Renewable Energy Industry in India

The Indian economy is the second fastest growing economy in the G-20, next only to that of China. It has recorded a CAGR of more than 7% since 1997. Even during the current global economic crisis, India remains strong and resilient, on the back of its fundamental strengths – a sizeable young population, increasing urbanization, rising per capita consumption and a growing and more affluent middle class. If the Indian economy continues to grow at the current rate, it would emerge as the second largest in the world, next only to China, by the year 2050. However, India's substantial and sustained economic growth is creating enormous pressure on its energy resources. There is a prominent energy supply-demand imbalance.

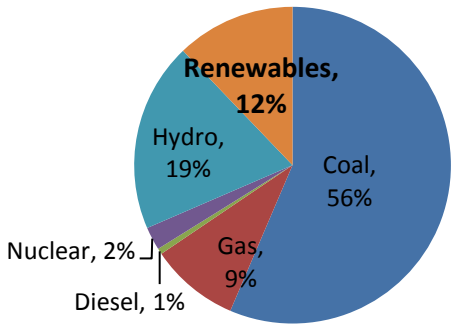
Already, in the electricity sector, official peak deficits are of the order of 10-12%, which could increase over the long term. In addition, 56% of Indian population (mainly in rural areas) does not have access to electricity. There is also a significant risk of lesser thermal capacity being installed on account of lack of indigenous coal in the coming years because of both production and logistic constraints, and increased dependence on imported coal. Difficulties of large hydro are increasing and nuclear power is also beset with unending controversies and problems. The country thus faces possible severe energy supply constraints. With the challenges being faced by the conventional power generation projects, and with the potential Foreign Direct Investment (FDI) availability, the renewable energy sector seems to be the key to India's energy security.

Renewable Power Installed Capacity in India

In April 2002, renewable energy based power generation installed capacity was 3,475 MW which was 2% of the total installed capacity in the country. As on 30th April 2012, the renewable energy installed capacity has reached 24,503 MW, which is about 12% of the total installed capacity of 201,637 MW, and RE contributes around 6% to the energy mix in India. Wind energy is the major contributor among all renewable energy sources with around 70% share, followed by small-hydro (<25MW projects), biomass, and solar power projects jointly contributing around 29%.

Figure 1: India's Fuel-wise installed capacity break-up (%)

Source: Central Electricity Authority (CEA)



India's Total Installed Power Generation Capacity = **201,637 MW**

Total Installed Grid-Interactive Renewable Energy Capacity = **24,503 MW**

Renewable Energy Sources include:

1. Wind (70%)
2. Small-Hydro (14%)
3. Biomass (13%)
4. Solar (2%)
5. Waste to Energy

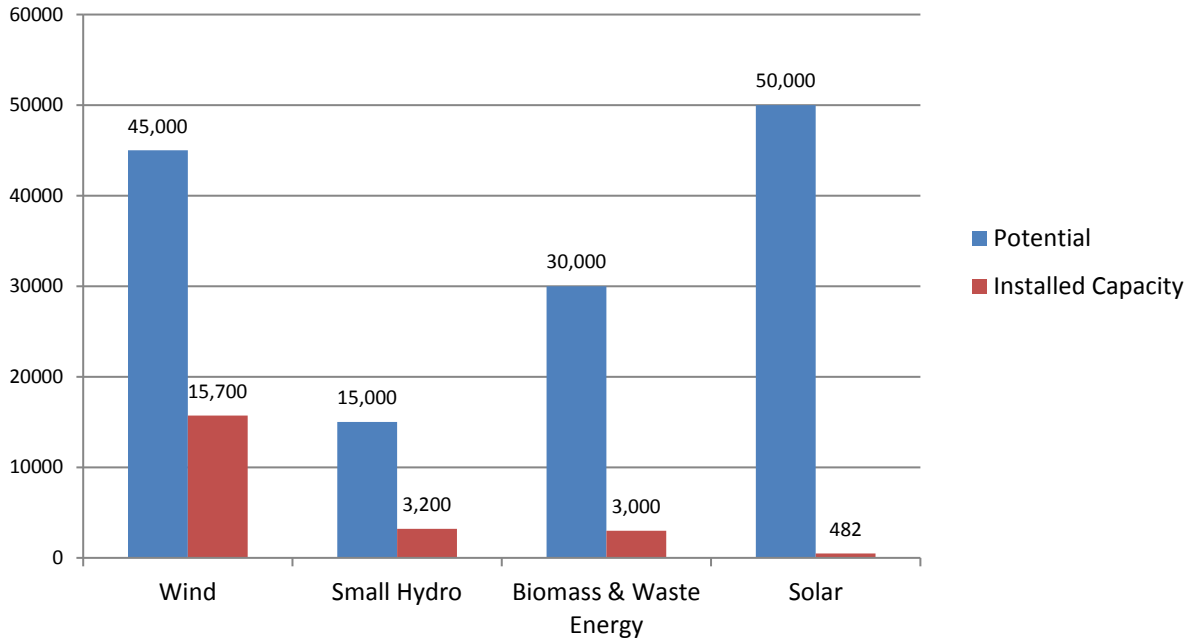
Tamil Nadu has the highest installed capacity of grid connected renewable power followed by Maharashtra and Karnataka, mainly on account of wind power. Besides, Gujarat and Rajasthan have shown rapid increase in renewable capacity addition due to their strong focus on developing solar power projects. More than 80% of the renewable generation capacity of India is in these five states (As per Report of Working Group, Ministry of Power, GoI).

