

Low Carbon Development in India: Challenges and Opportunities

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In preparation for its September 13, 2010 workshop bringing together leaders in Indian low carbon development, Worldwatch conducted interviews with twenty top experts in the field to gain a sense of the current state of thinking and frame the debate for the event. The set of questions were aiming at insights from ten issue areas: challenges to low carbon growth, whether low carbon development is in India's interest, emissions pathways, the National Solar Mission, the National Mission on Enhanced Energy Efficiency, policies for sustainable business models, opportunities in infrastructure, technology and IPR, international competitiveness and finally international leadership. For better illustration of the arguments given, we added a table on future emission scenarios as well as a summary of the government's National Action Plan on Climate Change to this document.

Is a Low Carbon Development Path in India's Interest?

The vast majority of experts interviewed gave at least a partial confirmation to the statement that low carbon development is in India's best interest, and most found it to be compatible with India's poverty eradication efforts. Some cited the co-benefits of low carbon strategies such as energy cost savings and mitigating air pollution and related public health issues.

"There is no other alternative [...] it's the right thing to do, the only thing to do."

Others highlighted the opportunities for India to leapfrog technologies and avoid going down the same carbon-intensive development path that today's industrialized countries followed, thereby reducing serious air pollution problems and economic and security risks associated with reliance on fossil fuel imports, and allowing India to reap the economic benefits as a leader in rapidly growing global green energy markets. For example, India has installed high-voltage direct-current cables to deliver electricity with greater reliability and efficiency than the alternating-current cables prevalent in the United States.

"A lot of these so-called mitigation measures are also measures by which we can ensure high energy security, we can create greater employment, and therefore a lot of things that may make sense on a global basis make perhaps greater sense on a national and local basis."

Making domestic advances in renewable energy technology can improve energy security, create jobs and save costs by using local rather than imported energy resources. India also stands on the brink of opportunity to become a global leader in providing low carbon technologies to the rest of the world. It is up for debate whether a domestic market – the potential for which is considered to be large by all respondents- is a precondition for international market leadership or not.

*** Damandeep Singh has been instrumental in putting this paper together. He took the lead on drafting the survey questions and conducted many of the interviews**

While some respondents rejected international pressures on India's development path, others acknowledged the increasingly important role that greenhouse gas emissions will play in international trade and economic relations and described the need for India to adopt a low carbon growth path in order to build and maintain strong diplomatic ties. Can India, already a strong voice in international climate negotiations, lead them out of their current gridlock?

Current domestic policies

Solar Mission

As part of its National Action Plan on Climate Change (NAPCC – see Annex II for summary), the Indian government has introduced a national Solar Mission with the goal of installing 20,000 MW of solar capacity in India by 2020. Some respondents felt that the Solar Mission is already on the right track, praising its phased approach (which starts with a Phase I goal of installing 1,000 MW of capacity by March 2013), as an important learning opportunity to bring down costs and facilitate rapid replication of effective projects.

“The National Action Plan on Climate Change is a very ambitious, forward-looking plan [...] we have to just implement that plan faithfully.”

Other praise of the Solar Mission included statements that it incentivizes corporations and industries to get past the initial hurdles for solar-powered grid-fed technologies and will spur further R&D, investments, availability and lower costs. These developments will be key as there was agreement among respondents that solar costs must come down, efficiencies need to improve and viable storage solutions have to be developed.

“It has to be done by all stakeholders involving government, business and industry, civil society and people at large.”

The specific regulations under the Solar Mission are yet to be determined, and many of the climate experts interviewed had suggestions for what they should entail. Some focused on the importance of the private sector and the need to open up the field to as many players as possible to encourage investment and innovation. Some also saw a key opportunity for India to develop a strong manufacturing base and indigenous expertise in solar power, an opportunity which would justify potentially high upfront investment costs.

“The key factor in terms of renewable energy, (...) as far as India is concerned, is how can you integrate it into the grid effectively, because large-scale development of renewable energy on an off-grid basis is not really possible.”

