

Energy Security

Insights



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Editors
Deepti Mahajan
Madhura Joshi



The Energy and Resources Institute

www.teriin.org

Rio+20: towards a sustainable energy future

The world today is grappling with a number of issues—climate change, food security, water security, biodiversity, trade, etc., that are rendering mankind vulnerable at unprecedented levels. And while we are struggling to address these issues, several of the global negotiations/discussions around them seem mired in controversy, with winners and losers of required actions unable to agree on acceptable mechanisms of cost/benefit sharing. There does exist, however, a deep-rooted understanding of the inter-linkages between these issues and of the commonality of solutions that would help mitigate multiple challenges.

The Rio+20 Summit offers yet another opportunity for the human race to demonstrate its sensitivity to the natural resource base on the planet, as also towards each other. Being able to address the challenges that we face in the energy sector is one potential cross-cutting solution that speaks to all the three pillars of sustainable development. At the core, however, is the basic issue of access to clean and modern energy forms. The UN Secretary General's initiative on Sustainable Energy for All will be launched globally at the Rio+20 Summit. With the very ambitious goals of providing access to energy for all, doubling the rate of energy efficiency improvements, and enhancing the share of renewable energy in the global energy mix by the year 2030, this initiative tries to steer clear of the concerns dogging other international processes. Focusing on win-win opportunities and ownership of action at the country level, this initiative is open to all stakeholders, namely governments, businesses, NGOs, academia, media, and others, to join the effort as per their capabilities and strengths and as per their own priorities.

Given the high dependence on biomass resources in developing countries, the energy access goal assumes added importance with its implications for land, water, and biodiversity issues. The inability to provide access to modern energy forms to billions also inhibits them from fully integrating into the development process. As reiterated once again by Acemoglu and Robinson in their new book *Why Nations Fail*, the wealth of a country is most closely correlated with the degree to which the average person shares in the overall growth of the economy. The same argument can be extended to the global level. The world cannot let the Rio+20 Summit, with its emphasis on Green Economy and linkage with energy, conclude without defining an alternative and equitable sustainable growth path for humanity as a whole!

Leena Srivastava

Vice Chancellor, TERI University and Executive Director-Operations, TERI

The green economy and energy security

Malancha Chakrabarty

The Energy and Resources Institute, New Delhi

The United Nations Conference on Sustainable Development (UNCSD), also known as Rio+20, will mark the twentieth anniversary of the United Nations Conference on Environment and Development (UNCED) held at Rio de Janeiro in 1992. Sustainable development has been the overarching goal of the international community since Rio 1992 and two decades on, the world is far from realizing the vision of Rio. The “interlocking crises” of energy, development, and the environment have become more severe. In addition, there are grave concerns about climate change, and food and energy security, for the growing global population, high levels of poverty and deprivation in developing countries, and rising global inequalities. The upcoming UNCSD is, therefore, an opportunity for world leaders to address the economic, social and environmental crises gripping the world today.

The conference will focus on the following themes:

- (a) A green economy in the context of sustainable development and poverty eradication
- (b) The institutional framework for sustainable development.

The concept of a green economy has moved into the mainstream of policy discourse in the last couple of years. The recent interest in green growth is due to widespread disillusionment with the current economic paradigm which encourages the rapid accumulation of wealth at the expense of depleting and degrading natural capital (UNEP 2011). The following definitions of green economy/ green growth can be found in the existing literature:

“The green economy approach is an attempt to unite, under one banner, a broad suite of economic instruments relevant to sustainable development” (UNCSD 2010).

“A green economy is one that results in ‘improved human well-being and social equity’, while significantly reducing environmental risks and ecological scarcities” (UNEP 2011).

“Green growth is environmentally sustainable economic progress to foster low-carbon, socially inclusive development” (UNESCAP).¹

In a nutshell, the concept of a green economy amalgamates several existing concepts such as durable economic activity, reduced environmental impact, sustained growth in high quality jobs and reduced poverty. The issue of energy security should be at the core of discussions on green economy because energy lies at the heart of economic development and environmental issues facing the world today. According to the UN Secretary General’s Advisory Group on Energy and Climate Change (AGECC), “Energy is at the forefront of the global agenda. It is central to the issues of development, global security, environmental protection and achieving the MDGs”.

Although there is agreement on the critical importance of energy security, there are myriad definitions of energy security, depending on the context in which it is used. The IEA has defined energy security as “the uninterrupted physical availability [of energy] at a price which is affordable, while respecting environment concerns.”² In the case of developing countries, such as India, the issue of energy security goes well beyond macro concerns to the challenge of providing the poorer sections of society with access to energy. India has defined energy security as “...when we can supply lifeline energy to all our citizens irrespective of their ability to pay for it as well as meet their effective demand for safe and convenient energy to satisfy their various needs at competitive prices, at all times, and with a prescribed confidence level considering shocks and disruptions that can be reasonably expected” (Planning Commission 2006).

¹ <http://www.greengrowth.org/>

² http://www.iea.org/subjectqueries/keyresult.asp?KEYWORD_ID=4103

In order to bring about a revolutionary change in the rural economy, the lighting and cooking needs of the rural population should be met through an affordable electricity supply and LPG gas connections respectively as there are various economic, social, and environmental costs associated with dependence on solid fuels. The lack of modern forms of energy represents a major barrier to economic development and prosperity in developing countries. For instance, there are very limited business opportunities available in rural areas due to the lack of electricity. Lack of power also limits the number of productive hours in a day. Indoor air pollution emitted from traditional fuels and cooking stoves is a potentially large health threat in rural areas. Every year, household air pollution is responsible for almost 2 million premature deaths, largely of women and children, and the loss of between 1 to 5 billion women-hours in collecting biomass fuels.³ Moreover, the unsustainable use of solid fuels can lead to local deforestation, and land and soil degradation. Products of incomplete combustion also have a higher global warming

potential. Therefore, energy is a critical component of the green economy in the context of sustainable development and poverty eradication.

The two major challenges facing the world today, in the context of energy security, are:

- High levels of energy poverty in developing countries: Globally, about 1.4 billion people still lack access to electricity. About 2.6 billion use solid fuels — wood, charcoal, coal, and dung— for cooking and heating. More than 95% of these people are either in Sub-Saharan Africa or developing Asia, and 84% of them are in rural areas.
- Developed countries are responsible for a large percentage of total global energy consumption: the United States, Europe and Japan account for about 36% of the world primary energy demand (WEO 2011).

