7 A view from India

E. Somanathan
Indian Statistical Institute

India's primary concern in the climate negotiations is to avoid having to make commitments it may come to regret. While this is a concern for all countries to some degree, it is much greater in a low-income country because the human and political cost of slowing economic growth is enormous at low income levels.

Fortunately, the need for secure energy access, and to a lesser extent, local environmental concerns, are driving Indian policy in the direction of a massive expansion of renewable energy. While continuing to exhort richer countries to own up to their responsibilities to finance mitigation and adaptation, India can be expected to propose mitigation actions that are consistent with domestic policy priorities. These include ambitious near-term renewable energy targets that have already been announced.

India should also announce gradually rising taxes on coal and oil. These would be an extension of existing programmes such as the coal tax and of policies aimed at fiscal rationalisation such as the recent elimination of the subsidy to diesel and its replacement by a net tax. Revenue from the coal tax should be used to create a flagship programme to replace power subsidies to farmers with capital subsidies for solar-powered pumps. Rich countries should be asked to meet their financial obligations for mitigation assistance by contributing via offsets from their carbon trading programmes. The creation of a credible mitigation programme to which funds can flow makes it much more likely that developed countries will be motivated to make good on their promises of financial assistance.

1 India and the 'like-minded' countries

India's policy towards an international climate agreement has historically been largely defensive. Climate change has not been an issue that has arisen from domestic concerns. It is one that India has reluctantly engaged with in response to demands made upon it in international fora. India's stance was that it would be iniquitous to expect poor countries to slow their development by restricting emissions when the rich countries were responsible for most of the excess stock of carbon dioxide, and could much more easily afford to pay for mitigation. This position was acknowledged in the UN Framework Convention on Climate Change in 1992 when it referred to "common but differentiated responsibilities", and further enshrined in the Kyoto Protocol.

India's approach was developed in the 1990s when the cost of mitigation actions was thought to be very high. This was never entirely true, of course. In fact, some mitigation at negative economic cost via elimination of subsidies to fossil fuels was always available. This was not taken up because it would require political energy to implement reforms, and because there was no significant action by the developed countries and, therefore, little pressure to act. Instead, India allied with a group of 'Like-Minded Countries' including many developing countries, China, and several fossil fuel exporters in resisting any mitigation actions at all by developing countries.

This approach has gradually become untenable with changing circumstances. The rich countries, with their vastly greater influence over the news media, successfully framed the debate in terms of their positive promised percentage emissions cuts against the developing countries' unwillingness to act, while downplaying their vastly higher per capita contributions to the stock of greenhouse gases. The fact that the Like-Minded Countries included some very wealthy oil exporters helped to take India down from the moral high ground. Gradually, developed country rhetoric began to be translated into action, for example, with the starting of the EU Emissions Trading System in the mid-2000s. The recent pledge by China that its carbon emissions will peak by 2030 and possibly earlier has increased the international expectations from India. Finally, awareness of climate change and its adverse consequences has grown in India and this has contributed to the sense that some action is needed.

2 India's ambitious pledge to reduce carbon intensity

Anxious to escape the obstructionist label pinned on it by the northern news media, India developed a National Action Plan on Climate Change in 2008 that included eight National Missions. None of them has amounted to much except for the National Solar Mission, which has been a dramatic success. The Government of India and some state governments auctioned long-term contracts for the purchase of electricity from private developers of large-scale solar PV plants. Prices in the auctions have fallen rapidly over the last four years as investment in the sector has grown rapidly. By the time of the most recent auctions (in July and August 2015), solar electricity prices had fallen considerably. They are now only 10-25% higher than the price of power from new coal-fired plants. India has reached 3.5 GW of capacity in solar PV from a starting point of virtually zero in 2010.

At the Copenhagen meeting in 2009, India pledged to reduce the carbon intensity of GDP by 20-25% from the 2005 level by 2020. A carbon-intensity target rather than a target for total emissions is appropriate for India because GDP growth is expected to be high and uncertain. Most recently, at the December 2014 meeting in Lima, the government confirmed the domestic policy announcement of a target for installed capacity of renewable energy of 175 GW by 2022, of which 100 GW is to be solar and 60 GW wind.

How ambitious are these targets? Are they likely to be met? Should India go further in this direction, or has it promised too much already? Should it take a different approach?

