INDIA'S ENERGY OPTIONS:

NEW SOURCES, INNOVATIONS, AND AREAS OF COOPERATION

REMARKS BY

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Introduction

Energy sits at the nub of every policymaker's deepest dilemmas in India. How does a policymaker provide access to affordable and secure energy to the poor, without undermining the fundamentals of the market, and imposing an unacceptable burden on the exchequer? How does a policymaker accelerate economic growth without degrading the environment? How can India extract the benefits of globalization and connectivity and at the same time ensure respect and furtherance of its national self-reliance? These dilemmas are difficult to resolve. It is exceedingly difficult for a policymaker in a democratic setup to establish the balance.

These questions should be viewed through the prism of the political economy of the energy sector, by identifying the issues that India faces, by setting out the agenda that the government has laid out, and by perhaps focusing on some of the questions that will need to be resolved in the coming years – all of this within the backdrop of the Indian political economy. First, it is important to provide a profile of the energy sector.

A Profile of the Indian Energy Sector

The Indian economy has grown by 8% plus over the last five years or so. During this period, the demand for motor gasoline and diesel has gone into double digits. The per capita consumption of energy in India is 500 kg of oil equivalent. The world average is 1800 kg. China is 1090 kg. And the United States is 7835 kg. Over the last 5 years, the international price of petrol, diesel, kerosene and LPG have increased by around 95%. During this same period, the domestic prices for these four products have increased by 35 to 45%. The difference between the international price and the domestic price has been made up through subsidies and by the losses of the state owned oil companies.

In 2009-2010, the state owned oil companies under-recovered, which is a euphemism for loss, $20 billion. In 2010-11, the number fell to $15 billion. The only reason these companies did not enter chapter 11 was because of the IOUs and the subsidies that the government provided them. The IEA has estimated that India ranks amongst the top 5 subsidizers in the world, next only to Saudi Arabia, but above Iran.

Furthermore, the production targets for coal and oil have had to be scaled down. The Planning Commission has reduced the targets by 8-10% for both of those products. In 1980, India imported 27% of its crude oil requirements. Today it imports 80%. The IEA has estimated that the OECD countries require 1.1 barrel of oil to add $1000 to their GDP. The equivalent is 3.3 barrels for India. 45% of our population is not on the commercial grid. They do not have access to commercial energy. They rely on firewood or dung to meet their fuel lighting and cooking

requirements. The contribution of hydro, nuclear, wind, solar and bio is 7% to the energy basket. The entire energy infrastructure is, in short, based on fossil fuels. The expenditure on R&D collectively by state owned companies over the past 5 years was less than $1 billion. This is less than what Shell spent on R&D in 1 year.

Finally, there are as many as eight different government ministries dealing with aspects of energy in India. The Ministry of Petroleum and Natural Gas, the Ministry of Coal, the Ministry of Unconventional Energy, the Ministry of Atomic Energy, the Ministry of Power, the Planning Commission, the Prime Minister's Office. These ministries are each headed by a cabinet minister. They have their bureaucracies, they have their vested interests, and they operate through their respective silos.

These facts not only provide a profile of the energy sector, but also identify five hard truths that the Indian energy sector and Indian policy makers must confront.

Five "Hard Truths" of the Indian Energy Sector

Market Demand

The first hard truth is that demand for energy is surging. The reason for this surge is population, prosperity and policy. The population rate in India has come down from 2.4 % to 1.1 % but it is still heading towards a population of 1.5 billion people. India is entering the most energy intensive phase of its economic development. The country has a huge plan to invest in infrastructure, manufacturing, and power plants and all of these are going to require massive amounts of energy.

But over and above that, millions of people are entering what is loosely referred to as the middle class. These are people who have middle class incomes – or if they don't have middle class incomes yet, they certainly have middle class aspirations. These are people who currently are maybe riding a bicycle, but have the aspiration to trade up to a two wheeler and eventually to own a Nano car.

The pressure on demand for energy is going to be huge as this mass of people move from rural India to urban India, and seek to meet their aspirations. The policy environment has not been conducive to containing demand. India is amongst the largest subsidizers of petroleum products in the world. The price mechanism has not been a counter-veiling force. The demand has been encouraged because of the subsidies on motor fuels, on transportation fuels, and cooking fuels.

