G.B. PANT MEMORIAL LECTURES

I
Dr. M.S. Swaminathan, Director, CRSARD, Madras – 1991

II
Dr. T.N. Khoshoo, Jawaharlal Nehru Fellow, TERI, New Delhi – 1992

III
Mr. V. Rajagopalan, Vice President, World Bank, Washington – 1993

IV
Prof. U.R. Rao, Member, Space Commission, New Delhi – 1994

V
Dr. S.Z. Qasim, Member, Planning Commission, New Delhi – 1995

VI
Prof. S.K. Joshi, Vikram Sarabhai Professor, JNCASR, Bangalore – 1996

VII
Prof. K.S. Valdiya, Bhatnagar Research Professor, JNCASR, Bangalore – 1997

VIII
Prof. Vinod K. Gaur, Distinguished Professor, IIA, Bangalore – 1998

IX
Prof. H.Y. Mohan Ram, INSA Senior Scientist, University of Delhi, New Delhi – 2000

X
Prof. J.S. Singh, Emeritus Professor, BHU, Varanasi – 2004

XI
Prof. Madhav Gadgil, Centre for Ecological Sciences, IISc, Bangalore – 2005

XII
Dr. S.S. Handa, Ex-Director, RRL (CSIR), Jammu – 2006

XIII
Dr. Lalji Singh, Director, CCMB, Hyderabad – 2007

XIV
Prof. Roddam Narasimha, Chairman, EMU, JNCASR, Bangalore – 2008

XV
Dr. R.S. Tolia, Chief Information Commissioner, Govt. Of Uttarakhand, Dehradun – 2009

XVI
Prof. Raghavendra Gadagkar, CES & CCS, IISc, Bangalore – 2010

XVII
Prof. Vidyanand Nanjundiah, JNCASR, IISc, Bangalore – 2011

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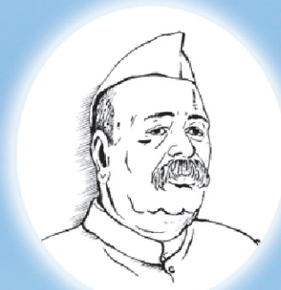


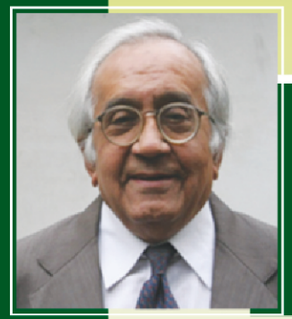
Pt. Govind Ballabh Pant

Memorial Lecture : XVIII

Kirit S Parikh

September 10, 2012
at
Kosi-Katarmal, Almora

G.B. Pant Institute of Himalayan Environment & Development
(An Autonomous Institute of Ministry of Environment and Forests, Govt. of India)
Kosi-Katarmal, Almora - 263 643, Uttarakhand, India



DR. KIRIT S. PARIKH
Chairman,
Expert Group for Low Carbon Strategy for Inclusive Growth,
Planning Commission of India.

Chairman,
Integrated Research and Action for Development (IRADe), New Delhi

Former Member, Planning Commission

Dr Kirit S. Parikh has a Doctor of Science in Civil Engineering and a Master's Degree in Economics from MIT, USA. He has been a Professor of Economics since 1967.

Widely recognized as architect of India's Integrated Energy Policy Committee. He was a Member of the Economic Advisory Council (EAC) of five Prime Ministers of India, Atal Behari Vajpayee, P.V. Narasimha Rao, Chandra Shekhar, V.P.Singh and Rajiv Gandhi.

Honoured with Padma Bhushan by the President of India in March 2009. He is also a Fellow of the National Academy of Sciences, India and honorary life member of the International Association of Agricultural Economists (on an average given to two persons a year in the world).

He was honoured as the most distinguished and illustrious alumni of the decade from India by the Massachusetts Institute of Technology (MIT), USA in September, 2007. He was conferred the Distinguished Alumnus Award by Indian Institute of Technology (IIT), Kharagpur in September, 2007

In 1978 he was given the "Vikram Sarabhai Award" for Systems Analysis and Management. In 1999 he was given the "Visveswaraya Award" by the Engineers' Foundation in Kolhapur. He is also a recipient of "Nayudamma Award" for contribution to the welfare of mankind through developments in the fields of Economics & Energy in February 2005.

