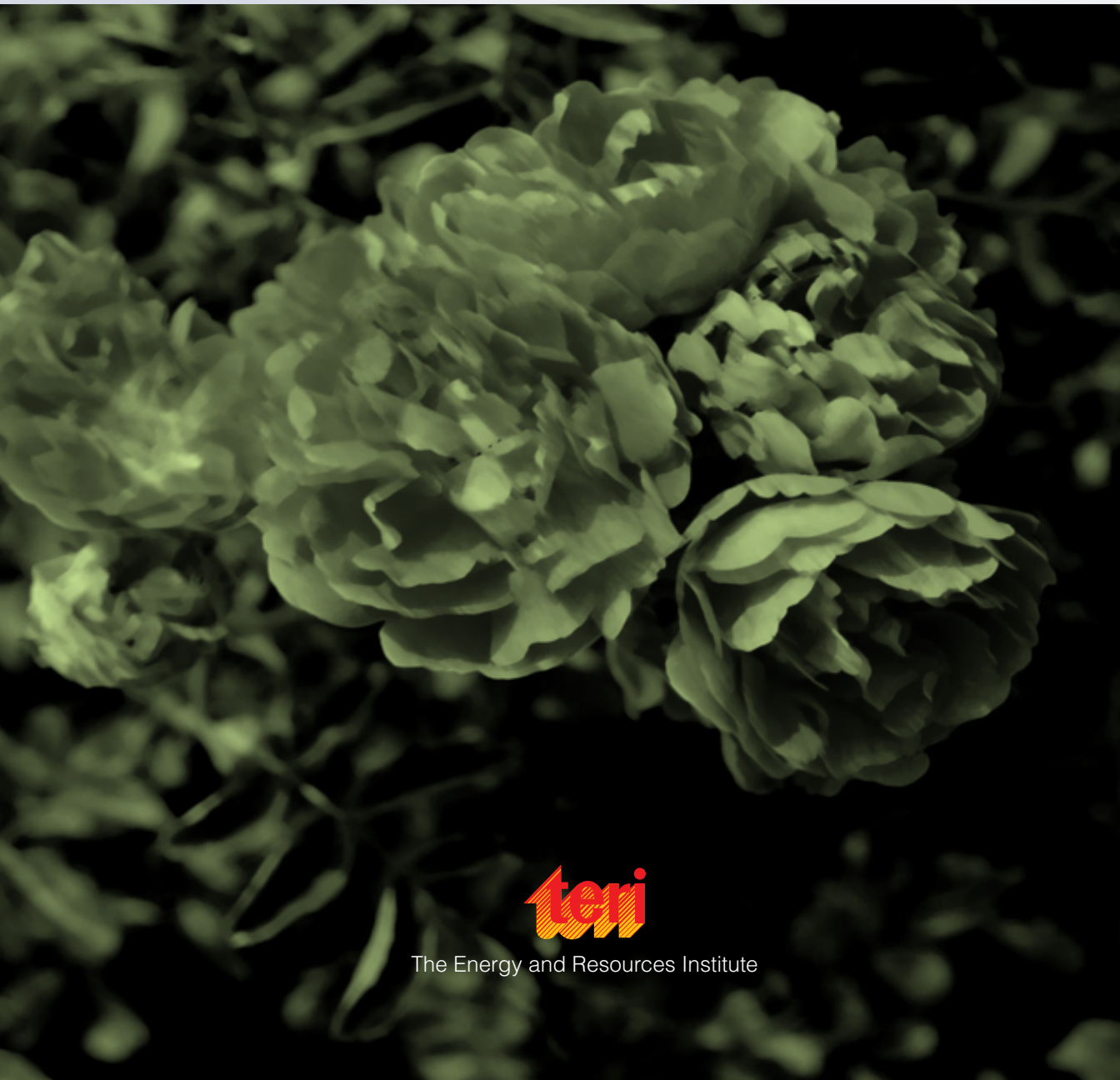




# Green Growth and Development Quarterly

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The Energy and Resources Institute

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## FOREWORD BY EDITOR-IN-CHIEF

I am delighted to be writing the foreword of this very first issue of Green Growth and Development Quarterly. This is perhaps the first formal output of the new Green Growth and Development Division that we have established in TERI. The new Division does not in any way reflect any departures from TERI's widespread initiatives, all of which support and promote development which in every sense of the term is "green". However, it was felt that there was now renewed need for creating a focus that brings together all the sectoral initiatives which TERI is pursuing within the framework of protecting the environment, conserving this planet's natural resources and ensuring development which is inclusive and green. One important element of green development would certainly target a lower level of intensity in emissions of greenhouse gases. This, incidentally, is consistent with the voluntary commitment that the Government of India made at the 15th Conference of the Parties under the UN Framework Convention on Climate Change, held in Copenhagen in 2009.

This quarterly has been launched in the belief that we need to create a platform on which debate and discussion should take place on the various facets of green growth and development, and which needs to be understood by every stakeholder in Indian society. And, in this effort we would not only be focusing on challenges and opportunities pertaining to India but across global society as a whole. In fact the new Division at TERI has already taken steps to launch collaborative activities which involve comparative analysis of green opportunities in India as well as in other countries such as the People's Republic of China, the Republic of Korea and Japan. Within India the effort to be undertaken would involve focusing on specific studies, which given the country's federal structure would need to be taken in defining and implementing a green paradigm of development at the level of states in the Indian Union. For instance, on the 11th of September 2012 TERI signed a Memorandum of Understanding (MoU) with the Government of Himachal Pradesh, which incidentally has set the goal of becoming carbon neutral by the year 2020. This would be facilitated by a commitment of financial resources totaling \$200 million to be provided by the World Bank for promoting green growth and development in the State. TERI has the ambition under

## Foreword

the MoU which has been signed, of providing vital technical assistance and support to help Himachal Pradesh in achieving its ambitious goals in this regard.

We hope to communicate each issue of this quarterly to stakeholders not only in India but across the globe, so that we can create the nucleus for a debate on the subject by providing information on green growth and development and receiving ideas and experiences which would enrich the quality and contents of this publication in subsequent issues.

I do hope you would enjoy the material provided in this first issue, and we would welcome comments and ideas which would help us improve on this modest effort in subsequent issues of the quarterly.



**R K Pachauri**

Director-General

The Energy and Resources Institute

## INTERVIEW



Dr Kelkar is the Chairman of the Forum of Federations, Ottawa; a Member of the Board of the India Development Foundation, New Delhi; and the Former Chairman of the Thirteenth Finance Commission, Government of India

### Dr Vijay Kelkar on inclusive green growth

Shailly Kedia talks to Dr Vijay Kelkar on inclusive green growth

**TERI:** *The concept of “green growth” had its genesis in the vision underlying the Thirteenth Finance Commission’s (TFC) recommendation, where the concept was articulated as, “rethinking growth strategies with regard to their impact[s] on environmental sustainability and the environmental resources availability to poor and vulnerable groups”. What inspired TFC to consider Green Growth as its vision?*

**Vijay Kelkar:** The Commission was looking for an overall approach that would serve as an organizing principle in the context of fiscal federalism in India. The Commission came to the conclusion that “growth” could be a key organizing principle in the context of India. This growth could be characterized by two things. First, this growth should not be indiscriminate in nature, but be one that is “green” in the sense of economizing environmental resource utilization. Second, this growth should be inclusive in nature. India is a federal state, which is characterized by one of the highest inequality levels in the world, with a difference in per capita income ratio of 6:1. When compared to other federal states, such as, Germany, Switzerland, USA, and Canada, it is clear that we should have done better. Growth in India should be inclusive over space, and consider making lagging regions a part of growth processes.

**TERI:** *In recent global debates, the concept of Green Growth per se has acquired a new “political” meaning. For example, during the Rio+20 deliberations, many developing countries in particular considered green growth as a possible compromise against their other inclusive growth or social policies. What is your comment on that?*

**Vijay Kelkar:** I think the reason why there are growing concerns is because countries like India are undergoing a demographic transition, which is opening new avenues for economic growth that these economies did not have earlier. Countries may be concerned about losing this growth window. Green growth should not be seen as a political concept as it is no different from the concept of high-quality growth that does not omit environmental concerns from deliberations on progress. That is the reason they are saying, please do not use this constraint on growth. There is no rationale as to why countries cannot yield dividends following growth and development, which is both green and inclusive.

**TERI:** *You played an instrumental role as an architect of the National Exploration and Licensing Policy (NELP) that promoted competitiveness in the Indian hydrocarbon industry. Green growth and development is also about enhancing the competitiveness of domestic industries – what lessons from your international experience could be useful for India?*

**Vijay Kelkar:** Japan was one of the earlier movers as a country that started talking about green growth. It is inspiring to see a country that is resource poor, in terms of natural resources, achieve high quality growth. By using technology, innovation, and promoting policies that have enhanced the competitiveness of domestic firms, Japan has been able to participate in international trade with many nations. India, in my view, is a rising trading power and can create new avenues of growth by trading in goods that economizes on resource consumption. India can also trade in labour intensive and skill intensive goods where we are competitive. We have lot to learn from countries like Japan and South Korea, who are doing very well.

**TERI:** *What are the key aspects of growth and development for India? What emerging challenges is the country set to face? What innovations does the TFC suggest to address these challenges?*

**Vijay Kelkar:** I think the key aspects of growth are giving a much larger fiscal space to states, cities, and the third tier, because India has the challenge of different dimensions, with huge disparities among states, and to address these issues they are going to need resources. Growing urbanization will be one of the key defining challenges of the next two to three generations for which cities and municipalities will require resources. Innovation is required so that cities can grow in a way whereby they can be called green cities in terms of their demand and consumption of natural resources. Here we should not adopt a straitjacket approach to all cities, but rather encourage innovations in individual cities.



Far more innovation has to be allowed at the state level, city level, and corporation level. In this regard, one of the innovations by the TFC is to give a larger resource base to not only the states, but also to the third tier of the country, which are the cities and the Panchayati Raj Institutions. If they are given more resources, then according to local conditions they can innovate to come with their own solutions. A predictable, sufficient, and secure fiscal base is required to secure local public goods for green growth, with state grants linked to their environmental performance. One of the key innovations of the TFC was Goods and Service Tax (GST), for providing lasting resource base to facilitate such innovations by states and third tiers of the government.

