

**PROSPECTIVE OF NEW BUSINESS AVENUES FOR COMPANY SECRETARY
PROFESSIONALS IN INDIA: A STUDY OF SOLAR ENERGY SECTOR**

**By Dr. Prasant Sarangi
Director (Research)
ICSI-CCGRT, Navi Mumbai**

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1. INTRODUCTION:

The demand for energy is growing day by day in the entire globe. The Conventional energy sources like coal and petroleum are limited. Hence everyone is keeping bird's eye on renewable energy resources which could play an important role in very next near future. India is situated in sunny belt based on its geographical appearance in the world map, hence, the country is endowed with vast solar energy potential.

Further, India is at a stage of development that requires it to grow at a fast rate and lift the large number of their citizens from below the poverty line. Energy deprivation levels for a sizeable portion of population remain at high levels. The importance given to secure energy access is also due to the fact that access to energy is intertwined with the various other economic and social developmental objectives such as poverty alleviation, health, industrialisation, education, provision of communication infrastructure, and climate change mitigation among others.

Why Solar Energy:

In the renewable energy resources, solar energy plays important role and it is a tremendous source of energy. The sun is the planet's most powerful source of energy and also the most unused source of energy by humans. Solar energy is abundant and offers a solution to fossil fuel emissions and global climate change. The rate of energy received by the earth from solar energy is approximately 1,20,000 TW (1 TW = 10 W or 1 trillion watt). This is much high from both the current annual global energy consumption rate of about 15 TW, and any additional requirement in future.

2. OBJECTIVES:

This paper mainly highlights and discusses the envisaged solar power generation capacity and opportunities thereof in India. The core objective of the research work is to carry out an exhaustive study the Indian potentiality towards solar sector and business perspective that are emerging in Indian for new entrepreneurs like young CS professionals.

3. METHODOLOGY:

The study is based on secondary sources of information. Most of the informations are gathered from research papers, annual studies and research studies that are specifically done for the solar sector in India by various agencies. The study is analytical in nature which analyses various aspects related to solar energy from the available literature.

4. SOLAR POWER AND POLICY IN INDIA- AN ANALYSIS:

Geographically, most parts of India get 300 days of sunshine a year. About 5,000 trillion kWh per year energy is incident over Indian land area with most area receiving 4-7 kWh per sq. meter per day. Hence, both technology solar thermal and solar photovoltaic's can effectively provide huge capability for solar in India.

India is ranked 11th in solar power generation in the world as on Jan. 2014. Government funded solar energy in India only accounted for about 6.4MW/yr of power as of 2005. In 2010 capacity of 25.1MW was added and 468.3MW in 2011. In 2012 the capacity increase more than two times and become 1205 MW. During 2013 capacity added by 1114 MW and during 2014 capacity added by 313 MW. In August 2015, the installed grid connected solar power capacity is 4.22 GW. The price of solar energy has come down from Rs. 17.90 per unit in 2010 to about Rs. 7 per unit in 2015. It is expected that with technology improvement and market competition solar power will reach grid parity by 2017-18. The Grid parity means the cost of electricity generated from alternative energy becomes equal or less than the cost of purchasing power from the grid[. Grid parity is very important term in the solar system and preferably photovoltaic panel. The Charanka Solar Park, at current installed capacity of 224 MW is the largest Solar Park in Asia, was commissioned on April 19, 2012. In India, Rajasthan has the largest share of solar

power generation of 28.4% and Gujarat share is 24.4% as on September 2015.

Table-1 shows current solar policy status among potential states in India.