There was some disagreement among respondents as to what the overall goal of the Solar Mission should be. Some praised its current approach of focusing on larger-scale grid-integrated solar development, smart grid development and feed-in tariffs, while others called on regulators to reform

the Solar Mission to encourage more inclusive, decentralized use of solar PV in order to more directly target underserved populations, expand access to electricity services and address poverty reduction needs.

Energy Efficiency Mission

Another initiative under India's NAPCC is the National Mission for Enhanced Energy Efficiency (NMEEE). By and large respondents praised the mission and its specific policies, including building codes and the star rating system for the energy performance of appliances. Another innovative approach included in the NMEEE is a market-based mechanism for meeting industry-wide energy efficiency targets. Facilities that exceed the energy efficiency requirements receive certificates which they can sell to those for whom own reductions would be much more expensive.

"The basic issue is to change the mindset of the corporations."

Some respondents discussed the new wave of super-efficient appliances which exceed even international efficiency standards. Different approaches were discussed for encouraging adoption of these appliances, including upstream financial incentives to manufacturers of super-efficient appliances.

"We really need a whole set of fiscal measures, incentives, disincentives, and in some cases regulation by which we are able to internalize the externalities that inefficient use of energy actually brings about."

Interviewees cited the need to encourage both consumers and businesses, including small and medium enterprises (SME), to reap the cost savings and competitive advantages of energy efficient measures. Suggestions ranged from raising awareness of options in order to change mindset to removing some of the upfront financing barriers to energy efficiency investment through creative financing options such as venture capital and partial risk guarantee funds.

Policies for Sustainable and Innovative Business Models

Some respondents stated that India is already taking many of the steps needed to promote sustainable and innovative business models, but many had additional suggestions which spanned a broad range of public and private initiatives, as detailed below. The range of ideas supports one interviewee's claim that there is no silver bullet policy and that a range of initiatives need to be in place.

"One of the key requirements is to see how you deploy scarce public resources in a manner which promotes low carbon development."

One idea that surfaced a couple times during the interviews was the need to attract venture capital investment and encourage technology companies to work in India in order to spur innovation and build a vibrant indigenous renewable energy industry. A couple respondents offered policy suggestions for how to even the playing field for businesses promoting low carbon technologies. These included feed-in tariffs, renewable portfolio standards, and reexamination of deployment of public funding for energy projects. For example, one interviewee suggested replacing the subsidy for kerosene lamp fuel provided

in rural areas with one for solar lanterns. Another proposed low-interest loans for energy efficiency projects.

“[One way] to solve this technology innovation problem is to attract venture capitalists as well as technology companies from outside, to come and work in India.”

One interviewee promoted an approach that moves away from traditional large centralized models of industrialization to a small business model that promotes local applications of innovation to improve local livelihoods and access to energy services. Another respondent also suggested involving microfinance in efforts to spur energy investment and low carbon leapfrogging in rural areas. As in discussions of the Solar Mission, there were different scales of focus ranging from high-level policy discussions and those that focused on industry and manufacturing, to those that centered on participatory processes, poverty-reduction and access goals.

International issues in focus

Technology and IPR

Many of the climate experts interviewed saw technology development as a key driver of low carbon growth in India. Some also pointed out that in addition to technical improvements, innovation in processes and services is key. Proper application of new technologies so their full benefits are realized is also important, such as motion sensors in buildings to control lighting.

“Technology is clearly an important issue in India’s low carbon growth but the challenges will likely be in building and harnessing domestic know-how rather than in overcoming IP.”

Interestingly, most interviewees did not view intellectual property rights (IPR) as a major impediment to low carbon technology implementation in India. Many instead maintained that the key to India’s low carbon technology future is through innovating, developing and commercializing new technologies within India and focusing on homegrown solutions. Suggestions for how this should be accomplished included attracting investment in India’s green technology industry and channeling more R&D funding into low carbon technology development. IPR issues are also diminished when there is open competition within an industry like renewable energy. One respondent suggested that there are IPR lessons learned from the IT industry, which provides a strong model for how profits can be made with open source innovation, rather than the pharmaceutical industry model which limits access to vital new developments.