Figure 1 compares the energy consumption of different countries (accounting for over 70% of global energy consumption, population and GDP)

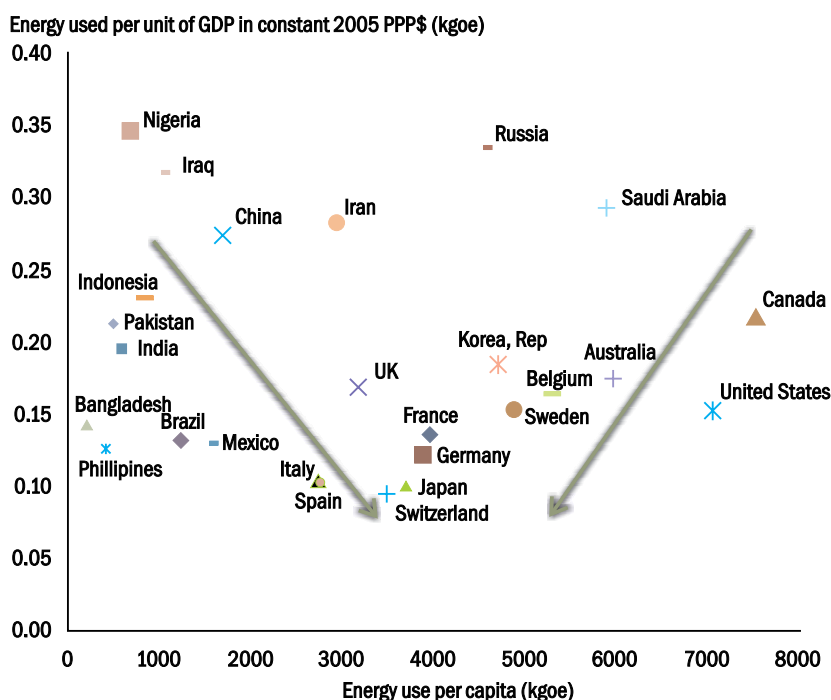


Figure 1 Energy intensity of GDP and per capita energy consumption in selected countries in 2009

Source World Bank database

³ See <http://moef.nic.in/downloads/public-information/dialogue/BreakoutDay2Group1> Dr. Shonali Pachauri 200410.pdf

on two different denominators: population and GDP. Countries on the left of the graph have low levels of per-capita energy consumption, signifying a problem with energy access. These countries also have the potential to improve energy efficiencies by adopting better technologies and infrastructure development. On the other hand, the developed and oil exporting countries on the right side of the graph represent increasingly high levels of per capita energy consumption, with several of them presenting a significant scope for energy efficiency improvements and conservation. The two arrows signify the movement towards a global sustainable future. It is, therefore, fitting that the UN Secretary General’s Advisory Group on Energy and Climate Change (AGECC 2010) has identified two priorities:

- Ensure universal energy access by 2030
- Reduce global energy intensity by 40% by the year 2030

Developing countries need to expand access to reliable and modern energy services in order to reduce poverty and improve the health of their citizens. Expanding access to affordable clean-energy is critical for realizing the MDGs and enabling sustainable development across much of the globe. Currently 1,441 million people across the world lack access to electricity, while 2,679 million people lack access to clean cooking technologies (Table 1). Developed countries, on the other hand, should take the lead in deployment of energy efficient technologies. Energy and infrastructure resources need to be freed up from current consumers to facilitate access to the poor. They should also develop and incubate globally relevant technology solutions and make available appropriate technologies to developing countries.

Issues critical for transition to a green economy

The following section discusses in detail the two major issues, viz. technology transfer and financial resources, which are critical for a transition to a green economy. Technology transfer and financial resources were identified as the two key “means of implementation” in Agenda 21. These issues have turned out to be stumbling blocks in most international negotiations. Therefore, for a smooth transition to a green economy, effective measures need to be undertaken on these two critical areas.

Table 1 Number of people without access to electricity and relying on the traditional use of biomass in 2009

	Number of people lacking access to electricity (million)	Number of people relying on traditional use of biomass for cooking (million)
1. Africa	587	657
Sub-Saharan Africa	585	653
2. Developing Asia	799	1937
i) China	8	423
ii) India	404	855
iii) Other Asia	387	659
3. Latin America	31	85
4. Developing countries*	1438	2679
5. World**	1441	2679

*Includes Middle East countries

**Includes OECD and transition economies

Source IEA (2010)

Technology

Although a few large developing countries such as China, Brazil and India may possess the ability to undertake technological effort on their own, the majority of developing nations are not in the same situation. Therefore, for the world to move to a path of green growth and universal energy access, developing countries would require access to technology at affordable prices. The critical role of technology transfer was recognized at the Earth Summit 1992 and its related conventions. Para 34.4 of Agenda 21 describes the importance of ensuring developing countries receive access to scientific and technological information:

“There is a need for favourable access to, and transfer of, environmentally sound technologies, in particular to developing countries, through supportive measures that promote technology cooperation; and that should enable transfer of necessary technological know-how as well as building up of economic, technical, and managerial capabilities for the efficient use and further development of transferred technology.”

However, there has been little technology transfer from developed to developing countries. The focus of implementation has generally been on creating conditions in developing countries

that are conducive to foreign investment and building capabilities to absorb and utilize imported technologies. Currently, a large body of technological information is with the private sector which is, in turn, dependent on intellectual property income. Therefore, the intellectual property regime is a decisive determinant of technology diffusion. Available evidence points to a process of technological evolution that is centre-periphery in its character, where firms from developed countries are the main holders of intellectual property rights and developing countries are technology followers. Existing IPR laws are not able to distinguish between countries at different stages of development in ways that might help IPRs to fully contribute to development objectives. Stiglitz (2006) highlights how the IPR regime rewards innovators by creating a temporary monopoly power, allowing them to charge far higher prices than they could if there were competition.

Finance

There are diverging estimates of the financial resources that will be required for the transition to a green economy. According to the Green Economy report by the UNEP, the investment required for the transition is likely to be within the range of \$1.3 trillion to \$3.4 trillion annually from 2011 to 2050. This amounts to around 2% of the global GDP. About 60% of this sum would be invested in energy efficiency in transport, industry, renewable energy and buildings sector (UNCSD 2012). The World Economic and Social Survey 2011 places the investment needed for the energy transformation at \$1.6 trillion per year during 2010-2050 (United Nations 2011). All the investment estimates are subject to caveats and uncertainties because of the variety of assumptions and methodologies used. Nonetheless, it is clear that garnering the resources for the transition to a green economy will be a daunting task.

