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High Returns, Low Attention, Slow Implementation:

The Policy Paradoxes of India's Clean Energy Development

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Summary

India claims to be undertaking a thorough transition to low-carbon electricity, stepping up renewable energy and energy efficiency efforts. Yet, two puzzling paradoxes weigh upon this dynamic. First, although energy efficiency measures offer high collective returns, at least as high as those for renewable energy, the energy efficiency agenda is receiving a lot less attention and priority, even though it would require significantly less investment. Second, within the energy efficiency domain, implementation is lower and slower in sectors where the savings potential is the highest, notably among agricultural and domestic (household) consumers. Drawing on a range of interviews, documentary analysis and policy observations, this paper helps to shed light on this conundrum. In particular, it points out the discrepancy between individual and collective incentives in promoting energy efficiency, the biases and weaknesses of Indian governance at both the central and state levels, the influence of lobbies, the weight of parallel governmental agendas, and the built-in preference of the government, as well as international donors, for a technological rather than a governance focus. Nonetheless, striking a new balance between energy efficiency and renewable energy as complementary agendas is of crucial importance if India is to achieve its developmental, social, environmental and energy security goals.

Introduction

Since the early 2000s, India has claimed to be undertaking a transition to cleaner and more efficient electricity production, as well as use. This alleged shift comes as a response to a range of competing agendas and constraints, such as the need to sustain economic growth through industrialisation, increase energy access for the poor, enhance domestic energy security, and factor in many local and global environmental issues, notably greenhouse gas emissions contributing to climate change.

After six decades of public electrification, the Indian electricity sector remains in dire straits (Box 1). Despite an ambitious objective of universal access to electricity by 2012, more than one-third of the Indian population is still deprived of energy service. At the same time, people who do have access remain highly dissatisfied with the irregular and poor quality of supply. There is a wide consensus that addressing these problems, as well as powering India's industrial growth, will require steady expansion of electricity availability.

Box 1: Still in Dire Straits
The Current State of Indian Electricity

At the time of independence, India inherited an electricity sector with a total installed capacity of about 1,350 MW. Only 1,500 (0.25%) villages were electrified, and per capita consumption stood at a mere 14 KWh. Over the past six decades, installed capacity has grown to 181,558 MW, electrified villages to 538,296 (90.7%) and per capita consumption has risen to 730 KWh. Yet, the state of India's electricity sector remains very poor compared with other countries. Approximately 57% of rural households and 12% of urban households do not have access to electricity. There are wide disparities among states: while eight states claim to have achieved 100% village electrification, the reality is that four are still below 70%; only three states have 85% household electrification or more, while five are still below the 20% level. The sector is in dire straits, plagued with chronic inefficiencies. While more than one-third of the population is still not connected, the country is faced with a severe power crisis. While the gap between demand and supply hovers around 10%, electricity loss stands at around 30%, much higher than what is considered sustainable. Those who have access to the service have to face low voltage issues during peak hours and power cuts ranging from 4 to 18 hours a day during peak usage times in summer and winter. Structural reforms during the 1990s have hardly helped. This ongoing situation has been analysed mostly as a problem of inadequate generation, while it arguably has a lot to do with many issues beyond generation only. Ailing governance of electricity distribution such as the lack of transparency, accountability and participation remains a root cause of the current state of the Indian electricity sector.

Source: Swain (2011).

Under conventional planning procedures, meeting such challenges and increasing electricity availability will require a dramatic growth in electricity generation. By 2035, India is projected by the International Energy Agency to be the second-largest contributor to the increase in global energy demand, accounting for 18% of the rise, with its energy consumption more than doubling by that time (IEA, 2007). Consecutively, India is now universally perceived as a major carbon emitter and under global pressure to reduce its emissions. In response, by 2020 India has proactively committed to cut its carbon intensity by 25% compared with 2005 (Page, 2009). This would require a significant reduction in fossil-fuel-based electricity generation and consumption, among other things.

Together these issues have placed India's energy policy between a rock and a hard place. In its attempt to balance competing demands, the country has developed a two-way approach to its energy policy: on the one hand, the development of more renewable energy sources; on the other hand, the enhancement of energy efficiency. Both moves are clearly visible in the Integrated Energy Policy adopted in 2006 and the National Action Plan on Climate Change launched in 2008. Through greater energy efficiency, India hopes to avoid the addition of extensive generation capacity; to meet much of the new demand for electricity, it has planned for faster development of renewable energy. The larger goal that is proclaimed is a transition to "a low-carbon electricity sector", one that would be more energy efficient in production and consumption, as well as less dependent on fossil fuel.

In this context, this paper questions the extent to which this supposed transition is taking place in real terms. Also, who can be said to be the winners and losers of this process? What are the dominant agendas and actors? What balance has been struck and why between the two key policy approaches, energy efficiency on the one hand, and renewable energy on the other? Looking for answers, this article enquires into the governance of cleaner energy development, its strengths, bottlenecks and paradoxes. In doing so, it points out potential areas of improvement. It also tries to identify the most useful scope of intervention for actors of the international community.

To date, policies related to energy efficiency in India have been much less studied than those related to renewable energy. This paper thus focuses on this relatively under-studied area, while offering a needed comparison between the two approaches, their potential benefits and developments. This work is based on documentary analysis and direct observation of policy processes and dialogues. It also draws on a series of 54 interviews with policy makers, government officials, implementing agencies, energy service companies, international development organisations, think tanks and civil society organisations. These were conducted between August 2010 and January 2011, mostly in Delhi but also in Mumbai, Pune, Hyderabad, Kolkata and Ahmadabad.

The following section provides a snapshot of renewable energy development in India and points out governance issues and resulting doubts about its potential success. Section 2 analyses the emergence and development of the energy efficiency approach to low-carbon electricity. Comparing the potential benefits of both agendas, as well as their current developments, we find that energy efficiency has garnered much less attention than renewable energy, although it is at least as equally promising. Section 3 analyses the implementation processes of energy efficiency policies in India. Through the evaluation of various schemes, it shows that, paradoxically, levels of implementation are much lower in sectors and areas where the energy savings potential is higher. It also provides several possible explanations for this conundrum. Section 4 discusses the current governance of energy efficiency in India and points out how it affects policy implementation. Finally, the concluding section suggests various options for opening up policy options and identifies some useful areas for intervention by the international community.

1. Renewable energy in India: promising returns, uncertain governance, high attention

The Integrated Energy Policy of India (GoI, 2006) and the National Action Plan on Climate Change (GoI, 2008) define two approaches to low-carbon electricity. The first focuses on clean electricity production through the utilisation of renewable energy, while the second is based on more efficient consumption of available electricity. In addition to existing institutional mechanisms, two specific "national missions", the Jawaharlal Nehru National Solar Mission (JNNSM) and the National Mission for Enhanced Energy Efficiency (NMEEE),[1] have been set up by the federal government to implement India's plan for clean electricity development. The government aims to raise the country's renewable-energy capacity from 17,000 MW to 74,000 MW by 2022, including a JNNSM target to install 20,000 MW of solar capacity by the same year. At the same time, India aims to save 10,000 MW by 2014-15 through NMEEE, thus hoping to avoid the installation of 19,000 MW in generation capacity – a substantial part of India's rising energy demand in the next five years. This shows that India does have a plan to move forward. Yet, the potential of these two approaches, as well as their biases in design and implementation, all need to be reflected upon.

Though renewable energy[2] has been a part of the Indian electricity sector since the 1980s (see Box 2), it has gained increased importance in the last decade. Globally, as well as within India, there is a consensus that renewable energy must play a pivotal role in tackling climate change and addressing domestic energy challenges. The country has made important efforts in this context. Quite symbolically, India was the first country in the world to establish (1992) a separate ministry to promote renewables. In the last 10 years, installed capacity additions from renewables have comprised nearly a quarter of total additions in the power sector. As a result, India has one of the highest shares of renewable sources of electricity in the world: 11.1% of its total installed generation capacity.[3]

Though there remain uncertainties about the overall potential of renewable energy, India definitely has a high one owing to its vast renewable resources, such as consistent sunshine, wind and various kinds of biomass. The country aims to generate 15% of its electricity from renewable sources by 2020.[4] The government has enacted several policies to support this expansion, including: the 2003 Electricity Act; the 2005 National Electricity Policy; the 2006 National Tariff Policy; the *Rajiv Gandhi Grameen Vidyutikaran Yojana*[5] (RGGVY) in 2005; the Eleventh Five-Year Plan (2007-2012); and the JNNSM.

1 Under the NAPCC, the federal government is in the process of setting up eight specific "missions" to tackle climate change. This national initiative includes missions on solar energy, energy efficiency, sustainable habitat, water, Himalayas, afforestation, agriculture and strategic knowledge. A mid-term review of the NAPCC finds uneven progress across the range of missions. While some of the missions have picked up steam, many have been lagging behind (Sethi, 2011). However, the two missions directly dealing with electricity, *viz.* JNNSM and NMEEE, have been prioritised among the eight missions, at least in design, and have taken off.