“I don’t think IPR issues are going to be a major impediment because I think India will soon become a major generator of innovation.”

A couple of respondents did however acknowledge that technology transfer from developed countries could help developing countries leapfrog to cleaner development patterns, citing the Asia-Pacific Partnership as a positive example.

International Competitiveness

There was also general agreement among respondents regarding international competitiveness, in that most did not see it as a major barrier to implementing low carbon development strategies. Some even saw investing in low carbon development as an opportunity for India to become a leader in rapidly emerging economic sectors like renewable energy.

“If we start taking leadership, we can take this opportunity to capitalize on the new technologies, the emerging technologies”

Many also favored international sharing of new technology developments to take advantage of advancements made abroad. Furthermore, one interviewee pointed out that India’s economic strengths lie in services, which could be an important part of bringing down carbon intensity worldwide.

“I don’t believe that India’s competitive strengths lie in carbon-intensive sectors, but rather in services, which can actually play a positive role in reducing overall carbon intensity worldwide.”

One respondent also made the point that in most cases, the competitiveness concerns in international climate discussions have been blown out of proportion, as emissions policies would play only a minor role compared to other considerations like labor and capital costs. This respondent and others felt that India has been unfairly targeted since Indian industries and consumers already pay much higher prices for energy services than their counterparts in the U.S. and China.

Looking forward

Challenges to Low Carbon Growth

One of the challenges cited most frequently by top Indian climate experts is the need to meet poverty reduction needs and expand access to energy services while at the same time moving India down a low carbon development growth path. The difficulty in adopting low carbon energy technologies is due mostly to the additional cost and in some cases technical barriers to implementation.

“The biggest challenge is the human mind. I think we need to change management and people who are not willing to aim high. If we all convince ourselves that we can do it, I think we can easily achieve it.”

Interviewees differed in their opinions on how great of a challenge low carbon development will be. Some pointed out that India’s economy already has low energy and carbon intensities and posited that co-benefits such as energy security, employment and air pollution reduction will make low carbon energy options the most beneficial choice regardless of climate mitigation goals. In these cases, the major obstacles center on changing mindsets and raising awareness of opportunities.

“The challenge basically is one of meeting the needs for energy on a development path. Our hunger and appetite for energy seems to be endless.”

On the other side of the debate, some experts highlighted the scale of the low carbon development challenge, including the need to expand electricity services to more than half of India's population that currently lacks them. On the whole however, most respondents praised India's recent policies, and some said they will be enough to set India down an appropriate and sustainable low carbon development path. Others still saw the need for additional effort and transformative thinking to spur new business models, technologies and innovative policies.

Opportunities in Infrastructure

In discussing the opportunities for low carbon growth in infrastructure development, a few respondents cited the figure that 70% of the infrastructure that will exist in India in 2030 has not yet been built. Nearly all interviewees see this as a key time to focus on low carbon approaches so that technological lock-in is energy efficient and sustainable rather than energy-intensive and fossil fuel-based.

"70-80% of the infrastructure which will exist in India in 2030 is yet to be built [...] This surely is an opportunity for leap-frogging."

Some respondents already saw encouraging signs that a green push is occurring in infrastructure development. Government buildings already have to comply with energy codes, and the private sector is also showing leadership in green building initiatives such as LEED certification. Others saw additional opportunities to expand on this movement and include more innovative green building ideas like incorporating passive light into building design.

"There are conscious consumers that are saying yes it's worthwhile even if I pay a little extra, over a period of time to realize that taking up an office or a residence at this building is beneficial for them."

Despite the strong role of the private sector, some respondents felt that government involvement would be necessary for the level of green infrastructure investments that will need to be made. Suggestions for the government's role ranged from competitive public-private partnerships, incentives, ratings and industry benchmarks.