Of the total renewable installed capacity in India, nearly 86% capacity (~21,000 MW) is owned and developed by the private sector, whereas the balance just 14% (~3,500 MW) is under state government initiatives.

Estimated Potential for Renewable Power in India

India is fifth worldwide in total renewable power generation capacity, and it accounts for little over 5% of the world's renewable energy installed capacity.

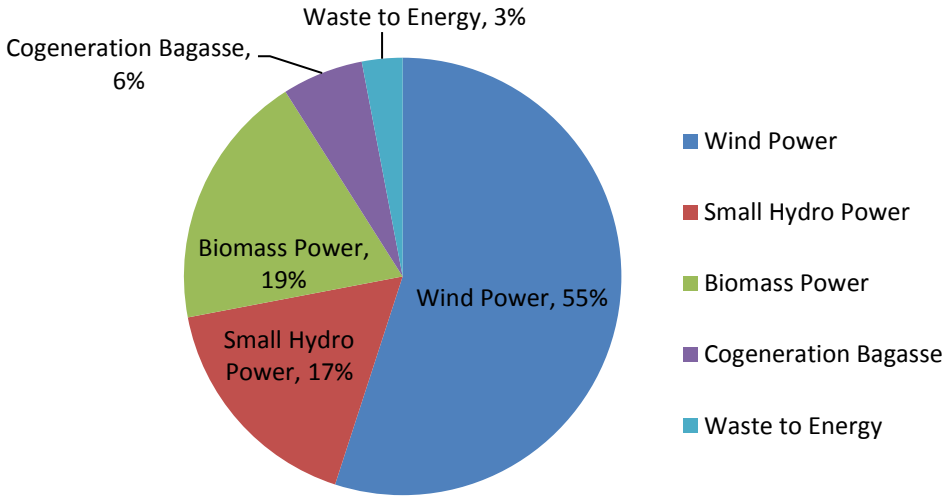
Figure 2: Potential and Installed Capacity of RE Sources – 2011 (in MW)



Source: Ministry of New & Renewable Energy, Government of India

The Central Statistics Office, also under the Government of India, has estimated the potential for renewable energy generation in India, and published the same in its 'Energy Statistics Report' dated March 2012. As of 31-March-2011, the CSO has estimated the total potential for renewable power generation in India (excluding solar) at 89,760 MW.

Figure 2: Sourcewise Estimated Potential of Renewable Power in India (excluding Solar)