These *are* ambitious targets. Emission intensity tends to rise rapidly with per capita income at low levels of income, and then more slowly at higher levels.[1] By way of example, in 2013 India's carbon intensity was 139 kg CO_2/US$1000 while PPP GDP per capita was $5,200. China was approximately twice as rich with a per capita GDP of $11,500 and a carbon intensity of 229 kg CO_2/$1,000. The US was ten times as rich with a per capita GDP of $51,300 and a carbon intensity of 334. Thus, India has promised to

1 This can be seen from the EDGAR database from which the following numbers are taken. GDP numbers are in 2011 PPP US dollars from the World Bank.

deviate from this pattern. It has had some success so far, with carbon intensity falling by 10% between 2005 and 2013.[2] It is, however, far from clear that this will continue without strong policy measures.

Turning to the renewables targets, there is no doubt that they are ambitious. Global installed capacity of solar PV is now 180 GW, of which India's share is only 3.5 GW. Moreover, India's entire electric power-generating capacity (mostly coal-based) is currently only 280 GW. To add 100 GW of solar PV in seven years, when PV is still not fully competitive with coal, will require strong policy action. Although wind power is competitive, 60 GW is still a very large capacity addition, given the time frame.

We can already see that these targets may not be met if circumstances are adverse or policy is not strong enough. It would, therefore, be a mistake for India to make further quantitative commitments by following the developed countries' announcements in terms of absolute emissions. It would also not be realistic to promise a peak year for aggregate emissions as China has done. It is safer to make promises about the more distant future, of course. But such promises would not be very meaningful or credible, because the capability to take action will depend to an enormous degree on how much India's per capita income rises in the next decade.

3 From targets to action: Towards carbon pricing...

Should India then stop at what it has so far laid out? I believe we should not. There is more that can and should be done. Most importantly, it is becoming clearer than ever that climate change has hurt the Indian economy and can become extremely dangerous in the next few decades. Global warming has already lowered the yields of the two most important Indian crops, rice and wheat, by a few percentage points each (Auffhammer et al. 2006, Gupta et al. 2014) and lowered labour productivity in manufacturing by 3% (Somanathan et al. 2014). India, therefore, has a strong stake in a meaningful climate agreement.

2 By way of comparison, China's carbon intensity fell by 29% while that of the US fell by 2.6% over the same period.

Rather than announcing *targets*, it would be much more helpful and credible for India to announce *actions*. First, India should announce a move towards carbon pricing that builds on recent domestic energy policy. Second, rather than only calling for more transfers from developed countries, India should call for transfers for specific programmes that credibly demonstrate mitigation and that can be scaled up with external finance. Some possibilities are spelled out below.

The Indian government has initiated carbon pricing in the oil and coal sectors in the last few years. Starting in 2013, the government decided to eliminate the implicit subsidy to diesel gradually by allowing state-owned oil companies to raise the price by a small amount every month.[3] This has been followed by increasing excise taxes on diesel and petrol over the last year as world oil prices fell. The result has been a move from a net subsidy for diesel of Rs 9/litre to a net tax of Rs 10/litre.[4] The resulting carbon tax is \$64/tCO_2e (Ministry of Finance 2015). This tax is still well below European transport fuel taxes, while being well above that of the US. The gap between Europe and the US in fuel taxes has resulted in European transport sector CO_2 emissions being 50% lower than what they would have been if Europe had US tax rates (Sterner 2007, Sterner and Köhlin 2015), thus demonstrating the importance of fuel taxes for climate policy.

India's road and rail networks are highly congested due to chronic under-investment and policymakers recognise that there will be a substantial economic boost from improving them (Ministry of Finance 2015). In fact, it is impossible to imagine a scenario in which India doubles its per capita income in a decade without an enormous expansion in rail and road capacity and a reduction in congestion.

It makes sense, therefore, for India to couple the two objectives of raising revenue for transport infrastructure and reducing carbon emissions by announcing a continued steady hike in liquid fuel taxation until the resulting revenue can entirely finance the building and maintenance of roads as well as some local public transport and at least a part of the capital investment needed to expand the rail network. The experience so far

3 http://timesofindia.indiatimes.com/business/india-business/Diesel-prices-to-be-hiked-40-50-paise-every-month-Veerappa-Moily-says/articleshow/18287874.cms

4 1 US dollar is about 65 rupees.

shows the political feasibility of gradual price increases. Announcing this in the climate venue will help commit the government to the policy.

The government has put in place a tax on coal and raised it twice over the last two years to the current rate of Rs 200/tonne, about 8% of the current price of coal and equivalent to about 1.15 $/tCO$_2$e. Revenues have been earmarked for a fund for 'green projects'.