2 In this paper, renewable energy refers to the electricity produced from renewable sources, excluding large hydro.

3 http://www.powermin.nic.in/indian_electricity_scenario/introduction.htm, last accessed on October 4, 2011.

4 India has set a national target of 5% for renewable purchase obligations by the year 2010, to increase by 1 percentage point annually, reaching 15% by 2020. India's renewable targets are at par with major developed and developing countries. For instance, the EU and Australia have set a target of 20% renewable for their energy mix; China targets 15% and the USA is finalising the goal of 15% renewable energy by the year 2020.

5 Rajiv Gandhi Rural Electrification Scheme.

Box 2: Renewable Energy Development in India
Some institutional and technological facts

India started its renewable energy program in 1981 with the establishment of the Commission for Additional Sources of Energy, with the responsibility of formulating policies and programmes, coordinating and intensifying research and development and ensuring implementation of government policies in regard to all matters concerning new and renewable energy sources. The Commission resulted in the creation of an independent Department of Non-Conventional Energy Sources in 1982. The department was later converted into a separate and independent Ministry of Non-conventional Energy Sources in 1992. In 2006 it was renamed as Ministry of New and Renewable Energy (MNRE). In 1987, the Indian Renewable Energy Development Agency was established to provide financial assistance for renewable energy projects. State level Renewable Energy Development Agencies have been created to implement projects at state level.

Table 1: Development of Grid-Connected Renewable Energy in India (in MW)

Year	By 2002 (Cumulative)	2002-2007 (Addition)	2007-2012 (Addition)	By 2012 (Cumulative)	By 2022 (Cumulative)
5 Year Plan	Achieved in 9th Plan	Achieved in 10th Plan	Anticipated in 11th Plan	Anticipated in 11th Plan	Anticipated in 13th Plan
Wind	1,667	5,415	10,500	17,582	40,000
Small Hydro	1,438	520	1,400	3,358	6,500
Biomass	368	750	2,100	3,218	7,500
Solar	2	1	1,000	1,003	20,000
Total	3,475	6,686	15,000	25,161	74,000

Source: Arora et al., 2010.

Wind and solar are the two main technologies contributing to renewable energy development in India. As shown in the above table, wind has a major share in current and future development. This is because this technology is well mastered and some of the large world producers are based in India. Though solar technology has contributed least so far, it is expected to become by 2020 the second contributor to renewable energy development.

The current policy structure has established time restrictions and provides a range of mandatory, enabling, and incentivising provisions for renewable energy development. For instance, the State Electricity Regulatory Commissions (SERCs) are required to specify a Renewable Purchase Obligation" (RPO)[6] for utilities within a specific time period, with purchases to be made through a competitive bidding process. They are also allowed to set a preferential tariff for renewable electricity. A wide range of policy provisions also exist for single-window clearances, simplified regulations (particularly for smaller projects), capital subsidies at the central, state and regional level, as well as tax incentives to accelerate renewable energy development. The Eleventh Five-Year Plan had set a 2012 target for 10% of electricity to be generated from renewables, a target that was already achieved by 2010. It should be noted that this Plan promotes the phasing out of investment subsidies per se, and rather favours performance-based incentives.

[6] A Renewable Purchase Obligation is a government-legislated requirement on electric utilities (or retailers) to source specific portions of their total electricity sales from renewable energy sources according to a fixed timeframe. The policy is being implemented throughout the country, toward the compulsory use of a minimum quantity of renewable energy. Under the Electricity Act of 2003, the National Electricity Policy of 2005 and the Tariff Policy of 2006, it is compulsory for Electricity Regulatory Commissions to set a RPO for the utilities they regulate.

India has thus been arguably aggressive in renewable energy development, as demonstrated not only by its strong legal, policy and regulatory frameworks but also by relatively strong implementation records. Most of the SERCs have issued orders for RPOs varying from 1% to 15% of total electricity sales. The Renewable Energy Certificate (REC) Programme[7] is being implemented to reward utilities that go beyond the set RPO; it provides renewable generators with a choice to trade electricity at a preferential tariff or to trade the environmental attributes of renewable electricity. In contrast, utilities that fail to meet the RPO have to compensate by purchasing these certificates. This creates an incentive structure through which good performers are rewarded for their achievement, while poor performers are penalised.

Although India has been serious about renewable energy development, the process has been plagued by significant governance issues and consequent scepticism about future development. To start with, one of the most controversial issues is tariff setting. While the tariff is set on the basis of a cost-plus approach, both the capital cost and the variable costs of these projects are based on inadequate data and ambiguous claims by the project developers (PEG, 2010). This has frequently led to high renewable-energy tariffs translating in turn into an unjustifiable burden upon consumers.[8] The high cost of renewable energy may lead to a trade-off between long-term energy security concerns and short-term affordability concerns. Second, another major problem lies in the lack of transparency and civil society participation in the various processes. Knowledge and information related to renewable energy development is confined to developers and public agencies. There is no public engagement in regulatory and policy processes.[9] Thirdly, mechanisms are inadequate for monitoring the actual performance of renewable energy projects. Though state-level agencies are expected to monitor, they seem to give primacy to the promotion of new projects – far more than to checking up on existing ones.[10] Fourthly, the social and environmental impacts of renewable energy generation are almost completely ignored. While renewable projects are exempt from environmental-impact assessment, some have caused local strife owing to land acquisition, use of common property resources and biomass-fuel procurement.[11] Developers and state agencies have done little to overcome these problems (PEG, 2010). Finally, lack of coordination between the various state programs and incentives makes it difficult to adopt an economics-based, least-cost development approach to tapping India's renewable energy potential (World Bank, 2010). In the future, these problems may well stall the growth of renewable energy in India.

If we merely consider past experiences in the Indian electricity sector, along with its many failed attempts at reform and big initiatives, there is every reason to doubt the country's capacity to reach its ambitious renewable energy target for 2020 – *i.e.* 15% renewables in its energy mix. Yet, there may also be reasons for optimism this time. First, the country has vast potential, of which little has been

7 It is acknowledged that renewable energy generation entails certain environmental attributes (positive impacts) apart from electricity generation. Renewable Energy Certificates (RECs) represent an aggregation of the positive environmental impacts of electricity generated from renewable energy sources. These attributes can be unbundled from electricity per se, and the two products – (1) the attributes embodied in the RECs; and (2) electricity as a commodity – can be traded separately. Producers of renewable energy thus have the choice to trade electricity at a preferential tariff, or to trade RECs separately after selling the electricity at a competitive tariff. One REC represents 1 MWh of renewable electricity. Since its inception in March 2011, 1,244,549 RECs have been issued to 1326 registered renewable energy generators, and 1,086,924 RECs had been redeemed by August 2011 (www.recregistryindia.in accessed on May 18, 2012).

8 A high renewable energy tariff is partly an outcome of legally mandated preferential tariff-setting and partly of non-transparent tariff-setting processes. This may have a significant negative impact on electricity access, particularly for the poor. With the increasing contribution of renewable energies to the Indian energy mix, this dynamic is likely to fuel higher retail electricity prices in the future. A consumer representative expressed this concern during an interview: "How will the poor afford this, when they already find current prices too high to afford?" (Interview in Delhi, November 26, 2010).

9 Renewable energy development has a direct bearing on the electricity tariffs that ultimately affect consumers. The end consumers have the right to know and question the reasons for the promotion of renewable energy and the methods used to calculate tariffs. The Electricity Act of 2003 and the National Electricity Policy have mandated that the Electricity Regulatory Commissions take into account the interests of all stakeholders (including consumers), through public hearings.

10 An NGO member pointed out the following during an interview: "All the state renewable energy development agencies are very aggressive in promoting new projects. They find new projects more attractive as they come with high state funding and also gain public attention. Partly because of the primacy given to new projects and partly because of poor institutional capacity [such as poor human resources], they have undermined the monitoring and evaluation of these projects." (Interview in Delhi, December 14, 2010). Moreover, the current shift from investment subsidies to performance-based incentives probably shows that the state has realised the inadequacy and ineffectiveness of existing monitoring mechanisms.

11 Local farmers are often unhappy with the land acquisition policy for renewable energy projects. It is reported that in Maharashtra, local people have protested against agricultural and forest land acquisition to set up wind farms. While some are not ready to part with their agricultural or forest land, others demand higher compensations. It is also reported that project developers are using muscle power to suppress local campaigns and protests (Jamwal and Lakhanpal, 2008). On the other hand, biomass-based power plants, which are expected to provide an additional source of income for local people as they sell their agricultural wastes, have also affected many rural poor. Those who depend on agricultural waste for fire-wood and fodder are unhappy with biomass procurement for electricity generation since it directly competes with their own use and needs (Kandhari and Pallavi, 2010).

tapped to date, and the 15% target lies much below that potential. With the growing concern over energy security, moreover, renewables increasingly appear to be the government's best option going forward for alleviating energy import dependency and meeting growing energy demand (Dubash and Bardley, 2005). India also aspires to be a technology manufacturing hub in renewables[12] – which requires and demands increased domestic use of these technologies. As a matter of fact, Indian companies already have a strong presence in the wind turbine industry globally,[13] while the government aspires to promote solar industries. Finally, India seems to be bundling the promotion of renewables with various other developmental objectives, such as regional development, employment generation or raising more income for local governments. This type of policy bundling, as analysed by Kostka and Harrison (2011), can be particularly effective in sustaining policy implementation[14].