Founder Director (Vice Chancellor), Indira Gandhi Institute of Development Research (IGIDR), Mumbai – An Advanced Research Institute from 1986 till 2000. In 1997-98, on sabbatical leave from the IGIDR, he was Special Economic Adviser to the Administrator, United Nations Development Programme (UNDP), New York. From 1980-86, as Program Leader of the Food and Agricultural Program of the International Institute for Applied Systems Analysis (IIASA), Austria. From 1960-80, he was Professor of Economics (and sometimes Head) of the Indian Statistical Institute (ISI), New Delhi.

Dr Parikh has authored, co-authored and edited 27 books in the areas of development planning and policy concerning planning, agricultural development, poverty, energy, environment, water resource management, trade and general equilibrium modeling.

He has also published numerous articles.

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Realizing Low Carbon Strategy for Inclusive Growth

Kirit S Parikh

18th Pt. Govind Ballabh Pant Memorial Lecture
September 10, 2012

G.B. Pant Institute of Himalayan Environment & Development
(An Autonomous Institute of Ministry of Environment and Forests, Govt. of India)
Kosi-Katarmal, Almora - 263 643, Uttarakhand, India

As a child growing up during the "Quit India movement" and India becoming independent I admired national leaders. Mahatma Gandhi, Sardar Patel, Jawaharlal Nehru, Maulana Azad, Acharya Kripalani and Pandit Govind Ballabh Pant were our heroes. I remember when the first cabinet of independent India was formed; it was with great pride that we would remember the names and port folios of all ministers. I did have a chance to see him when he came to Ahmedabad. I attended a Gandhian school and many leaders use to visit our school. Many of our teachers were in jail during the Quit India movement.

Later on, I knew Shri K C Pant well when he became Minister for Energy. HE released my study on Energy as one of the Second India Studies in 1975. Since then we have interacted often over the last nearly 40 years.

I feel therefore privileged and honoured to give this talk in the memory of a great son of India.

1. Background

There is near consensus among scientists around the world that the threat of climate change is real and is due to man-made emissions of Greenhouse Gases (GHGs). Manifestations of it are already visible in the increase of incidence of extreme events. The probabilities of different degrees of temperature change have already been estimated by the Inter-governmental Panel for Climate Change (IPCC). It now seems that a 2 0C increase of temperature is almost unavoidable.

The 2007 Fourth Assessment Report compiled by the IPCC (IPCC AR4) noted that "changes in atmospheric concentrations of greenhouse gases and aerosols, land cover and solar radiation alter the energy balance of the climate system" and concluded that "Most of the observed increase in globally averaged temperatures since the mid-20th century are very likely (greater than 90% probability) due to observed increase in anthropogenic greenhouse gas concentrations".

Some of the impacts of climate change on India can be as follows:

- Widespread melting of glaciers and snow cover will reduce melt water from Himalayas and affect the flow patterns of our major rivers.
- Change in pattern of temperature and rainfall will affect agriculture in serious ways. With a 2.5 0C increase, yields of wheat and rice would go down by 25% and 15% respectively and agricultural GDP may fall by 7% (Kumar and Parikh, 2001).
- More than 20 million people were displaced by sudden climate-related disasters in 2008 alone. An estimated 10 million people could be displaced as a result of climate impacts in India and 30 million in Bangladesh by 2050. The displaced from Bangladesh may most likely spill over in to India.

As a child growing up during the "Quit India movement" and India becoming independent I admired national leaders. Mahatma Gandhi, Sardar Patel, Jawaharlal Nehru, Maulana Azad, Acharya Kripalani and Pandit Govind Ballabh Pant were our heroes. I remember when the first cabinet of independent India was formed; it was with great pride that we would remember the names and port folios of all ministers. I did have a chance to see him when he came to Ahmedabad. I attended a Gandhian school and many leaders use to visit our school. Many of our teachers were in jail during the Quit India movement.