Emissions pathways

None of the climate experts interviewed felt comfortable giving concrete projections for India's emissions trajectory over the coming decades, though this work has been done. The table below shows business as usual and abatement scenarios developed by McKinsey & Company in August 2009.¹

¹ http://www.mckinsey.com/client-service/sustainability/pdf/India_Environmental_Energy_Sustainability_final.pdf

Factor	Unit	2005	2030 Reference Case	2030 Abatement Case
GDP growth	Percent		7.5	7.5
Population	Billion	1.10	1.47	1.47
Energy demand	Billion tons of oil equivalent (Btoe)	0.5	1.8	1.4
Power demand	Terawatt-hour (TWh)	700	3,870	2,910
Power capacity	Gigawatts (GW)	150	760	640
GHG Emissions	Billion tons CO ₂ e	1.6	5.0 to 6.5 (5.7)	2.8 to 3.6 (3.1)

Many interviewees were also quick to say that reducing economy-wide emissions in absolute terms is not yet a realistic option for India, and that emissions will continue to grow for at least the next decade as the country continues to grow and expand energy services to underserved populations.

“As of now there is now way we could say that we would move toward decarbonization. It has to increase.”

Among the interviewees who gave general thoughts on India’s emission trajectory, there were differences in opinion about how significant India’s contribution to global emissions will be. One respondent pointed out that India is one of the world’s largest carbon emitters and that emissions are growing fast, while others were less concerned with the immediacy of emissions growth and stated that even under business as usual projections India’s per capita emissions would be minor compared to global standards over the next couple of decades. One respondent proposed that India should reach peak greenhouse gas emissions of five to six billion tons CO₂e between 2025 and 2030, while another suggested that policies enacted today should be mostly aimed at preparing the country for the period post2030 when emissions levels will be more significant, even on a global scale. The domestic debate seems to more and more reflect the international discussion over what should be the relative importance of considering overall national emissions versus per capita emissions.

“The question isn’t whether India can go on an ambitious GHG pathway but how it chooses to do so. Will the bottom third of India’s population have a chance to raise their emissions by moving up the energy ladder while the top 1% or so are required to make some sacrifices?”

Some respondents mentioned India's Copenhagen commitment to reduce the carbon intensity of its economy by 24% below 2005 levels by 2020. Again, opinions differed on this target, with some calling it modest and easily attainable, while others lauded it as an ambitious goal. However, no one we talked to was arguing for a lower domestic target. And others chose to end on a very optimistic note:

"We have abundant land, we have abundant sunshine, there are storage technologies which are coming in, I don't see a reason why renewable energy cannot be the only way to power ourselves."

International Leadership

The international climate negotiation process under the United Nations Framework Convention on Climate Change (UNFCCC) is another area where most of the climate experts interviewed were in general agreement. Most felt that pressure for comparable action from industrialized countries was unjust, and that India should maintain its stance that it will only agree to an equitable agreement.

"India should form deeper political ties with G-77 in ensuring an equity-based framework that includes deep cuts from all the major emitters."

For some respondents, this meant forming stronger ties with the rest of the developing world (the G77) to push for an equitable sharing of the global carbon space based on per capita emissions. Many applauded India's commitment to such a goal, as well as its aggressive domestic policy actions and carbon intensity commitment.

"India and China can not only set an example to other developing countries but they can also help them in adopting the same path."

One climate expert was especially critical of the national appropriate mitigation actions (NAMA) proposal in the UNFCCC process, suggesting that tying domestic policies up in an international process infringes on national sovereignty and precludes necessary experimentation to find successful policies and projects.

Conclusion

India is moving in the right direction for low carbon development with strong domestic policies and international engagement. Collaboration and open stakeholder involvement from a range of fields including government, industry, academic and civil society is essential in carving out the details of the path ahead in order to ensure that the best policies are implemented to promote environmental sustainability, spur innovative businesses and meet the poverty reduction and basic access needs of India's large underserved population.