Impressively, India aims at reducing the carbon intensity of its economy by 25% by 2020, per unit of GPD. This is a severe and complex challenge that will require far more efforts than even the most aggressive and successful promotion of renewable energy.[15] There is indeed a similarly immense need for increased energy savings through higher energy efficiency.

12 This aspiration was obvious in the presentation delivered by Indian policy makers at the 2010 Delhi International Renewable Energy Conference, as observed by the authors.

13 India's current wind turbine technology manufacturing capacity stands at around 6 GW per year, with the potential to increase to 15 GW. Players such as Suzlon have managed to develop a global market presence. This company, with a majority share in the German manufacturer Repower, is the third-largest supplier in the world and the largest supplier in Asia, and held 10% of the global market in 2009 (Muller and Kadakia, 2010). India clearly sees renewable energy technology development as an opportunity for increasing employment opportunities and revenues for the country.

14 Kostka and Harrison (2011) provide a detailed analysis of "policy bundling" and "interest bundling" in the context of energy efficiency and renewable policies in China and India. Bundling refers to a political tactic, widely used by actors to combine policies or interests to strengthen the pursuit of a policy goal. Interest bundling involves linking different immediate interests to different actors in order to improve the implementation of one or more policies. Policy bundling involves actors' *ad hoc* combination of policies, explicit or implicit, in order to improve the implementation of some or all policies in this combined bundle (Kostka and Harrison, 2011).

15 India's carbon emissions are expected to triple by 2030 if the current dominance of fossil fuels in the energy mix continues. To reduce its carbon intensity, India has to drastically increase its percentage of renewables.

2. Energy efficiency in India: high returns, low attention

India has huge potential in the area of energy efficiency, estimated to stand between 15% and 25% of the total domestic consumption. A recent study by the National Productivity Council estimates the total savings potential at 15.04% (See Table 2).[16] Moreover, as energy efficiency can be attained with far less investment than that necessary for renewables, energy efficiency may be looked at as the "low-hanging fruit" of India's energy policy.

Although a strategy for energy efficiency has been developed in the country over the past four decades (see Box 3), it is only in the last 10 years that it has gained prominence. Since 2001, the federal government has undertaken several notable initiatives – particularly the enactment of a specific Act, the setting up of a "national mission" and of a dedicated agency. This nodal agency, the Bureau of Energy Efficiency (BEE), has taken a range of actions that have resulted in estimated electricity-demand savings of 2,000 MW in 2007-08 and 2008-09 (National Productivity Council [NPC], 2009*b*). Under the National Mission for Enhanced Energy Efficiency, India is targeting to save 10,000 MW by 2015, which should help it avoid the installation of 19,000 MW of generation capacity. These are truly ambitious goals.

Table 2- Electricity Consumption & Conservation Potential in India

Consumer Category	Consumption (Billion KWh)	Savings Potential (Billion KWh)	Savings Potential (% of Consumption/ % of total potential)
Agricultural (Pumping)	92.33	27.79	30.10/36.87
Commercial (With load >500 KW)	9.92	1.98	19.96/2.62
Municipalities	12.45	2.88	23.13/3.81
Domestic	120.92	24.16	19.98/32.06
Industrial (Including SMEs)	265.38	18.57	7.00/24.64
Total	501.00	75.36	15.04/100

Source: NPC, 2009a.

However, the policy and actual practice of energy efficiency promotion is far from being at par with the efforts devoted to renewable energy. While there are mandatory policy provisions regarding the latter, like the Renewable Purchase Obligation, there is no such mandatory provision in the case of energy efficiency. Thus, many of the energy services companies (ESCOs)[17] find it difficult to motivate clients to invest in and implement energy efficiency measures.[18]

16 These estimates of energy savings potential are incomplete, as they consider the savings due to the adoption of new technologies and do not take into account potential changes in consumption patterns. For example, the NPC (2009*a*) study covers only 87% of all Indian consumption of electrical energy. If all behavioural changes and anticipated technological innovation were factored in, the potential for energy savings in India would stand much higher.

17 ESCOs are one of the key players in the promotion and implementation of energy efficiency (cf. Section V).

18 Interview with various ESCOs in Delhi during October and November, 2010.

Similarly, electricity regulatory commissions have been very active in promoting new incentives in favour of renewable energy. Although the regulators have the capability to create such schemes to promote energy efficiency, pro-activeness is visibly missing. "The regulators have treated energy efficiency as a stepchild", as a staff member of an NGO involved in energy governance declared.[19] While national targets for both policies are equally ambitious on paper, state-level action for them greatly varies and is extremely biased in favour of renewable energy development.

Yet, renewable energy and energy efficiency are complementary agendas offering environmental benefits and contributing to energy security and energy access. As pointed out by several interviewees, it may even be said that energy efficiency enjoys a marginal advantage over renewables given the lower levels of investment that are usually required, as well as the immediate and reliable returns for both consumers and the utilities.

Table 3 qualitatively compares some of the implications of renewable energy development and energy efficiency for different stakeholders. It summarises a range of largely accepted analyses found in both the expert literature and interviewees' comments. As indicated in the table, consumers, utilities, as well as the government, are very likely to benefit more from energy efficiency measures than increased renewable energy use. This is notably due to the fact that the investment required to improve energy efficiency is mostly born by the end-users, who are supposed to recover this cost through lower bills. It is thus particularly puzzling that energy efficiency should receive less attention.

Table 3 - Qualitative Comparison of the Likely Implications for Various Stakeholders of Renewable Energy *vs.* Energy Efficiency Policies

Stakeholders	Renewable Energy	Energy Efficiency
Consumer	• Increased electricity availability • Improved quality of supply • Increased electricity access • Increased electricity tariff	• Increased electricity availability • Improved quality of supply • Increased electricity access • Energy savings & reduced electricity bill • Mitigation of impacts of higher tariff • Need for an initial investment in energy efficient equipment
Utility	• Increased capital needs • Increased cost of electricity supply • Reduced electricity deficit	• Reduced cost of electricity supply • Reduced capital needs • Peak load reduction • Reduced electricity deficit
Government	• Increased public expenditure • Contributes to fiscal deficits • Improved energy security	• Reduced public expenditure • Reduced fiscal deficit • Improved energy security
Environment	• Reduction in local pollution and in GHG emission	• Reduction in local pollution and in GHG emission

Source: the authors. Compilation of arguments from interviewees' comments and expert literature.

Moreover, having strong energy efficiency policies in place would also make renewable energy development more effective. As demand for energy declines (or at least grows more slowly) due to higher energy efficiency, renewable energy plants can then cater to a larger number of consumers, and the share of renewables in further capacity

[19] Interview with a member of an NGO active in energy governance in Pune, September 2, 2010.

additions could increase. If one follows this line of reasoning, then energy efficiency should be prioritised. Yet, reality goes right counter to this. Utilities are mandated to purchase significant amounts of renewable energy at high prices, even under highly resource-strained situations; meanwhile, energy efficiency measures that would cost much less for utilities[20] are largely ignored (PEG, 2010).

Why is there so little attention given to energy efficiency when the rationale to prioritise it is so strong? What explains this paradoxical situation? We do not claim to have definitive answers to this puzzling question. Yet, we classify and discuss below some possible explanations based on insights gained from the range of interviews we carried out.

First, there is the issue of the number of stakeholders involved in implementation, and thus the ease with which decisions and coordination can take place – or not. Renewable energy development fits well into a top-down approach to clean energy development, where the top end consists of new generating plants connecting to the grid (supply). Meanwhile, energy efficiency is more of a bottom-up approach that requires action on the part of consumers, which constitute the bottom end (demand). Even though bottom-up approaches are typically more sustainable, it is much easier to implement top-down approaches through investment decisions made by a central or local government. Setting up a renewable energy plant and connecting it to the grid can be a decision taken by public authorities alone and does not require the active involvement, or even the consent of, countless consumers. On the contrary, energy efficiency measures do require (most of the time) some kind of involvement and contribution on the part of the affected consumers.

