

# INDIA'S RENEWABLE ENERGY SECTOR - POTENTIAL AND INVESTMENT OPPORTUNITIES

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## **Indian Economy Overview**

According to the Economic Survey 2009-10, the Indian economy is expected to grow at 7.2 per cent in 2009-10. The expected growth comes on the back of the growth momentum witnessed in Q2 2009-10 estimates, when the economy recorded a GDP growth of 7.9 per cent as against 7.5 per cent in the corresponding quarter of 2008-09. The industrial and the service sectors are growing at 8.2 and 8.7 per cent respectively, as per the advance estimates of gross domestic product (GDP) for 2009-10, released by the Central Statistical Organisation (CSO).

### **The Economic Survey 2009-10 estimates:**

- Growth rate of GDP at factor cost expected to be 7.2 per cent.
- Growth in the manufacturing sector has more than doubled from 3.2 per cent in 2008-09 to 8.9 per cent in 2009-10.
- Growth of private investment demand picked up in 2009-10.
- Savings rate as a percentage of GDP in 2008-09 stood at 32.5 per cent.
- Growth rate of capital formation as a percentage of GDP in 2008-09 stood at 34.9 per cent.
- Foreign Exchange Reserves in 2009-10 as of December 31, 2009 stood at US\$ 283.5 billion.
- Financing, insurance, real estate and business services have retained their growth momentum at around 10 per cent in 2009-10.

### **The main highlights of the survey 2009-10 are:**

- The recovery in GDP growth for 2009-10, as indicated in the advance estimates, is broad based. Seven out of eight sectors/sub-sectors show a growth rate of 6.5 per cent or higher. Sectors including mining and quarrying; manufacturing; and electricity, gas and water supply have significantly improved their growth rates at over 8 per cent in comparison with 2008-09. The construction sector and trade, hotels, transport and communication have also improved their growth rates over the preceding year.
- Strong growth in automobiles, rubber and plastic products, wool and silk textiles, wood products, chemicals and miscellaneous manufacturing; modest growth in nonmetallic mineral products.
- The opening of the telecom sector led to rapid growth in subscriber base. From only 54.6 million telephone subscribers in 2003, the number increased to 429.7 million at the end of March 2009 and further to 562 million as of October 31, 2009 showing an addition of 96 million subscribers during the period from March to December 2009.

- There has been improvement in the balance of payments (BoP) situation during H1 of 2009-10 over H1 of 2008-09, reflected in higher net capital inflows and lower trade deficit.
- Net capital flows to India at US\$ 29.6 billion in April-September 2009 remained higher as compared to US\$ 12 billion in April-September 2008.
- During fiscal 2009-10, foreign exchange reserves increased by US\$ 31.5 billion from US\$ 252 billion in end March 2009 to US\$ 283.5 billion in end December 2009.
- Growth rate of gross fixed capital formation in 2009-10 has recovered, as per the revised National Accounts Statistics (NAS).
- Turnaround in merchandise export growth witnessed in November 2009, which has been sustained in December 2009.

### **INDIAN POWER SCENARIO**

- Total Installed Capacity: India's total installed capacity of electricity generation has expanded from 105,045.96 MW at the end of 2001-02 to **1,57,229.48** MW at the end of February, 2010. In fact, India ranks sixth globally in terms of total electricity generation.
- Source-wise:
  - Thermal power - 64.6 per cent of the total installed capacity, producing 1,00,598.40MW.
  - Hydel power plants come next with 24.7 per cent of the total an installed capacity of 36,863.40 MW.
  - Renewable energy sources contribute around 10%cent to the total power generation in the country producing **15,789 MW** (as on 31.1.2010).
- Gross Generation: 640 BUs
- Per Capita Consumption: 620 kwh/ ANNUM
- Energy Shortage about : 8%
- Peaking Shortage about: 13-14 %
- Electricity demand growing @ 8% annually
- Capacity addition of about 92,000 MW required in the next 10 years
- Challenge is to meet the energy needs in a sustainable manner  
( Source: CEA and MNRE)

## **SUSTAINABLE DEVELOPMENT**

India is one of the fastest growing countries in terms of energy consumption. Currently, it is the fifth largest consumer of energy in the world, and will be the third largest by 2030. At the same time; the country is heavily dependent on fossil sources of energy for most of its demand. This has necessitated the country to start aggressively pursuing alternative energy sources - solar, wind, biofuels, small hydro and more.