This policy should now be extended by announcing an annual increase in the tax by, say, 50-100 rupees per tonne, to be continued indefinitely. Part of the proceeds should be earmarked for removing one of the most intractable problems for the Indian electricity sector – free (but rationed) electricity for farmers for irrigation pumpsets. Agriculture accounts for 18% of electricity consumption in India (Central Statistical Organisation 2015) and very little of it is paid for. Removing the subsidy without compensation would be political suicide for any government. However, the proceeds of the coal tax can used to subsidise solar PV powered pumps for farmers in return for getting their electricity connections metered at the commercial rate.[5] Farmers could also sell electricity back to the grid at a slightly lower rate to cover utility costs. The programme should be voluntary. This will help build political support for it.

From the point of view of domestic policy priorities, removing the un-metered and subsidised electricity for agriculture is a crucial step for putting an end to the chronic blackouts and under-investment that characterise India's electricity sector. This summer has been characterised by a shut-down of many power plants due to lack of demand even as the country reels under power blackouts. The parlous state of the public distribution companies' finances are the reason for this – they have no reason to buy power when they would have to give away substantial portions of it.[6]

5 Irrigation pumpsets are a natural source of demand for solar power because they do not require a 24-hour supply.

6 http://gulzar05.blogspot.in/2015/06/more-on-indias-power-sector-woes.html

4 ...with mitigation financing via offsets from carbon trading programmes

It would take decades for such a coal tax to raise enough revenue to buy out all the 18 million farmers with electric pumpsets.[7] However, India can ask the developed countries to make good on their promises to finance mitigation in developing countries by contributing to the solar subsidies. Emission reductions from the programme can be easily measured and so they can be priced. This will enable financing via offsets from carbon trading programmes, an option that developed countries are likely to find far more politically attractive than government-to-government transfers. By transparently laying out the domestic outlays for the scheme from projected coal tax revenues, disputes over baseline emissions can be avoided. This may actually engender some real international cooperation in an arena that has so far been characterised mostly by conflictual rhetoric.

The incentive effect of a gradually rising tax on coal will be very important in helping India make the transition away from (locally and globally) polluting coal to renewables. By lowering the prospective returns from investment in new coal plants, more investment will be forthcoming in renewable alternatives. By anchoring expectations without any abrupt shifts, it will make for an economically painless transition. In fact, it is clear that in order to increase renewable capacity by two orders of magnitude in less than a decade, the existing procurement policies will not do. The only viable route is by making investment in coal less attractive. So the renewable capacity target to which the government is already committed makes some policy of the sort proposed here almost inevitable if the target is to be met.

7 Not to speak of the 8 million farmers with diesel-powered pumpsets (http://mnre.gov.in/file-manager/UserFiles/Scheme-for-Solar-Pumping-Programme-for-Irrigation-and-Drinking-Water-under-Offgrid-and-Decentralised-Solar-applications.pdf).

References

Auffhammer, M., V. Ramanathan and J. R. Vincent (2006), "Integrated Model Shows That Atmospheric Brown Clouds and Greenhouse Gases Have Reduced Rice Harvests in India", *Proceedings of the National Academy of Sciences* 103 (52): 19668–72.

Central Statistical Organisation (2015), *Energy Statistics*, Delhi: Government of India.

Gupta, R., E Somanathan and S. Dey (2014), "Global Warming and Aerosol Pollution Have Reduced Wheat Yields in India".

Ministry of Finance (2015), *Economic Survey*, Delhi: Government of India.

Somanathan, E., R. Somanathan, A. Sudarshan and M. Tewari (2014), "The Impact of Temperature on Productivity and Labor Supply: Evidence from Indian Manufacturing."

Sterner, T. (2007), "Fuel Taxes: An Important Instrument for Climate Policy", *Energy Policy* 35 (6): 3194–3202.

Sterner, T. and G. Köhlin (2015), "Pricing carbon: The challenges", Chapter 18 in this volume.

About the author

E. Somanathan is Executive Director of the South Asian Network for Development and Environmental Economics (SANDEE) and Professor in the Economics and Planning Unit of the Indian Statistical Institute, Delhi. He is currently Gilbert White Fellow at Resources For the Future. He was a Co-ordinating Lead Author for Working Group III of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, and is the Editor of the journal *Environment and Development Economics,* published by Cambridge University Press. His research is in development and environmental economics including common property resources, climate impacts, and climate policies.