It is estimated that the demand for energy in India will grow by 400% between now and 2030. These estimates highlight the basic truth that India's demand position is a worry. Demand is surging, and that is something that has to be considered very carefully.

Market Supply

The second hard truth is that supplies of energy are struggling to keep pace with demand. Coal is the mainstay of India's energy consumption basket. India has abundant coal reserves. The reserves-to-consumption ratio in coal is about 85 years; and, in principle, India should not have concerns about energy.

But there are three major blockers to realizing the potential of coal.

The first is that the coal mines are located hundreds of miles from the main consumption centers. They are also located in areas that are currently facing social difficulties. The Maoist movement in India is concentrated in those areas where the coal mines are located.

The second problem is that the infrastructure for bringing the coal from the production point, from the pit head, to the consumption center is relatively weak and inadequate. Recently it was noted in Indian media that 60% of the thermal coal power plants in India had less than seven days of stock because the rains had washed away the roads. And 30% of that 60% had less than one day of stock. So they had reached critical levels due to the inadequacy of the infrastructure.

The third blocker to coal is quality. The quality of coal in India is poor; it has extremely high ash and sulfur content. For these three reasons coal has had difficulty in actually meeting its production targets, and indeed realizing perhaps the potential the policymakers had set out for it.

Oil is not available in abundance in India. India has 29 years of reserves-to-production ratio, but the bulk of these oil reserves are in areas that are geologically and topographically very complex. There is no easy oil left in India. It has been difficult to locate the oil, but it has been even more difficult to extract the oil on a commercial and sustainable basis.

Now that does not mean that India hasn't had some successes. In the private sector, the Reliance Company discovered the largest gas fields in all of 2002, and it has a production potential of half a million barrels of oil equivalent today. There have been other smaller finds but they have all held out the expectation that India, in fact, has a large amount of reserves that have yet to be located. The problem is that these reserves are in very difficult terrain and it is not easy to access them.

India is hopeful about alternatives but that is a long term solution. Nuclear energy is very high on the agenda but, following Fukushima, there is local resistance. In early-October, 2011, a group of very senior ex-bureaucrats headed by a cabinet secretary filed a petition in the Supreme Court asking for a stay on all new nuclear generating plants. They also asked for a complete review of the safety conditions. The Supreme Court must look at this particular petition.

Wind energy: India is currently producing 8 Giga-Watts of wind power and has, again on paper, huge expectations from wind. But here the problem lies with the site. It is never easy to actually locate a wind mill because of the need for land. Land rights in India have not been properly

defined, title is never easily identified, and therefore it is not easy from a practical standpoint to actually expand or to scale up wind.

Solar energy: solar is the highest item on the Prime Minister's agenda. The Government of India has given this great priority. But once again there are commercial, technical and financial reasons why solar is unlikely to make a major impact on India's energy basket in the near future.

Bio-fuels: there is a lot of talk about bio. But every time a policy paper is written, it raises the issue of how do we reconcile the conflict between food and fuel.

The point is that whilst India has a broad base of energy resources, it is not able to extract the full potential from these resources, so supply is therefore struggling to keep pace with this demand.

Technological Capacity

The third hard truth is that technology has been relatively underutilized or inefficiently utilized. The recovery rate of oil and gas from India's producing fields right now is 28%. This should be compared to an average recovery rate from fields of similar geology of around 40%. India's coal-based power plants have a converging factor of 30%, whereas the average in the world is about 37%. India has not actually managed to use technology that is available off the shelf in an efficient manner. It needs to do that.

Inadequate Policy Framework

The fourth hard truth is the absence of an institutional structure that allows for an integrated energy policy. As mentioned, India has seven or eight different ministries that are currently involved with energy. The consequence of that is the absence of one holistic framework within which an integrated energy policy can be framed.

Environmental Considerations

The final hard truth is that the environment is under stress. The link between economic growth, energy demand, and the environment is too strong, and we have not done enough to weaken this link. The fact is that the economy is almost totally reliant on fossil fuels. The fact is that gas, which is a relatively benign fossil fuel, has not yet achieved its position in the energy basket because of the absence of adequate distribution and logistics infrastructure. The fact is that 400-450 million people are currently using firewood and dung to meet their requirements. The indoor air pollution as a consequence of burning dung has led to respiratory illness that, according to the WHO, is one of the principal causes for premature death in India.