Sustainable energy investment in India went up to US\$ 3.7 billion in 2008, up 12 per cent since 2007 and this is likely to increase much more in the coming years. It included asset finance of US\$ 3.2 billion, up by 36 per cent. Venture capital and private equity saw an increase of 270 per cent to US\$ 493 million. Mergers and acquisition activities totaled US\$ 585 million. Most acquisition activity was centered on biomass, small hydro and wind projects, according to UNEP report, Global Trends in Sustainable Energy Investment 2009.

The Global Wind Energy Council in its report – “ Indian Wind Energy Outlook 2009” estimates that there is a potential of around 90,000 MW for power generation from different renewable energy sources in the country, including 48,561 MW of wind power, 14,294 MW of small hydro power and 26,367 MW of biomass. In addition, the potential for solar energy is estimated for most parts of the country at around 20 MW per square kilometer of open, shadow free area covered with solar collectors, which would add to a minimum of 657 GW of installed capacity.

## **POWER GROWTH PERSPECTIVE**

Today, India can well be identified as an energy guzzler. The demand for power is growing exponentially and the scope of growth of this sector is immense. India's power supply-demand gap has averaged between 8 and 10 per cent over the last decade where electricity access exists. By 2012, India's energy requirement to touch 975,222 MU (and peak demand 1,571,070 MU) an increase of 31.9% and 44.3% respectively from the current demand. India's grid-connected power generation capacity will need to scale from 148GW currently to 460GW by 2030 while the country's primary energy demand is expected to grow from 400 million tons of oil equivalent to well over 1,200 million by 2030. It is feared that by 2030, the country will import 94% of its petroleum requirement. Undoubtedly, renewable energy appears to be the most plausible option for the country to rely on.

The average per capita consumption of energy in India is around 500 W, which is much lower than that of developed countries like the United States, Europe, Australia, Japan, etc. However, this figure is expected to rise sharply due to high economic growth and rapid industrialization. Government of India aims to increase the per capita consumption of electricity to 1,000 units by year 2010, envisaged a capacity addition of 100,000 MW to meet the mission of 'Power for All by 2012. India's energy demand is increasing with the robust growth in economy. A steady forecasted growth for manufacturing sector would need more power generation in future. However, power generation through fossil fuels raises serious concern over the depleting resources and environmental pollution.

Energy security is important for India, which is largely dependent on fossil fuel imports to foster its economic growth. According to the World Energy Outlook report, India will become the third largest net importer of oil before 2025 after the United States and China. This will not be sustainable in the long run given the high volatility of international crude oil prices. Coal imports are also likely to increase from 12 percent in 2005 to 28 percent in 2030. In order to insulate itself from any future supply disruption and price shocks of fossil fuels and to achieve energy security and also meet global climate change objectives Renewables have indeed caught the imagination of India. Riding on the crest of a high growth trajectory and in pursuit of sustainable sources to meet its rising domestic energy demand and access to energy for overall development the country is focusing on harnessing renewable energy production through maximizing the utilisation of renewable energy. The Government of India is convinced that Renewable source could make it possible to generate off-grid power to bridge this electricity deficit.

### **RENEWABLES IN INDIA: POTENTIAL & PROSPECTS**

India is the 4th largest country with regard to installed power generation capacity in the field of renewable energy sources and much is waiting to be discovered by it. Wind, Hydro, Biomass and Solar are main renewable energy sources. India has tremendous potentialities to harness the much-needed energy from renewable sources and considered as one of the ideal investment destinations for renewable energy equipment manufacturers and service providers. Wind energy has posted the highest growth. India could become top player in world's solar market.