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Table 1 : Energy Related Cumulative CO_2 Emissions

Country	MT of CO_2 1990-2006	MT of CO_2 1850-2006	Per cent 1990-2006	Per cent 1850-2006
World	400834	1000000	100	100
India	15977	27433	4	2.4
China	61360	99204	15.3	8.6
Brazil	4925	9457	1.2	0.8
USA	92641	333747	23.1	29
Europe15	55377	252148	13.8	21.9
Annex I	237534	856115	59.3	74.4
Non-Annex I	157582	281497	39.3	24.5

Source: Based on data from WRI, 2010

Realizing Low Carbon Strategy for Inclusive Growth

It is seen that India's contribution since 1850 to global emissions is only 2.4% while that of USA is 29%. Annex 1 countries account for nearly 75% and non-annex 1 countries around 25%. When looked at cumulative emissions since 1990, the share of non-annex 1 countries is nearly 40 percent as the emissions of non-annex 1 countries have been growing faster than those of annex 1 countries. Thus India's share is 4% in emissions since 1990, China's 15% and USA's 23%.

Though India is not responsible, India is a socially responsible country. Thus India's Prime Minister announced on June 8 2007 at Heiligendamm, Germany, that India's per capita emission levels will never exceed the average of the per capita carbon emission levels of developed countries. This declaration, which continues to guide India's stand, places a self- imposed restraint and is in form of a voluntary commitment made by India in the climate change negotiations.

In December 2009, India made another announcement, stating that it will aim to reduce the emissions intensity of its gross domestic product (GDP) by 20-24% by 2020 in comparison with 2005 level. This is a further articulation of India's voluntary domestic commitment even while India has made clear that that this will not form part of any international agreement committing India to binding emission intensity targets and emission reduction outcomes. This announcement will require that necessary actions in specific sectors are undertaken to reduce emission intensity and corresponding emission reduction outcomes during fifteen years beginning 2012. The Planning Commission set up an Expert Group in February 2010 to chalk out a Low Carbon Strategy for Inclusive Growth.

3. A Low Carbon Growth Strategy

The major GHG emitting sectors are power, transport, industries and buildings including both residential and commercial. Options to reduce emissions by improving energy efficiency on the demand side and by reducing GHG emissions on supply side are important, and offer a significant scope for mitigation. The expert group set up by the Planning Commission on 'low carbon strategy for inclusive growth' has identified options to reduce emissions and estimated their scope (Planning Commission, 2011).

The expert group report presents four scenarios with two different growth rates of the economy with average real GDP growth rates of 8 and 9% up to 2020 and two levels of efforts for each growth rate. The lower end of the emission reduction range would henceforth be called Determined Effort Scenario, and the higher end of this range would henceforth be called Aggressive Effort Scenario. Both of these are defined below:

a) Determined Effort [Lower End of the Emission Reduction Range]

Determined Mitigation Effort implies that policies that are already in place or contemplated are pursued vigorously and implemented effectively up to 2020. This is by no means automatic as it requires continuous up-gradation of technology as well as finance from both public and private sources. This also assumes the private sector sustains its current efficiency enhancing efforts.

b) Aggressive Effort [Higher End of the Emission Reduction Range]

Aggressive Mitigation requires, in addition to the above, introduction as well as

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Table 2: Emissions in 2020 with 8 % growth rate as per 2005 intensity and Reductions in MT CO_2 and per cent

Sector	Emissions as per 2005 norm	Determined effort MT CO_2	Per cent	Aggressive effort MT CO_2	Per cent
Power	1609				
DSM		96	6.0	201	12.5
Supply side		85	5.3	145	9.0
Transport	476				
Freight modal shift		14	2.9	22	4.6
Passenger modal shift		17	3.6	24	5.0
Vehicle fuel efficiency		11	2.3	17	3.6
Industry					
Iron & Steel	442	36	8.1	82	18.6
Cement	393.5	57.5	14.6	100	25.4
Oil & Gas	154	29	18.8	39	25.3
Other Industries	285	40	14.0	100	35.1
Buildings					
Commercial	610	60	9.8	122	20.0
Other Household Energy	270	15	5.6	41	15.2
Waste Management	150	15	10.0	32	21.3
Miscellaneous	155	16	10.3	33	21.3

Source: Inferred from Planning Commission, 2011

Table 3: Projected Emission Intensity Reduction over 2005 levels

	Growth Scenarios:2020		8% growth		9% growth	
	Higher and Lower ends of the range	2005 emissions	Determined effort	Aggressive effort	Determined effort	Aggressive effort
1	Emissions at 2005 Levels	1,433	4,571	4,571	5,248	5,248
2	Emission Intensity (g CO_2 eq/ ₹ GDP)	56.21	42.47	36.87	42.79	37.51
3	Percentage Reduction in Emission Intensity		24.44%	34.40%	23.88%	33.27%

Source: *Planning Commission, 2011*

4. Policy Options

The challenge is to realize this low carbon growth strategy. It calls for policies that lead to desired outcomes. Low carbon growth options have to be designed in the context of India's energy needs (Parikh and Parikh, 2011). I examine some possible policy for each sector in turn.