These are all very hard, hard truths, and India cannot even begin to address energy security issues if it does not tackle these hard truths. It cannot tackle these hard truths sequentially; it has to tackle them together. But in order for India to tackle these hard truths together, we have to recognize the issues, the constraints, the limitations within which the energy sector currently functions.

Intervening Issues

There is a set of internal conflicts that have a direct bearing on how energy policies are framed.

The first is the conflict between the society and the state. India's society is vibrant, dynamic, and the people are demanding. They are questioning traditional concepts, they are upending traditional hierarchies, they are entrepreneurial, and they are clashing with a state that is still hesitant and suspicious of change. They are clashing with a state that has certainly shed its leftist rhetoric, but maybe they have not shed their leftist impulses.

This is a state that still wants to hold on to the energy sector. It has not unshackled the energy sector. It has not necessarily allowed the private sector and the government to operate on a level playing field. This is a clash between good economics and good politics. Good economics would demand that we must reduce subsidies. Good economics would suggest that we must use pricing as a counter-veiling factor to control demand, and that we must encourage real competition. Populist politics (good politics), however, fears the market. This clash between good politics and good economics is a major factor in the decision making process regarding energy.

There is also a clash between centralization and federalization, or federalism. India is a federal polity. Energy is a central subject; it's a subject that is handled out of Delhi. But Delhi cannot implement its energy policy without the support of the state governments. It cannot implement its policy unless they have the support of governments that can give them access to lands. It cannot implement its policies if the political party in Delhi is in loggerheads with the political parties running the states. This dynamic between the center and the state is another factor that we need to keep in mind when we discuss the policy issues related to energy.

And finally, there is the dynamic between globalization and self-reliance. As mentioned, we are connected, but our oil sector today is aggressively looking for assets overseas. They already have a presence in 15 different countries. They are in partnership with a number of different international players. So they are looking aggressively to benefit from our connected and global world. But at the same time, the logic for going overseas is always written in a language that highlights national security or energy security. And sometimes this dynamic between the imperative of globalization and the imperative of nationalism, can actually lead to energy policy falling between the cracks.

Toward a National Energy Strategy

This is the backdrop against the next question: what should India's energy strategy then look like? Well, the premise of energy strategy in India has to flow from the hard truths mentioned above. The fact is that fossil fuel will be the dominant fuel in India for the coming decades. India's energy infrastructure is based on fossil fuels. The fact is that India must do something to

weaken the link between economic growth, energy demand and the environment. India has to also look at energy security against the short term compulsions of ensuring that it does not suffer from technical and market disruptions, and the long term requirement to ensure access to reliable and secure supplies. And India also has to premise its strategy on somehow moving the economy from fossil fuels towards the alternatives.

Those are the four premises upon which India's national strategy on energy should be based, and it is indeed the four premises upon which the government is currently looking to develop a national strategy. What are the elements of this national strategy? What should be the elements of this national strategy?

Boost Domestic Production and Smart Partnerships

There's no doubt that India has to do more to harness indigenous hydrocarbon fuels, its hydrocarbon resources. It has to not only bring technology that will improve recovery rate from 28% to 40% or 45%, but must establish partnerships that will enable access to the oil and gas, and the new unconventionals like shale oil and shale gas that are certainly available in India but are difficult to locate and develop commercially. India cannot manage that on its own. It should be looking to liberalize coal mines so that the private sector has access to its coal mines. And it must certainly do more to ensure that the fiscal terms are competitive, are predictable, and there is no doubt in anyone's mind – whether the private sector, public sector, international or domestic – that contract terms will be respected, that it will not ex-post alter the terms that have been agreed ex-ante.