Agenda 21 gave financing a critical place as one of the two key means of implementation of sustainable development objectives. Para 33.3 recognized that poverty eradication is the overriding

priority for developing countries and that financial transfers are of key importance to developing countries:

“Economic growth, social development, and poverty eradication are the first and overriding priorities in developing countries, and are themselves essential to meeting national and global sustainability objectives. In the light of the global benefits to be realized by the implementation of Agenda 21 as a whole, the provision to developing countries of effective means, inter alia, financial resources and technology, without which it will be difficult for them to fully implement their commitments, will serve the common interests of developed and developing countries and of humankind in general, including future generations.”

However, inadequate financing continues to be the biggest obstacle to sustainable development implementation. Developing countries are not able to mobilize domestic resources for the required additional investment effort for sustainable development because of multiple demands on government expenditure. Most developing countries also have poorly developed markets for long-term financing and a weak fiscal basis, which further limits the scope for substantial increases in domestic funding for long-term investment.

Much of the incremental investment in green technology will need to take place in developing countries because new technologies can be installed, not just to replace “brown” activity, but also to increase the scale of economic activity. Therefore, developing countries will require support from developed countries for a transition to a green economy. The provision of new, additional, stable, and predictable financial resources to support implementation activities in developing countries is essential for the achievement of tangible outcomes. In their submission to the UNCSD,⁴ the G77 and China have urged developed countries to establish clear and transparent timetables within their national budget allocation processes to reach the level of at least 0.5% for ODA for developing countries as well as 0.15% to 0.2% of GNP for ODA for LDCs as urgently as possible. In addition, it is essential to ensure that international financial

⁴ Submission by the Group of 77 (G77) and China for the compilation document of UNCSD (Rio+20) can be downloaded from <http://www.uncsd2012.org/rio20/content/documents/399UNCSD%20RIO-%20complete%20submission-final.pdf>

resources for green economy transition should not be subject to unnecessary conditionalities, nor should the environment serve as an excuse to add additional conditions for ODA aid, loans, debt rescheduling, or debt relief.

Way forward

The outcomes of Rio+20 should include a green economy roadmap which focuses on overcoming the deficiencies of existing mechanisms and offering practical solutions for a sustainable future. The energy issue is indeed one of the biggest challenges facing the world today. However, addressing the energy challenge is beyond the capacity of individual governments, and calls for international collaboration. Therefore, to achieve the objective of sustainable energy for all, the Rio+20 conference should result in concrete actions in the following areas:

Development and equity issues should be at the core of the green economy concept

Despite improvements in many areas of development and the environment, the world has not made progress towards sustainable development as aspired to in the outcomes of the Rio Summit. Although some progress has been made on the economic front and in the eradication of poverty in some regions; the dividends have been shared unequally. Many countries are not on track for achieving key Millennium Development Goals (MDGs), and most environmental indicators have continued to deteriorate. According to the Report on the World Social Situation 2010, 963 million people—about 14.6% of the estimated world population of 6.6 billion—are undernourished. The poorest 40% of the world's population account for only 5% of global income, and on the other hand, the richest 20% account for 75% of world income (United Nations 2009). Similar inequalities persist in the case of energy consumption, as outlined above. Extreme poverty and inequality is a denial of human rights; therefore, development and equity issues should be placed at the centre of the green economy approach for a comprehensive roadmap to improve the lives of the deprived people at Rio+20.

Mechanisms for technology development and dissemination

Protection of the natural environment is a public good, therefore, market mechanisms cannot be relied upon to provide the right incentives for adequate investment in green technologies. In order to ensure affordable access to new green technologies, the public sector has to play an important role in technology development and deployment. Public financing is likely to increase the size of the market and thereby spur private companies to increase scale and reduce costs. Poor infrastructure, shortage of skilled personnel, weak institutions, and inadequate regulations are important barriers to technology transfers in developing countries. Therefore, a Global Technology Incubation Centre should be established which would institutionalize long-term stable funding for research and development of clean energy technologies. This centre should focus on technologies that would accelerate access to clean energy and improve energy efficiency in micro, and small and medium enterprises.

Mobilization of financial resources for transition to a green economy

Overall, the investment required for the transition to a green economy is very high. A high proportion of the estimated needs will come from developing countries; particularly in the area of energy, where significant expansion of demand is projected. Therefore, additional financial flows from developed to developing countries are essential. Moreover, developed countries should also stimulate private sector innovation by a combination of tax and regulatory policies. According to the IEA (2011), in order to provide universal modern energy access by 2030, a cumulative investment of \$1 trillion is required—an average of \$48 billion per year. A fund for universal energy access should be created to generate the requisite funds.

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Can a reformed institutional framework get us to the future we want?

Binu Parthan

Renewable Energy and Energy Efficiency Partnership, Vienna*

Context

During the on-going preparatory process for the 2012 United Nations Conference on Sustainable Development, reform of the existing institutional framework for sustainable development has emerged as one of the two central themes. While the calls for institutional reforms date back to the World Summit on Sustainable Development in 2002, they have found more traction in recent years. The Zero Draft¹ of the Outcome Document also reflects this need, and proposes the elements that could form the basis of, and contribute to, an eventual outcome.

Need for institutional reform

There are a number of inadequacies with the current institutional framework for sustainable development which are driving the need for reform. Some of the key shortcomings are:

- High levels of fragmentation in existing sustainable development institutions, and the lack of effective mechanisms for inter-institutional coordination. The fragmentation and limited coordination results in duplication of efforts and wastage of resources.
- Low levels of performance by a number of sustainable development institutions, and the absence of a global performance measurement framework applicable to all sustainable development institutions.
- Governance of a large number of sustainable development institutions is outdated, skewed towards funding sources, and does not reflect the balanced governance arrangements that characterize some of the recent mechanisms under one of the Rio Conventions - UNFCCC.²

- Resources available to sustainable development institutions are inadequate to address development priorities and environmental challenges. The allocation of these resources to individual sustainable development institutions is also not necessarily made based on the needs or the performance of the institutions.
- Monitoring, Reporting and Verification frameworks, and processes of sustainable development institutions and their programmes, are weak and need to be strengthened. Weaker Monitoring, Reporting, and Verification frameworks discourage accountability and retard performance.