4.1 Promoting Energy Efficiency

4.1.1 Lighting

A compact fluorescent lamp (CFL) can provide the same level of light as an incandescent lamp (IL) at a much lower consumption of electricity. Thus an 11 watt CFL gives the same light as a 60 watt IL. Replacing all the ILs with CFLs can save lot of electricity. The main hurdle is that the initial cost of a CFL is 7 to 10 times as high as that of an IL.

A light emitting diode (LED) lamp consumes even less of electricity than a CFL but costs much more than a CFL. How does one promote the use of more efficient CFL or LED lights where many of the consumers are poor, have high discount rate and for whom the

BOX: Bachat Lamp Yojana (BLY)

The BEE will coordinate the Small-Scale Programme of Activities (SSC-PoA) and will support the project implementer(s) in implementing the clean development mechanism (CDM) programme activities (CPAs) in India through collaboration with electricity Distribution Companies (DISCOMs). The scheme after implementation will result in reducing GHG emissions from power plants connected to the grid.

Under the BLY scheme quality long-life CFLs would be distributed by SSC-CPA implementer(s) to grid-connected residential households in exchange of an incandescent lamp (ICL) and INR 15. Once the CFLs have reached their end of life or any CFLs which have failed prematurely during the project period, the SSC-CPA implementer(s) would arrange for the collection and disposal of CFLs as per applicable environmental norms.

To bridge the cost differential between the market price of the CFLs and the price at which they are distributed to households, the Clean Development Mechanism (CDM) is harnessed. The SSC-CPA implementer(s) would cover the project cost through sale of GHG emission reductions achieved in their respective CPA areas.

The Bachat Lamp Yojana is a scheme developed by Bureau of Energy Efficiency (BEE) to promote energy efficient lighting in India. There are no mandatory requirements in India requiring the use of energy efficient CFL at the household level. All the key players under the scheme like the BEE and participating implementer(s), DISCOMs and households are voluntarily taking part under this scheme 6. Further, right at the announcement of the scheme in May 2007 at the Conference of Chief Ministers, the project has been envisaged as a CDM project. The Bachat Lamp Yojana was officially launched in February 2009.

Source: BEEa, 2011

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A light emitting diode (LED) lamp consumes even less of electricity than a CFL but costs much more than a CFL. How does one promote the use of more efficient CFL or LED lights where many of the consumers are poor, have high discount rate and for whom the first cost is very important? Two approaches are generally used. The first one is one where the distribution utility loans the more efficient CFL and adds a monthly charge to the customer's bill. The customer does not feel any financial burden if the monthly charge is less than the value of electricity saved.

Such a system does not work well if poorer domestic consumers, who constitute bulk of the domestic consumers, are charged a flat fee or are supplied electricity at subsidized price. The relatively well off might have no financial constraint in "switching over" to more efficient lights. On the other hand for them the cost of electricity for lighting may constitute a small fraction of their expenditure and they may not bother to change. Some of them have sophisticated lighting of a room with indirect light from many lamps and might not find CFL attractive.

India has used a different mechanism. The bureau of energy efficiency (BEE) set up to promote energy efficiency has launched a "Bachat Lamp Yojana" (Literally saving lamp scheme). Under it, a working incandescent bulb is exchanged at a small cost of ₹ 15 (a CFL costs ₹ 100) with a CFL by the distribution company, which has worked out a scheme to get carbon credit for its programme. Chips are introduced in a small number of randomly selected CFLs that measure the number of hours the bulb is turned on. This provides a verifiable estimate of carbon emissions saved.

In 2011 nearly 5 million ILs were replaced by CFLs saving 231 MU of electricity and 85 MW of installed capacity. The programme's aim is to replaced 400 million ILs to save 6000 MW of installed capacity and 18400 MU of electricity per year. At a carbon cost of US $ 20/ ton of CO_2, that prevailed in 2006 when the programme was launched, the saving is worth US $ 400 million per year. With an assumed life of 5 years for a CFL (it is claimed to be much longer) the presenr discounted value of the saving at 10% discount rate will be US $ 1670 million. Thus for each CFL, US $ 4.17 is earned and the cost to the DISCOM is only ₹ 85. Thus as long as carbon credit is assured, the Bachat lamp Yojana should be successful. However, at present the price of CO_2 has come down to US $ 3 per ton and the business model is no longer viable. We need to make sure that adequate carbon credit is available from international climate finance funds.