Second, according to many interviewees, it seems that the bias characterising India's clean energy development may, to a large extent, be explained by the presence of "concentrated interests" in the renewable energy landscape, while there are only "diffuse interests" pushing for energy efficiency measures. The immediate benefits of renewable energy development are indeed concentrated among a few players such as manufacturers, project developers and generators, while the benefits of energy efficiency measures are much more fragmented across producers and consumers. Through the development of renewables, there are major benefits going to a few; in constrast, with energy efficiency, there are smaller individual benefits reaching many more scattered stakeholders. As a consequence, there tends to be concentrated support and promotion for renewable energy development, something that is missing in the case of energy efficiency. Many interviewees have pointed to the large industries involved in renewable technologies as a key lobby. Because of their global presence, Indian producers are indeed large in size and influence. The entry of big business conglomerates – such as Tata and Reliance – into this field has further strengthened the lobby for renewable energy.[21]

Third, the institutional settings supporting the implementation of renewable energy versus energy efficiency measures are significantly different, and they are much stronger in the case of the former. While the nodal agency for renewables is a full-fledged and independent ministry, the one dedicated to energy efficiency is a mere "bureau" that remains under the administrative control of the Ministry of Power (MoP) – whose chief priority and mandate, in turn, is to expand India's energy generation capacity. Along the same lines, there is a dedicated financing institution at the federal level promoting renewable energies: the so-called Indian Renewable Energy Development Agency (IREDA). There are also state-level agencies established for the same purpose in all of the Indian states.

Although there is provision for state-level-designated agencies for energy efficiency, there is in practice no independent agency for this purpose. In most cases, renewable energy agencies are simply selected as the designated agencies for energy efficiency. These agencies,

20 Energy efficiency improvements cost a fraction of the cost of new generation (Sathaye and Gupta, 2010). Moreover, most of the investment in energy efficiency is incurred at the level of consumption by the consumers (and is recovered later through lower bills); it thus leads to reduced capital needs for the utilities.

21 Interview with a senior utility official, Hyderabad, October 28, 2010.

evolving from organisations set up to address earlier policy priorities, inevitably look at the promotion of energy efficiency as a secondary function and mandate. They also lack the capacity to promote effective strategies for energy efficiency across their states. As a consequence, the implementation of renewable energy projects tends to be way stronger than that targeting energy efficiency.

Fourth, the development of renewable energy is widely perceived as providing a higher developmental benefit compared to energy efficiency. It is expected to spur employment opportunities and regional economic growth, particularly in the underdeveloped states, some of which have the greatest potential for renewable resources in India (World Bank, 2010). At the same time, even though this approach is relatively less exploited, decentralised renewable energy development is expected to speed up rural electrification and improve access to electricity.

Fifth, the political will to support energy efficiency is missing. This relates to the lack of strong interest groups lobbying for this fragmented "industry", as well as to the high perceived benefit from renewable energy development. The government seems to be ignoring the high collective returns of energy efficiency policies inherent in avoided capacity additions, although such policies would come with simultaneous individual returns in the form of reduced electricity bills. Moreover, low per-capita electricity consumption in India is sometimes seen as justification for slower action on energy efficiency, while growing energy demand provides strong justification for the aggressive development of renewables. Yet, growing demand for energy offers an equally valid justification for the promotion of energy efficiency.

Finally, energy efficiency is lacking a global governance framework, which would help give political weight to domestic "policy entrepreneurs" in this field as well as promoting, motivating and monitoring more energy efficiency initiatives in the country. In contrast, such a global governance framework seems to be building up for renewable energy with the creation of an inter-governmental organisation (the International Renewable Energy Agency, IRENA), the formation of a policy network (the Renewable Energy Policy Network for the 21st Century, REN21) and bi-annual, international inter-ministerial renewable energy conferences.

Box 3: Transformation of Energy Efficiency in the Indian Context

India has made several significant efforts toward greater energy efficiency over the past four decades. While early initiatives were focused on "energy conservation" for domestic energy security, more recent ones emphasise "energy efficiency" for both energy security and climate mitigation. There has been also a noticeable evolution and transformation in the concept, context and the institutions of energy efficiency. The early 1970s witnessed the emergence of the idea, when energy policy was integrated into development policy at the time of the fossil fuel crisis. In 1970, a Fuel Policy Committee (FPC) was set up to prepare an outline for a national fuel policy for the next 15 years. In its 1974 report, the FPC emphasised the need to substitute oil with coal and achieve higher efficiency in electricity generation and transmission, notably through hydro-electricity. FPC also provided an outline for the energy policy of India and suggested setting up an Energy Board to ensure the integration of an energy plan into the country's development plan. A Working Group on Energy Policy (WGEP) was created in 1979 to carry out a comprehensive review of the energy situation in light of developments both within the country and outside, to develop an outlook for the next 5-15 years and to recommend policy measures for the optimal utilisation of available energy resources, including non-conventional ones. The recommendations of the WGEP included better management of oil demand, the rethinking of transportation options, as well as new standards of fuel efficiency for electrical and diesel pumps, lighting and cooking appliances, etc. The WGEP report also signalled the need for integrated energy planning in India (WGEP, 1979).

Despite these strong recommendations for a national energy plan, from both FPC and WGEP, the government took no immediate action. An Inter-Ministerial Working Group on Utilisation and Conservation of Energy was formed in 1981 to recommend actual policies and programmes, which resulted in the first-ever concrete proposal for reducing energy consumption in India. The working group suggested the creation of an apex body to initiate, coordinate and monitor the progress and implementation of various energy conservation measures. The Inter-Ministerial Working Group claimed that three major economic sectors of India (industry, transportation and agriculture) had immense potential for energy savings. It contended that with 5% to 10% of the investment required for new energy supply, it would be possible to save an equal amount of energy that would otherwise have to be produced (MoP, 1983).

In 1983, an Advisory Board on Energy was set up to provide energy policy guidance directly to the Prime Minister's Office. The Board has made several recommendations on the technical, financial and institutional aspects of energy and detailed projections of energy demand in different regions. It also commissioned a draft Energy Conservation Bill for enactment by the parliament. In line with the Inter-Ministerial Working Group, the Board emphasised the need for a nodal energy conservation organisation. As a result, the Department of Power (which became an independent ministry in 1992) was designated as the nodal energy conservation organisation: its recommendations would be binding on all central and state government agencies as well as on other specified public authorities. Yet, this institutional arrangement was replaced in 1989 with the creation of an Energy Management Centre, a body under the Department of Power.

The 1990s largely focused on improving economic efficiency in the energy sector and much less attention was paid to improving usage efficiency. Measures taken at this time were more symbolic than effective. They include the declaration of 14th December (every year) as National Energy Conservation Day, the launch of a National Energy Conservation Award for industrial units that have undertaken exceptional initiatives, the labelling of environment friendly products (Eco-Mark), and a voluntary programme for energy efficiency standards for refrigerators and air-conditioners. In 2001, an Energy Conservation Act was passed. It provided energy conservation norms and required a range of designated consumers to adhere to them. Though the Act does not differ much in form and content from the 1988 Energy Conservation Bill, its notable difference is that it facilitated the creation of a new administrative body. Under the provisions of the Act, a Bureau of Energy Efficiency (BEE) was indeed created in 2002 to implement this very Act (Dey, 2008; Balachandra *et al.*, 2010). Since then, there have been several major developments, and BEE has taken a range of initiatives that are discussed in Section 3).

During the past four decades, energy efficiency as a concept, strategy and practice has evolved and transformed. There have been at least four key shifts. First, there has been a shift in language from "energy conservation" to "energy efficiency". Though the two phrases are often used as synonyms, energy conservation covers any behaviour that results in a reduction in energy consumption, while energy efficiency typically implies the use of technology to reduce energy intensity. In the Indian context, energy conservation was used in a wider sense that included substituting costly imported energy with cheaper energy, harnessing non-conventional energy resources and substituting oil with coal. As it emerged in the 1970s, energy conservation was clearly a strategy for addressing the problem presented by the Oil Crisis. In recent years, energy efficiency has become a strategy to reduce the energy intensity of production through the use of new technologies. Second, there has been a shift in focus away from fossil fuels to electricity demand and consumption. Thirdly, there has been a shift in the drivers of change. In the initial period, the key driver for energy conservation was energy scarcity, which has continued to be a driver so far. In 1990s, however, achieving economic efficiency by reducing the cost of production became an additional driver. In the last decade, climate mitigation has become the third driver. Finally, there has been an institutional shift from *ad hoc* and embedded institutions to a permanent and relatively autonomous institution.

Sources: Swain (2011); Ramachandra (2009); Dey (2007).

3. The implementation paradox: the higher the return, the lower the implementation

Over the past four decades, although political will has been neither always strong nor always present, India has gained significant experience in designing and implementing energy efficiency policies. The enactment of the 2001 Energy Conservation Act and the establishment in 2002 of the Bureau of Energy Efficiency (see Box 3) formed a turning point. The Act emphasises energy consumption norms and requires designated consumers (*i.e.* energy intensive industries and other entities identified by the government) to adhere to these. BEE was created to implement the provisions of the Act. Immediately after its formation, it prepared an Action Plan for Energy Efficiency for the wider dissemination and implementation of the standards it had set. The Action Plan gave a thrust on almost all fronts to energy efficiency: industrial production, standards and labelling of appliances, agricultural and municipal demand-side management, energy use in commercial buildings, training and capacity building of energy managers and auditors, energy performance codes and manuals, etc. Since its establishment, BEE has thus taken many initiatives across sectors (See Box 4). These schemes were designed to involve all of the four categories of electricity consumer: industrial, commercial, domestic and agricultural.