Source: Central Statistics Office (CSO), MoSPI, GoI

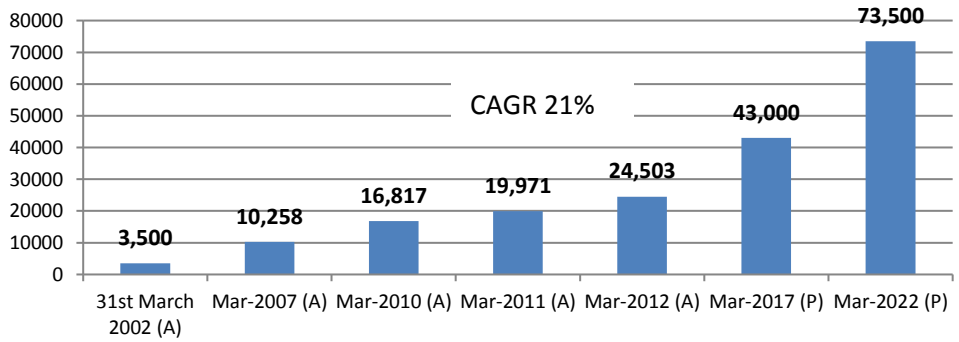
This includes an estimated wind power potential of 49,132 MW (55%), SHP (small-hydro power) potential of 15,385 MW (17%), Biomass power potential of 17,538 MW (20%) and 5,000 MW (6%) from Bagasse-based cogeneration in sugar mills.

The geographic distribution of the estimated potential across States reveals that Gujarat has the highest share of about 14% (12,489 MW), followed by Karnataka with 12% share (11,071 MW) and Maharashtra with 11% share (9596 MW), mainly on account of wind power potential.

The renewable energy estimates as per the Working Group Report, Ministry of Power, Government of India (dated January 2012), suggests that the total estimated medium-term potential (2032) for power generation from renewable energy sources such as wind, small hydro, solar, waste to energy and biomass in the country is about 183,000 MW.

Renewable Power Capacity Additions over the years

Figure 3: Renewable Energy Installed Capacity (MW)

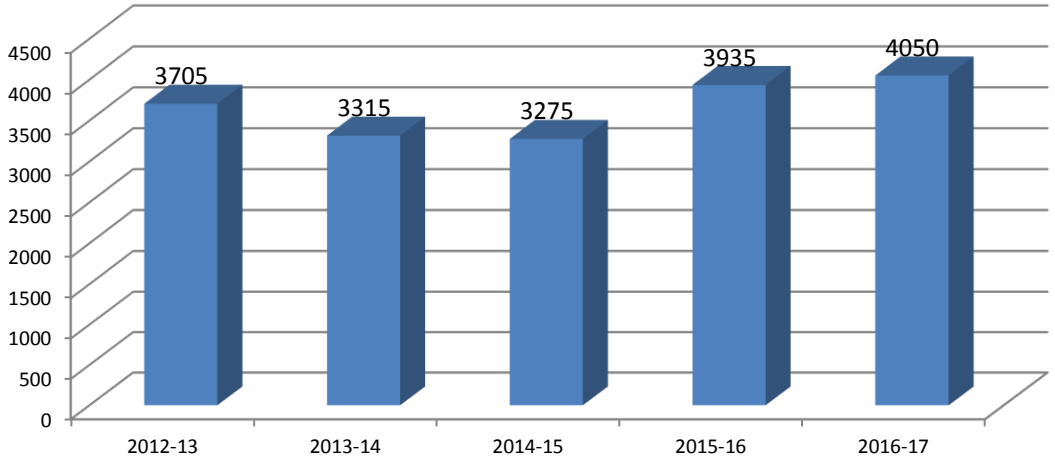


Sources: Central Electricity Authority (CEA), and Report of Working Group (Ministry of Power, GoI)

The grid interactive Installed Capacity from renewable sources has increased from about 3,500 MW at end of 9th Five Year Plan (1997-2002), to 10,258 MW at the end of 10th Plan (2002-07) and to 24,500 MW at the end of 11th Plan (2007-12). In the last three years of the 11th Plan the installed renewable energy capacity grew at a CAGR of 21% with a cumulative installed capacity at 16,817 MW, 19,971 MW and 24,503 MW as on the 31st March of 2010, 2011 and 2012 respectively. During the 12th Five Year Plan (2012-17) renewable capacity of 18,500 MW and during 13th Plan (2017-22) 30,500 MW has been envisaged to be added through Wind, Biomass, Small Hydro and Solar sources.