Changing sustainable development landscape

Apart from these inadequacies with the institutional framework, the Sustainable Development domain has undergone significant changes since the United Nations Conference on Environment and Development in 1992. Some of the key changes that are relevant include:

- The scale of the sustainable development challenge has increased significantly and the natural resources and ecosystems support 7 billion people today, a number which is expected to increase to 9 billion in 2050.
- The level at which decisions about green economy and sustainable development are made is increasingly at the local levels—provinces, cities, villages, and households, and the global green economy policies need to percolate to this level of implementation.
- The share of international sustainable development institutions in the infrastructure, transport, and energy sectors is steadily

*The views expressed in the article are that of the author and do not necessarily represent REEEP's position.

¹ Dated 10th January 2012

² Such as the Green Climate Fund and the Adaptation Fund.

decreasing. For example, global investment in clean energy in 2011 was US\$ 260 billion³ and investments in clean energy in 2011 by the World Bank—the world’s largest sustainable development financial institution, was only \$ 5.9 billion.

- A number of emerging developing countries are also supporting other developing countries to build their infrastructure and industries. These south-south finance flows are also becoming a significant financing source for sustainable development in a number of countries.
- Due to the economic downturn and sovereign debt issues, a number of OECD countries are scaling back their ODA budgets which may, in the short to medium term, adversely affect achievements under the proposed framework for action on the green economy.

What is on offer?

The Zero Draft, dated 12th January 2012, provides a number of possible outcomes, and notes the need for strengthening or reforming the institutional framework. While the final outcome is unclear, some of the key outcomes possible include:

- Transformation of the CSD into a sustainable development council which will be a high-level authoritative body that will promote integration of the sustainable development pillars, foster institutional coherence, and promote effective implementation.
- Establishment of a UN specialized agency for the environment with a strengthened mandate and at an equal level with other UN specialized agencies.
- Call to countries to establish national sustainable development councils to coordinate cross-cutting issues related to sustainable development. Recognition of the need to integrate sustainable urban development policy into national sustainable development policies, and facilitate closer cooperation between national and local authorities.

It is unclear at this stage whether these proposals for institutional reform and creation of new institutions

and mechanisms will be successful, or whether the outcome will be closer to status quo with the Commission on Sustainable Development continuing its sustainable development oversight and UNEP continuing its current mandate.

Apart from the proposals for the council and the specialized agency, gaps relating to implementation, performance, MRV, and governance do not seem to have been addressed. The proposals also do not seem to recognize the global changes occurring in the area of sustainable development although there is recognition about the need for local and city level action.

Towards an effective institutional framework

To encourage sustainable development in a changed global landscape and to be effective, the institutional framework will need to incorporate the following elements:

- A strategic and institutional framework for green economy to be overseen by a global council with a balanced governance arrangement consisting of both donors and beneficiaries.
- An emphasis on implementation of green economy programmes supported by a clear and measurable performance framework and metrics linked to tangible outcomes. The performance evaluation should be applicable to all sustainable development institutions and an independent and transparent evaluation of performance should be overseen by the council.
- The institutional framework to be supported by an international financing mechanism based on the principle of open access, where national and regional institutions should be able to access resources for sustainable development. Access to financial resources to be based on the performance of the sustainable development institutions.
- A financing mechanism to leverage local government and private sector contributions and to support green economy programmes in developing countries.
- Engagement and involvement of the private sector and national and local governments, in the institutional framework as implementing

³ Source: Bloomberg New Energy Finance, 2012

institutions, through market based mechanisms for a green economy.

It is hoped that at the UNCSO in 2012, we can start the process of reforming the institutional framework towards one that reflects the changes and addresses the short-comings prevalent in the sustainable development landscape. The opportunity will be to reform a 20th Century institutional framework to deliver a green economy in the 21st Century.

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Energy access and the sustainable development discourse

Harsha Meenawat and P R Krithika

The Energy and Resources Institute, New Delhi

The energy access challenge

The Rio+20 process has recognized “energy” as one of the seven critical issues facing the world today, along with jobs, cities, food, water, oceans, and disasters. Energy is an issue that is closely linked with almost all global challenges, be it energy security for fuelling economic development, or reducing the carbon intensity of energy use to mitigate environmental degradation, or access to energy for poverty alleviation and livelihood generation. Energy is an enabler which can strengthen the three pillars of sustainable development—economic, social, and environment.

In particular, energy access remains at the heart of the debate in achieving the Millennium Development Goals (MDGs). A recent report by the UNDP shows that access to clean and efficient energy services play an important role in the achievement of the MDGs (UNDP 2012). Experience shows us that expanding access to modern energy services continues to be a massive challenge for developing countries in

the South, especially the LDCs (Least Developed Countries). IEA statistics show that over 20% of the global population—over 1.4 billion people—lack access to electricity (OECD/IEA 2010). Some 40% of the global population—over 2.7 billion people—rely on the traditional use of biomass for cooking even today. More than 80% of the people without electricity access live either in sub-Saharan Africa or in South Asia. A further 56% of people in developing countries rely primarily on solid fuels—coal and traditional biomass—for their cooking needs, with little or no access to modern efficient forms of energy (UNDP 2009).

Without underplaying the scale of the problem, it also needs to be pointed out that serious efforts are underway in many countries to provide access to the unserved. While policy is definitely a push factor, many of these initiatives are taking place at the local level—driven by private entities and civil society. An on-going TERI-IGES study on energy innovations (supported by the Asian Development Bank)

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offers interesting insights from select energy access projects in developing Asia. The projects studied were implemented in Bangladesh, Cambodia, India, Laos, and Vietnam. These projects were deemed to be successful and considered best-practice examples as they supplied clean and reliable energy to a segment of the population that was either not covered by grid electricity or lacked efficient sources of supply. The projects provided access in a manner that was sustainable, affordable, and generated multiple benefits for the communities. More importantly, all of them displayed robust partnerships and coordination in the entire value chain, starting from project implementer, facilitator, and financiers, to the end beneficiaries. The key messages which emerge from the review of energy access projects are as follows:-

- Financing mechanisms in energy projects serving rural populations where emphasis is laid on self-sustainability are successful. The emphasis is on moving away from a grant-based approach.
- Capacity building is important for introducing or developing a technology, as well as for the absorption of the technology introduced.
- User buy-in is crucial for energy access projects. More than making a technology or measure available, it is important to ensure that it enjoys acceptability and a buy-in from the target group.
- Rather than adopting a 'minimalist' approach by providing only basic services, projects which are able to provide to income generating opportunities for the community and serve multiple functions are successful in the long run.
- Market-driven programmes, which are able to create a market value chain around their products, are far more independent than purely government supported programmes. Creation of this value chain requires more participation from businesses, final consumers, financing entities (government or independent banks) and market regulators that can provide benchmarking standards to main product quality and ensure technology delivery.