Table-1: State Wise Solar Policy Status

STATE	SOLAR POLICY STATUS
GUJARAT	State Solar Policy under execution Phase 1: deadline Dec. 2010 Phase 2: deadline Dec. 2011 Phase 3: To be announced by end of 2011
RAJASTAN	State Solar Policy announced in April 2011 Base FiTs announced. Bidding results expected by August 2012 [150MW to be allotted]
KARNATAKA	State Solar Policy announced in July 2011 Allocations announced in April 2012 [60MW solar PV and 20MW solar thermal] Deadline for commissioning October 2013
MADHYA PRADESH	Allocation through reverse bidding. Not guided by policy Deadline for commissioning is June 2013 for projects up to 25 MW and June 2014 for projects greater than 25MW
ODISHA	Allocation through reverse bidding. Not guided by policy. Deadline for commissioning is August 2013
MAHARASHTRA	Broad Renewable Energy Policy. No policy specific to solar energy
TAMIL NADU	State Solar Policy likely to be released soon
ANDHRA PRADESH	Direct agreements likely Memorandum signed with welspun for a 100MW project
HARYANA	Broad renewable energy policy. No policy specific to solar energy
UTTAR PRADESH	No state solar policy
PUNJAB	No state solar policy
UTTARAKHAND	Existing broad renewable energy policy
WEST BENGAL	No state solar policy
CHATTISGARH	No state solar policy
JHARKHAND	No state solar policy
MANIPUR	No state solar policy [Rooftop projects initiated by [MIREDA]
DELHI	No solar policy yet, notified their RPO requirements. Solar rooftop policy expected.
JAMMU AND KASHMIR	Draft solar policy [Not formalized] Projects to be developed under NSM off-grid and RPSSGP
KERALA	Existing broad renewable energy policy
TRIPURA	Draft solar policy [Not formalized]
MIZORAM	Draft solar policy [Not formalized]
PUDUCHERRY	No state solar policy
ASSAM	No state solar policy
HIMACHAL PRADESH	No state solar policy
ARUNACHAL PRADESH	No state solar policy
NAGALAND	No state solar policy
MEGHALAYA	No state solar policy
SIKKIM	No state solar policy
GOA	No state solar policy
UNION TERRITORIES	Only central renewable energy policy

Source: BRIDGE to India, 2012.

Solar power is a clean, environmental friendly source of energy. There are no toxic byproducts or emissions. Sun Heat is directly utilized for water heating, room heating, vaporization etc. Solar water heating systems are in high demand. In a study it has been found that, sun heat's system can save the individual family from 70% to 90% of the total amount spent on the electricity used for heating water. The system generally meets all of the summer time heating needs. During times of decreased sunlight, the system will preheat the water then bring it up to temperature by the conventional water heating system already in place. The first serious attempts to deploy the technology were made with the formation of Department of Non-Conventional Energy Sources (DNES) in 1982, though the history of research and pilot-demonstration go back to 1960s.

5. INDIAN SOLAR POWER POTENTIALITY:

India's plan to become of the largest solar power markets in the world has received a massive boost as the latest estimated of its solar power potential. The National Institute of Solar Energy in India has determined the country's solar power potential at about 750 GW, a recently released document by the Ministry of New & Renewable Energy (MNRE) shows. The solar power potential has been estimated using the wasteland availability data in every state and jurisdiction of India. The estimate is based on the assumption that only 3% of the total wasteland available in a state is used for development of solar power projects.

A state wise capacity of solar power is narrated in the table-2 derived below.

Table-2 Current Solar Power Capacity in Some State

Sl. No.	State or U.T.	Capacity In MW
1	Andhra Pradesh	279.44
2	Arunachal Pradesh	0.265
3	Chhatisgarh	73.18
4	Gujarat	1000.05
5	Haryana	12.8
6	Jharkhand	16
7	Karnataka	104.22
8	Kerala	12.025
9	Madhya Pradesh	673.58
10	Maharashtra	378.7
11	Orissa	56.92
12	Punjab	200.32

13	Rajasthan	1199.7
14	Tamil Nadu	157.98
15	Telangana	72.25
16	Tripura	5
17	Uttar Pradesh	71.26
18	Uttarakhand	5
19	West Bengal	7.21
20	Andaman & Nicobar	5.1
21	Delhi	6.712
22	Lakshadweep	0.75
23	Puducherry	0.025
24	Chandigarh	5.041
25	Daman & Diu	2.5
26	Others	0.79
	TOTAL	4346.818

Source: RRJET, Vol.-5, No-2, June, 23016.