Provisions under the 72nd and 73rd constitutional amendments give the basis for strengthening the third tier of the government, which are rural-local bodies (Panchayats) and urban-local bodies (Municipalities). These provisions have still not been implemented adequately. I called this the unfinished agenda of Rajiv Gandhi, who had emphasized the transfer of funds, functions, and functionaries to the third tier. According to the basic philosophy of the TFC, once the funds are transferred to the local level, functions will greatly follow. Therefore, funds become the driver of the change.

Of course, ensuring fiscal discipline in terms of the use of these funds is a challenge and they should be well directed; otherwise they will prove to be wasteful like subsidies. All subsidies are environmentally unfriendly – subsidizing fertilizers destroys the soil, subsidizing electricity leads to over exploitation of ground water, and subsidizing kerosene leads to adulteration and causes greater air pollution. Instead of subsidizing inputs, direct income transfers could lead to growth and development, and the protection of vulnerable groups. A good fiscal arrangement along with the required social safety nets could lead to inclusive and green growth or, in other words, high quality growth.

**TERI:** *In your opinion, you talk about factor reforms in the context of growth and development. How do you view these in the present context?*

**Vijay Kelkar:** I think that the factor reforms in the context of India are very important including land reforms, labour market reforms and capital market reforms. In case of India, there is no regulated land market and absence of land records often leads to conflicts. Labour market reforms are essential especially if the country want to reap demographic dividend. For this, labour laws are important to ensure high productivity employment in the country. Asian tigers including a country like Vietnam have been successful in labour market reforms and could serve as a useful model for India. Similarly, capital market reforms are important to ensure well-functioning markets and promote

efficiency and productivity in firms. Natural resources also should be considered a part of the factor reforms to ensure green growth and development in India.

**TERI:** *What is your opinion on the role of the knowledge community in India?*

**Vijay Kelkar:** My mentor, Mr Lovraj Kumar, would always tell me, “Vijay, in an open society, more knowledge needs to be mobilized”. Knowledge communities are important for facilitating debates that lead to the formulation of good policies. They also give feedback to policy makers so that early corrections can take place. TERI is a role model for think tanks in India. And, I want to place, on record, my deep appreciation for Dr Pachauri for creating such a world-class institution, and I wish there are more institutes like TERI.

An early initiative was a small think tank called the 21st Century Foundation that was started by Dr Pachauri and some of us. The foundation would bring out a series of policy papers as an input for the government. Some of them were used and some of them were not. Independent think tanks like TERI play a central role. I am currently involved with a think tank called the India Development Foundation, working in the area of education, security, and issues of social development.

**TERI:** *Finally, how optimistic are you about the Indian growth story?*

**Vijay Kelkar:** I am very optimistic about the Indian growth story. What is going on in this country is like Manthan, which produced first poison and then ambrosia. In the mythology, the poison was taken by Lord Shankar; in the case of our country, it may be the people of India who are taking the poison. However, the new generation inspires optimism – they are global, ambitious, and knowledgeable. I just close my eyes and imagine... one billion educated Indians will mean more innovation and democratic institutions...who can stop us?

## INTERNATIONAL CASE STUDY

# Guyana's Low Carbon Development Strategy

The Office of Climate Change,  
Office of the President, GUYANA



## Background

Guyana, a tropical, English-speaking South American country, roughly the size of England, bordered by the

Atlantic Ocean on the north, and Brazil, Venezuela, and Suriname to the south, west, and east, respectively, is rapidly emerging on the global climate change landscape and is establishing Green Growth leadership globally.

With a total land mass of 215,000 square kilometres and a population of just 756,040 people concentrated on a narrow plain that lies 1.4 meters below sea level, Guyana is extremely vulnerable to flooding. Climate change has been exacerbating these vulnerabilities. In 2005, excessive flooding caused damages equivalent to 60 percent of Guyana's GDP.

The hinterland, south of the Coast, is covered with more than 18 million hectares of pristine tropical rainforest covering approximately 80 percent of the country's total land mass, with an annual deforestation rate of less than 0.1 percent for over 20 measurable years, making Guyana one of the few tropical forest countries with High Forest cover and Low rate of Deforestation (HFLD). The country is also endowed with an abundance of natural resources; extensive and fertile savannah; arable croplands; rich mineral deposits of gold, bauxite, and diamonds; and abundant fresh water and hydropower potential.

In spite of its natural wealth, Guyana remains a poor developing country with a vast potential for robust economic and social development. The country stands at the crossroads of two global forces. On one hand, there is pressure to exploit its natural resources, and grow and develop, with increased Green House Gas (GHG) emissions. On the other hand, the challenge of climate change requires responsible mitigation actions, which could place constraints on natural resource exploitation. Even in the absence of any action, climate modelling has indicated that by 2030, Guyana will experience significant increases in temperature and sea level rise, a

greater risk of storm surges, and changed rainfall patterns, with adverse impacts on food security, and public health and livelihood.

### **Guyana's strategy**

In its search for a win-win solution, Guyana turned to its most prized asset – its rainforests. Deforestation and forest degradation are responsible for approximately 17 percent of global total greenhouse gas emissions. However, the Economic Value to the Nation (EVN) of Guyana's forests, excluding titled Amerindian lands, is equivalent to payments of approximately US\$580 million a year. A conservative estimate of the forests' ecological value to the world is US\$40 billion annually. Even prior to the Copenhagen climate change negotiations and agreement, Guyana's policy makers challenged the pervasive development dilemma head on. If the international community were to acknowledge the vital services Guyana's forests provide, and were willing to pay for these services, the traditionally incompatible forces of environmental protection and economic development could be unified. It was on this rationale that Guyana's Low Carbon Development Strategy (LCDS) was born.

The LCDS, a vision of former President Bharrat Jagdeo, boldly charts a new, green development path for Guyana. Payments received for the conservation and sustainable management of its forests and forest services will be applied to alternative low emission economic activities, thus generating green jobs. These include hydropower development at Amaila Falls, situated in Guyana's interior, that will meet 90 percent of Guyana's domestic energy needs; titling of Amerindian lands and the establishment of an Amerindian Development Fund to support alternative livelihood projects to enable the economic empowerment of the Amerindian native people of the hinterland; water conservancy and drainage infrastructure for better flood management; farm to market roads for agriculture in non-forested areas; the establishment of a micro and small enterprise development fund to promote alternative livelihoods for vulnerable groups; and institutional strengthening and capacity-building within all national agencies and partner bodies engaged in climate change mitigation. These represent a first wave of projects under the LCDS.

### **The process**

The first draft of the LCDS was launched on 8 June 2009. Following the launch, the LCDS was taken to countrywide stakeholder awareness consultations and extensive outreach sessions across Guyana. To ensure transparency and accountability, a Multi-Stakeholder Steering Committee (MSSC) – which includes representatives of indigenous NGOs, conservation NGOs, women and youth organisations, the

academia, civil society, and the private sector – was established to oversee the LCDS. The entire consultation and awareness process was independently monitored by the International Institute for Environment and Development (IIED), which reported that the process was “credible, transparent, and inclusive” and highlighted “the government’s commitment to transparency and accountability during the preliminary consultation process”. The LCDS was also considered and approved by the Cabinet and Parliament of Guyana.

## Financial aspects

Following approval of the LCDS, the Government of Guyana signed a Memorandum of Understanding (MoU) with the Government of Norway on November 9, 2009, for payments of avoided deforestation and forest services, the first of its kind in the world. Under the MoU, Norway has committed performance-based payments of up to US\$250 million by 2015. Guyana must deliver on agreed indicators, which must be independently verified prior to Norway’s release of the payments.

Payments are made through a financial mechanism, the Guyana REDD+ Investment Fund (GRIF) with the World Bank as trustee. International financial institutions and development agencies serve as partner entities to support locals in implementing the LCDS projects. To date, Guyana has earned the two tranches of payments amounting to US\$70 million, which has been deposited in the GRIF and is on track to receiving a third tranche. This partnership between Guyana and Norway is the world's second largest Interim REDD+ scheme and the first national-scale effort, with Guyana being one of a few countries in the world that is being paid for the climate services provided by its forests.

## Conclusion

This process of LCDS has not been without its challenges, but these challenges have not proven insurmountable. In fact, they have served to build a useful dossier of lessons and experiences that help to mould best practices for the world over and an opportunity for Guyana to demonstrate global leadership in REDD+ and green economy. In a period of just three years, the LCDS has moved from concept to implementation and can serve as a working example that can be replicated in other rainforest countries.

***For more details, contact Shyam Nokta, Adviser to the President and Head, Office of Climate Change, Office of the President, Guyana at [snokta@op.gov.gy](mailto:snokta@op.gov.gy)***

## “The Future We Want”, and economic, social, and cultural rights

Chandrashekhar Dasgupta

A noteworthy feature of the Outcome Document of the Rio+20 Summit, *The Future We Want*, are the numerous references to human rights. In particular, several paragraphs of the outcome document emphasise the importance of economic, social, and cultural rights, as well as the right to development.

On the eve of the Summit, the UN Committee on Economic, Social, and Cultural Rights issued a statement drawing attention to the relevance of these rights in the context of sustainable development (CESCR 2012). It pointed out that “many provisions of the International Covenant on Economic, Social, and Cultural Rights (the Covenant) link with environment and sustainable development”. These include:

- International cooperation to enhance the availability of resources for the promotion of Covenant rights, which is an obligation under Article 2, paragraph 1 of the Covenant. The Committee stresses the importance of raising ODA contributions of affluent countries to the agreed level of 0.7 percent of their gross national income, ensuring that these contributions promote sustainable development by adopting a human rights-based approach to development
- Articles 3 and 11 of the Covenant emphasise the role of women in sustainable development
- Article 11 covers the right to food, requiring states, *inter alia*, to avoid adverse environmental impacts on this right
- Article 12 deals with the right to health, and requires states, *inter alia*, to ensure access to safe and potable water, as well as sanitation
- Article 15 addresses cultural rights, including the traditional knowledge rights of indigenous peoples and local communities, and is thus linked to biodiversity conservation. Moreover, it imposes an obligation on states to prevent deforestation in the absence of the prior informed consent of forest dwellers and indigenous communities whose culture and very survival depend on their natural habitat.