An analysis of the impacts of these energy access projects has revealed that, to effectively address the challenges related to energy access, developing countries need to tap into regional and global partnerships. These partnerships will support

this agenda through much-needed financing and technology assistance, and help in building the capacity and successful business models required to upscale energy solutions for increasing access. The UNCSD Rio+20 Summit is one of the global platforms that can promote the agenda of energy access and substantiate its role in the arena of sustainable development.

Energy and Sustainable Development

UNCED 1992

The Earth Summit or the United Nations Conference on Environment and Development (UNCED) in 1992 at Rio de Janeiro was a landmark summit where representatives from 172 countries and 2400 non-governmental organizations came together to discuss global issues related to sustainable development (UN 1997). The summit's outcomes included Agenda 21, the Rio Declaration on Environment and Development, the Statement of Forest Principles, and the opening of legally binding agreements for signature on the Framework Convention on Climate Change (FCCC) and the Convention on Biological Diversity (CBD).

The summit was successful in highlighting the problems faced at a global scale and the impact the human population was making on the environment. The Rio principles provided guidelines for pursuing sustainable development at a global scale; Agenda 21 put forth detailed proposals for action in social and economic dimensions, conservation and management of resources, means of implementation, and the strengthening of the role of 'major groups' for inclusive action; while the Forest principles provisioned for countries to make efforts for re-forestation, forest conservation, and utilization of forest resources according to sustainable development principles. The follow up mechanisms from the UNCED were the Commission on Sustainable Development (CSD), the Inter-agency Committee on Sustainable Development (IACSD) and the High-level Advisory Board on Sustainable Development.

The CSD has been the overarching high-level forum with a mandate of mainstreaming sustainable development in the agendas of the UN system, intergovernmental agencies and other key actors who have a role to play in the transition towards

sustainable development. The CSD does this through reviews of the implementation of major agreements, by providing policy guidance and promoting dialogue and partnerships to stimulate sustainable development. The CSD has identified and clustered issue-areas for deliberation; namely:

- Critical elements of sustainability—Trade and the environment, patterns of production and consumption, combating poverty, and demographic dynamics
- Financial resources and mechanisms
- Education
- Science
- Transfer of environmentally sound technologies
- Technical cooperation and capacity building
- Decision making
- Issues relevant to major groups

Energy did not feature as an issue area at the Earth Summit, but on scrutiny, it figures as a second layer of issues that support the priority issues areas of critical elements of sustainability, environmentally sound technologies, and technical cooperation. Since then, the role of energy in achieving sustainable development has been well demonstrated.

WSSD 2002

Building on the outcomes of the Earth Summit and the principles defined thereof, the World Summit on Sustainable Development (WSSD) adopted the Johannesburg Plan of Implementation (JPOI). This plan documented further the actions to be taken on the issue areas identified at the Earth Summit in 1992. With regard to energy, the JPOI lists seven action points relevant to Energy for Sustainable Development (emphasis added):

1. Improve access to reliable, affordable, economically viable, socially acceptable, and environmentally sound energy services - para. 9(a)
2. Recognize that energy services have positive impacts on poverty eradication and the improvement of standards of living - para. 9 (g)
3. Develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energy and, with a sense of urgency, substantially increase the global share of renewable energy sources - para. 20(c)

4. Diversify energy supply by developing advanced, cleaner, more efficient, and cost-effective energy technologies - para. 20(e)
5. Combine a range of energy technologies, including advanced and cleaner fossil fuel technologies, to meet the growing need for energy services - para. 20(d)
6. Accelerate the development, dissemination, and deployment of affordable, and cleaner energy efficiency and energy conservation technologies - para. 20(i)
7. Take action, where appropriate, to phase out subsidies in this area that inhibit sustainable development - para. 20(p)

The actions points under the JPOI direct our attention to the fact that energy has traditionally been a topic of national consideration and has been mostly addressed through bilateral treaties or regional agreements. The international institutional arrangement for energy has not been as developed as other areas of sustainable development, leading to dispersed comments on energy instead of concrete strategies.

As a result, one of the most important institutional arrangements arising from the WSSD in 2002 was the formation of UN-Energy; that is, an interagency mechanism in the UN related to energy. The aim of UN-Energy is to promote sustainable energy systems in developing countries, to assist them in meeting their sustainable development goals. UN-Energy has organized its work under the clusters of Energy Access (with UN DESA and UNDP supported by the World Bank), Renewable Energy (with UNEP and FAO supported by UNESCO), and Energy Efficiency (with UNIDO and IAEA).

With the involvement of the above mentioned and numerous other such organizations working at the global level to provide support for capacity building, financing, knowledge sharing, and technology assistance, a bigger challenge has arisen; co-ordinating the activities of these agencies and connecting them with the local institutions that are responsible for the actual implementation of the initiatives that provide energy access.

In recognition of the importance of energy for sustainable development, the United Nations General Assembly resolution has declared 2012 as

the “International Year of Sustainable Energy for All”. The UN Secretary-General Ban Ki-moon, with support from UN-Energy and the United Nations Foundation, is also leading a new global initiative—Sustainable Energy for All. This initiative will engage governments, the private sector, and civil society partners, globally with the goal of achieving sustainable energy for all, and to reach three major objectives by 2030:

- Ensuring universal access to modern energy services
- Doubling the rate of improvement in energy efficiency
- Doubling the share of renewable energy in the global energy mix

UNCSD Rio+20

The two overarching themes for Rio+20 will be the Green Economy and the Institutional Framework for Sustainable Development (IFSD). The IFSD discussions so far have been focused on reforming the UN structure—particularly the UNEP and CSD. Though energy is being discussed only as a critical issue and not a main topic, the discussions related to the Green Economy would have repercussions for this sector. What will be more important to note after this summit are the repercussions of the IFSD discussions on the governance of energy resources. If Rio+20 were to work towards an institutional framework for sustainable development that features institutions for

energy that are well-integrated into mechanisms for sustainable development and green economy, there could be better consensus for the three priority areas of energy - Energy access, Energy efficiency, and Renewable Energy.