India intends to provide a reliable energy supply through a diverse and sustainable fuel mix that addresses major national drivers. These include security concerns, commercial exploitation of renewable power potential, eradication of energy poverty, ensuring availability and affordability of energy supply and preparing the nation for imminent energy transition.

The country has an estimated renewable energy potential of around 85,000 MW from commercially exploitable sources: Wind, 45,000 MW; small hydro, 15,000 MW and biomass/bioenergy, 25,000 MW. In addition, India has the potential to generate 35 MW per square km using solar photovoltaic and solar thermal energy.

The Government of India has outlined ambitious capacity expansion and investment plans for the eleventh five year plan period (FY 2007- FY 2012). It has proposed an addition of 15,000 MW of Renewable Energy generation capacities during the period. Wind Power projects form 70 percent (10,500 MW) of the proposed capacity addition, while Small Hydro Projects (SHP) accounts for 9.3 per cent (1,400 MW). The total investments on development of RE during the plan period is expected to be about USD 2 billion.

The Greenpeace International, European Renewable Energy (EREC) in its report released in March, 2009 has projected that by 2050; about 69% of the electricity produced in India will come from renewable energy sources. 'New' renewables – mainly wind, solar thermal energy and PV – will contribute almost 40%. The installed capacity of renewable energy technologies will grow from the current 38 GW to 1,659 GW in 2050, a substantial increase over the next 42 years. Upto 2030, wind will

remain the main new power source. After 2020, the continuing growth of wind will be complemented by electricity from biomass, photovoltaics and solar thermal (CSP) energy.

### **SUB-SECTORS THAT CONTINUE TO SHOW A HIGH GROWTH RATE AND ARE EXPECTED TO DRIVE THE RE MARKET:**

The market in India for the RE business is growing at an annual rate of 15%. The scope for private investment in RE is estimated to about \$3 billion. This growth is expected to continue in the coming years as stricter environmental norms and regulatory pressure are placed on Indian industries. Best prospects in sub-sectors that continue to show a high growth rate and are expected to drive the RE market includes:

#### **Solar Energy:**

Solar energy development is supported by Government of India incentives and, more recently, is spurred by the ruling high fossil fuel prices. Generation of electricity from Sun is a flagship programme of the Government of India. The solar energy market potential is huge, while only a fraction of the aggregate potential has so far been realised. India has one of the world's largest programmes in solar energy which include R&D, demonstration and utilisation, testing & standardization, industrial and promotional activities. Processed raw material for solar cells, large capacity SPV modules, SPV roof tiles, inverters, charge controllers all have good market potential in India as do advanced solar water heaters, roof integrated solar air heaters; and solar concentrators for power generation (above 100 KW).

#### **Wind Energy:**

The onshore wind power potential has been estimated at about 48,500 MW, assuming 1% land availability in potential areas for setting up wind farms @ 12ha/MW in sites having wind power density greater than 200/W/sq.m at 50 m hub-height. Thus far only 10,464 MW or 21.6 percent of India's potential is being generated. The growth of wind energy in India has been consistent with the global trends. In 2008 India added 1800 MW taking the total wind energy installed capacity to 9645 MW, making it fifth top country in the world, after USA, Germany, Spain and China for wind energy installed capacity

India is implementing the world's largest wind resource assessment program comprising wind monitoring, wind mapping and complex terrain projects. This program covers 800 stations in 24 states with around 200 wind monitoring stations in operation at present. Wind Electric Generators are being manufactured in the country by a dozen manufacturers through (i) joint ventures or under licensed production (ii) subsidiaries of foreign companies under licensed production and (iii) Indian companies with their own technology. The current annual production capacity of domestic wind turbine is about 3,000 MW. IREDA-sponsored wind power development program provides financial assistance for the project and extends equipment financing.

