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WOOING BIG BUSINESS

"SOLAR INDIA"

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On June 30, 2008 the Prime Minister of India has released the National Action Plan on Climate Change. The 'action plan' focuses on Eight National Missions which will be pursued as key components of India's strategy for sustainable development. The National Mission on Solar Energy is one of such Missions. While releasing the document, the Prime Minister stated that India must pioneer in a graduated 'shift from reliance on non-renewable and depleting sources of energy to renewable sources of energy.' Prior to this, in 2007, the government had announced a three year (to be completed in March 2010) special incentive package scheme (SIPS). Any unit, approved under the scheme, could claim incentives in the form of capital subsidy or equity participation.

In November 2009, few weeks before the crucial UN meet on climate change at Copenhagen, the government of India has approved a new policy on development of solar energy. And on 11th January, 2010 the Indian Prime Minister formally has launched the Jawaharlal Nehru National Solar Mission, under the brand name "Solar India".

The objective of the National Solar Mission is to establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible. It is claimed that the solar mission is very much in line with the vision of Jawaharlal Nehru, the first Prime Minister of independent India, which has made the country a leading nuclear and space power. It needs to be noted that the government of India has accorded very high importance to solar mission as were the cases with nuclear and space research.

To achieve this ambitious target, the Mission aims :
To create an enabling policy framework for the deployment of 20,000 MW of solar power by 2022.
To ramp up capacity of grid-connected solar power generation to 1000 MW within three years - by 2013 and an additional 3000 MW by 2017 through the mandatory use of the renewable purchase obligation by utilities backed with a preferential tariff.
To create favorable conditions for solar manufacturing capability, particularly solar thermal for indigenous production and market leadership.
To promote programmes for off- grid applications, reaching 2000 MW by 2022 including 20 million solar lighting systems.
To achieve 20 million square metre solar thermal collector area by 2022.

It needs to be explored why the government of India has planned a national mission on solar energy, 'based on availability of international finance and technology', which till date is the most expensive form of renewable energy source (almost six to seven times that of wind).Moreover, due to its typical production characteristics i.e no production at night; partial production during morning, evening and cloudy days, a typical utility -scale

solar installation produces power at only a fifth of its maximum capacity. To replace 1GW coal plant running at 70% of capacity with solar power would require a total installation of 3 GW of solar panels. Compared to wind energy, the amount of solar energy produced is only one third of the energy generated by wind power.

Earlier, in the late nineties also, the government of India had taken an initiative to disseminate very expensive photovoltaic solar home system to rural India which was accessible to a very small percentage of the elitist population. A K N Reddy (1999) raised a very important question on whether the donor and multilateral institutions were biased towards elitist energy sources/devices.

The government policy looks miserably inconsistent when it remains noncommittal to other viable forms of renewable energy sources like wind energy. In wind energy sector few Indian companies have already achieved reasonable recognition in the global market. Among all the renewable energy sources, achievement of wind energy sector was remarkable. And even for the 11th Plan period (2007-12), of the total physical target of 150,000 MW of renewable energy, target for wind energy was as high as 105,000 MW which in relative term constituted 70% of the total. Compared to this, the target for solar energy was only 50 MW.

It may be recalled that the Expert Committee on Energy, formed by the government of India, in their report 'Integrated Energy Policy, 2006', recommended a comprehensive R&D plan to make India self-sufficient in energy requirements by making breakthroughs in new frontiers of clean energy. Among others, they recommended five technology missions on (i) coal; (ii) solar energy; (iii) bio-fuels; (iv) biomass plantation and wood gasification, and (v) community biogas plants run on commercial basis. Suddenly, within two years, leaving aside all other alternatives, the government has chosen solar energy as the major thrust area.

India is probably the only nation where the concerned ministry, solely responsible for development of renewable energy sources, could project a lesser share of it while preparing plans for the future fuel-mix of the country. For the year 2021-22, the projected share of renewable, was reduced to 30.9% from the actual share of 33.52% in 2001-02. In 2002-03, electricity generated from different renewable energy sources amounted to 0.330 MTOE (million ton of oil equivalent). This was equivalent to only 0.10% of the total primary energy consumption of India in that year. Against a total generation of 536.8 billion kwh unit of electricity in 2002-03, the contribution of renewable sources were only 4.1 billion kwh.

Moreover, unlike the developed economies, the share of renewable energy in India's total energy consumption look very high due to the dominance of traditional biomass in the total renewable sources. The quality of renewable fuel thus remained very low in India.