Our research, as well as research from other institutions like the UNDP, has concluded that while energy access is being addressed at different levels within developing countries (especially in Asia), local efforts that involve different stakeholders can deliver sustainable development outcomes. While these efforts are making a difference, there is still the need for considerable support to ensure their success. The discourse on sustainable development needs to address this challenge.

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Identity and energy access in India - setting contexts for Rio+20

Samir Saran and Vivan Sharan

Observer Research Foundation, New Delhi

“Sustainable development emphasizes a holistic, equitable, and far-sighted approach to decision-making at all levels. It emphasizes not just strong economic performance but intra-generational and inter-generational equity”—United Nations Conference on Sustainable Development

In the two decades following the Rio Earth Summit of 1992, India has changed dramatically. It has transformed from a closed economy with empty coffers to one that is now far more integrated with the world and is widely viewed as one of the most important ‘emerging economies’ that are shaping the 21st century. This year in June, stakeholders from across the globe will convene in Rio once again to discuss what is destined to be amongst the most important contemporary theme—sustainable development. The Rio+20 Summit, otherwise known as the United Nations Conference on Sustainable Development (UNCSD), will serve as an introspective pause, a chance to review development trajectories, and to realign priorities with reality and ambitions. India will find itself in the uncomfortable position of demanding greater development space and equity as a nation from the developed world, while having to reconcile stark domestic inequities amongst different social groups and income classes.

India’s views on the priorities outlined by the UNCSD were communicated in an official submission sent to the UNCSD Secretariat on 28th October, 2011. According to the document, India views universal access to modern energy¹ as “essential for improving the quality of life of the poor”. Yet the nation’s achievements in building capacities to

generate or distribute energy in its various forms have been far from remarkable, and indeed far from what is needed to ensure universal access.

India produced around 811 billion units of electricity in 2010–2011,² with about 300 million people with no access to electricity³ and many more with only notional access. The per capita energy consumption in the country remained around 500 kilograms of oil equivalent, compared with a global average of 1800 (MoEF 2007). India’s National Electricity Policy, which was notified in 2005, outlined the objective of ensuring “power for all” by 2012, an ambition which still remains far from fulfilled. The fact that only about half of the planned 78,577 megawatts of capacity additions took place over the course of the 11th Five Year Plan,⁴ exemplified an abject failure in implementation of transformational energy sector projects.

Such failures in implementing capacity-addition programmes, alongside attracting sufficient domestic and foreign private sector investments in the energy sector, are indicative of a larger political failure. The policy deadlocks that result in the lack of progressive reforms on land use and acquisition, foreign capital flows, and environmental norms have created an uncertainty that adversely affects investment decisions. This uncertainty, coupled with bureaucratic

¹ The International Energy Agency describes modern energy access as “a household having reliable and affordable access to clean cooking facilities, a first connection to electricity and then an increasing level of electricity consumption over time to reach the regional average”. The initial threshold level of electricity for rural households is assumed to be 250 kWh, while urban households are assumed to use 500 kWh per year on average. For more information, see <http://www.iea.org/papers/2011/weo2011_energy_for_all.pdf>

² According to the Central Electricity Authority: http://www.cea.nic.in/reports/yearly/energy_generation_10_11.pdf

³ The latest figure for the number of people without access to electricity is 272 million. This is calculated from the 66th round of the National Sample Survey.

⁴ 34,462 megawatts were added by the end of FY 2011.

hurdles and the threat of disruptive regulatory and tariff policies, has managed to keep both local and international investors away from large scale, capital-intensive energy projects. This economic environment is also keeping away investments into smaller, off-grid solutions, which already suffer from an inherent lack of scalability and from the weak absorptive capacities within local communities.

This capability gap (in execution), due to a variety of reasons, is also why India is unable to commit to timelines and sought development space (read ‘time’) at the most recent international forum. The virtual deadlock at the Durban Climate Change Conference⁵ is, in part, a result of the inability of India to commit (or even envision) timelines to peak energy emissions, even for achieving global energy poverty thresholds.⁶ This is the real and hidden story of ‘Emerging India’. Perhaps it is time that this is placed on the table at Rio+20 and beyond, and that Indian positions on mitigation and capping of emissions are understood in this light.

The emphasis on universal access to ‘modern energy’ is an important aspect of the Rio+20 agenda, and it may be useful to understand the Indian landscape. According to 2009-10 Indian National Sample Survey (NSS) data from households, 75 per cent of rural India still relies on traditional energy, such as firewood, for cooking fuel; while over 33 per cent in the same category rely on kerosene for lighting (as a substitute for electricity).⁷ Over the

period 2004-05 to 2009-10, as a result of focused rural electrification programmes such as the Rajiv Gandhi Vidyutikaran Yojna, access to electricity in rural areas did increase by over 10 per cent; and over the same period, access to LPG (for cooking) in urban areas has also shown significant improvement.⁸

While such numbers indicate that efforts to transform the energy demography have not completely stalled, the dependence on traditional and inefficient forms of fuels has not shown substantial decline. A case in point is the minimal 1.85 per cent decrease in dependence on firewood for cooking across India over the five-year period as shown in Table 1. Yet these numbers only convey a macro position on energy access. Even cursory examinations of some of the surveys and reports suggest that there are deep and complex socio-economic issues at play that must be addressed and resolved by the policymaking apparatus in order to achieve real progress.

Identity and Access

India is a diverse country, with multiple identities gleaned through the prisms of religion, social groups, regions, language, ethnicity, economic capability, and many more. For the purpose of this paper, it is our intention to examine the state of energy access across social groups and economic classes: the two most prominent identities of modern India.