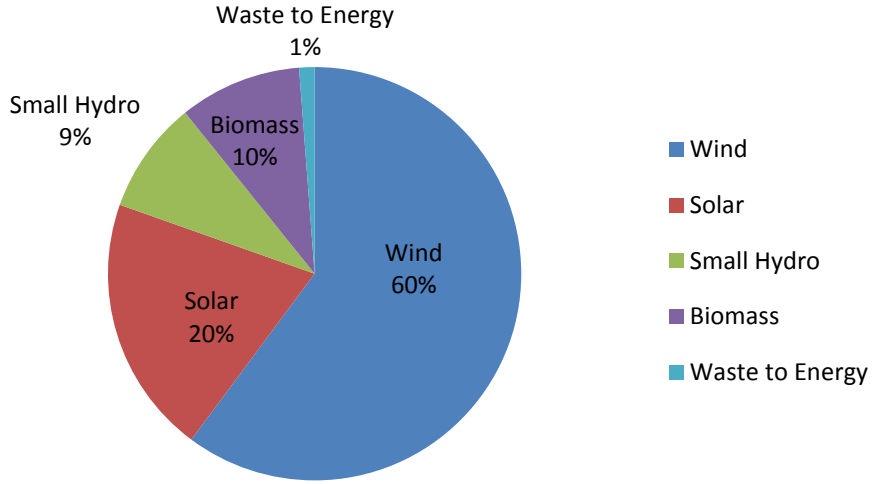
Of the 18,500 MW renewable capacity addition to be made during 2012-17, only 3,000 MW is estimated to be made by the State Governments; rest 15,500 MW is to come from the Private Sector (including Foreign Investments).

Figure 4: Year-wise Targets for Grid interactive RE Power in MW (2012-17)*



Over the five-year period (2012-17), Wind power is expected to be the largest contributor with an addition of about 11,000 MW, followed by Solar PV and Thermal capacities with an addition of about 3,700 MW. The rest of the capacity, which is about 20% of the total RE capacity addition, will be accounted for by the Small Hydro, Biomass and Waste to Energy power projects.

Figure 5: Resource-wise Targets for Grid interactive RE Power in MW (2012-17)*



Source: Ministry of New & Renewable Energy, Government of India

Planned Investments in Renewable Energy Sector in the 12th Five Year Plan (2012-17)

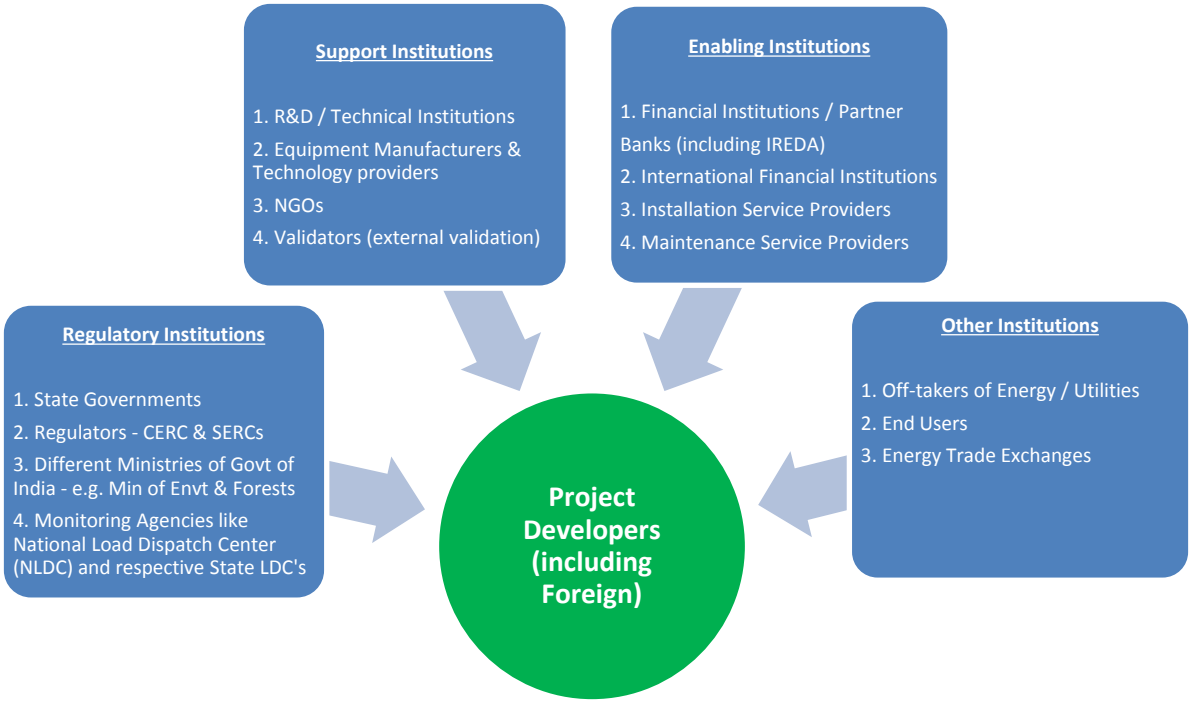
The Report of the Working Group on Power (published in January 2012), under the Ministry of Power, Government of India, has computed the fund outlay required for implementing grid-connected Renewable Energy projects in India for the period 2012-17. The computation is done on the basis of per MW cost of different types of RE projects which are based on the FY 2011-12 prices. The total fund requirement for RE projects in 12th Plan is estimated to be around USD 23 billion, which has been delineated here below:

Renewable Energy Source	Fund Requirement (INR crore)	Fund Requirement (USD million)
Wind Power	67,200	12,200
Solar Power	49,400	9,000
Small Hydro Power (<25 MW)	8,000	1,500
Biomass Power	10,500	2,000
TOTAL	**135,100**	**23,700**

The total estimated fund outlay of USD 23 billion for the renewable energy sector is about just 10% of the total fund outlay as projected for the entire power sector in the 12th Five Year Plan period (2012-17).

Key Stakeholders in the Indian Renewable Energy Industry

The renewable energy sector is still in the nascent stage in India. Naturally, the role of the governing agencies is therefore quite crucial in determining how this sector will evolve and develop, and how much it will be able to nurture and promote domestic as well as international private participation.



With the government trying to formalize key policies and frameworks, such as the Renewable Energy Certificate (REC) scheme and the Renewable Purchase Obligation (RPO) scheme, and with new models of market participation taking shape, these are very interesting times to be in the renewables space in India, and definitely an opportunity to catch the rising tide early.

Market Opportunity and Regulatory Overview in the RE Industry in India

Although the utilization of renewable energy sources is still relatively low in India, India has the fifth largest renewable energy installed capacity in the world with annual revenue of about USD 185 billion. India was also the fifth largest global investor in renewable energy in 2011 (China came on top followed by the US, Germany and Italy), and is the most developed renewable energy market in South Asia. Not just that, India is emerging as one of the largest potential sources of Certified Emission Reduction (CER) and Renewable Energy Certificates (REC). Due to the increasingly transparent and encouraging framework being put in place by the Government of India for RE projects, there exists a strong platform on which promising opportunities can be offered to private players (both national and international) to commit their efforts and resources in the Indian renewable energy sector.

Basic Regulations for participation in the Indian Renewable Energy Sector:

GENERATING COMPANY:

a) Under the Electricity Act 2003, a generating company may establish, operate and maintain a generating station without obtaining a license if it complies with the technical standards relating to connectivity with the grid specified by the Central Electricity Authority (CEA).
b) It may supply electricity to any licensee or consumer.
c) It must submit technical details regarding its generating stations to the Regulatory Commission and the Central Electricity Authority.
d) It must co-ordinate with the Central Transmission Utility or the State Transmission Utility for transmission of the electricity generated by it.
e) In circumstances arising out of threat to security of the State, public order and public interest, Government may specify direction concerning operation and maintenance of the generating stations for a generating company.

FORMALITIES:

An investor needs to obtain following permissions:

a) Environmental clearance certificate
    - An environmental clearance is granted by the regulatory authority which is either the Ministry of Environment and Forests (MoEF) at the central level or the State Environment Impact Assessment Authority (SEIAA) at the state level.
    - An investor needs to conduct a procedure of public consultation which consists of two components:
        i. Public hearing – where local affected people can express theirs concerns about the impact of the investment, organized by the State Pollution Control Board at the site of the industry within 45 days from the applicant's request and not

earlier that 30 days from the publishing of public notice informing about the venue and time of the public hearing;

ii. Obtaining responses in writing – when plausible stakeholders can convey their concerns in writing to the responsible authorities.