However, not all initiatives were implemented with equal vigour and outcomes greatly vary for each and across consumer sectors (NPC, 2009*b*). Standards and labelling schemes have arguably had the greatest success, resulting in 2,100 million units of electricity saved in the year 2008-09, which is equivalent to an avoided generation capacity of 600 MW, as shown in Table 4. Launched in 2006, this scheme has been expanded to include several types of widely used domestic electrical equipment. A voluntary energy conservation award aimed at industries has also been very successful by saving more than 1,600 million units of electricity during the same year (2008-09). Schemes aimed at commercial buildings and small and medium enterprises are being implemented rather adequately and are expected to produce positive results soon. However, other schemes are still lagging behind. For instance, the federal government launched in early 2008 the *Bachat Lamp Yojana*[22] programme, to deliver compact fluorescent lamps (CFLs) at the cost of incandescent bulbs but the programme has yet to be implemented on a large scale. Kerala is the only state to date that has done so successfully. The status of most agricultural and municipal demand-side management projects is not much different. While a couple of experimental schemes are being undertaken in the area of municipal demand-side management[23], the first ever agricultural demand-side management project is yet to be executed. It was launched in early 2009 in Solapur, Maharashtra, aiming to replace 3,530 irrigation pumpsets with more energy efficient ones. After more than two years, implementation has not yet started.[24] However, these types of schemes are attracting more attention: many other states are expressing their interest and preparing Detailed Project Reports (DPR) along these lines.

22 *Bachat Lamp Yojana* means "Savings-Lamp Scheme".

23 While some of the municipalities have prepared detailed project reports (DPRs) for demand-side management and many are in the process of preparing DPRs, very few, like the Kolkata Municipal Corporation, have actually started implementation.

24 By February 2011, only two pumpsets had been put in place for testing purposes.

Box 4: BEE Schemes for Promoting Energy Efficiency

- The **Bachat Lamp Yojana** is meant to promote energy efficient, high-quality compact fluorescent lamps (CFLs) as replacements for incandescent bulbs in households. The scheme, upon implementation, would result in reducing electricity demand by an estimated 6,000 MW of generation capacity, translating into potential savings of INR 240 billion per annum.

- The **Standards & Labelling** scheme targets high-energy-use consumer equipment and appliances by establishing minimum energy performance standards. The key objective is to allow the consumer to make an informed choice based on the potential energy savings, and thereby cost savings, of the relevant marketed products.

- The **Energy Conservation Building Code** sets minimum energy performance standards for new commercial buildings with a connected load of 500 KW or more, as well as promoting the implementation of energy efficiency measures in existing buildings.

- **Agricultural Demand-Side Management** targets the replacement of inefficient pumpsets.

- **Municipal Demand-Side Management** targets the replacement of inefficient street lighting and water pumps.

- The **Energy Efficiency in Small and Medium Enterprises** scheme has identified 25 clusters of high-energy-consuming small and medium enterprises. BEE has developed cluster-specific manuals.

- The **Energy Conservation Award** is a voluntary BEE scheme that recognises innovation and achievement in energy conservation by industries, commercial buildings, and railways.

Table 4: Energy Savings through Various BEE Activities

Programme	BEE		NPC	
	Electricity Saved (MU)	Avoided Generation (MW)	Electricity Saved (MU)	Avoided Generation (MW)
Standards &Labelling	2106.16	567.63	2106.16	599.44
Industry EC Awards	1633.25	239	1633.25	239
Energy Savings- SDA	2807.05	667	2755.48	660.43
ECBC- Green Buildings	33.36	7	33.36	6.1
Total	6759.82	1480.63	6528.15	1504.97

Source: NPC, 2009b

There are also additional schemes under the National Mission on Enhanced Energy Efficiency (NMEEE):

- **Perform, Achieve and Trade (PAT**) is a market-based mechanism to enhance energy efficiency among "designated consumers". These are given a specific energy consumption target, which they have to achieve within three years. Those consumers who do better than their target will be credited with tradable energy permits. These permits can be sold in turn to those who failed to meet their target.

- **Market Transformation for Energy Efficiency (MTEE)** aims to accelerate the shift to energy efficient appliances in designated sectors, through innovative measures. The initiative includes the preparation and implementation of a national CDM (Clean Development Mechanism) roadmap, the mandatory labelling of energy consuming equipment and appliances, as well as the implementation of the Energy Conservation Building Code (ECBC). The scheme also aims to make energy efficient equipment and appliances more affordable through CDM financing wherever possible.
- **The Energy Efficiency Financing Platform (EEFP)** aims to stimulate necessary funding for ESCOs based on delivery mechanisms. It focuses on the creation of mechanisms that would help finance DSM programmes in all sectors by capturing future energy savings.
- **The Framework for Energy Efficient Economic Development (FEEED)** aims to develop fiscal instruments for promoting energy efficiency. Under the scheme, a Partial Risk Guarantee Fund (PRGF) has been launched to help reduce the risk exposure of commercial banks on loans for energy efficiency projects. A Venture Capital Fund for Energy Efficiency (VCFEE) has been set up to provide initial seed capital from the government budget, which can be augmented by contributions from other agencies. The scheme also provides tax and duty exemptions for the promotion of energy efficiency. At the same time, the scheme allows for the amendment of public-procurement rules to explicitly mandate the procurement of energy efficient products for all public entities.

In addition to these initiatives, NMEEE aims to enhance the energy efficiency of electricity generating plants, strengthen the institutional architecture and promote awareness of energy efficiency.

However, as argued below in this article, implementation remains a crucial challenge for all of these schemes.

Source: BEE Website (http://www.bee-india.nic.in/) last accessed on December 15, 2011.

The National Mission on Enhanced Energy Efficiency (NMEEE), which was launched under the National Action Plan on Climate Change designed and implemented by the BEE, has several provisions that build on (or add to) existing BEE initiatives. Chief among them is the Perform, Achieve and Trade (PAT) scheme. PAT makes it mandatory for energy-intensive industries in eight sectors[25] to meet a specific energy conservation target that goes beyond BEE's voluntary energy conservation award programme. Through tradable Energy Savings Certificates (ESCerts), PAT rewards industries that exceed their target, while penalising those that fail. The NMEEE mission also aims at promoting the production of energy efficient equipment and appliances through innovative measures, while reducing the cost to the consumer. One such measure is the national programme focused on market transformation by providing incentives to manufacturers to develop and sell highly efficient electrical equipment.[26] The mission also aims to accelerate the implementation of the Energy Conservation Building Code (ECBC) for new and existing commercial buildings, as well as demand-side management (DSM) programmes across sectors. It emphasises energy efficiency in electricity generating plants. It offers various financing schemes and helps establish specific funds dedicated to energy efficiency initiatives. Finally, the mission is taking steps to stimulate funding through various market-based mechanisms and to develop fiscal instruments. If properly implemented, all these schemes should certainly help reduce the carbon intensity of the Indian economy.

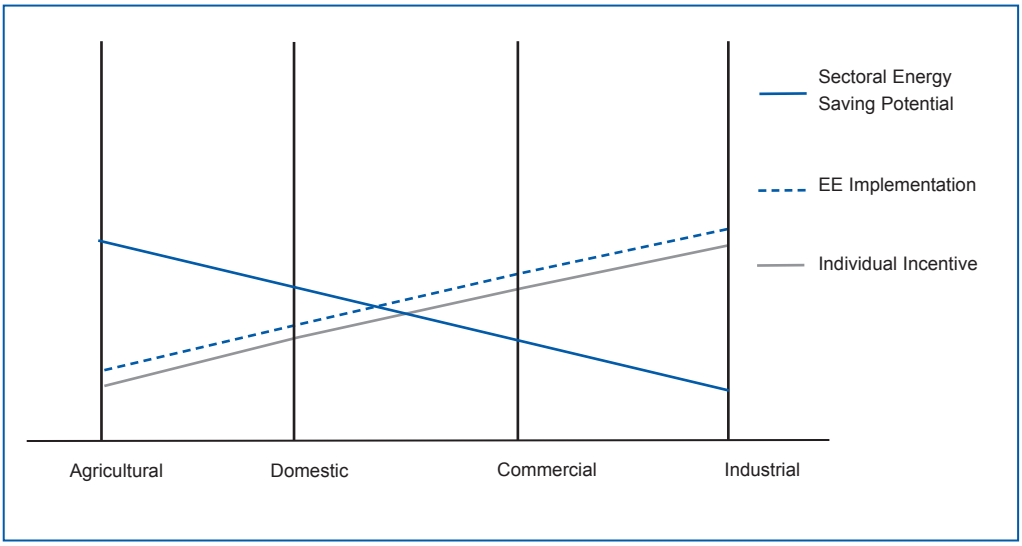
25 Thermal power plants, iron and steel, fertiliser, cement, aluminium, pulp and paper, textiles, and chloralkali.