Even as India aspires to work within a more balanced and stable multilateral framework,

Table 1 Percentage of households using primary sources of energy for cooking and lighting

Energy Source	Rural		Urban		All India	
	2004-05	2009-10	2004-05	2009-10	2004-05	2009-10
Firewood	75.25	75.92	21.75	17.56	60.53	58.68
LPG	8.62	12.09	57.22	64.6	21.99	27.61
Kerosene	44.42	33.54	7.1	4.85	34.16	25.06
Electricity	54.96	65.61	92.35	93.83	65.24	73.94

Source India Data Labs @ ORF; NSS primary source of energy for cooking and lighting, 2004-05, 2009-10

⁵ The 17th Conference of Parties held in November, 2011, in Durban, South Africa.

⁶ The 2010 edition of the “World Energy Outlook” published by the International Energy Agency assesses two primary indicators of energy poverty at the household level—the lack of access to electricity and the reliance on the traditional use of biomass for cooking. As is highlighted in this report, India fares badly across both the indicators.

⁷ Data obtained from ‘India Data Labs’ at the Observer Research Foundation.

⁸ Throughout the paper we make the assumption that electrification is the closest available proxy for access to electricity and we acknowledge that access to the grid may not necessarily imply access to energy. In this context, we make conservative estimates of the overall lack of access to electricity.

and seeks the enhancement of local institutional capacities and capabilities, these alone are unlikely to address the fundamental causes of lack of energy access, and will require substantial levels of organic social transformation through local and national programs. These would need to focus on means of delinking energy access from income class so as to offer a modest quantum of modern energy as a universal right alongside food and education. This may allow certain transformations in the causal relationship that exists today between social groups and income classes (Table 2) and could potentially assist in bridging the socio-economic wedge between marginalized groups and the rest.

On studying the patterns of energy access in Table 3, it is quite apparent that Scheduled Castes (SCs), Scheduled Tribes (STs), and Other Backward

Table 2 Social groups and monthly per-capita expenditure (MPCE)⁹, 2009-10

Social Group	% Population	Average MPCE
Scheduled Tribe	8.8	854.47
Scheduled Caste	20.29	887.44
Other Backward Class	41.76	1064.50
Others	29.14	1578.70
Total	100	1159.80

Source India Data Labs @ ORF; NSS, MPCE, 2009-10

Classes (OBCs)¹⁰ in rural areas are more reliant on firewood—a traditional cooking fuel, than ‘other’ social groups who increasingly use modern fuels such as LPG. Firewood has low cooking efficiency, and its use has detrimental effects on health (due to the proximate smoke that is generated) and environment (owing to deforestation and greenhouse gas emissions). The average dependency on firewood is between 76 and 88 per cent across the aforementioned disadvantaged groups, compared to close to 66 per cent for all ‘other’ groups¹¹ in rural areas. The data shows (Table 3) that the dependency on firewood has only increased over time¹² (between 2004-05 and 2009-10) in rural areas amongst the disadvantaged groups, while it has simultaneously shown a marginal decrease for ‘other’ groups.

Alongside the divergences amongst social groups, the difference in energy access across income groups also becomes instructive. The lowest income class is as reliant on firewood in urban areas as it is in rural areas. The startling fact is that the inequity in the urban areas has become more pronounced over the five-year period for the lowest income group shown in Table 4, with reliance on firewood increasing from around 69 per cent to around 76 per cent, and access to LPG decreasing from 5.8 to 1.83 per cent. Although absolute numbers in the lowest income

Table 3 Percentage of Indian households using firewood and LPG by social group

Social Group	2004-05				2009-10			
	Rural		Urban		Rural		Urban	
	Firewood	LPG	Firewood	LPG	Firewood	LPG	Firewood	LPG
ST	90.12	2.65	36.29	41.1	88.17	5.87	25.56	50.45
SC	77.47	3.76	34.68	36.56	79.87	7.03	30.69	48.96
OBC	74.53	8.08	28.86	50.9	76.48	12.13	22.62	60.04
Others	68.29	16.08	11.12	69.88	65.87	19.47	8.14	74.92

Source India Data Labs @ ORF; NSS, Primary Source of Cooking, 2004-05, 2009-10

⁹ The Government of India uses MPCE as proxy for income for households to identify the poor (who tend to have minimal savings). The proxy works well given that expenditure= income - savings. Similarly, we use MPCE throughout this paper to define income classes.

¹⁰ To be referred to as “disadvantaged groups” henceforth.

¹¹ 2010 Data obtained from ‘India Data Labs’ at the Observer Research Foundation

¹² Given that LPG use has increased in rural and urban areas, the simultaneous increase in the use of firewood can also be attributed to the substitution of other low efficiency cooking fuels such as dung cake. It is instructive to note that according to NSS data, the use of dung cake for cooking (all India) has decreased significantly over the discussed five year period amongst SCs and OBCs showing a 3.1 per cent and 5.51 per cent decline in each of the respective social groups.

Table 4 Percentage of Households Reliant on Firewood and LPG by Monthly per Capita Expenditure (MPCE)

MPCE (In Rupees)	2004-05				2009-10			
	Rural		Urban		Rural		Urban	
	Firewood	LPG	Firewood	LPG	Firewood	LPG	Firewood	LPG
0-235	79.05	0.24	68.81	5.8	74.78	6.19	75.72	1.83
>1155 & more	43.29	39.22	1.21	82.11	55.65	31	1.18	79.4
Total	75.25	8.62	21.75	57.22	75.92	12.09	17.56	64.6

Source India Data Labs @ ORF; NSS MPCE, 2004-05, 2009-10

groups have decreased significantly,¹³ affordability is still a key challenge.

Asymmetric patterns of access to electricity are also prevalent in the country. The percentage of households still using kerosene for lighting in rural areas averages between 30 to 40 per cent for disadvantaged groups—a striking figure considering that typical kerosene lamps deliver between 1 and 6 lumens per square meter (lux) of useful light, as opposed to typical western standards of 300 lux for basic tasks such as reading (Mills 2003). A pronounced inequity of access among social groups is also observable across rural-urban areas in Table 5. While approximately 60 per cent of STs have access to electricity in rural areas (lower than the rural average as given in Table 1), around 87 per cent within the same social group have access to electricity in urban areas. The electricity access divide between the SCs, which are a significant social group in terms of urban population (Table 2), and the ‘others’ is around 9 per cent. It is interesting to note that the level of access to electricity for SCs in urban areas is roughly equivalent to level of access for urban

citizens in the MPCE bracket of INR 675 - INR 790 per month (Table 6), which is representative of a level much below even the conservative World Bank extreme poverty threshold (defined at US\$ 1.25 a day). In terms of energy access, the statistics suggest that SCs are pegged at a level of access for income classes below the average income of this social group.