The scheme has been successful in popularizing CFL and creating a large market for it. Many commercial places, offices, hotels and richer households now buy CFL at market price without subsidy. Since these are used where the light remains on for a long period, the saving in electricity would be larger.

Table 4: Characteristics of Air Conditioners

Air Conditioners							
Star Rating Category	Cost (₹)		Annual Energy Saving over 1* (kWh/year) (Compared to Non Star Category) (kWh/product/year)	Cost Difference over 1* (₹)		Present Discounted Value of Savings (₹)	
	Window	Split		Window	Split	₹4/kWh	₹ 6/kWh
1 Star	18190	23000	0	0	0	0	0
2 Star	19000	26000	155.78	810	3000	2598	3897
3 Star	24990	29000	307.4	6800	6000	5127	7691
4 Star	27000	31500	428.62	8810	8500	7149	10724
5 Star	30000	33500	527.83	11810	10500	8804	13206

Discount rate 10 %; operating life 5 years
Annual operaring hours 2000

Figure 1 shows how the shares of different * rated ACs have grown over the last five years. Share of 2* AC has come down but 3* and 5* ACs have gone up. However share of 4* ACs has remained more or less constant. From this pattern, the projected sales for 2020 and 2030, shown in Table 5, seem reasonable. Thus, labelling can be quite effective.

While private individuals and firms would make an economically rational choice, it is not easy for procurement officers of public sectors firms or government departments to do so. They are required to buy on lowest first cost basis. They need to be empowered to buy on the basis of life cycle cost.

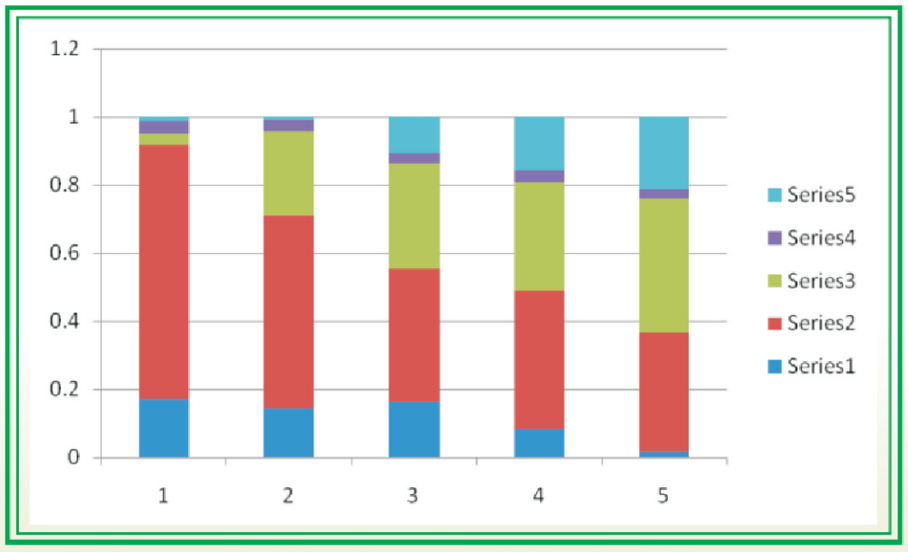
Table 5, shows the premium that may be paid over a 1 star rated model for different star rated models with a 5 year life time of equipment and price of electricity ` 4 and ` 6 /kWh. Thus it would be worthwhile to buy a 5* window AC if the price difference between a 1 star rated model is less than Rs 8800 with a discount rate of 10% and less than ` 13200 for a 5* split AC. The procurement officers should be so empowered. Such a scheme will still be consistent with competitive bidding and firms will have to match the performance of a 1 star product as well as higher * rated products of other firms. Since public sector is a major purchaser of some of these equipments such a measure would be very useful in promoting energy efficient equipment.