26 BEE is in the process of developing the programme in consultation with Lawrence Berkley National Laboratory and Prayas Energy Group.

Yet, these initiatives are still at too early a stage to make a judgment about the strength of their final impact. As with most policies, when it comes to implementation, the devil is in the details. This is all the more true given that energy efficiency in India is supported only by a weak institutional infrastructure still in its infancy.

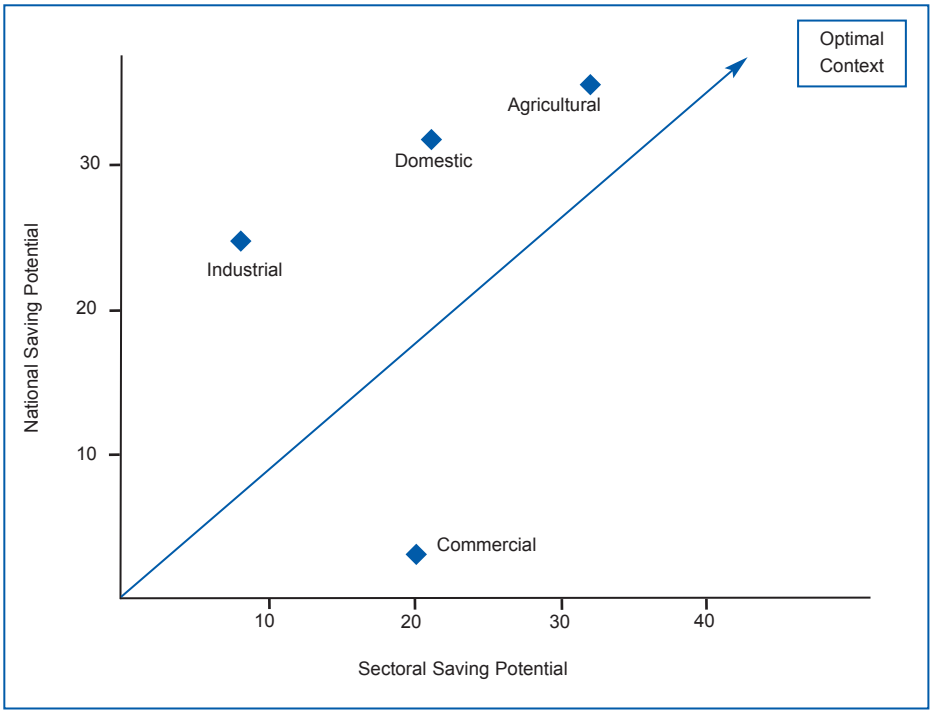
Moreover, although the initiatives taken by BEE are commendable, one can only observe a paradox in their implementation: **implementation is slower in sectors where the energy savings potential is higher**. Graph 1 encapsulates this idea. According to the National Productivity Council (NPC, 2009a), the potential for energy savings is highest in the agricultural sector followed by the domestic (household) sector (see Table 1). The agricultural sector can potentially save 27.79 billion kWh of electricity, which is 30% of this sector's total consumption and more than 36% of the total energy savings potential of India. Similarly, the domestic sector can potentially save 24.16 billion kWh of electricity, which is 20% of this sector's consumption and 32% of India's entire potential savings. According to these estimates and combining both national and sectoral energy saving potential (See Graph 2), both the agricultural and domestic sectors offer the highest collective return in terms of energy savings and should therefore be the priority areas of energy efficiency initiatives. Yet, implementation by BEE shows an opposite trend, whereby the industrial sector is being strongly prioritised. Indeed, most BEE activities revolve around this latter sector, while the agricultural sector is almost completely neglected.

Graph 1 - Potential Savings *vs.* Actual Implementation: Contradictory Incentives



Source: Authors.

Graph 2 - Energy Savings Potential across Consumer Categories: Sectoral Potential *vs.* National Potential



Source: Authors.

What drives this trend? Why is implementation high in the industrial sector when the potential for energy savings is highest in the agricultural sector?

First, a credible explanation may be related to the relatively low incentives faced by individuals in the agricultural and domestic (household) sectors when it comes to implementing energy efficiency measures, despite the fact that the overall collective return and incentive is high in these sectors. This is the idea that Graph 1 tries to encapsulate: the clash between *individual* and *collective* incentives. Implementation of energy efficiency measures is higher when individual incentives are higher. For instance, for the individual owners of pumpsets in the agricultural sector, the benefit accrued from increased efficiency is very minimal, compared to the benefits captured by an industrial company investing in energy efficiency. The same story applies to domestic (household) consumers: the monetary benefit of energy efficiency measures for a given household is very small.[27] This situation makes it difficult to motivate the pumpset owners and households to opt for energy efficiency and provide the upfront investment required. In the absence of an effective incentive structure, this initial investment is often unaffordable for most agricultural and domestic consumers.[28] Moreover, low levels of public awareness about the benefits of energy efficiency have also contributed to a low willingness to implement such measures in the agricultural and domestic sectors. In contrast, large industrial consumers initially have to invest substantially more in energy efficiency measures, but they have a clear view of their potential gains and have access to credit markets.

[27] Agricultural and household consumers can get only a small amount of monetary savings from energy efficiency measures, owing to their low electricity bills, while the savings could be quite big from the point of view of an energy intensive industry with high utility bills. Moreover, the former are required to invest in energy efficiency on their own, which for many is unaffordable, while the latter have access to some form of market credit.

[28] BEE is currently trying to devise mechanisms to reduce the cost of energy efficient equipment and appliances.

Second, the number of industrial and large commercial consumers is limited, which makes it easier to target and monitor them, whereas the agricultural and domestic consumers are large in number and geographically dispersed, making it difficult for BEE to reach out to them. BEE does not have the institutional capability to reach each and every household consumer in a country as large as India; it can only work through, or in coordination with, other agencies.[29]

Third, the technocratic orientation of the Indian electricity sector[30] (Harrison and Swain, 2010) has lead to an overemphasis on technology based solutions. Yet the promotion of energy efficiency in the agricultural and domestic sectors requires governance innovations and behavioural changes, along with technology. This would mean increased involvement by local governments, civil society organisations and other developmental agencies, all of which seems beyond the scope of current BEE activities and capabilities.

29 Interview with a senior BEE official, Delhi, September 16, 2010.

30 The Indian electricity sector is highly populated with engineers who make all governance decisions. It is not that the engineers cannot make good governance decisions; rather, it is observed that in the Indian context, they often prefer technocratic solutions even for governance problems. Electricity reforms during the 1990s reflect this phenomenon.

4. Paralysed energy efficiency implementation: the current governance

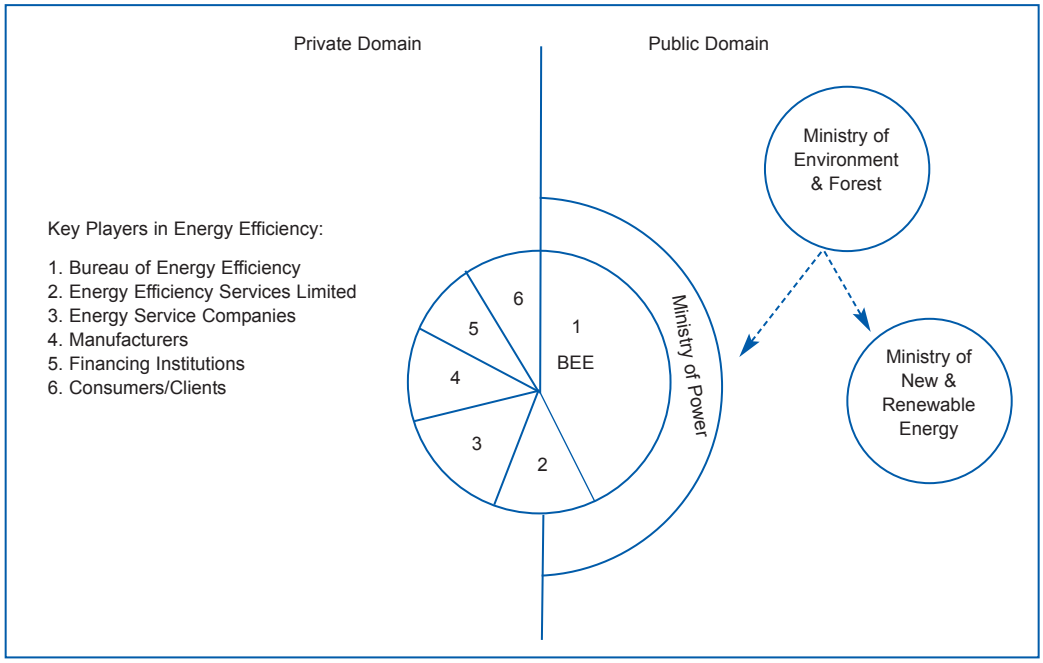
We can define "energy efficiency governance" according to the IEA as "the combination of legislative frameworks and funding mechanisms, institutional arrangements, and coordination mechanisms, which work together to support implementation of energy efficiency strategies, policies and programmes" (IEA, 2010, p.7). Yet, the policy practices found in India raise the question of whether the current governance structure is capable of addressing the two paradoxes we pointed out: high collective returns, yet low attention and slow implementation.