### **Biomass Energy and Cogeneration:**

Globally, India is in the fourth position in generating power through biomass and with a huge potential, is poised to become a world leader in the utilisation of biomass. Biomass power projects with an aggregate capacity of 773.3 MW through over 100 projects have been installed in the country. For the last 15 years, biomass power has become an industry attracting annual investment of over Rs. 1,000 billion, generating more than 09 billion unit of electricity per year. More than 540 million tons of crop and plantation residues are produced every year in India and a large portion is either wasted, or used inefficiently. By using these surplus agricultural residues, by conservative estimates more than 16,000 MW of grid quality power could be generated through Biomass. In addition, about 5,000 MW if power can be produced, if all 550 sugar mills in the country switch over to modern techniques of cogeneration. Thus the estimated biomass power potential is about 21,000 MW.

### **Small Hydro Projects (< 25 MW):**

With numerous rivers and their tributaries in India, small hydro RE presents an excellent opportunity with an estimated potential of 15,000 MW with only 17 percent of this sector exploited so far. Over 674 projects aggregating to about 2558.92 MW generating capacity have been set up in the country as on 31.12.2009. Of the estimated potential of 15,000 MW of small hydro power in the country, 5415 potential sites with an aggregate capacity of 14,292 MW have been identified. Most of the potential is in Himalayan States as river-based projects and in other States on irrigation canals. The GOI is encouraging the development of small hydro projects and aims to double the current growth rate that leads to a capacity addition of 500 MW per year with total installed capacity of 4,000 MW by the end of 2012. The GOI is providing concessions for existing hydro projects including financial support for renovation, modernization and capacity upgrading of aging small hydro power stations.

### **Energy from Wastes:**

The rising piles of garbage in urban areas caused by rapid urbanization and industrialization throughout India represent another source of non-conventional energy. An estimated 50 million tonnes of solid waste and approximately 6,000 million cubic meters of liquid waste are generated annually in the urban areas of India. Good potential exists for generating approximately 2,600 MW of power from urban and municipal wastes and approximately 1,300 MW from industrial wastes in India. A total of 48 projects with aggregate capacity of about 69.62 MWeq have been installed in the country thereby utilising only 1.8% of the potential that exists.

### **Biofuels:**

The GOI recently mandated the blending of 10 percent fuel ethanol in 90 percent gasoline. This mandate as created an approximately 3.6 billion-liter demand for fuel ethanol in blend mandate to the entire country. This significant demand growth creates a tremendous manufacturing opportunity for the fuel ethanol industry seeking to expand its investments internationally.

Table below demonstrates the renewable energy achievements in India as on 31.12.2009 and potential upto 2032.

**Details of Estimated Renewable Energy potential & Cumulative Achievements of power from renewables**

No.	Sources / Systems	Estimated Potential	Cumulative Achievements (upto 31.12.2009)
1.	Biomass Power (Agro residues)	16,881 MW	834.50 MW
2.	Wind Power	48,500 MW	10925.00 MW
3.	Small Hydro Power (up to 25 MW)	15,000 MW	2558.92 MW
4.	Cogeneration-bagasse	5,000 MW	1302.00 MW
5.	Waste to Energy	2,700 MW	65.01 MW
6.	Solar Power	50 MW/sq.km.	6.00 MW
	<b>Sub Total (A)</b>	<b>88,081 MW</b>	<b>15691.43 MW</b>

**B. Off-grid/Distributed Renewable Power (including Captive/CHP plants)**

7	Biomass Power / Cogen.(non-bagasse)	210.57 MW
8.	Biomass Gasifier	109.62 MWeq
9.	Waste-to- Energy	37.97 MWeq
10.	Solar PV Power Plants and Street Lights	2.39 MWp
11.	Aero-Generators/Hybrid Systems	0.89 MW
	<b>Sub Total (B)</b>	<b>361.44 MWeq</b>
	<b>Total ( A + B )</b>	<b>16052.87 MW</b>

This is a medium term projection and **does not include quantification of the huge solar potential**. India has huge potential of producing electricity from renewable sources. India's cumulative achievement (renewable electricity generation) up to 31.12.2009 is about 15,692 MW, around 9% of the total installed capacity, as against estimated medium term (up to 2032) potential of 87,200 MW in the country from wind, small hydro, solar, agro-residues, co-generation, waste to energy and biomass. The possibility of technology leapfrogging in the renewable sector is also considerably great. Even at the conservative total estimated potential of 1,72,000 MW (without considering the solar energy sector), the investment potential in the country is Rs.8,600 billion.