The share of kerosene for lighting has reduced significantly amongst the lowest income classes in rural areas over 2004-05 to 2009-10 (Table 6). Meanwhile this trend is not witnessed in urban areas, where the inequity is starker over the same period with an increase in dependency on this fuel by 16.32 percentage points. Access to electricity for the lowest income class in urban areas has decreased from 62.1 to 44.56 per cent. This mirrors the trends in cooking fuels and is indicative of inherent inequities in the provision of access to modern energy in urban areas, alongside the implications of price rise and inflation. While rural areas tend to suffer from an overall lack of access to modern energy, poor inhabitants in urban areas experience discriminatory barriers usually based on economic

Table 5 Percentage of households using kerosene and electricity by social group, 2009-10

Social Group	Overall		Rural		Urban	
	Kerosene	Electricity	Kerosene	Electricity	Kerosene	Electricity
ST	35.33	62.73	39.11	59.37	7.8	87.22
SC	33.87	64.91	40.29	58.78	10.01	87.7
OBC	24.42	74.71	31.72	67.55	5.25	93.53
Others	17.07	82.2	27.96	71.36	2.56	96.65

Source India Data Labs @ ORF; NSS, Primary source of Lighting, 2009-10

¹³ According to NSS data

capacity. Such trends would challenge policies in the context of a sustainable development agenda, as India is likely to witness sustained and rapid urbanization in this current decade and beyond.

According to the provisional numbers released by the Census of India last year, 90,986,070 people were added to the urban population of the country,¹⁴ more than the number added to the rural population. The pace of movement to cities in India is unprecedented, and is on a scale that, outside of China, is unparalleled; with over 30 per cent of the total population already living in urban agglomerations. Our estimates suggest that around 44.5 per cent of the total decadal increase in urban population was a result of migration.¹⁵

Urban centres in India are veritable microcosms of the entire country—with a diverse mix of communities, cultures, and income classes ranging from the marginalized, disadvantaged classes to the expanding middle class—which is the primary driver of consumption and economic growth. Table 7 suggests that the share of OBCs in the overall urban population mix has increased substantially over the previous decade, while the proportions of the rest of the disadvantaged groups has almost remained the same, and ‘others’ have shown a marked decrease.¹⁶ The way that the various sections of society interact with each other, and perceive each other’s spaces and priorities would be an essential ingredient in India’s growth story going forward.

Table 7 Percentage of urban population sorted by social groups

Social Group	Urban	
	2000-01	2009-10
	Population	Population
Scheduled Tribe	3.38	3.45
Scheduled caste	15.28	15.06
Other Backward Classes	30.28	38.48
Others	51.26	43.01
Total	100	100

Source India Data Labs @ ORF; NSS, Population, 2000-01, 2009-10

Conclusion

The trends highlighted in this paper demonstrate that existing inequities in access to modern energy amongst the lowest income classes and the disadvantaged groups tend to reinforce each other. The causal relationship between income classes and social groups acts as a self-fulfilling spiral, breeding inter-generational infirmities. Our analysis suggests that this is particularly true in urban areas. Given the fact that India will add over 200 million urban citizens over the next twenty years,¹⁷ increased policy emphasis must be given to urban areas by creating new ways to allow access to energy, especially for those who cannot afford it.

The Rio Earth Summit of 1992 coincided with the beginning of India’s increased engagements with the

Table 6 Percentage of households using kerosene and electricity by monthly per capita expenditure (MPCE)

MPCE (In Rupees)	2004-05				2009-10			
	Rural		Urban		Rural		Urban	
	Kerosene	Electricity	Kerosene	Electricity	Kerosene	Electricity	Kerosene	Electricity
0-335	70.31	28.34	36.08	62.1	54.8	45.2	52.4	44.56
>675-790	50.27	49.21	6.26	93.23	56.13	43.12	14.4	85.18
>2540 and more	13.66	85.86	0.3	99.36	15.41	83.87	0.38	96.46
Total	44.42	54.96	7.1	92.35	33.54	65.61	4.85	93.83

Source India Data Labs @ ORF; NSS, MPCE, 2004-05, 2009-10

¹⁴ Provisional Population Tools, Census of India <<http://censusindia.gov.in/2011census/censusinfodashboard/index.html>>

¹⁵ According to Census 2011, total decadal growth rate of population is 17.64 per cent. Using this conservative benchmark (urban decadal growth rate is 31.8 per cent); the total population increase in urban areas should have equalled 50,471,513, whereas the figure stands at 90,986,071.

¹⁶ It is important to note the caveat that the NSS relies on self-reporting of people about their Other Backward Classes (OBC).

¹⁷ According to the United Nation’s *World Urbanization Prospects*, 2009.

international community. This current decade is likely to determine whether or not the country will succeed in narrowing income gaps, overcoming socio-economic inequities, and reducing poverty through decisive domestic actions. An economy and country which uses a majority of its scarce resources and limited infrastructure to serve only a minority of its people will find it increasingly hard to deflect arguments which suggest that its elite hide behind its poverty. India's macro position on equity at international fora such as Rio +20 must be reflected in its domestic resolve to offer energy equitably to its diverse population. The

imperatives of creating a 'green economy' must only follow and complement such efforts.

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Centre for Research on Energy Security (CeRES) was set up on 31 May 2005. The objective of the Centre is to conduct research and provide analysis, information, and direction on issues related to energy security in India. It aims to track global energy demands, supply, prices, and technological research/breakthroughs—both in the present and for the future—and analyse their implications for global as well as India's energy security, and in relation to the energy needs of the poor. Its mission is also to engage in international, regional, and national dialogues on energy security issues, form strategic partnerships with various countries, and take initiatives that would be in India's and the region's long-term energy interest. *Energy Security Insights* is a quarterly bulletin of CeRES that seeks to establish a multistakeholder dialogue on these issues.

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For inclusion in mailing list, contact

M K Bineesan

Centre for Research on Energy Security

TERI, Darbari Seth Block

IHC Complex, Lodhi Road

New Delhi - 110 003

Tel. 2468 2100 or 4150 4900

Fax 2468 2144 or 2468 2145

India +91 • Delhi (0)11

E-mail bineesan@teri.res.in

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