It was always claimed by the energy planners that India had a huge potential for renewable and alternative energy sources. Energy economists have made village level energy plans, entirely on renewable sources, as early as 1974. Considering the energy needs of a village consisting of 100 households and 250 cattle, they made an analysis of techno economic factors relating to biogas plants. The biogas yield from the available cow dung would be more than adequate to meet the energy needs of the households in such villages. According to the planners, the biogas energy should be sufficient to

provide energy for ten pump sets, cottage industry units, and an electric lamp besides energy for cooking in every house. As against this the targets of rural electrification program was at a much lower level of energy supply thus compelling the continued use of non-commercial fuels, and as consequence, the continued loss of organic fertilizer and forest through the burning of dung and firewood. In the cost-benefit comparison between biogas energy production and rural electrification, they found the former preferable to the latter.

In the absence of any concrete road map, the nation had to wait for the Greenpeace report 'Energy Revolution: A Sustainable Energy Outlook for India', released in April 2007, to assess its true potential. Commissioned by the European Renewable Energy Council, the report also provided a practical blueprint for reducing India's carbon dioxide emissions by 4% in the next 43 years while 'providing for a secure, affordable energy supply, maintaining steady economic development and without relying on hazardous nuclear technologies.' The energy scenario predicted in the Greenpeace report is very encouraging. By 2050, the share of renewable energy is expected to reach to 51% from the current 4% and the share of nuclear is likely to decline to 0.2% from the current share of 2%.

It is an irony that when India tops in research publications on Pressurized Heavy Water Reactors (nearly 55% of such publications in 2006) and in the area of thorium research, the country is far ahead of Japan, France, Germany and the USA, nearly fifty percent of its population don't have access to any modern form of energy. This underscores the lackadaisical approach of the Indian government on energy issue.

It may be noted that Indian government has taken this enormous initiative towards solar energy at a time when the ruling coalition Ministry had been desperately trying to complete the procedural issues related to 123 Nuclear Agreement with USA. India and USA have entered into a civilian nuclear deal (commonly known as '123 nuclear agreement') on March 2, 2006, where India has promised to separate its civilian and military installations in return for uninterrupted supply of uranium and access to advanced nuclear technology that in the long run would help the country to fuel its growing energy needs. The present US law prohibits any nuclear co-operation between USA and India as the latter has not signed the Non-Proliferation Treaty (NPT). The proposed agreement grants a 'waiver' from that law to enable the American firms to participate in the massive nuclear program of India.

EU and US have taken two distinct approaches in tackling the climate issue and seize the advantages of the new business opportunities it has offered. While the EU is following the 'mitigation strategy' and is trying to address the main cause (emission of green house gases) of global warming by promoting clean technology and alternative fuel, as a late entrant, USA is pursuing the 'adaptation strategy'. In addition to promoting nuclear power, as a green energy source, USA is trying to retain their control on energy sources by shifting the energy base from carbon (fossil fuel) to carbohydrate (bio- fuel) sources.

In keeping with the dominance of the European firms in the production of renewable energy, export of most RES (renewable energy supply) products and components are largely dominated by European companies. Spain and Germany are the main growth centers of solar industry in Europe. Due to various reasons, solar markets in these two major European countries are likely to slow down in coming years. To sustain the industry, the growth point will have to be shifted to other countries. Now new market for

solar energy is being explored in emerging economies like China, the Republic of Korea and India.

By announcing the Solar Mission, the government of India has tried a balancing act to satisfy both the super powers.

WIND POWER– THE MAJOR LOOSER

Though at present, the wind energy enjoys the most favorable position among the different renewable forms of energy, it might lose its position to solar in near future. In 2008, the global installed capacity of the grid connected solar photovoltaic was only 13 GW. Compared to that, the installed capacity of wind power was 121 GW. In 2009 the installed capacity increased to 158.5 GW. India installed 2.4 GW of new wind power capacity last year, consolidating its position as the fifth largest wind energy producer in the world. In 2007, India was the fourth largest wind energy producer. Both India and China have strong domestic wind turbine manufacturing industries with large market shares in Asia: 4 of the top 10 wind turbine manufacturers by market share in 2009 were Chinese or Indian, together serving 29 percent of the world market.

The rate of growth of wind power is slower than the solar power. Between 2004 and 2008, while the installed capacity of wind power grew by two and half times, solar power grew by six fold in the said period. Globally some 300,000 people are employed in wind power and approximately 170,000 in solar photovoltaic. Over 600,000 people, mostly in China, are also employed in solar thermal energy. In coming years, concentrated solar power is likely to become a very important energy source. In patent application also, fuel cells and solar energy patents account for the fastest growth in global patents in renewable energy, far ahead of wind energy patents.

The technology used in the generation of wind energy is not very complex. A recent Oxfam case study has documented how a Thai farmer creatively designed his own wind mill pump from old bill board cut outs to irrigate water from a well that Oxfam helped to build. As firms may find it difficult to retain their proprietary control on such a technology which is not very complex, they might switch their focus to other energy sources which are relatively more complex.