The 48,500 MW potential of Wind Power is a conservative estimate and with the growth in unit size of turbines, greater land availability, and expanded wind resource exploration, this potential should go up significantly.

India also has considerable potential for production of biofuels. The current estimates may seem to be over-optimistic. But if properly planned and executed, India's investment potential in biofuels can grow to the same levels as in renewable power generation technologies.

Other potential investment destinations include a whole host of downstream production facilities, components development for renewable power technologies, manufacture of silicon cells and films for solar panels, co-gen applications in industries, solar thermal devices, etc.

India receives the highest global solar radiation on a horizontal surface. According to solar energy experts, India has considerable scope for solar energy production. India receives on a daily average over the year of 520-630 W/m<sup>2</sup>; 1660-1990 Btu/ft<sup>2</sup> and 6.8-8.3 GJ/m<sup>2</sup> annually. The desert areas in India have the solar radiation required for CSP production. A 60 km x 60 km area can produce 1,00,000 MW of power. India has a desert area of 2,08,110 sq kilometres in Rajasthan and Gujarat. Even if India uses only 15,000 sq. kilometres of the desert, it can produce 3,00,000 MW of power.

Government of India is currently envisaging large-scale expansion of solar power capacity by 2022. The government is gearing up to provide 20 million un-reached rural households to access light energy. In addition, the government plans 20 million sqm. to be built up for green buildings and 20 million sqm. for heating applications by 2022.

In the past few years the cost to produce photovoltaic cells and modules has dropped significantly, opening the way for large-scale deployment. Various cell types exist, but the least expensive modules today are thin films made of cadmium telluride.

Shortages of finance, efficiency and human cadre are the main obstacles to optimal renewable energy usage, according to International Renewable Energy Agency (IRENA). India can be the hub for manufacturing renewable energy equipment if foreign manufacturers come forward to manufacture their products in India by way of joint ventures, technology transfer and exports as India has a tremendous manpower available at very economical costs.

### **KEY FACTORS RESPONSIBLE FOR GROWTH OF THIS SECTOR INCLUDE:**

Large demand-supply gap in electricity

- India is generously endowed with RE resources like solar, wind, bio-mass materials, urban and industrial wastes and small hydro resources
- Low gestation periods for setting up RE projects with quick return
- Conducive government policies
- The large number of financing options available for capital equipment



- Increasing awareness among industry that being environmentally responsible is economically sound.
- The significant resource coupled with continued Government support makes India a very attractive location for renewables development.

### **FOCUS AREAS**

- Grid-interactive renewable electricity generation systems;
- Renewable Energy for Urban, Industrial & Commercial Applications;
- Renewable Energy for Rural Applications;
- Research, Design & Development in New & Renewable Energy Generation and Applications

### **MARKET ENERGY**

Recognizing the enormous potential of RE technologies, the GOI has issued guidelines to all state governments in India articulating the policies that states should follow to attract private sector investment and promote commercial projects in the renewable energy sector. States, such as Gujarat, Kerala, Madhya Pradesh, Maharashtra and Tamil Nadu, have provided sales tax exemptions/deferment policies for investment in wind power projects. The states also have created additional major policy initiatives to encourage private/foreign direct investment to tap energy from renewable sources of energy, including provisions of fiscal and financial incentives (e.g., 100 percent depreciation), simplification of procedures for private investment including single-window permit procurement, reduced number of required governmental authorizations and unrestricted levels of foreign direct investment in the ownership of renewable energy projects.