Referring to the Rio+20 “zero draft” then under negotiation, the Committee emphasized the “need to integrate the green economy in the broader concept of sustainable development, which encompasses social development together with economic growth and environmental protection, and thus has close linkages with economic, social, and cultural rights”. It concluded by inviting delegations at the Rio+20 Conference to:

- “Reaffirm the principles enunciated in the Rio Declaration on Environment and Development”
- “Reaffirm the right to development”
- “Ensure that the new concept of the green economy (which does not specifically incorporate social development) is intrinsically linked to the comprehensive concept of sustainable development”
- “Integrate a human rights dimension into the outcome document and, in particular, refer to the rights under the Covenant”

In the event, most of these suggestions were accommodated to a substantial degree in the outcome of Rio+20. Thus the outcome document, “*The Future We Want*”, reaffirms the importance of “respect of all human rights, including the right to development” (paragraph 8). This is reiterated in paragraph 9, which “reaffirms the importance of the Universal Declaration of Human Rights, as well as other international instruments relating to human rights and international law”. Furthermore, paragraph 58 (d), affirms that “policies for green economy in the context of sustainable development and poverty eradication” should *inter alia* promote “respect of all human rights”. Paragraph 15 “reaffirms all the principles of the Rio Declaration on Environment and Development, including, *inter alia*, the principle of common but differentiated responsibilities, as set out in Principle 7 of the Rio Declaration”. The outcome also requires that “policies for a green economy should be guided by and be in accordance with all the Rio Principles...” (Paragraph 57).

In addition to general references to human rights, *The Future We Want* document also incorporates elements related to, or directly bearing on, specific provisions of the International Covenant on Economic, Social, and Cultural Rights. These address most of the issues listed in the statement issued by the Committee on Economic, Social, and Cultural Rights. Table 1 lists the provisions related to human rights in “*The Future We Want*” Outcome Document.

Thus, the Rio+20 outcome document, “*The Future We Want*”, marks a significant advance in integrating economic, social, and cultural rights with sustainable

Table 1 Provisions related to Economic, Social, and Cultural Rights in “The Future We Want”	
Paragraph	Reference
Paragraph 258	“... fulfilment of all ODA commitments is crucial, including the commitments by many developed countries to achieve the target of 0.7 percent of GNP for ODA to developing countries by 2015, as well as a target of 0.15 to 0.20 percent of GNP for ODA to least developed countries...”
Paragraph 8	“...the right to food...”
Paragraph 108	“...right to adequate food and the fundamental right of everyone to be free from hunger...”
Paragraph 138	“...right to adequate food and the fundamental right of everyone to be free from hunger...”
Paragraph 121	“...the human right to safe drinking water and sanitation...”
Paragraph 142	“...the right to use, to the full, the provisions contained in the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), the Doha Declaration on the Agreement on Trade-Related Aspects of Intellectual Property Rights and Public Health...which provides flexibilities for the protection of public health...”
Paragraph 31	“...gender equality and women’s empowerment are important for sustainable development and our common future...”
Paragraph 45	“...gender equality and women’s empowerment, and to ensure their full and effective participation in sustainable development policies programmes and decision-making at all levels.”
Paragraph 236	“...women’s vital role and full and equal participation and leadership in all areas of sustainable development, and decide to accelerate the implementation of our respective commitments in this regard as contained in the Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW) as well as Agenda 21, the Beijing Declaration and Platform for Action and the Millennium Declaration.”
Paragraph 146	“...gender equality and to protect the rights of women, men and youth to have control over and decide freely and responsibly on matters related to their sexuality, including access to sexual and reproductive health, free from coercion, discrimination and violence...”
Paragraph 229	“...full access to quality education at all levels is an essential condition for achieving sustainable development, poverty eradication, gender equality and women’s empowerment as well as human development, for the attainment of the internationally agreed development goals including the Millennium Development Goals, as well as for the full participation of both women and men, in particular young people. In this regard, we stress the need for ensuring equal access to education for persons with disabilities, indigenous peoples, local communities, ethnic minorities, and people living in rural areas.”
Paragraph 58 (j)	“...welfare of indigenous peoples and their communities, other local and traditional communities, and ethnic minorities, recognizing and supporting their identity, culture and interests and avoid endangering their cultural heritage, practices and traditional knowledge...”
Source: Compiled from UNCSD (2012)	



development policies. It reflects the synergy between human rights and sustainable development more comprehensively than the outcomes of previous UN conferences on environmental and developmental issues. This is the redeeming feature of a summit that has been rightly criticized on other grounds for failing to set out concrete specific time-bound commitments to tackle urgent challenges to sustainable development.

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***Ambassador Chandrashekar Dasgupta is Member at UN Committee on Economic, Social and Cultural Rights and Distinguished Fellow at TERI***

## Sustainable energy transitions is fundamental for growth and development in rural India

*Aditya Ramji*



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Ensuring access to energy and security within an equitable green economy is critical. This sense of urgency arises from the current concerns of climate change and the existing scale of energy deprivation. Re-envisioning sustainable development for the 21st century, therefore, requires more than environmentally benign economic growth—instead, it requires a broadening of clean energy entrepreneurship and innovation to encompass new regions, new technologies, and new approaches. The largest challenge facing energy in a green economy is increasing access to energy services, a task linked to reducing poverty, and improving human health and environmental quality.

Energy access for all must go beyond electricity to ensure that people have access to clean fuels for meeting their heating and cooking requirements, and importantly also help in livelihood enhancements.

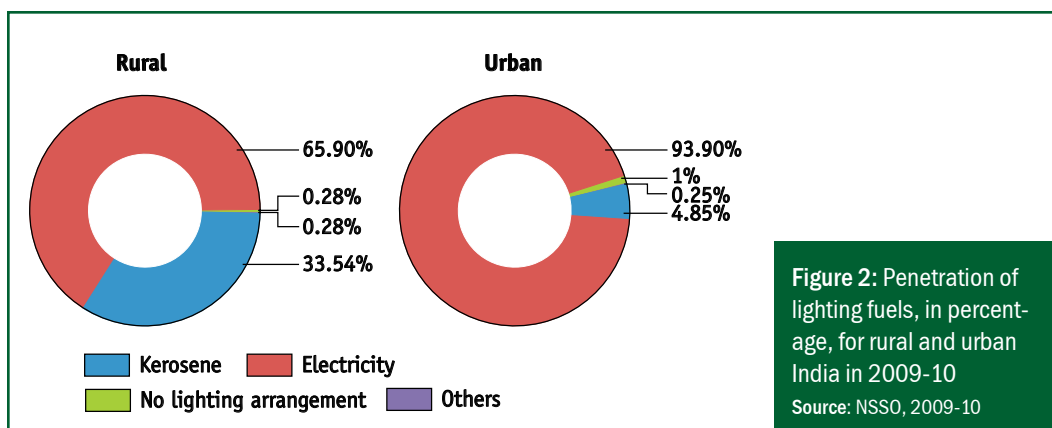
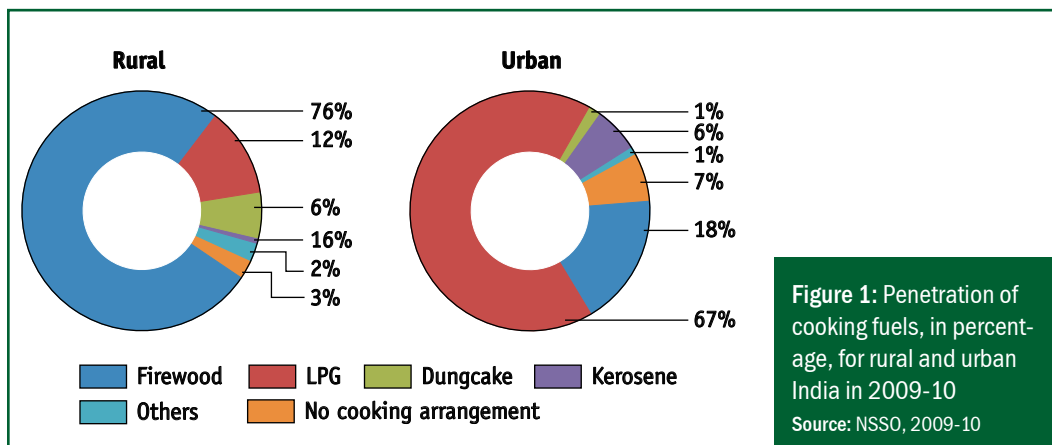
Access to modern energy services is fundamental to fulfilling basic social needs, driving economic growth, and fuelling human development. This is because energy services have an effect on productivity, health, education, safe water, and communication services. As emphasized by the Indian government, both energy security and energy access are integral to sustainable development and to the achievement of the Millennium Development Goals (MDGs).

Energy access is not only essential at the household level, but it is also very critical to the provision of basic minimum infrastructure, such as, hospitals, schools, and industries among others. For a country like India, developmental goals and energy access are very closely linked and “Universal Energy Access” as a goal is necessary not just for each household but also for the associated sectors in the economy that will play an important role in development.

Ensuring energy access and transitioning to cleaner energy is a challenging task, especially in India, where over 400 million Indians lack access to modern forms of energy, most of whom live in rural areas. These people live in a very different socio-

economic and cultural context as compared to urban India. In India, the energy consumption patterns in urban and rural areas are quite different (*Figure 1 and 2*). In rural India, most households have been using firewood and other traditional biomass fuels, such as, chips, charcoal, and dung cake for cooking. Almost 76% of rural households still depend on the most polluting traditional biomass fuels to meet their cooking fuel requirements. While more than 65% rural households indicate electricity as their primary source of lighting, it does not reflect access to electricity, as there are many issues regarding quality of supply that plague rural households.