- An applicant prepares a final Environment Impact Assessment (EIA) Report addressing all concerns and data collected during public consultation.
- Within 60 days from the receipt of the final EIA Report, (State) Expert Appraisal Committee makes categorical recommendations to the regulatory authority as to whether grant or reject prior environmental clearance to the applicant.
- A regulatory authority makes its decision within 45 days from the receipt of the recommendations. It should "normally accept" the recommendations, in case it disagrees with recommendations it can request (S)EAC to reconsideration its position. Within 60 days the (S)EAC adopts its final decision which is conveyed to the applicant.
- Under the Post Environmental Clearance Monitoring procedure, an industry is obliged to submit six monthly compliance reports, which should be uploaded on the website of the regulatory authority

b) Techno-economic appraisal

- A techno-economic clearance is granted by the Central Electricity Authority.
- Projects are appraised in accordance with the guidelines and procedures which are defined and made available to all the utilities.

c) Infrastructure clearance

- After preparation of topographical map for the land, an infrastructure clearance must be obtained from the appropriate Energy Development Agency.
- In the state of Maharashtra, an infrastructure clearance is granted by the Maharashtra Energy Development Agency. At the time of making application for the infrastructural clearance a developer has to pay INR 500,0000 as Green Fund (not refundable) and INR 1,500,000 as deposit (refundable). A developer has to complete the project in all respects within period of 9 months from the date of getting Infrastructural Clearance. The Green Fund is the fund created to develop approach roads and supply lines for Wind Power Project.

d) Permission for the Land for power project

- The land acquired by an investor must be granted permission from the State Energy Department.

ACQUISITION OF LAND:

a) Land for installation of the power project is offered by the regional officer of the State Industrial Development Corporation.

b) Regional Officer will sanction allotment of land in favour of the applicant; following that a lease agreement will be concluded.

c) An investor will require approval of building plan from the Deputy Engineer of the State Industrial Development Corporation.

d) In order to promote wind energy, the Ministry of Environment and Forests issued specific guidelines for diversion of forest land for non-forest purposes for project utilizing wind energy.

According to the guidelines, a land shall be initially leased for a period of 30 years (for the period of first four years in favour of the developer and subsequently the lease shall be transferred in the name of the investor/power producer).

FINANCIAL POLICY:

a) Income from power generation can get a tax holiday for 10 years.
b) Concessions on import duty on specified wind turbine parts are offered.
c) States provide for a guarantee market by entering into power purchase agreements (PPA) with power projects at a preferred tariff. If the project developer wishes to not be bound by this tariff, it can choose to develop the project under the Renewable Energy Certificate (REC) mechanism or, in some cases, by going for the reverse bidding process.
d) State Electricity Regulatory Commissions (SERC's) set up electricity charges: the commission specifies generic preferential tariffs for renewable energy technologies; there is also a possibility to apply for determination of project specific tariffs. In the year 2010 Maharashtra Electricity Regulatory Commission (MERC) specified the levellised total tariffs for different Wind Zones ranging from 3.38 to 5.07 Rs/kWh.
e) Indian Renewable Energy Development Agency (IREDA) offers loans for renewable projects in private sector which may be obtained through the bidding procedure.

TRANSMISSION:

a) Since the promulgation of the Electricity Act 2003 open access in transmission is allowed. The Central Electricity Regulatory Commission (CERC) notified regulations on non-discriminatory open access in transmission.
b) In order to promote the generation of the power from renewable sources reduced wheeling charges are offered.

SPECIAL ECONOMIC ZONES (SEZ's):

a) The SEZ Policy was introduced by the central government in 2000, till August 2010 more than 370 SPZs were established in India.
b) SEZs were introduced in order to promote foreign investments, provide hassle-free environment for business, the territory is treated as a foreign enclaves, exempted from custom duties.
c) SEZ authorities are bound to provide investments within its territory with the electricity connection. It may be done by establishing Independent Power Producer (IPP). Industrial units located in the SEZs for which no IPP has been established, may generate their own power for captive use.
d) Power plants located in SEZs are divided into following categories:
    i. Power plant set up by developer/Co-developer – it is a part of infrastructure facility:
        - does not enjoy fiscal benefits,
        - it can supply power to units within SEZ/ other SEZs and Domestic Tariff Area (DTA). Domestic Tariff Area is an area within India which is outside SEZ.
    ii. A unit set up within SEZ – generate power as product or as a captive power plant,

- such power plant is entitled to all fiscal benefits provided in the SEZ Act including benefits for initial setting up, maintenance and the duty free import of raw materials and consumables for the generation of the power in such plants;
- it may supply power within SEZ/ other SEZ/ DTA

iii. A single power plant in SEZ – a single stand alone power plant set up in SEZ in which there would be no other units:

- entitled to all fiscal benefits provided in the SEZ Act;
- it may supply power to units within SEZ/ other SEZs/ DTA

e) Tariff – The tariff of the electricity for any sales within SEZs is determined by the Regulatory Commission in accordance with the provisions of the Electricity Act, 2003.