The GOI is encouraging foreign investors to establish renewable energy based power generation projects on the BOO, i.e., build-own-operate, model. The GOI also provides exemptions/reductions in the excise tax duty on the manufacture of most renewable energy systems and devices such as flat plate solar collectors, solar water heaters and systems, Solar PV cells, windmill systems, and any specially-designed devices which operate those systems (e.g., including electric generators and pumps running on wind energy, bio gas plants and bio gas engines, etc.); The GOI provides “soft” loans on favorable terms to manufacturers and users for commercial and near commercial technologies through (i) the Indian Renewable Energy Development Agency (“IREDA”), (i.e., a public sector, GOI-owned, company of the MNRE) and (ii) some of the Indian nationalized banks and other financial institutions for identified technologies/systems. The renewable energy industry is identified as a ‘priority sector’ by the Reserve Bank of India (“RBI”) to obtain loans from banks; and the GOI provides a facility for third party sales of renewable energy power.

### **GOVERNMENT INCENTIVES**

- State Electricity Regulatory Commissions (SERC) have been mandated to promote RE, through renewable purchase obligations, which require discoms to source up to 10% of their power from RE sources.

- The key wind energy incentives include a provision for 80% accelerated depreciation in the first year, a 10-year tax holiday, income tax waiver on power sold to utilities and favourable tariffs.
- Projects that do not claim accelerated depreciation benefits are entitled to generation-based incentives (GBI) that provides INR0.5/kWh of power sold, for independent Power Producer (IPPs) with capacity >5 MW.
- India offers several subsidies to solar power systems, such as solar lanterns, home lighting systems, etc., and GBI of up to INR12/kWh for power plants
- For SHP projects, incentives include concessions on customs duty, 10-year tax holiday and other state-level incentives including sales and electricity tax exemptions and preferential tariffs. The incentives also include capital subsidies.

Incentives for biomass energy include accelerated depreciation, import duty concessions, excise duty exemption and a 10-year tax holiday. The incentives also include capital subsidies. Various export incentives have made India a key player in the global wind turbine generator (WTG) and solar PV cells market

### **POLICY NETWORK FOR RENEWABLE ENERGY DEVELOPMENT:**

Renewable energy gained significance in India with growing concern for 'energy security'. Energy self sufficiency has been identified as the major driver for renewable energy in India with rising insecurity in relation to fluctuating oil prices.

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.

- Within the electricity act 2003, it requires each State regulatory commission to specify the minimum percentage of electricity that each distribution utility must source from renewable energy sources.
- The National Electricity Policy 2005 stipulates that progressively the share of electricity from non-conventional sources would need to be increased; such purchase by distribution companies shall be through competitive bidding process; considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the commission may determine an appropriate differential in prices to promote these technologies.
- Under the National Rural Electrification Policy also for villages/habitations where grid connectivity would not be feasible or not cost effective, off-grid solutions based on stand-alone systems may be taken up for supply of electricity. Where these also are not feasible and if only alternative is to use isolated lighting technologies like solar photovoltaic, these may be adopted.
- Various states give financial subsidies on renewable energy utilities like PV, home lighting systems, solar water heater etc. The Ministry of New and

Renewable Energy also gives various incentives to individuals for installing various such utilities.

### **CENTRAL GOVERNMENT POLICY:**

The spread of various renewable energy technologies have been aided by a variety of policy and support measures by Government. The Prime Minister of India at the meeting of the full Planning Commission in New Delhi on 1<sup>st</sup> September, 2009 said that “a rational energy policy, with appropriate policies for renewable and non-conventional energy sources, is also important for climate change. We need to dovetail our strategy for energy with our national action plan for climate change”.