There have been changes in consumption patterns of different fuels over time and across households belonging to different income groups. Interesting observations can



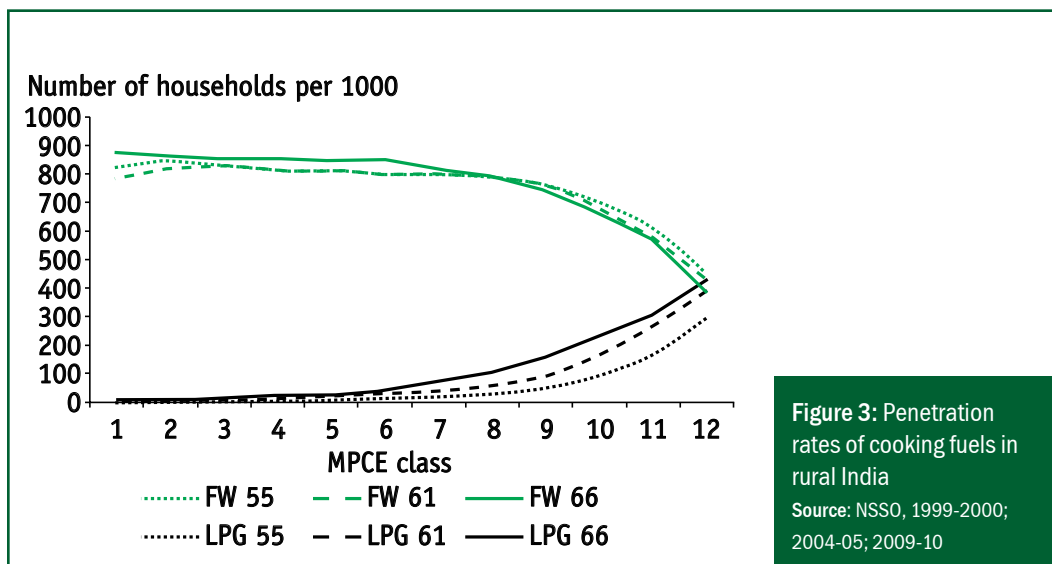
be made from a basic analysis of the data reported by the National Sample Survey Organization (NSSO) on the consumption of three important fuels, namely, firewood, Liquefied Petroleum Gas (LPG), and electricity, which are used predominantly for cooking and lighting among rural households. In the case of firewood, we find that there is an increase in household consumption between 1999-2000 and 2004-05, followed by a slight decline in 2009-10. It should be noted that the consumption level of firewood in absolute terms during 2009-10 was higher than that reported in 1999-2000. The overall consumption of firewood actually went up in the past decade by about 7.5%. In the case of electricity, there was an increase in electricity consumption by almost 25-30% overall in the last decade; while for LPG, though there was marginal changes in consumption over time, but it remained more or less constant.

If we observe the trend across income classes, there are considerable inequalities that are reflected, especially in terms of modern energy, viz., electricity and LPG. We can categorize the households into three different income groups, namely, Low Income, Medium Income, and High Income. Table 1 summarizes the changes in gross physical consumption of different fuels over time.

Table 1 Fuel consumption patterns over time in rural India			
	Low Income	Medium Income	High Income
Firewood	Increase from 1999-00 to 2004-05 (95kg-113kg); decline from 2004-05 to 2009-10 (113kg-102kg) but overall increase in the decade	Significant increase from 1999-00 to 2004-05 (107kg-125kg); lower mid-income remain same from 2004-05 to 2009-10 (~120kg); high mid-income indicates decline from 2004-05 to 2009-10 (124kg-115kg)	Drastic increase from 1999-00 to 2004-05 (112kg-124kg) and marginal decline in 2009-10 (~120kg); richer have higher consumption
Electricity	Increase from 1999-00 to 2004-05 (33kWh-37kWh); marginal increase from 2004-05 to 2009-10	Increase over time (40kWh-47kWh); low mid-income indicate greater increase in consumption (~6kWh) than high mid-income	Increase over time (54kWh-80kWh); significant increase from 2004-05 to 2009-10 (61kWh-80kWh); for highest income group, 2004-05 and 2009-10 consumption values converge (~80kWh)
LPG	Increase from 1999-00 to 2004-05 (6kg-8kg); marginal change from 2004-05 to 2009-10	Increase in consumption by lower mid-income (7kg-10kg); high mid-income constant from 2004-05 to 2009-10 (~11kg)	No change from 2004-05 to 2009-10 (~10-11kg)
<b>Source:</b> Compiled on the basis of NSSO data on gross consumption of fuel over various rounds (55 <sup>th</sup> , 61 <sup>st</sup> , and 66 <sup>th</sup> Rounds)			

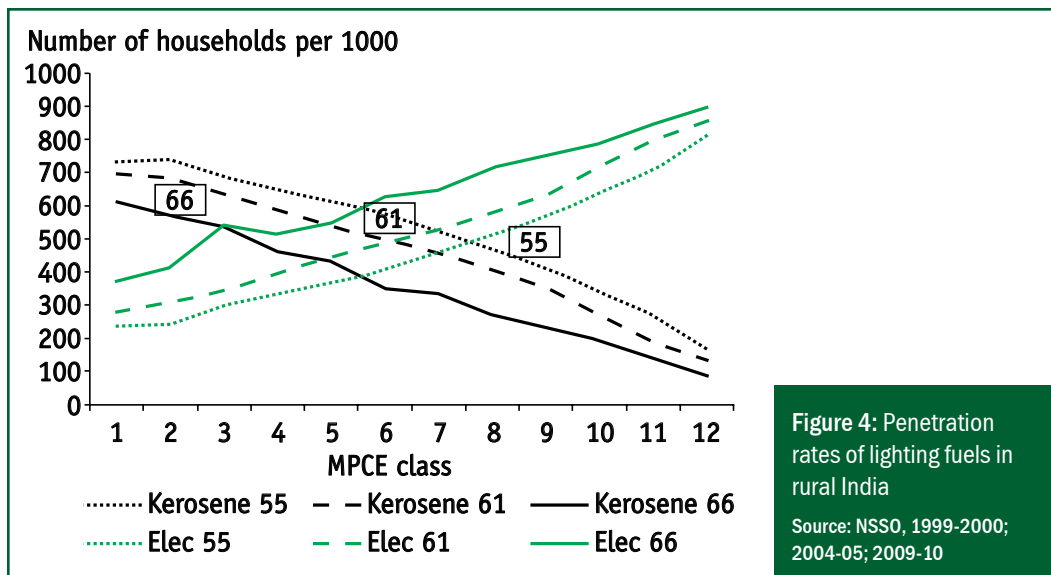
If we look at the story so far in India, the access situation – while showing clear signs of improvement in urban areas – is still a challenge in rural India. If we address the issues of energy access in rural India, we would be very close to achieving our goal of universal energy access. For this, it is important to understand how energy transition has occurred in rural India over the past decade. In the case of cooking, the fuels considered are firewood and LPG, whereas for lighting, kerosene and electricity have been considered, as they are the most common fuels used.

Figures 3 and 4 indicate the percentage of households in rural India reporting a particular fuel as the primary cooking fuel (firewood and LPG) and primary lighting fuel (electricity and kerosene), respectively. The graphs plot the trends over time and across income classes<sup>7</sup>. If we see the case for cooking (Figure 3), we find that the intersection point between the graph for firewood and LPG occurs only at the higher MPCE classes. This indicates that the switch from firewood to LPG is occurring only among the higher income classes. Thus, in the case of cooking fuels, we find that there is no real transition in terms of access to modern cooking fuels.



**Figure 3:** Penetration rates of cooking fuels in rural India  
 Source: NSSO, 1999-2000; 2004-05; 2009-10

<sup>7</sup> Monthly Per Capita Expenditure (MPCE) classes have been taken as proxy for income by the NSSO survey for each household and these are used to categorize the income classes. The data has been used from three NSSO rounds: 55th Round (1999-2000); 61st Round (2004-05); and, 66th Round (2009-10).



In the case of lighting (Figure 4), we find the switch (denoted by the intersection point of the graph of kerosene and electricity) to modern lighting fuels occurring at lower income classes over time, indicating improved access to modern lighting fuels and a clear transition path.

The success in the case of lighting can be attributed to the national level Rural Electrification Program (Rajiv Gandhi Grameen Vidyutikaran Yojana or RGGVY) that aims to provide electricity to all villages in India. As of May 2012, the Government of India had spent about INR 28,265 crore on rural electrification under the RGGVY Program.

This type of transition path is not seen in the case of cooking fuels. Providing access to cooking fuels, and more importantly, effecting a transition towards modern cooking fuels will remain as one of the greatest challenges in terms of energy access at the household level, especially in rural India.

Recently, as part of a research study funded by the Royal Norwegian Ministry of Foreign Affairs, a team from TERI visited the district of Dindori in Madhya Pradesh, India, to further understand the issues that continue to challenge the goal of universal energy access. During this visit, the team visited a few villages and interacted with people among various socio-economic strata. The discussion brought out interesting issues ranging from access, availability, affordability, and the way people perceive a typical choice.

As expected, most villagers used firewood for cooking and kerosene for lighting. The women would generally go to the forests to bring firewood while the men would go to work. Kerosene was available through the Public Distribution System (PDS), which provides a quota of certain basic necessities – such as, rice, wheat, and sugar among others – at a subsidized rate to families that belonged to the Below Poverty Line (BPL) category. On being asked why they do not use LPG, which has greater benefits than firewood, the answers were varied, reflecting all aspects of access, availability, affordability, and perceptions. Some said outright that LPG is too expensive, while some maintained that even if they could afford LPG, firewood costs much lower and hence reduces the economic burden on the household. Some others mentioned that even if LPG was affordable, they had to travel quite a distance to the nearest block or town, purchase a cylinder, and then get it back to the village, which added further costs, and for many, this meant a day's loss of work and income.

On further discussion, the team found various other reasons as to why people preferred using firewood and not LPG. There were many who said that they preferred the taste of the food, especially the *roti* (an Indian preparation of wheat), which was cooked on firewood rather than the one cooked on an LPG stove. There were some women in the group who mentioned that using firewood as a cooking fuel served more than one purposes. Apart from cooking, the smoke from firewood helped keep the house free of mosquitoes and it kept the house clean (this arises out of a traditional Indian custom where the worship of the Fire God is considered sacred and is said to keep the air purified). The visit highlighted that an important issue, which more often than not goes unnoticed, is that of gender, as most often the women carry out daily household chores.

In the context of green growth and development, ensuring equity and access are critical. It is not just sufficient that a fuel is available, but it is equally important that there exists a minimum level of physical infrastructure to ensure easy accessibility to a household or individual when the requirement arises. It is also important to ensure that the fuel should be clean such that the overall benefits of energy access are greater in terms of additional health and livelihood benefits.