WHY SOLAR MISSION

The simple and highly diffused nature of most of the renewable energy technologies (say small hydro, wind power, bio-gasifier et al) failed to satisfy the indomitable desire of the states and large energy utilities to retain their control on energy needs of the masses. This is one of the reasons; why compared to fossil and nuclear energy these renewable forms of energy sources were not promoted, to the extent they deserved, by the states and energy utilities.

The initial high growth of wind energy vis-à-vis other renewable energy sources could be explained as a result of 'demand pull factor' - a reflection of consumer's eagerness for green and clean energy. The next phase of growth of the renewable would be more of 'supply push factor' where the techno-economic and political factors will play more dominant role in deciding the type of energy consumers will be supplied with. Solar energy fits in this phase of expansion.

Various factors which have mainly contributed to this special status of solar energy are: (i) initial high production cost and huge expenditures associated with its research and development and (ii) technical complexity. The first factor has made the energy utilities, especially during this nascent stage of its development, dependent on the states for subsidies and support thereby enabling the states to retain their control on this form of energy. Solar energy (solar PV and solar thermal power), fit into the existing 'state-corporate symbiotic relationship' model. And technical complexity of solar power helps the large firms retain their control on the industry.

SYMBIOTIC RELATIONSHIP

As billions of dollars have been invested in research activities on solar semiconductors, the energy utilities are also willing to continue with the 'win-win symbiotic relationship' they have had enjoyed with the nation states for over a century. Now policies to promote grid-tied rooftop solar PV, exist in several countries. These policies have been responsible for rapid market growth over the past several years. Capital subsidies are becoming common at national, state, local, and utility levels, typically for 30-50 percent of installed costs. About half of all US states had such subsidy programs (or tax-credit policies), either statewide or for specific utilities. California's new "Solar Initiative", calls for the installation of 3 GW of solar PV by 2017 for homes, schools, businesses, and farms. Korea has a similar program and expects 300 MW by 2011 through its 100,000-rooftop program, which initially provided 70 percent capital subsidies. Both the United States and Sweden provide a 30 percent national tax credit for solar PV. France provides a 50 percent income tax credit. Australia provides rebates up to AUD $8/watt ($7/watt). The United Kingdom restarted a grants program in 2007 that subsidizes household solar. In Japan, over 300 municipalities continue to provide subsidies for solar PV after the expiration of Japan's national subsidy in 2005. New solar PV rooftop programs have been announced in several other countries.

In India also the government has announced a major subsidy scheme to boost solar energy. The recent rush in solar energy projects by the Indian firms to take advantage of the Special Incentive Package Scheme (SIPS), notified in 2007, by the government of India to encourage investment in semiconductor fabrications, eco-system units, and other micro and nano technology manufacturing industries is a case in point. The semiconductor scheme stipulates that the Government will provide incentives of 20 per cent of capital expenditure - land, building, plant, machinery and technology - during the first 10 years, for units in Special Economic Zones. For non-SEZ units, incentives are capped at 25 per cent of capital expenditure.

As of March 2010, when the SIPS was closed, the government of India received 26 proposals, together worth more than Rs 2, 29,000 crore. Some of the major applicants were BHEL, Titan Energy Systems, Reliance Industries, Tata BP Solar Power, PV Technologies India (a subsidiary of Moser Baer), KSK Surya PV Ventures, Signet Solar, Indo-Solar Ltd, Solar Semiconductors, TF SolarPower, Lanco Solar Pvt Ltd, EPV Solar and Bhaskar Silicon, Jain Solar Energy Pvt Ltd, Enfield Solar Energy Ltd and Cosmic Photovoltaic Pvt Ltd. While only a few applications are in the areas of wafer-fabrication or other eco-system units, a majority of the overall proposals received till date are to do with production of solar PV cells and modules. Reliance Industries' proposal for establishment of a semiconductor wafer fabrication would involve an investment of Rs 18,521 crore spread over a period of 10 years. The company has also planned to

manufacture polysilicon, solar-grade wafers and SPV modules with capacity of 1 Giga Watt, at an investment of Rs 11,631 crore over a 10-year period. RIL has sought a subsidy of Rs 3,394.5 crore for the semiconductor fab and Rs 2,326.2 crore for the solar project.

The Solar Energy Mission as announced by the Indian Prime Minister is not an isolated announcement made in haste. It is a pledge to pursue with the policy as followed by the dominant players of the industry. Moreover, it suits the ambitious state to retain its control, as were the case with petroleum and nuclear, on the supply of this renewable source of energy also. □

[Abridged]