Major policy initiatives taken to encourage private/foreign direct investment to tap energy from renewable energy sources include provision of fiscal and financial incentives under a wide range of programmes being implemented by the Ministry and simplification of procedures for private investment, including foreign direct investment (FDI) to tap energy from renewable energy sources. These include provision of fiscal and financial incentives under a wide range of programmes being implemented by the Ministry of New and Renewable Energy, Government of India, and simplification of the procedures for private investment, including FDI, in renewable energy projects. The policy is clearly directed towards a greater thrust on over all development and promotion of renewable energy technologies and applications. The recent policy measures provide excellent opportunities for increased investment in this sector, technology up-gradation, induction of new technologies, market-development and export promotion.

A Comprehensive Renewable Energy Policy for all round development of the sector is under preparation.

### **POLICY MEASURES IN VAGUE:**

A host of fiscal incentives and facilities are available to both manufacturers and users of renewable energy systems, which include:

- 100% accelerated depreciation for tax purposes in the first year of the installation of projects/systems.
- No excise duty on manufacture of most of the finished products.
- Low import tariffs for capital equipment and most of the materials and components.
- Soft loans to manufacturers and users for commercial and near commercial technologies.
- Five-year tax holiday for power generation projects.
- Remunerative price under alternate power purchase policy by State Government for the power generated through renewable energy systems, fed to the grid by private sector.
- Facility for Banking and wheeling of power.

- Facility for Third party sale of renewable energy power.
- Financial Incentives/Subsidies for devices with high initial cost.
- Involvement of women not only as beneficiaries but also for their active contribution in implementation of renewable energy programmes.
- Encouragement to NGOs and small entrepreneurs.
- Special thrust for renewable energy in North-Eastern region of the country. 10% of Plan funds earmarked for North-East towards enhanced and special subsidies.
- Allotment of land on long term basis at token lease rent and supply of garbage free of cost at project site by State Governments, in respect of projects on energy recovery from municipal waste.

In addition the Central Government gives financial assistance to develop Solar Cities as per following:

- Up to Rs. 50 lakh per city for a period of 5 years for:
  - Up to Rs. 10 lakh for Preparation of a Master Plan;
  - Up to Rs. 10 lakh for setting-up institutional arrangements;
  - Up to Rs 20 lakh for awareness generation, capacity building and other promotional activities; and
  - up to Rs. 10 lakh for oversight of implementation during five years

### **STATES GOVERNMENTS' POLICY:**

For creating an attractive environment for evacuation and purchase, wheeling and banking of electrical energy generated from renewable energy sources and encouraging investment by the private and public sector companies in power generation through renewable energy, a set of guidelines have been issued by the Central Government for consideration of the States.

As a result the state governments have also announced promotional policy packages in the form of wheeling, banking and buyback guarantee, and considerable tariff escalations for wind, co-generation projects, small hydro, and biomass projects. In order to give fillip to the promotion of RE Sector in their respective States, some of the State Governments are providing concession/exemption in State Sales Tax and Octroi etc. In addition the state governments promoted renewable energy development agencies are playing a catalyzing role in the development of renewable energy.

Some states like Rajasthan and Uttarakhand have set up **single window clearance** for RE power projects to facilitate quick and hassle free approvals and clearances for such projects.

### **FOREIGN INVESTMENT POLICY:**

The government has created a liberal environment for foreign investment in renewable energy projects. Key highlights of the foreign investment policy are:

- Foreign investors can 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.
- Liberalised foreign investment approval regime to facilitate foreign investment and transfer of technology through joint ventures
- Proposals for up to 74% foreign equity participation in a joint venture qualify for automatic approval
- 100% foreign investment as equity is permissible with the approval of Foreign Investment Promotion Board (FIPB)
- Various chambers of commerce and industry associations in India can be approached for providing guidance to the investors in finding appropriate partners
- Foreign investors can also set up a liaison office in India
- Government of India is also encouraging foreign Investors to set up renewable energy-based power generation projects on build-own-operate basis

### **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)
- Five-year 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.