Further, the provision of modern energy sources at a price that is affordable to the user is very critical to achieving the goal of universal energy access. Affordability has two key aspects, the ability of the individual to pay and the willingness of the individual to pay. More often than not, it is the ability to pay that acts as the biggest threat or barrier to energy access, as it is most often driven by constraints of income. The willingness to pay is driven by the availability of the resource, supporting infrastructure, opportunity

costs of investing, and cultural factors associated that may differ with fuel type. The issues of access, availability, and affordability are quite tangible, and thus very often quoted as the barriers to energy access. But, something that is not as tangible, and on further probing becomes an important factor when it comes to achieving energy access for all, is the attitudes and perceptions of people.

The Planning Commission, Government of India has defined energy security as “... *when we can supply lifeline energy to all our citizens as well as meet their effective demand for safe and convenient energy to satisfy various needs at affordable costs at all times with a prescribed confidence level considering shocks and disruptions that can be reasonably expected*”.

While we design policies or programmes aimed at achieving universal energy access, it is very important to take into consideration of the basic needs of people. While significant efforts have been made through government rural electrification programmes, such as, the RGGVY, we still have “...miles to go before we sleep, miles to go before we sleep”.

***Aditya Ramji is Research Associate, Green Growth and Development Division, TERI***



## GREEN ANALYSIS

# Commercial energy flows in India

Rinki Jain

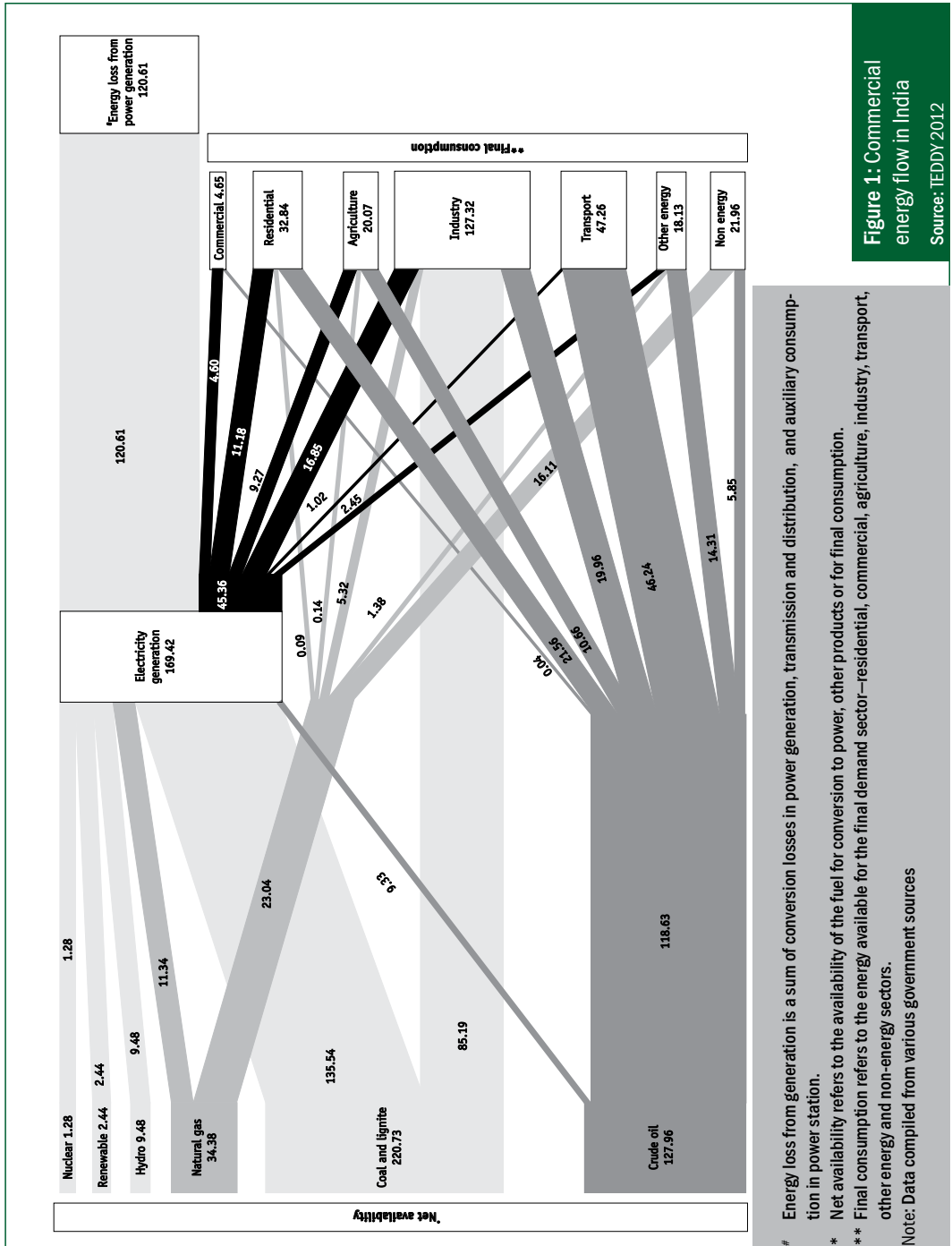
**E**nergy is a key driver for growth and development. As depicted by the Sankey diagram in Figure 1, commercial energy supply in India is heavily dependent on fossil fuels.

As can be seen from the Sankey diagram, coal and oil together accounted for 88% of the total primary energy supply in 2008/09 (TEDDY, 2012). More than 60% of the coal produced is consumed in the power sector and goes for electricity generation. Given our limited and unevenly distributed supply of non-renewable energy sources, it will become extremely difficult to meet India's growing energy demand by relying on fossil fuels alone.

Renewable energy sources can play an important role in this regard. Harvesting renewable energy in a decentralized manner is one of the options in meeting the challenges of providing energy access to India's rural areas and in reducing consumption of fossil fuels, which is essential for the future energy security of the country.

India is a country that is at an important development phase with growing energy demands as well as socio-economic implication, such as, a young working population. Demand for energy is bound to increase due to growth in population and economic activities. Resource augmentation and growth in domestic energy supply has not kept pace with the increasing demand for energy. Higher consumption of fossil fuels leads to higher greenhouse gas emissions, particularly carbon dioxide (CO<sub>2</sub>), which contributes to global warming.

A sustainable energy future will be directed to raising living standards, providing access to modern energy services, using energy more efficiently, protecting the global environment, and ensuring reliable energy supplies, for which green growth must play a key role (OECD, 2012). India has to bring about a major transformation of the energy sector that would include strategies relating to structural as well as distributional



**Figure 1: Commercial energy flow in India**  
Source: TEDDY 2012

# Energy loss from generation is a sum of conversion losses in power generation, transmission and distribution, and auxiliary consumption in power station.  
 \* Net availability refers to the availability of the fuel for conversion to power, other products or for final consumption.  
 \*\* Final consumption refers to the energy available for the final demand sector—residential, commercial, agriculture, industry, transport, other energy and non-energy sectors.  
 Note: Data compiled from various government sources



aspects. It is, therefore, imperative for India to implement green growth strategies and promote sustainable energy systems in the country.

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The United Nations Conference on Sustainable Development (UNCSD), popularly known as Rio+20, was organized in pursuance of the UN General Assembly Resolution 64/236. The event took place in Rio de Janeiro, Brazil from the 20th to the 22nd of June, 2012, marking the 20th anniversary of the 1992 United Nations Conference on Environment and Development (UNCED) and the 10th anniversary of the 2002 World Summit on Sustainable Development (WSSD). Participants at Rio+20 included 57 Heads of State, 8 Vice-Presidents, 31 Heads of Government, 9 Deputy Prime Ministers, and 487 Ministers. Commitments made at Rio+20 included more than US\$513 billion towards the areas of energy, transport, green economy, disaster reduction, desertification, water, forests, and agriculture.

The Conference focused on two themes: (a) a green economy in the context of sustainable development and poverty eradication (GESDPE); and (b) the institutional framework for sustainable development (IFSD). Green economy is a part of sustainable development that focuses primarily on the intersection between the environment and economy. Institutional framework primarily focused on the role of institutions at the national, regional, and international levels. Deliberations for Rio+20 also highlighted seven areas that included decent jobs, energy, sustainable cities, food security and sustainable agriculture, water, oceans, and disaster readiness.

The UNCSD is seen as an action-oriented conference, where all stakeholders including major groups, the UN System/Intergovernmental Organizations, and member states were invited to make commitments focusing on delivering concrete results for sustainable development on a voluntary basis. Major groups, such as, governments, businesses, civil society groups, and universities initiated a voluntary commitment processes that totalled to 747 participants as on 4 September 2012<sup>1</sup>. The Energy and Resources Institute (TERI) also made a voluntary commitment during Rio+20. TERI

<sup>1</sup> Information compiled from UNCSD website; <http://www.uncsd2012.org> last accessed on 4 September 2012

University made voluntary commitments under the category of Higher Education Sustainability Initiative Training programme, which includes deliverables pertaining to capacity-building and academic publications towards sustainability.

From 13th to the 22nd June 2012, 498 side events were held at the RioCentro, the official venue for Rio+20 deliberations. During the period, TERI organized two side events focusing on the Rio+20 themes. The TERI event titled, “Green Economy and Inclusive Growth for a Sustainable Future” focused on sector-wise priorities for India and also on issues related to poverty and provisioning of basic services. The event was chaired by Dr R K Pachauri (Director-General, TERI; Chairman, Intergovernmental Panel on Climate Change) with presidential addresses given by H.E. Mr Donald Ramotar (President of Guyana), and H.E. Dr Bharrat Jagdeo (Former President of Guyana)<sup>2</sup>. The TERI side event titled, “Civil Society and Knowledge Community: Dialogues around Institutional Framework for Sustainable Development (IFSD)” focused on discussion around the role of various actors at local, sub-national, national, regional, and global levels<sup>3</sup>. The event was presided over by Dr Leena Srivastava (Executive Director, TERI). Both events also led to discussions where speakers shared experiences from their countries or projects.



