has not only reduced travel emissions significantly, but has also presented a cost-saving opportunity for organizations.

Energy monitoring and optimization through the installation of building energy management systems

Building and facility energy management systems integrate hardware measuring devices installed at a facility with a software application to enable remote and real-time monitoring of energy parameters. These systems are backed up with centralized support teams that continuously track the building's or facility's energy, water consumption. Real time tracking of the parameters ensures that anomalies are addressed sooner and faulty meters replaced immediately. These systems have gained a lot of acceptability in the US and Europe, owing to the large spread of energy intensive heritage buildings in these countries. A few companies offering these services include Johnson Controls, Novar and HARA.

Efficient energy infrastructure through smart meters and smart grid

Smart grid is a type of electrical grid which attempts to predict and intelligently respond to the behaviour and actions of all electric power users connected to it, in order to efficiently deliver reliable, economic and sustainable electricity services. Smart meters and smart grids have witnessed widespread acceptance in terms of their potential to achieve energy savings. However, the technological shift from traditional meters and grids to smart grids is bound by financial and policy constraints. The developed countries are actively propagating the concept of smart grid, and may witness the beginning of a smart metering revolution. Upon proliferation, the emission reductions and energy savings from smart grids would be immense.

Optimization of production energy consumption through automation tools

The manufacturing sector has been a major benefactor of process automation tools. The entire manufacturing process in the plant can be viewed centrally, on a real time basis; input parameters like flow rate, composition of material etc. can be modified remotely and variations can be corrected immediately. This ensures that the production process is not affected, thereby reducing the number of accidents, ensuring uniform product quality and optimum resource consumption. Such systems from technology majors like ABB, Honeywell, and Siemens are known to have designed and delivered extremely efficient devices.

Reduction in data center energy consumption through cloud computing

The cloud computing technology and market are rapidly expanding. As per a Pike Research report, this growth in adoption of cloud computing is expected to have a positive impact on the environment as these networks are considered to be far more energy efficient than traditional data centers.

IT companies will clearly have a focus on reduction of energy consumption and the increase in sales of energy efficient servers and office computers bears a direct testimony to it. IT companies also take a lot of steps internally to ensure minimization of energy consumption. They can not only internal carbon footprints but also impact external stakeholders such as its customers, for example, by sourcing green power from the grid.

To combat climate change and ensure sustainable environmental business practices, IT companies can also formulate sustainability risk assessment, environmental costs and direct carbon footprint measurement related software for energy intensive companies to help them map scenarios and manage their carbon footprint on a continuous basis thereby mitigating the business risks related to sustainability issues and generating competitive advantage out of possible compliance mechanisms. A logical step further will be automating the whole cycle and making the system or process self-corrective.

IT can also develop better hardware – software integration mechanisms and advanced Building Management Systems (BMS) to generate massive energy savings even at a domestic level. This adds to the concept of smart homes and green buildings. This paper touched upon such possibilities and identifies the most attractive areas where IT can make a direct impact as far as reducing carbon footprints are concerned.

Conclusion

Popular economic theory identifies carbon emissions mitigation as a 'public good'. This raises the question - who will be responsible for implementing this 'public good'? Will it be the private sector or the Government? As a conclusion to this paper, we reiterate that gubernatorial policy changes will be the trigger for low carbon economic growth. The private sector is inherently reactive – voluntary public good is an unrealistic expectation out of them. However, policy incentives or mandates (in the long term) will facilitate the private sector to get involved in carbon abatement, provided they see business sense in it. This paper designs a possible roadmap to achieve this end – we propose the Government to have a relook at existing policy and make it more encouraging for businesses to take action to reduce emissions. To help the private sector screen options we have also provided potential opportunities which we believe will emerge attractive in wake of our proposed policy changes. Much of emissions abatement in conventional areas like manufacturing and transportation has matured. What remain untapped are the opportunities in including ICT and related fields under the gamut of emission reduction services. Harmonizing such opportunities with a climate focused Governmental policy will be the key to effective low carbon development of the Indian economy.

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