Realizing Low Carbon Strategy for Inclusive Growth

Table 5: Sales of AC by *rating

Star Rating Category	No. of Units sold as per NPC reports (Star Labeled Products)					Projected	
	2007-08	2008-09	2009-10	2010-11	2011	2020	2030
1 Star	52218	94988	361703	265387	50636	0	0
2 Star	227468	370531	871288	1263155	1034072	0	0
3 Star	10683	162848	692482	993836	1177119	545000	0
4 Star	11191	21823	70496	114280	75477	545000	1690000
5 Star	3640	5937	236634	486332	632846	9810000	32110000
Total * rated	**305200**	**656127**	**2232603**	**3122990**	**2970150**	**10900000**	**33800000**

Figure 1: Shares of * rated Air Conditioners from 2007-08 till 2011



4.1.3 Promoting Energy Efficiency in Industry:

Since Indian industries are growing rapidly, the industrial capital stocks will double every seven to eight years. Thus concentrating on new industries to set up energy efficient plants is an attractive option. Labelling for industrial equipment, such as variable speed drives, can be effective if energy prices are competitively determined.

This is where India has yet to move. The government has accepted Integrated Energy Policy (Planning Commission, 2006). The principal recommendations of having a competitive energy sector by pricing various fuels at their opportunity costs, i.e. at trade parity prices, is not yet implemented, Diesel and natural gas prices are set by the

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This is where India has yet to move. The government has accepted Integrated Energy Policy (Planning Commission, 2006). The principal recommendations of having a competitive energy sector by pricing various fuels at their opportunity costs, i.e. at trade parity prices, is not yet implemented, Diesel and natural gas prices are set by the government and are priced below what would have been their prices in competitive markets. Coal price is also not market determined and is also below its trade parity price. Due to these distortions, labelling for industrial equipment would not fully realize its potential.

To promote energy use efficiency in industries, a scheme of perform achieve and trade (PAT) is being introduced (BEEc, 2011). Under this scheme designated firms (some 400 of them) are set mandatory energy efficiency standards. The firms trade among themselves their excess or deficit energy consumption. The scheme has the advantage of a market mechanism that leads to efficiency targets at least cost. However, there is no economic cost minimization in the way firm specific standards are set. There is also a penalty for non-compliance. The penalty for not meeting targets is specified cost of tonne of oil equivalent not saved. The trading will begin in 2012 and experience will show how the system functions and ways to refine it.

The PAT scheme covers only some 400 large designated consumers (DCs) in 9 sectors. They consume 231 m MTOE of energy, which was about 54% of total energy in the country in 2007-08. The main challenge is in setting firm specific mutually agreed energy targets. Energy consumption of a firm depends on the source and quality of raw materials, product mix location of plant, scale of operation, processes, vintage, capacity utilisation, etc. This would provide huge incentives and opportunity to firms to negotiate low energy reduction target.

BEE has made a heroic effort to get DCs to agree to reduction targets and over the first three year period of 2012 to 2015, an energy use reduction target of 6.6 mtoe is set. The plant manager would know more about the plant than others and one would expect agreed reduction target to be low and achievable. In fact, the gazette notification has reduced the target of energy use reduction to 6.6 mtoe from 10 mtoe that was anticipated earlier. Thus it is reasonable to assume that these targets would be achieved, and the level of trade in energy certificates could be expected to be low.

Another challenge is posed by millions of small and medium enterprises (SMEs). They are not covered by the PAT scheme. Some of these SMEs are located in clusters. The BEE is examining some 25 clusters to see how there SMEs can be incentivized to improve energy efficiency. The experience with the functioning of common effluent treatment plants has not been too good. Thus getting a cluster of SMEs to act in a co-ordinated manner in situations where opportunities for free riding exist is difficult.

Many studies have shown that there exist, many economically justifiable

opportunities for energy saving. Despite these, firms do not go for them. The barrier to seizing such opportunities are often perceived risks and availability of up front finance.

A mechanism needs to be set up to deal with these barriers. The UK has set up a fund, called Carbon Trust, which takes care of these concerns. It gets at its own cost firm specific project report prepared by hiring expert energy service companies (ESCOs) for improving energy efficiency. If the firm agrees to implement the project, Carbon Trust also arranges finance. On successful completion it charges the firm for the cost of project preparation. This has been quite successful. We need to set up a similar fund to encourage and facilitate SMEs to increase their energy efficiency.

4.2 Electricity Supply

India is well endowed with solar power. The Integrated Energy Policy had identified solar (along with nuclear) as India's two important and major energy options. There is also an upward revision of wind power potential of the country from around 48000 MW that was estimated in 2005 to 2 to 4 million MW. India is short of conventional fossil fuels. In 2011-12 oil consumption was based on 80% of imports and even coal imports constituted 25% of domestic consumption. Promoting renewable power is important for the country not only for low carbon development but also for energy security of the country.