**Figure 1:** LaBL featured at RioCentro under the Rural Solutions category

Photo credit: TERI

<sup>2</sup> Further information on the event can be found at [http://www.teriin.org/index.php?option=com\\_events&task=details&sid=518](http://www.teriin.org/index.php?option=com_events&task=details&sid=518)

<sup>3</sup> Further information on the event can be found at [http://www.teriin.org/index.php?option=com\\_events&task=details&sid=512](http://www.teriin.org/index.php?option=com_events&task=details&sid=512)

Apart from the events, TERI's initiatives were also showcased at various venues and proceedings during Rio+20. TERI's Lighting a Billion Lives (LaBL) initiative was displayed at *The Future We Want* Wall in Pavilion 1 of Riocentro under the Rural Solutions category. TERI's Delhi Sustainable Development Summit (DSDS) was also showcased at the Regions of Climate Action Event (also known as R-20).

The outcome document (*The Future We Want*) calls for a wide range of actions, such as, detailing how the green economy can be used as a tool to achieve sustainable development; strengthening the United Nations Environment Programme; promoting corporate sustainability reporting measures; taking steps to go beyond gross domestic product to assess the well-being of a country; processes around Sustainable Development Goals and developing a strategy for sustainable development financing; and adopting a framework for tackling sustainable consumption and production. While the conference, like other recent environment conferences, has been touted as one lacking ambition, new action-oriented approaches, such as, voluntary commitments may be seen as a step in the right direction.

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## Sustainable habitats in India: TERI's role in constructing change

*Contributed by Priyanka Kochhar*

**T**he rapid increase in Indian population and the growth of India's Gross Domestic Product (GDP) has given rise to an enormous demand for buildings with a subsequent pressure on available resources. With an anticipated 500 million people living in urban India by 2020, the challenges of greenhouse gas emissions from electricity use in new and existing buildings and building material manufacturing are likely to spike significantly.<sup>1</sup> Another key challenge for the built environment of Indian cities is the diminishing availability of water for urban areas.

In order to be sustainable, the environmental pressures of increased demand for resources, coupled with a rapidly changing climate, are being addressed by policy makers at various levels. Several policy and regulatory mechanisms to address the urban challenges, implemented through national plans and programmes, have been devised. The ministries and agencies at the centre have designed frameworks, such as, Environmental Clearance (EC), to ensure efficiency in resource use for large projects (i.e., more than 20,000 sqm built up area); the Energy Conservation Building Code (ECBC), applicable to air-conditioned commercial buildings with connected load of more than 100 KW; and the Solar Buildings Programme for Energy Efficient Buildings, for implementation by the designated state agencies and municipal bodies.

However, as in most countries, there is a huge scope to optimize the effectiveness of policy by encouraging a more holistic lifecycle approach to buildings. Lack of disincentives for non-compliance, agencies and systems working in factions (i.e. various departments at the centre and state looking at issues related to energy efficiency, renewable energy, water resources, waste management independently as opposed to

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<sup>1</sup> RICS. (2011). RICS study indicates a likely demand-supply gap of 44 million core professionals by 2020. Royal Institution of Chartered Surveyors (RICS) details available at [http://www.rics.org/site/scripts/press\\_article.aspx?pressreleaseID=699](http://www.rics.org/site/scripts/press_article.aspx?pressreleaseID=699); last accessed on 4 September 2012.

a holistic approach that would address the building sector encompassing water, energy, etc., as a whole); and implementation of codes and standards prior to verification on site, leading to implementation challenges on site, are some of the difficulties faced during implementation of policies on sustainable habitats.

The perceived notion of the high cost of green buildings, coupled with flawed and old interpretations, lack of clarity on application domain (e.g. the ECBC does not address energy efficiency in residential buildings), and a lack of integration and uniformity of various codes and standards, has added to impediments in the implementation of sustainable habitats.

In view of the above, and with an overall objective to reduce resource consumption, reduce greenhouse gas emissions, and enhance the use of renewable and recycled resources by the building sector, TERI has played a crucial role in the convergence of various initiatives essential for effective implementation and mainstreaming of sustainable habitats in India.

With over two decades of experience on green and energy efficient buildings, TERI has developed GRIHA (Green Rating for Integrated Habitat Assessment), which was adopted as the national rating system for green buildings by the Government of India in 2007 (refer figure 1).

GRIHA is a tool to facilitate the design, construction, and operation of green buildings in India, which in turn measures the “greenness” of a building. With approximately 7.5

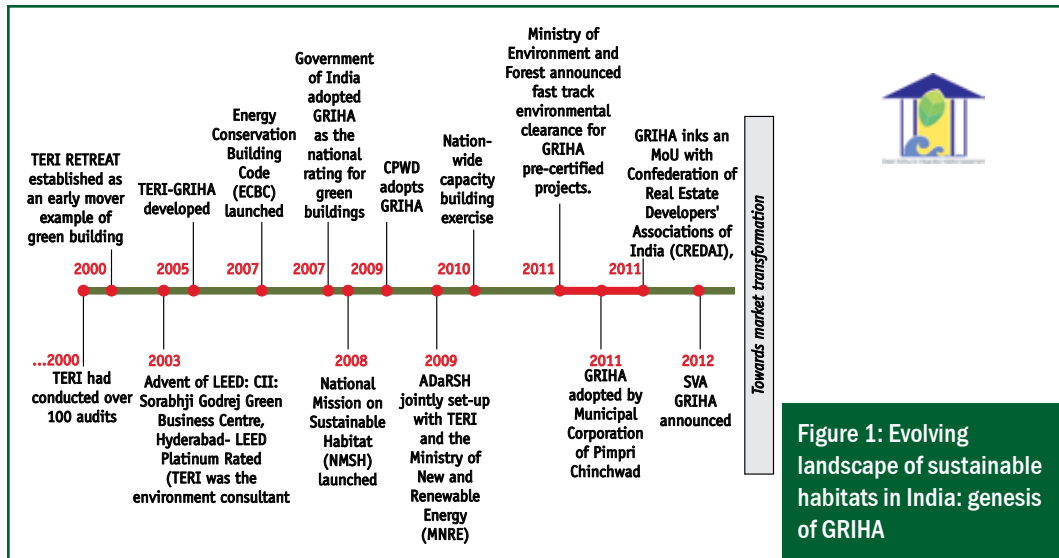


Figure 1: Evolving landscape of sustainable habitats in India: genesis of GRIHA



million sqm of built up space registered to be GRIHA compliant by the end of 11th Five Year Plan (i.e. March 2012), it is estimated that the installation of 5.1 MW of renewable energy through solar photovoltaic cells, solar water heating systems for 1500 kl of hot water, and full compliance with ECBC, shall be executed on completion of the projects. GRIHA compliance for a typical office building used for 8 hours a day shall result in a 30% to 50% reduction in energy consumption compared to GRIHA benchmarks, a 40% to 65% reduction in building water consumption compared to GRIHA base case, and the implementation of good practices on site at no/negligible incremental cost. Further, experience from GRIHA implementation on site also contributes to influencing and implementing policies at various levels at the centre and state.

TERI, together with the Ministry of New and Renewable Energy (MNRE), Government of India, and other prominent industry stakeholders, has set up an independent society called ADaRSH (Association for Development and Research for Sustainable Habitats) for the effective implementation and promotion of GRIHA across the country. ADaRSH has trained over 10,000 green building professionals and generated a pool of over 450 GRIHA trainers and evaluators for imparting training and conducting independent evaluations of GRIHA registered projects.

The demonstrated impact of GRIHA projects includes the quantification of resource use optimization, the implementation of environmental commitments, and enhanced transparency through a web-based portal. GRIHA also serves as an integrated platform for the implementation of various government strategies for environmental sustainability.

During last year, the adoption and implementation of the GRIHA standard has grown exponentially across the country, as members of the construction sector recognize the value added which GRIHA has brought to construction projects. This standard offers proof of the sound environmental performance of buildings, notably of their carbon emissions, and as such helps to increase demand for GRIHA-certified constructions. Companies and others whose constructions comply with the standard, therefore, gain a competitive advantage over other non-GRIHA compliant institutions.

More recently, TERI devised a rating system for built areas of 2500 sqm or less, called SVAGRIHA. This is a rating system for small stand-alone buildings, such as, residences, commercial offices, and schools. With the SVAGRIHA rating, a project can achieve a maximum of 50 points based on its design performance in 14 criteria, which are further classified into five groups including energy, water, waste, materials, and landscape.

The success of green building rating systems and its endorsement by the government have encouraged companies from the private sector to adopt the idea of constructing

## TERI showcase

green buildings, and many companies are currently adapting their business models and practices to make them compliant with the standards of green building rating systems.

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## GREEN FROM THE GRASSROOTS

### Improving quality of life through clean cookstoves

*Contributed by G Mini*

Inclusive green growth has the potential to yield multiple benefits, and it is being increasingly recognized as a pathway to sustainable development. In India, going green is no longer seen as an option and its importance is reflected in many government (including eight missions under National Action Plan for Climate Change, and Taskforce on Climate Change and Green Jobs) and private sector initiatives. Considerable progress has been made to address issues of environmental concern, such as, carbon emissions, waste reduction and recycling, non-polluting transport, efficient utilization, and management of natural resources, and so on. However, it is the actions at the grassroots, which play a crucial role in driving green growth strategy. Towards this end, The Energy and Resources Institute (TERI) have been at the forefront of influencing and promoting green concepts by way of research, development, and dissemination.

Project 'Surya' is a flagship initiative commissioned by TERI in collaboration with the University of California San Diego, United Nations Environment Programme (UNEP), and other partners, which aims to mitigate future Black Carbon (BC) and greenhouse gas emissions through the large-scale adoption of improved cooking and lighting devices with co-benefits of improved health of the end-user community. It is a well-acknowledged fact that the majority of India's rural population utilize solid biomass as cooking fuel – often coupled with inefficient end use devices, such as, traditional mud cookstoves – which have detrimental consequences on public health, in addition to regional and global climate changes. Under Project Surya, five hamlets in the Indo-Gangetic plain were selected to understand and quantify the efficacy of Improved Cookstoves (IC) in the reduction of the emission of global warming agents and the promotion of public health. Improved cookstoves and solar lanterns were distributed in 438 households, and their usage was monitored over a period of six months. TERI undertook qualitative and quantitative assessments of the usage pattern of fuel, and

## Green from the grassroots

corresponding kitchen air BC concentrations, capturing seasonal variations in select village households. The study revealed that the reduction in BC emissions averaged at 40%, which directly correlated with a high degree of clean technology adoption.