To start with, it may be noted that unlike climate-change governance, energy efficiency and conservation governance is very diffuse at the international level (Gupta and Ivanova, 2009).[31] Certainly, over the years, several global commissions and meetings have emphasised the need for energy efficiency and management. In 1987, the World Commission on Environment and Development promoted energy efficiency as part of sustainable energy. In 1992, the UN Conference on Environment and Development adopted the Agenda 21 framework of action, which claims that "the need to control atmospheric emissions of greenhouse and other gases and substances will increasingly need to be based on efficiency in energy production, transmission, distribution and consumption" (United Nations, 1992, paragraph 9.9). In 2002, the World Summit on Sustainable Development called for improved access to reliable and affordable energy and for improving energy efficiency through innovative financial, technology transfer and capacity building mechanisms (United Nations, 2002). Yet, even after so much discussion, there is no global agency with the mandate to promote energy efficiency. Though there are several international agencies working directly or indirectly on energy governance, they lack a clear mandate on energy efficiency, as well as a clear framework for coordination among themselves.

At the Indian domestic level, energy efficiency governance is equally paralysed and paralysing. Unlike in many other countries, the governance structure for cleaner energy development includes three different ministries (See Graph 3). The Ministry of Environment & Forest (MoEF) is responsible for representing India in international climate negotiations. The Ministry of New & Renewable Energy (MNRE) is responsible for the promotion of renewables. The Ministry of Power (MoP) is in charge of developing conventional electricity sources (coal, nuclear, large hydro projects, etc.) and the development of the power-distribution network. MoEF sets the macro target for emission reductions. In a way, it determines the targets under which the MNRE and MoP operate, while the latter have the authority to decide their preferred pathways for achieving them. Yet, coordination is absent among these three ministries in the agenda-setting and implementation processes. What is more, there is no direct accountability mechanism among these three ministries; each one is directly accountable to the Parliament and only indirectly to other ministries via the Parliament. Such an arrangement paralyses the governance of this policy domain. Accordingly, even though there is a strong consensus at the national level on the need and importance of energy efficiency, action has been exceedingly slow.

[31] Diffuse governance of energy efficiency at the global level is partly an outcome of an uncoordinated and inchoate global energy governance landscape. The latter is littered with overlapping and partial institutional frameworks, which emerged in a path-dependent fashion, attempting to achieve fragmented and un-prioritised objectives (Dubash and Florini, 2011).

Graph 3 - Key Stakeholders in Energy Efficiency in India



Source: Authors.

As for BEE, the nodal agency, it is under the administrative control of the MoP. Though BEE is largely autonomous on paper, it still works inevitably within the agenda of the MoP, whose main mandate is the expansion of the electricity sector. Many interviewees have emphasised that additions to generation capacity and expansion of the electricity supply is unambiguously the key agenda of this ministry. It is thus not actually accountable for progress in energy efficiency, or this is an absolutely minor part of its governmental and political evaluation. Though BEE can help the MoP by reducing consumption and the need for capacity additions, it also reduces by nature the scope of MoP's activities. This contradiction makes it difficult to truly coordinate between BEE and MoP. Moreover, some of the new provisions under the MNEEE (to monitor energy efficiency in electricity plants) mean that MoP projects should be brought under BEE supervision. This may lead to uncomfortable situations, (unequal) confrontation between BEE and MoP, and eventually non-credible programmes.[32]

BEE started as a small agency with very few resources, including staffing. Over the years it has expanded and grown to become a full-fledged, although still weak, administrative body. It has not only grown in size but also in sector coverage and functions. BEE helps to coordinate a range of designated consumers (notably big industries), designated agencies and other organisations. Broadly speaking, the functions of BEE are of two types, regulatory and promotional, and they are huge compared to its capacity as an agency. Its regulatory functions include: developing minimum energy performance standards and labelling designs for equipment and appliances; developing specific energy conservation building codes; creating energy consumption norms; accrediting energy auditors and energy service companies; as well as defining the manner and timing of mandatory energy audits. As for the promotional functions of BEE, they include: raising awareness and disseminating information on energy efficiency, organising training; strengthening consulting

[32] India has had several experiences with confrontation between ministries and the independent agencies working under them. In such cases, typically the autonomy of these agencies has been curtailed to maintain the supremacy of ministries. The relationship between erstwhile State Electricity Boards and the MoP offers a good example of such a situation.

services; promoting research and development; developing testing and certification procedures; formulating and facilitating implementation of pilot projects and demonstration projects; promoting innovative financing for energy efficiency; preparing educational curriculum on efficient use of energy; and implementing international cooperation programmes.

These are absolutely daunting tasks for such a small agency. In the field of renewable energy, similar responsibilities lay with an entirely different and independent ministry, which is much larger and resourceful. The institutional architecture for energy efficiency is thus very limited and fragile.

Moreover, the nodal agency (BEE), which is still at a nascent stage, does not yet have effective state-level counterparts. As mentioned earlier, although the Energy Conservation Act provides for state-level designated agencies, it is left to local governments to choose an existing agency for that purpose, thus expediting the key process of institution-building. In response, all states except Kerala (which has a separate Energy Management Cell) have selected their respective Renewable Energy Development Agencies (REDAs) as their designated agency for energy efficiency. The REDAs treat energy efficiency as their secondary responsibility for obvious reasons. This has highly curtailed the institutional capability of BEE to implement policies at state-level and largely explains why the implementation of energy efficiency initiatives has been so sluggish at state-level. Moreover, the noticeable lack of pro-activeness on the part of the electricity regulatory commissions in promoting energy efficiency has also contributed to slow implementation.[33] Finally, there is no well-developed funding mechanism for the promotion of energy efficiency.

Thus, weak policy and institutional arrangements, as well as the lack of funding and coordination mechanisms have resulted in slow implementation of many of BEE's schemes – even though the Bureau has a well-defined legal framework, clear targets, strategies and an action plan.

This is not to say, however, that BEE lacks motivation or dynamism to comply with its mandate. To cope with a paralysed governance structure, and improve implementation, the Bureau has been "manoeuvring in constrained spaces"[34] and building coalitions with various actors, far beyond the public domain. Graph 3 underscores that energy efficiency is an issue area populated by multiple actors with different natures and in different sectors. Rather than depending solely on state agencies for implementation, BEE has been following a "market plus" approach involving non-state actors and based on the narrative of "co-benefits": energy and cost savings. In this narrative, "co-beneficiaries" are created and the focus is placed on sectors rather than individual firms. BEE has thus intensely sought to create new players (such as ESCOs) and rules that would allow for market mechanisms to push for energy efficiency (Harrison and Swain, 2010). This active strategy of creating a plural coalition outside of the public domain mirrors the feeling that India is arguably a "flailing state"[35], where there is little confidence that national policies will be systematically implemented at the local level.

The key partners in this coalition are the Energy Service Companies (ESCOs), the manufacturers, financing institutions and the consumers. Acknowledging its inability to deal directly with individual consumers, BEE has promoted and certified ESCOs to help implement energy efficiency measures at the consumer level. At the same time, it has been pushing manufacturers, and facilitating cooperation among them, to produce more energy efficient equipment. Given the need for better financing to promote energy efficiency, BEE has also started sensitising various financial institutions about energy efficiency projects. To attract institutional investment in such projects, it has

33 The lack of pro-activeness on the part of regulatory commissions is in itself a very big and puzzling research question for which this study does not have an answer.

34 Interview with a senior official in the electricity sector in Delhi, November 24, 2010.

35 A flailing state is "a nation-state in which the head, that is the elite institutions at the national (and in some states) level remain sound and functional but where this head is no longer reliably connected via nerves and sinews to its own limbs" (Pritchett, 2009: 4). In the Indian context, it is well acknowledged that the field-level state agencies responsible for implementation are increasingly beyond the control of the administration at the national or state level. A detailed discussion of this issue is provided by Pritchett (2009).

created a fund (PRGF) that partially guarantees the return on investors' money. Moreover, it has created a separate agency called Energy Efficiency Services Limited (EESL), a publicly owned entity meant to interact on market terms with the non-state actors in the "coalition".[36] BEE has also taken several initiatives to inform consumers and help motivate them to use electricity more efficiently, reflected by awareness programmes in the mass media and public consultation meetings.

In all this manoeuvring, BEE has been rather transparent by engaging with a range of civil society organisations and incorporating their input.[37] These manoeuvres are expected to strengthen BEE as an institution; yet it is not clear if they will suffice to compensate for the governance problems discussed above.