Benefits / Incentives offered by the Government of India for promoting Investment in RE sector

To make the Indian renewable energy market exciting for entrepreneurs and investors, there are a number of incentives and preferred terms being offered by the policy makers.

1. ***Foreign Investment Policy –***

The Government of India has created a liberal environment for foreign investment in renewable energy projects. It is encouraging foreign investors to set up renewable energy-based power generation projects on BOO (build-own-operate) basis. Key highlights of the foreign investment policy are:

- **Foreign Direct Investment (FDI):**

  Under the Foreign Exchange Regulations, Foreign Direct Investment (FDI) upto 100% is allowed in the Power sector under the Automatic Route which includes generation, transmission, distribution and trading of Power. FDI in new and renewable energy sector would fall within the ambit of Power sector and hence 100% FDI would be permissible under the Automatic Route.

  Under the Automatic Route, no prior approval would be required of the Government of India. However, the Indian Company receiving FDI would be required to report to the Reserve Bank of India (RBI) the receipt of FDI within 30 days of such receipt and file form FC-GPR within 30 days of issue of shares in the prescribed manner. It is pertinent to note that the shares have to be issued to the Foreign Investor within 180 days of receipt of FDI by the Indian Company. In case, the shares are not issued within the said 180 days, the share consideration is required to be refunded immediately. Failure to do so could attract penal provisions under the Foreign Exchange Management Act and Regulations.

- **Joint Venture:**

  There is a liberalized foreign investment approval regime to facilitate foreign investment and transfer of technology through joint ventures as well. Foreign investors can also enter into joint venture with an Indian partner for financial and/or technical collaboration and for setting up of renewable energy-based power generation projects.

- **Liaison Office:**
  Foreign investors looking to participate in the Indian renewable energy sector in a limited capacity initially can also set up a liaison office in India.

2. ***Industrial Policy for Renewable Energy Development in India –***
   Government of India is promoting medium, small, mini and micro enterprises for manufacturing and servicing of various types of renewable energy systems and devices. The industrial policy measures include:

   - Exemption of industrial clearance for setting up of renewable energy industry
   - Exemption of clearance from Central Electricity Authority for power generation projects of up to Rs 100 crore (Rs 1,000 million)
   - Tax holiday for renewable energy power generation power generation projects
   - Soft loan made available through IREDA for renewable energy equipment manufacturing
   - Facilities for promotion of export-oriented units for renewable energy industry
   - Financial support extended to renewable energy industries for taking up R&D projects in association with technology institutions
   - Power project import allowed
   - Allowance to private sector companies to set up enterprises to operate as license or generating companies
   - Customs duty concession for renewable energy parts/equipment, including for machinery required for renovation and modernization of power plants.
   - Excise duty on a number of capital goods and instruments in the renewable energy sector has been reduced/ exempted.

3. ***Other Incentives offered to Renewable Energy projects –***
   India does not have any integrated renewable energy policy but within various other policies relating to electrification some incentives for renewable energy have been given by the Central and some State Governments, as enumerated below.

   a. Preferential feed-in-tariffs for both wind and solar energy projects
   b. Preferential tax rate of 15 percent, instead of the standard 30 percent
   c. Exemption from Central Sales Tax and customs duty concessions on soft loans for the import of material, components, and equipment used in renewable energy projects
   d. Soft loans for setting up renewable energy enterprises
   e. Special thrust for renewable energy in North-Eastern region of the country
   f. Setting up single window clearance in some states like Rajasthan and Uttarakhand
   g. Generation based incentives,
   h. Grid based incentives Scheme introduced for Wind power and Solar Power to attract private investment by Independent Power Producers (IPP's) not availing Accelerated Depreciation benefit; and

i. Directives under Electricity Act 2003 to all States for fixing a minimum percentage for purchase of electricity from renewable energy sources – also called Renewable Purchase Obligations (RPO) – for power utilities and bulk power consumers.