Leverage Natural Gas Potential

The second element of India's strategy has to focus on natural gas. Natural gas is the bridge fuel between our present position and our hoped-for future situation when renewables become a more dominant part of the energy basket. The reason why natural gas has not acquired a more dominant position is because of the absence of pipelines, and also because we have not invested perhaps enough in LNG port terminals. Now, both those facts are known to the government; both those facts are being considered aggressively by the government. There are plans to put up five more energy terminals, re-gasification terminals in the west coast of India. There are plans to look at two LNG re-gas terminals in the east coast of India. A whole blueprint has been drawn up for a network that links the southern markets to gas supplies. Today, the two gas pipelines both cover the north and the west of India but they do not go to the south. Gas is not available to the south of India. India has to do much more to accelerate the investment in infrastructure, to link the southern market to the gas production system.

Rationalize Fuel Prices

The third important policy initiative, which has found expression in the Planning Commission report that is just being published, is to rationalize fuel prices. India just simply cannot afford to continue to subsidize petrol, diesel, kerosene and LPG. It is a burden on the exchequer; it makes a mockery of all hopes and plans to control India's fiscal deficits. But more than that, it is

pushing the public sector companies to the edge of chapter 11 bankruptcy. It is also skewing the playing field between the public sector companies and the private companies, and as a consequence the investment environment itself has been somewhat undermined.

Elevate Oil Diplomacy

There's an important reason for India now to elevate the role of its oil diplomacy. The bulk of its oil supplies come from the Middle East, and they come from Nigeria, and India will be reliant on those countries for years to come. India therefore has to see what can be done to better establish the relationship between the Middle East countries and India. They have oil production, India has the market. Perhaps, there is scope here for upstream-downstream linkages. But, in effect, the idea of elevating the role of oil diplomats, energy diplomats, within India's policy framework is something that needs to find a stronger traction.

Promote Demand Focus and Innovation

The demand conversation is a low hanging fruit. It has not yet acquired the importance that it should have. As mentioned, there is no way India can meet its energy security aspirations if it focuses only on the levers of supply. We have to also introduce demand into the equation. Demand conservation and energy efficiency has therefore got to be a very pivotal part of India's energy strategy. R&D expenditure is amongst the lowest in the industry. That has to change.

The technical resource base in India is phenomenal. Shell, for instance, has a technical center in India. It is the only center of its kind east of Suez. At the time that Shell set up this center, it established a bar for short-listing candidates, and the bar had to be raised three times before Shell was able to start interviewing an acceptable number of people. There were far too many people who met the threshold that Shell had set out in the early stages of the center's development.

Today, Shell has 600 technocrat scientists and its own laboratory. They are providing support to the Shell Group of Companies around the world. Shell has decided to look at only three technology centers around the world, one of which will be the one that was set up in Bangalore. The reason for this example is to essentially highlight the fact that India has the human resource talent, but the industry has not spent enough on extracting the most from this talent. That is something that has to change.

Invest in Smart Infrastructure

India cannot push for an increase in the role of alternative energies unless it also invests heavily in smart infrastructure. India has wind farms in Tamil Nadu that are unable to actually provide energy because they have not been linked with the consumption centers. The fact is that India has to start looking at investments across the integrated alternative energy value change. It is no good just saying that we want to develop commercialized, solar, wind and bio. India has to also see what can be done to recalibrate its infrastructure so that these new forms of energy are able to meet the needs of the customer and are also able to be scaled up. That is one of the major

impediments to developing new sources of energy in India. So the development and investment in smart infrastructure has to be a key element of strategy.

Increase US-India Collaborations

India has to also now look at a much stronger collaboration with countries like the United States, and these collaborations must be in the realm of technology. Several examples have been mentioned regarding how technology can actually add value. Through the input of appropriate technology, we can shift the need 5, 10, or 15 degrees, add considerable value to existing energy picture. India should not be looking at technology to radically reinvent the energy consumption basket or the energy supply situation. The US and India should look at technology to do better what we are already doing.

Establish a Super-Ministry on Energy

Finally there's a need for a super-ministry in India that focuses on energy. India needs to actually ask the question: how does a country develop an energy policy if it is handled through a multiplicity of decision makers, each of whom have turf to protect, each of whom have companies to protect, and all of whom are looking at the energy picture through their particular silo. This issue perhaps is the most important and arguably the most urgent issue facing the Indian energy sector. Were India to create an institutional framework that allows for a more cohesive and integrated energy policy framework, it would be able to address many of these hard truths.

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