36 Interview with a senior official of EESL in Delhi, October 20, 2010.

37 BEE organises public meetings not only to disseminate information on its programmes, but also to seek input from the public. It also engages with various stakeholders and expert groups during the design and implementation stages of its programmes.

Conclusion: Opening up options for energy efficiency policy

Energy efficiency and renewable energy should both be equally promoted as important and promising approaches to clean-energy development. Both approaches complement each other in achieving the larger goals of electricity access, energy security and climate mitigation. Giving equal importance to each within Indian energy policies could yield extraordinary benefits on all fronts. This paper has argued that there is a dire need to open up policy options for energy efficiency in India. According to some estimates, a range of cost-effective, end-use electricity efficiency measures could eliminate the electricity deficit in India as early as 2014, while contributing at the same time to climate mitigation. Taking this path would require less investment compared with the "business as usual scenario", based on the addition of new generation capacity (Sathaye and Gupta, 2010). In the following concluding paragraphs, we make some suggestions towards that objective.

First and foremost, maximising energy savings requires optimising the existing programmes and introducing new approaches that reorient the focus of action towards high-return sectors, like agriculture and domestic (household) consumption. Better incentivising implementation and penalties for delay seem absolutely key. Indeed, the higher the implementing incentives, the lower the transaction costs. Revamped incentive packages could be provided at different levels, from local to national, and be better targeted at consumers, as well as manufacturers. Suitable incentives are often hard to devise, however, and require a careful look at a range of contextual factors. A good source of inspiration for India can be found in the "Super-Efficient Equipment and Appliances Deployment Programme" (SEAD) managed by the Lawrence Berkeley National Laboratory. Through incentives, SEAD envisions targeting and pushing manufacturers at the global level to produce super-efficient equipment and appliances. Appliance manufacturing is indeed highly globalised and concentrated as 15 international manufacturers control 70% of the Indian market. The SEAD programme thus claims that multi-country coordination of financial incentives, labels, and standards to accelerate the penetration of energy-efficient appliances and equipment is feasible and cost-effective (Phadke *et al.*, 2009). India has already subscribed to the idea and is party to the SEAD programme through its Market Transformation for Energy Efficiency Scheme within NMEEE. The strengthening of global energy governance, at least through a G20 declaration of intent, could be a great facilitator of this process.

Second, there is a need in energy savings policy for a shift away from the current, rather technocratic approaches (that emphasize technological upgrades) to more mixed approaches with stronger governance components. To date, energy development in India has been largely focused on technological improvements; so is the promotion of energy efficiency. Yet, governance fixes have the potential to facilitate the process greatly, promote effective adoption of appropriate technologies, and remove implementation barriers. This would require a build-up of institutional capacities, more public awareness and more research regarding both technological and governance approaches. The technological bias in governmental policies is also often found in projects proposed by large international donors, who find it easier to offer and finance new technologies rather than engage in long and complex governance dialogue. This also raises the question of what the organisational incentives for international donors really are when it comes to designing projects in the energy sector.

Third, promoting and implementing energy efficiency initiatives requires change in behaviour, practice and attitude. BEE has been working on awareness programmes through campaigns, media programmes, and public consultations. There is a need to strengthen such processes by engaging more with civil societies, think tanks, the media and educational institutions. Awareness-raising should strengthen the developmental coalition being formed around energy efficiency.

Fourth, the governance of energy efficiency also demands to be fixed at the national level. This would require the development of an enabling framework with stronger provisions, action plans, funding mechanisms, coordination and cooperation among various authorities. Though India has a well-established legal framework and action plan, there is a need for far more stringent regulatory and policy mandates weighing not only upon the high-end consumers but also on the low-end consumers, such as households. Such mandates could be implemented through tougher incentive structures, as is currently the case with the energy-intensive industries. Institutional arrangements should be further strengthened by granting more resources and autonomy to BEE. The same should be done with its state-level counterparts whose accountability should be enhanced. This may require creating separate agencies, instead of relying upon those that are already in charge of renewable energies.

Fifth, given low per-capita energy consumption in India, there is relatively little support among high-level government officials for energy efficiency measures, especially in the face of other competing agendas. Using the high electricity prices in effect, however, India is trying to incentivise users to improve their usage efficiency and thus save on their electricity bills. Yet, while price incentives may be effective with high-usage industrial consumers, they may not motivate relatively low-usage household and agricultural users. Policy makers need to bundle energy efficiency policies with other developmental policies to produce co-benefits, what has been done to a certain extent in the area of renewable energy. Devising such pragmatic and tailored programs, however, requires a detailed understanding of local contexts and stronger implementation capacity on the part of the public agencies. Energy policy is not just a technical issue but a highly political one also. Designing such "bundling strategies" requires taking into account the history and politics of specific local contexts (Kostka and Harrison, 2011).

Sixth, in the absence of an adequate global funding mechanism for climate mitigation, international development agencies have a significant role to play in promoting energy efficiency in India. Yet to date, their role is rather limited to facilitating research, capacity development and occasional pilot projects. Why is this so? Donor representatives argue that Indian governments have been hesitant to cooperate with them in taking on energy efficiency projects. This reluctance is suggested to be partly an outcome of low political will and a lack of understanding of, and confidence in, returns from energy efficiency measures.[38] Yet, there may be another side to the story. International agencies actually do not have dedicated grant resources to sponsor climate mitigation projects in India. Rather, they offer loans, which Indian governments are not prepared to accept given the credit burden. It is true that energy efficient projects that are sound should also be financially sustainable, and it can be hard for international donors to see why they should provide grants for such projects in India. Yet one must understand where the Indian reluctance to borrow comes from. Many Indians feel that developed countries should pay first and foremost for their historic emissions, as India's per capita emission rate is much lower than the global average and that of developed countries.

[38] Interviews with representatives from three leading international development agencies operating in India. Interviews conducted in Delhi in December 2010 and January 2011.

When promoting energy efficiency in India, international donors thus need to work in sensitive and diplomatic ways. They need to understand this mindset very clearly and tailor their interventions to the local context, in forms likely to be locally acceptable and that insist on development benefits. The current situation has created a financial bottleneck for large-scale energy efficiency projects. To ease out of this, India obviously needs to change its attitude towards investment in energy efficiency, but international donors should show goodwill and develop more attractive financial tools to help finance this agenda, such as grant programmes or direct capital investments, that would provide returns but not weigh on the country's credit burden.

Seventh, international donors know, or should know, they can only do so much in India. Historically Indian energy policy has been far more influenced by global trends and discourses than direct interventions by international organisations (Dubash, 2011), with the notable exception of multilateral development banks like the World Bank and the Asian Development Bank, which have influenced tariff policies (Nakhooda, 2011). Future influences on Indian energy policy are thus expected to come primarily from shifts in broad tendencies. In that sense, most international donors may usefully focus a large share of their efforts on reinforcing such broad trends and policy discourses for enhanced energy efficiency.

Finally, a global governance approach going much beyond India but supporting its efforts is also needed. The production and consumption of electricity in one part of the world does affect the rest of the world, in terms of carbon emissions, environmental impacts and resource scarcity. Moreover, every global citizen should ideally have equal access to electricity services. If one adds to these concerns those about global energy security, then energy efficiency may surely be looked at as a global public good deserving a dedicated global agency, free from other agendas. This would certainly not be a miracle solution but a useful step toward enhancing the profile and political weight of opinion leaders or lay people within their own domestic arenas, who strive for this agenda across the globe.

Acronyms and abbreviations

AFD	*Agence Française de Développement*
BEE	Bureau of Energy Efficiency
CDM	Clean Development Mechanism
DSM	Demand Side Management
ECBC	Energy Conservation Building Code
EEFP	Energy Efficiency Financing Platform
EESL	Energy Efficiency Services Limited
ESCert	Energy Saving Certificate
ESCO	Energy Service Company
FEEED	Framework for Energy Efficient Economic Development
GHG	Greenhouse Gas
IEA	International Energy Agency
IEP	Integrated Energy Policy
IREDA	Indian Renewable Energy Development Agency Limited
IRENA	International Renewable Energy Agency
JNNSM	Jawaharlal Nehru National Solar Mission
KW	Kilowatt
KWh	Kilowatt/hour
MNRE	Ministry of New and Renewable Energy
MoEF	Ministry of Environment and Forest
MoP	Ministry of Power

MTEE	Market Transformation for Energy Efficiency
MU	Million Units
MW	Megawatt
NAPCC	National Action Plan on Climate Change
NMEEE	National Mission on Enhanced Energy Efficiency
NPC	National Productivity Council
PAT	Perform, Achieve and Trade
PRGF	Partial Risk Guarantee Fund
REC	Renewable Energy Certificate
REDA	Renewable Energy Development Agency
REN21	Renewable Energy Policy Network for the 21st Century
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RPO	Renewable Purchase Obligation
SERC	State Electricity Regulatory Commission
SME	Small and Medium Enterprises
UNFCCC	United Nations Framework Convention on Climate Change
VCFEE	Venture Capital Fund for Energy Efficiency

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