Renewable energy faces a number of barriers. The capital costs of solar and wind plants are higher than that of coal. Financing them is another problem. The technologies are not matured and economies of scale are yet to be reaped. The availability of power is not certain. The plant factors are low and range between 15 to 30%. Wind is intermittent. Solar is available when the sun shines. Clouds can interrupt it. These require balancing power. Wind power locations may be far off from grid or demand centres and special transmission lines may be required. Various approaches have been followed to address these problems.

The National Action Plan for Climate Change prepared by the Prime Minister's Council on Climate Change (NAPCC, 2009) has suggested eight national missions to deal with the problems created by climate change. These missions address both mitigation and adaptation. These include the Jawaharlal Nehru National Solar Mission (JNNSM, 2010). The principle objective of this mission is to make Solar Electricity cost competitive to coal based electricity by 2020 or latest by 2030. To do so the mission envisages supporting solar power up to 20000 MW through a feed in tariff (FIT) route. This should help develop industry and exploit economies of scale.

In order to incentivize industry for technological improvement and cost reduction, a competitive framework is used. Firms are required to bid for the feed in tariff they need and the first auction has already lowered the feed in tariff to ₹13/ kWh from the ceiling of ₹15. The second auction further lowered it to ₹ 7.5 to ₹ 9.5. Also to promote renewable energy many state electricity regulatory commissions have announced renewable portfolio obligation (RPO) and the renewable energy certificates given to those who achieve more than their RPO can be traded, for which power exchanges provide electronic trading platforms.

4.1.3 Promoting Energy Efficiency in Industry:

Since Indian industries are growing rapidly, the industrial capital stocks will double every seven to eight years. Thus concentrating on new industries to set up energy efficient plants is an attractive option. Labelling for industrial equipment, such as variable speed drives, can be effective if energy prices are competitively determined.

This is where India has yet to move. The government has accepted Integrated Energy Policy (Planning Commission, 2006). The principal recommendations of having a competitive energy sector by pricing various fuels at their opportunity costs, i.e. at trade parity prices, is not yet implemented, Diesel and natural gas prices are set by the government and are priced below what would have been their prices in competitive markets. Coal price is also not market determined and is also below its trade parity price. Due to these distortions, labelling for industrial equipment would not fully realize its potential.

To promote energy use efficiency in industries, a scheme of perform achieve and trade (PAT) is being introduced (BEEc, 2011). Under this scheme designated firms (some 400 of them) are set mandatory energy efficiency standards. The firms trade among themselves their excess or deficit energy consumption. The scheme has the advantage of a market mechanism that leads to efficiency targets at least cost. However, there is no economic cost minimization in the way firm specific standards are set. There is also a penalty for non-compliance. The penalty for not meeting targets is specified cost of tonne of oil equivalent not saved. The trading will begin in 2012 and experience will show how the system functions and ways to refine it.

The PAT scheme covers only some 400 large designated consumers (DCs) in 9 sectors. They consume 231 m MTOE of energy, which was about 54% of total energy in the country in 2007-08. The main challenge is in setting firm specific mutually agreed energy targets. Energy consumption of a firm depends on the source and quality of raw materials, product mix location of plant, scale of operation, processes, vintage, capacity utilisation, etc. This would provide huge incentives and opportunity to firms to negotiate low energy reduction target.

BEE has made a heroic effort to get DCs to agree to reduction targets and over the first three year period of 2012 to 2015, an energy use reduction target of 6.6 mtoe is set. The plant manager would know more about the plant than others and one would expect agreed reduction target to be low and achievable. In fact, the gazette notification has reduced the target of energy use reduction to 6.6 mtoe from 10 mtoe that was anticipated earlier. Thus it is reasonable to assume that these targets would be achieved, and the level of trade in energy certificates could be expected to be low.

Another challenge is posed by millions of small and medium enterprises (SMEs). They are not covered by the PAT scheme. Some of these SMEs are located in clusters. The BEE is examining some 25 clusters to see how there SMEs can be incentivized to improve energy efficiency. The experience with the functioning of common effluent treatment plants has not been too good. Thus getting a cluster of SMEs to act in a co-ordinated manner in situations where opportunities for free riding exist is difficult.

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