In order to take these learnings forward and realize their scalable benefits, Surya is now positioned to embark on the demonstration phase, which requires an area that is large enough to be captured by satellite sensors (approximately 100 square kilometres), and a population of about 50,000 people to constitute a valid and viable test that spans approximately 40 neighbouring villages. After the successful completion of this phase, the project expects to replicate the intervention in other regions that rely on burning solid fuels, such as Africa, Southeast Asia, East Asia, and South America.



Speaking of the benefits realized by using improved cookstoves, Kushboo feels, “When I used my traditional stove, my eyes would water from the smoke, now with the usage of improved stoves not only I am feeling better but also I can save time as the food gets cooked faster”. Her neighbour Heena agrees, “Not only do I need less time to cook, but also I spend less time in gathering fuel wood”.

The first and the most important reflection from the project has been the perceived value of the new product. The project focused on women as consumers and addressed the entire product lifecycle, where the improved cookstoves were seen as a technology that provided concrete and observable benefits. Motivational activities, such as, intensive community mobilization, door to door IC usage monitoring, regular field visits to repair technology, constant presence of TERI in the field site, training workshops on IC usage conducted with women, comprehensive messages on the benefits of IC usage, and the setting up of a pellet machine allowed TERI to register the adoption of ICs.


Projects of such a nature, which involve simple renewable technology when realized at a local level, provide ample scope to meet both environmental and social objectives. In addition, they help to decouple growth from natural capital depletion and environmental pollution. Yet, such local initiatives to drive green growth are still

at a nascent stage in the country, more so as there are incentives for adopting green technology. Furthermore, initiatives undertaken at the local level are crippled by lack of support for green business ventures, mainly due to inadequate availability of working capital, scant financing options, inefficient subsidies, limited opportunities for global partnership and trade, and lack of demand for the enterprise. Nevertheless, we require more grassroots initiatives like Project Surya, which brings scientific evidence to the forefront of mundane green technologies like improved cookstoves.

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## Lighting up rural communities

*Contributed by Prashanth V and Smita Rakesh*



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Rural areas in India, particularly economically poorer rural areas, have almost negligible access to basic modern energy facilities and still have to resort to the use of conventional fuel for meeting their energy needs. In this context, reaching out to the rural areas does not only mean supplying modern energy products; it translates into enabling the communities to be able to afford these modern energy solutions and make them a part of their everyday life effectively. One of the most basic amongst the various energy needs is that of lighting.

Realizing the need for a programme which looks beyond merely provisioning lighting devices, and focuses on filling the gaps to address the challenge more holistically, The Energy & Resources Institute (TERI) committed to enabling a billion people out of darkness through the 'Lighting a Billion Lives' (LaBL) programme in the year 2007. The main objective of the programme is to replace kerosene-based lighting with cleaner, more efficient and more reliable lighting, through promotion of rural entrepreneurship. LaBL is based on an entrepreneurial model of energy service delivery, that sets up micro solar-enterprises in un-electrified or poorly electrified villages. A local entrepreneur trained by TERI provides solar energy service to the community in lieu of an affordable fee. The support from a range of stakeholders and the public-private-people partnership that the programme has been able to achieve are the main strengths of the initiative and are the key reasons for reaching out to more than 1650 villages across 22 states in the country. LaBL has worked in more than 20 left wing extremism affected districts across India and has helped in addressing the challenge of development in such difficult socio-political set up as well. The campaign also made its presence in some African countries such as Kenya, Ethiopia, Mozambique, Sierra Leone and Uganda.

The impacts of the initiative have been diverse – from extended hours for work after dusk, which generates additional revenue, increase in study hours for children. The intervention has also benefited mid-wives in carrying safe child-deliveries, public health centres in dispensing medical aid at odd hours, house-wives in carrying out daily chores, and the farmers working in the fields after dusk, to name a few.



### Rahul Urja Shop

Rahul Urja is an Energy Enterprise set up in Jagdishpur, Uttar Pradesh, by Rahul, an entrepreneur who was interested in starting his renewable energy shop with TERI's support. Rahul was totally new to the sector, when he started the enterprise; but saw potential in it. In the two years of operation, he has installed solar micro-grids in nearby villages and sold several solar lighting devices and improved biomass cookstoves. Rahul also trains the operators managing these micro-grids and provides after sale support to his entire customer base. With regular technical and marketing training from TERI, Rahul is now confident and willing to expand his reach to more villages and nearby poultry farms.

Solar technology applications in the past have suffered from issues related to post sale maintenance, especially in the rural areas. The missing link in implementation and sustenance of rural energy projects is that of a platform or network of local-level institutions to facilitate micro-implementation of project deliverables, carry out training and capacity building and ensure after-sales services. TERI identified this gap and realized the need for creating new institutions for sustaining decentralized rural energy projects which would provide technical support to the solar sector, as a whole, apart from filling the institutional gap in implementing such projects in remote pockets.

LaBL is now facilitating setting up of energy enterprises, which are managed by local entrepreneurs and provide energy access solutions to rural areas. One of the Energy Enterprises is discussed in the case study – Rahul Urja Shop. Hence, it is strengthening the last mile of the renewable energy supply chain in the rural areas.

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## BOOK REVIEW

# Low Carbon Green Growth Roadmap in Asia

Ritu Singh

*Low Carbon Green Growth Roadmap in Asia and the Pacific* By United Nations ESCAP, KOICA. United Nations Publication, 2012. ISBN: 978-974-680-329-8. 176pp

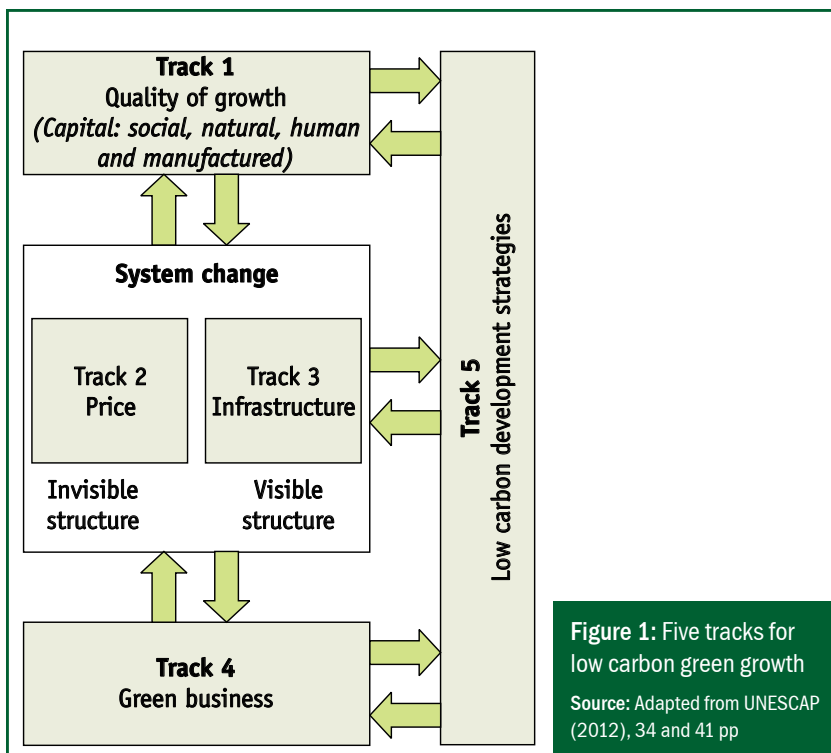
Developing countries in the Asia-Pacific region have experienced rapid economic growth in recent years by taking advantage of globalization and export-led growth models. However, compared to the rest of the world, the region uses three times the resources to create one unit of GDP. In the wake of the 2008 financial crisis, there has been an increasing demand for newer policy options for the greening of economic development. A transition to a green economy would require policy interventions at various levels and collaboration among different stakeholders, including Governments, research & academia, the private sector, and civil society groups.

The publication “Low Carbon Green Growth Roadmap for Asia and the Pacific” is targeted towards decision-makers for achieving inclusive and sustainable growth, without the need for a conventional “grow first, clean up later” path in the Asia-Pacific region. The book is published by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), with support from the Korea International Cooperation Agency (KOICA), under the East Asia Climate Partnership.

The publication is also supplemented with a compact disc that provides factsheets and case studies from countries around the world. As depicted in the figure, the roadmap suggests five tracks incorporating various policy options and strategies for low carbon green growth in the region.

The first track comes as shifting focus from “quantity growth” to “quality growth”, so that net growth is maximized. The track informs that for improving the quality of growth and reducing the hidden costs as GDP losses, investment in human, social, and natural capital is considered essential.





The second track guides reforming invisible structures, such as, institutional arrangements, policy instruments, and changing behavioural dynamics. For instance, environmental taxes levied on natural resources, energy, pollutants, and transport could shift the tax base from income to resource consumption, and ensure revenue neutrality while internalizing externalities. Similarly, policy reforms including fiscal measures, such as, phasing out subsidies on environmentally harmful activities and products should be encouraged.

The third track highlights changing visible structures, such as, physical infrastructure that includes urban design and planning, buildings, transport, energy, water, and waste system. This could re-orient economic activities to align with eco-efficiency and avoid a lock-in into energy and carbon-intensive infrastructure. Policy initiatives for solid waste management should follow a “reduce, reuse and recycle” approach for which countries, such as, Japan and Australia – which have introduced extended producer responsibility to reduce waste – serve as good examples.

The fourth track focuses on government initiatives in creating favourable conditions through reducing uncertainty and risk for investors so that businesses flourish in a green economy. Growth engines could consider four areas – namely, green industry, green technologies, green financing, and green jobs. On the consumer front, awareness and eco-labelling can play an important role. All these would have to be supported by legislation and policy support.

The fifth track stresses on low-carbon development strategies by combining economic development and climate change in an integrated, comprehensive, consistent, and coordinated manner. Given the global consensus to limit the increase in global temperature to less than 2 degrees centigrade by 2050, economies could engage in low carbon development strategies. Apart from providing enabling institutional frameworks, global partnerships could also help to mobilize funds, transfer learning, and build required capacities in developing countries.

Countries, such as, India are federal in nature and institutional frameworks would need to recognize strategies that could be adopted at the sub-national and local levels. Hence, there is a need to understand whether these case studies would be operationalized in the Indian context. An examination of co-benefits resulting from low-carbon green growth could help in informing governments at the national and sub-national level. A detailed enquiry on a sector wise approach and resulting co-benefits can take this work to the next level.