Note: Tax incentives that provided developers with 80% accelerated depreciation on capital deployed in renewable energy in their first year of operation, have been withdrawn in the Union budget of 2012, but tax holidays available to power projects have been extended by one year and are applicable to projects which commence generation before 31 March 2013.

Measures taken by MNRE to push growth of Renewable Energy Generation at grass root levels in India

During the year 2010-11, the Ministry of New and Renewable Energy (MNRE) took up several new initiatives to make renewable energy devices and systems reach out to meet the electricity and energy needs of people in different parts of the country. These new initiatives include:

1. National Solar Mission Operationalized:
   The Ministry issued guidelines for new grid projects through NVVN, small grid projects through IREDA, off-grid solar applications like solar rooftops and solar water heaters etc; and technical performance and domestic content requirements of solar projects, to operationalize the National Solar Mission.

2. BOOT model for Cogeneration Projects:
   21 Bagasse cogeneration projects have been taken up through BOOT (Build, Own, Operate, Transfer) model in cooperative sector sugar mills set up by Special Purpose Vehicle (SPV) or an Independent Power Producer (IPP) in the states of Punjab, Maharashtra and Tamil Nadu.

3. Solar Cities/Green Buildings:
   The Ministry operationalised the GRIHA rating scheme. Independent Society "ADARSH" established by Ministry for implementation of rating system. Government has mandated that new Central government and PSU buildings would go for minimum GRIHA – 3 star rating. Ten Cities to be developed as 'Pilot Solar Cities', Four Cities will be developed as 'Model Solar Cities' and 50 new Small townships/Campuses being promoted as green Renewable Energy townships under the Solar Cities Programme.

4. Micro-hydel scheme:
   The Ministry has sanctioned support for 3547 water mills in 9 states. So far 1414 water mills have been setup. The Ministry also sanctioned 28 micro hydel projects (up to 100 kW) under the new scheme announced in February 2009.

With the several attractive characteristics and potential, India presents a significant market opportunity for renewable energy firms worldwide. However, with the Indian RE sector still in its nascent stages, interested participants in the sector may perhaps require assistance and support of experienced

professionals on several regulatory and operational aspects before they are in a position to effectively tap this opportunity.

Investment Attractiveness of the Indian RE sector

The Indian renewable energy sector presents an attractive picture for the global and private investors. As per a KPMG report on M&A Outlook in the Global Renewables Market (2012), India is the second most preferred investment destination for renewable energy investment and M&A. Further, as per an Ernst & Young Country Attractiveness Indices Report published in 2012, India is the third most attractive country to invest in renewable energy.

Renewable energy investment in India was the second fastest-growing among the G-20 in 2011, with investments increasing 54 percent to USD 10.2 billion. Wind resources received 45 percent of the financing (USD 4.6 billion), while 41 percent (USD 4.2 billion) went to solar. According to the MNRE (Govt of India), majority of the investments made in the Indian RE sector in 2011 were through the FDI route. Moreover, KPMG estimates suggest that some USD 7.6 billion worth of project financing flowed into Indian renewable energy assets in 2011, more than double the USD 3.1 billion invested in 2010.

The Government of India, through the MNRE, is currently targeting foreign investors as part of its efforts to raise USD 50 billion worth of investment for its renewable energy sector over the next five years upto 2017. It expects to raise USD 19 billion of investment in wind energy, USD 25 billion for solar, and USD 3 billion each for small hydro and biomass in this period.

Conclusion

The country in the recent years has emerged as an economic powerhouse as well as an environmental leader in the global arena. With the progress of the Indian economy, the country is also required to look into producing more energy for providing quality living conditions to its people. India is in fact blessed with huge resources of renewable sources of energy such as wind, solar, biomass and hydro energy. In fact, it has been found that the technical potential of these renewable energy resources may exceed the current installed generation capacity.

India is the fifth largest consumer of energy in the world and it is projected that the country would surpass Japan and Russia to become the third biggest energy consumer globally by 2030. Thus, in order to fill this growing need, investments in renewable energy sector have been rising. India is also the only country in the world that has a ministry, the Ministry of New and Renewable Energy, is dedicated to the development of renewable energy. The initiatives taken by the government along with the efforts of the corporate sector would help in accelerating the development of renewable energy sources in the country and help in meeting the energy needs of the people of India.