## **INTEGRATED ENERGY POLICY OF INDIA:**

The Government of India has formulated an Integrated Energy Policy covering all sources of energy including renewable energy sources, in December 2008. The policy document has highlighted the need to maximally develop domestic energy supply options and diversify energy sources, including increased exploitation of renewable energy, especially solar. It has further projected that with a concerted push, renewables may account for 5 to 6 per cent of India's energy mix by 2031-32. Main features of the policy include:

- Incentives for promoting renewables should be linked to outcomes (energy generated) and not just outlays (capacity installed).
- Power Regulators should create alternate incentive structures such as mandated feed-in-laws or differential tariffs or specifying renewable portfolio percentage in total supply.
- An annual renewable energy report should be published providing details of actual performance of different renewable technologies at the state and national levels.
- Appropriate policies, regulatory systems and fiscal measures duly leveraged by funding available under global climate mechanism should be designed to accelerate the development of solar technology for large-scale deployment.
- Fuel wood plantations, bio-gas plants, wood gasifier based power plants, bio-diesel and ethanol should be promoted.

## **POSITIVE FACTORS FOR INVESTING IN INDIA:**

Some of the many factors that make India a great investment destination for new and renewable energy firms across the world are:

- **Electricity demand growing:** @ 8% annually
- **Capacity addition of about:** 92,000 MW required in the next 10 years
- **The Size of the Indian Market and the unmet demand:** India has a large domestic market with immense absorptive capacity for electricity. According to a study by the McKinsey Global Institute (MGI), India's consumer market will be the world's fifth largest (from twelfth) in the world by 2025 and India's middle class will swell by over ten times from its current size of 50 million to 583 million people by 2025.
- Largest number of listed companies - 10,000 across 23 stock exchanges, India has the third largest investor base in the world.
- Healthy banking system with a network of 70,000 branches is among the largest in the world.
- **Large pool of skilled, talent and English speaking workforce:** India's chief strength comes from its large pool of well-educated, managerial, technical, scientific and skilled people, adept in the English language with innovative skills and talent. India has been mentioned as one of the most favourable locations

for investments according to the World Investment Prospects Survey carried out by UNTAD for 2009-11. According to the World Fact Book, India is among the world's youngest nations with a median age of 25 years as compared to 43 in Japan and 36 in USA. Of the BRIC—Brazil, Russia, India and China, India will see 70 million new entrants to its workforce over the next 5 years.

- **Cheap labour:** Cheap labour has been cited as another factor for favourable destination for investments by the TNCs in India according the above UNTAD survey.
- **Other factors** that make India as favourable destination in foreign direct investments (FDI) from world over include: its speeding growth, its future potential and its political and economic stability, liberal investment policies and reforms, innovative and technologically advanced products being manufactured in India and low cost and effective solutions.
- India has been ranked at the third place after China and USA in global foreign direct investments this year, following the economic meltdown, and will continue to remain among the top five attractive destinations for international investors during the next two years, according to United Nations Conference on Trade and Development (UNCTAD) in a new report on world investment prospects titled, 'World Investment Prospects Survey 2009-2011'. In Asia, India has been placed second most favoured destination, after China, to receive more Foreign Direct Investment (FDI) in the coming years, according to the above Survey.
- According to Development Counselors International (DCI), a U.S. marketing company, India is the second-best country after China for business investment. DCI cites India's labor, including its supply, skills level and cost, as the main reason for this positive perception.
- Due to favourable investment factors, India's attracted an foreign direct investment inflow of US \$ 127,460 million from Aug., 1991 to Dec., 2009. Despite global economic slowdown the country has attracted foreign direct investment (FDI) worth US\$ 20,921million during April – Dec., 2009.
- Solar energy is not even a fraction of the total Renewable energy potential that India generates, though the country receives abundant sunshine throughout the year. But India hopes to move from near-zero to 20,000 megawatts of solar electricity by 2022, as part of the National Action Plan on Climate Change. Announced in June 2008, the plan is a structured response to combat global warming and part of a proposal India intends to pitch at a climate change summit in Copenhagen this December. The centerpiece of the plan is the National Solar Mission, which is aimed at harnessing India's neglected energy source.

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