Understanding existing socio-economic paradigms needs to be done simultaneously while examining new paradigms. For example, the ecological economics school of thought would argue going beyond measures that internalize externalities to consider the incommensurability of entities such as biodiversity. For example, India's National Environment Policy of 2006 recognizes incommensurability through the concept of Entities of Incomparable Value (EIV). Noted academic Georgescu-Roegen emphasized on the importance to consider inconvenient variables, such as, energy and matter flows and institutional inertia. Hence, debates around low carbon green growth would need to consider a plurality of viewpoints as expressed in various schools of thought.

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## GANDHI'S QUOTES

"Nature has implanted in the human breast the ability to cope with any difficulty or suffering that may come to man unprovoked."

"A technological society has two choices. First, it can wait until catastrophic failures expose systemic deficiencies, distortion, and self-deception. Secondly, a culture can provide social checks and balances to correct for systemic distortion prior to catastrophic failures."

"Man did not weave the web of life; he is merely a strand in it. Whatever he does to the web of life, he does to himself."

"When I admire the wonders of a sunset or the beauty of the moon, my soul expands in the worship of the creator."

"Earth provides enough to satisfy every man's needs, but not every man's greed."



# GREEN GLOSSARY

## Green Growth

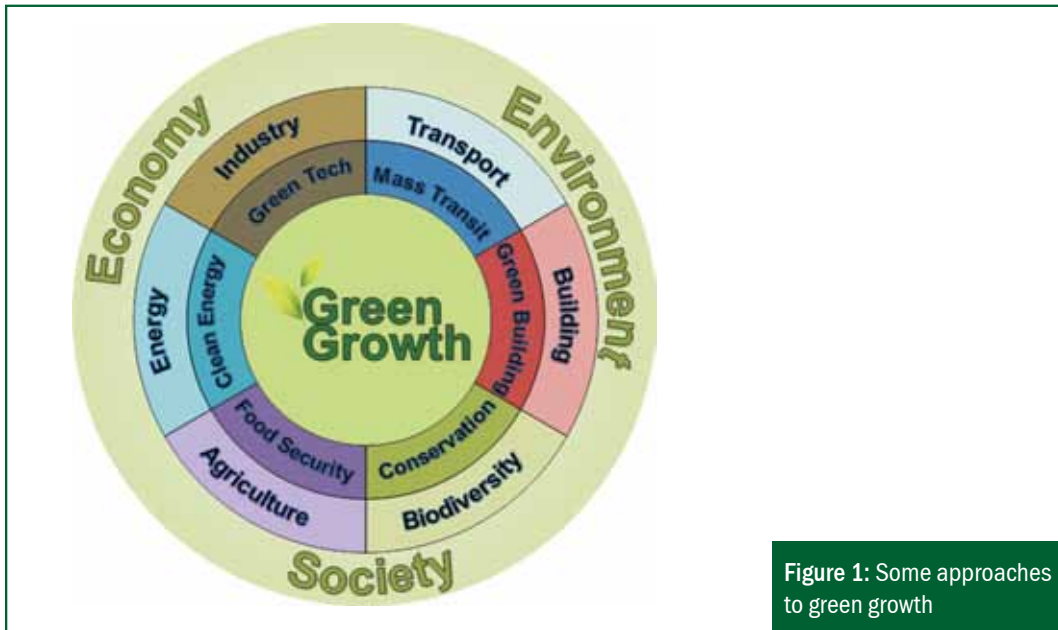


Figure 1: Some approaches to green growth

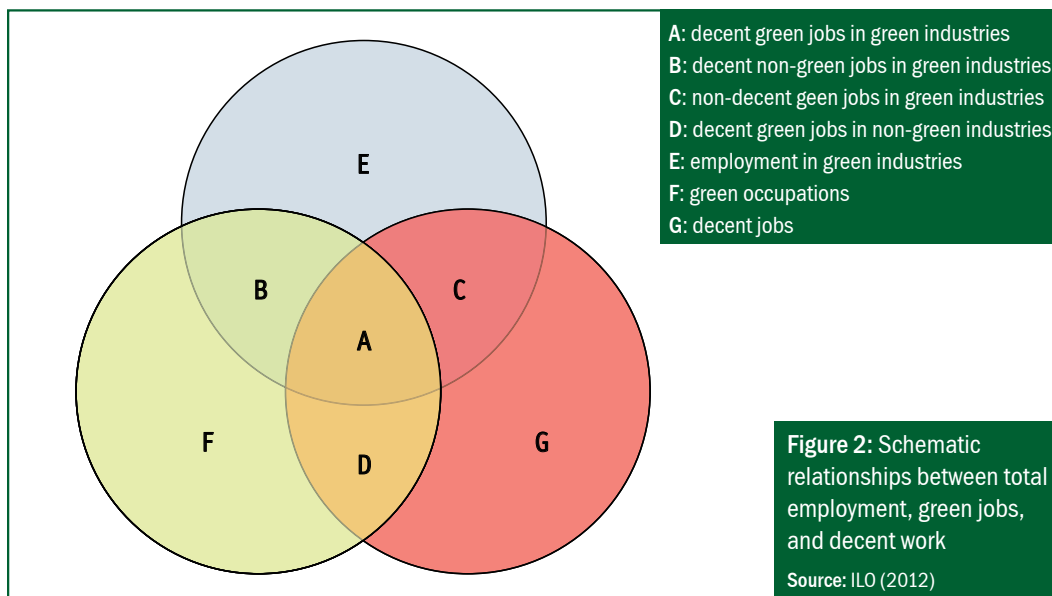
Green growth involves rethinking growth strategies with regard to their impact on environmental sustainability and the environmental resources available to poor and vulnerable groups (Para 3.15, TFC, 2009).

Green growth is about maximizing economic growth and development while avoiding unsustainable pressure on the quality and quantity of natural assets. It is also about harnessing the growth potential that arises from transiting towards a green economy (OECD, 2011).

## Green Jobs

Green jobs significantly reduce negative environmental impacts of economic activity, ultimately leading to sustainable enterprises and economies (ILO, 2012).

Green jobs as work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute substantially to preserving or restoring environmental quality (UNEP, 2008).



## References

- ILO. (2012). *Working towards Sustainable Development: Opportunities for decent work and social inclusion in green economy*. Geneva: International Labour Organization (ILO).
- OECD. (2011, February 16). *OECD Green Growth Strategy: Presentation made at the Partnership for Economic Policy (PEP) Meeting*. Organisation for Economic Co-operation and Development (OECD).
- TFC. (2009). *Report of the Thirteenth Finance Commission*. New Delhi: Thirteenth Finance Commission (TFC), Government of India (GoI).
- UNEP. (2008). *Green Jobs: Towards decent work in a sustainable, low carbon world*. Nairobi: United Nations Environment Programme (UNEP).

# GREEN UPDATES

## **Prime Minister's visit to Republic of Korea (23 March 2012 - 27 March 2012)**

The PM emphasized that India would pursue a strategy of green growth and reiterated India's commitment to increase energy efficiency and the share of renewables, including solar and nuclear power, in the country's energy mix.

More: <http://pib.nic.in/newsite/erelease.aspx?relid=81596>

## **Vietnam adopts green growth strategy (21 May 2012)**

Vietnam is taking measures to promote green growth by having a planning process towards a 2020 Green Growth Strategy that would aim to reduce energy consumption by three percent GDP per year by 2020 and reduce greenhouse gas emissions by 10-15 per cent with 2010 as the base year.

More: <http://vietnamnews.vn/vnnet.vn/social-issues/224990/green-growth-strategy-to-be-submitted-this-june.html>

## **German solar power plants produced a world record of electricity per hour (26 May 2012)**

On 26 May 2012, German solar power plants produced a world record with 22 gigawatts of electricity per hour, meeting nearly half of Germany's electricity needs. It is said that government mandated support for renewables has helped Germany to become a world leader in renewable energy.

More: <http://www.reuters.com/article/2012/05/26/us-climate-germany-solar-idUSBRE84P0FI20120526>

## **United Nations Conference on Sustainable Development (UNCSD) (20 June 2012 – 22 June 2012)**

Global leaders, experts, academia and civil society gathered at Rio de Janeiro from 20 June-22 June 2012 to celebrate the anniversary of the landmark Earth Summit of 1992. Rio+20 focused on two themes – Green Economy in context of Sustainable Development and Poverty Eradication, and the Institutional Framework for Sustainable Development. The Future We Want was the outcome document of the Summit.

More: [www.uncsd2012.org](http://www.uncsd2012.org)

### **Perform Achieve and Trade scheme (4 July 2012)**

The Perform Achieve and Trade (PAT) scheme is aimed at increasing the energy efficiency in energy intensive industries in India. This scheme includes promotion of trading of Energy Saving Certificates (ESCerts) to those designated consumers who exceed their target Specific Energy Consumption (SEC) reduction targets.

More: <http://beeindia.in/content.php?page=schemes/schemes.php?id=9>

### **Proposal for a Bilateral Offset Credit Mechanism by Japan (9 August 2012)**

The government of Japan is proposing the Bilateral Offset Credit Mechanism, which complements the current mechanisms, such as, the clean development mechanism (CDM) in order to contribute to global greenhouse gas emission reduction and removal. The mechanism is expected to reduce at least 1.3 billion tons carbon emissions by the year 2020.

More: <http://www.env.go.jp/en/headline/headline.php?serial=1829>

### **Himachal Pradesh to get US\$200 Million World Bank Loan to “Promote Inclusive Green Growth and Sustainable Development” (27 July 2012)**

The Government of Himachal Pradesh through the Department of Environment, Science & Technology is focusing its efforts towards improving management of its natural assets, and to promote inclusive green growth and sustainable development. According to Shri Sudripta Roy, Chief Secretary, this loan amount sanctioned by the World Bank would help in implementing different policy reform programmes in the state.

More: <http://himachalpr.gov.in/pressreleaseEng.asp?id=8254>

# Green Growth and Development Quarterly



Green Growth and Development Quarterly aims to understand the many facets of inclusive and green growth. It is a step towards a forward looking knowledge process for new opportunities linked with growth and sustainable development. Volume I (Issue 1) of the quarterly showcases new research and innovative practices.

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