6. SOLAR MARKETS IN INDIA:

Almost all parts of India receive 4-7 kWh of solar radiation per sq metres. This is equivalent to 2,300–3,200 sunshine hours per year. States like Andhra Pradesh, Bihar, Gujarat, Haryana, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, and West Bengal have great potential for tapping solar energy due to their location.

Since, majority of the population live in rural areas, there is much scope for solar energy being promoted in these areas. Use of solar energy can reduce the use of firewood and dung cakes by rural household.

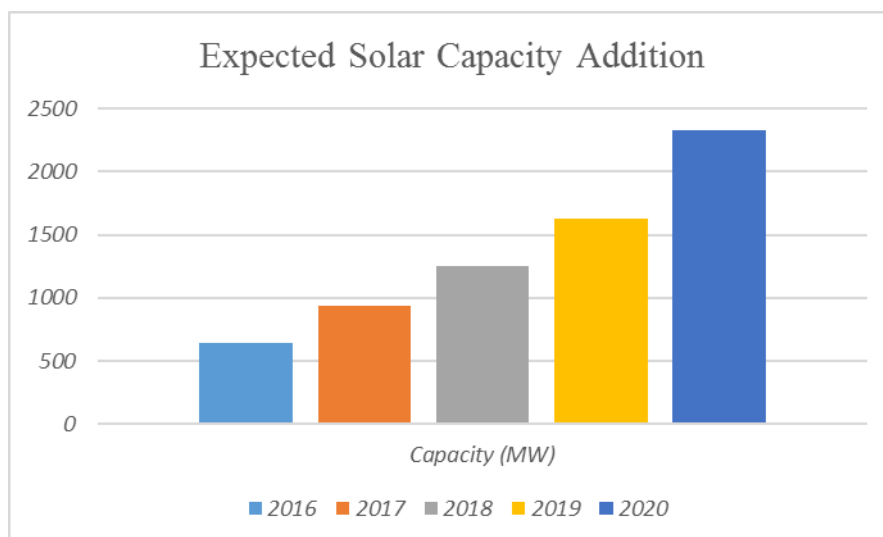
Madhya Pradesh and Maharashtra both have more than 60 GW of solar power potential. These are among the largest of the Indian states and thus have large wasteland resources. Both these states have ambitious solar power policies and plans to implement large-scale solar power projects.

Gujarat, the leading Indian state in terms of installed solar power capacity, has an estimated potential of 36 GW. The state has large tracts of land covered with marshes but these lands also support a wide variety of wildlife. Gujarat already has an installed capacity of close to 900 MW of solar power and has already started developing utility-scale solar power projects over water canals.

Agricultural states like Punjab and Haryana expectedly rank low in terms of estimated solar power potential. Punjab would find it difficult to make available land for large solar power projects and has thus decided to concentrate efforts to set up solar power projects over rooftops and canals.

India's current solar power installed capacity is around 3 GW, or less than 0.5% of the estimated potential. Naturally there exists a massive opportunity to tap this potential. As a result, the Indian government has increased its solar power capacity addition target five-fold. Instead of the initial target to installed 22 GW solar power capacity by 2022, the government now plans to add 100 GW capacities. This includes 20 GW of ultra mega solar power projects, with installed capacity of 500 MW or more, across 12 states as against the India total Solar Capacity is 750 GWh.

As per the Bridge to India report, economic fundamentals for adoption of rooftop solar in India are improving rapidly. By the year 2016, the market is expected to add a capacity similar to the entire capacity added in India till date. The market is expected to grow at compounded annual growth rate of 58% per annum. The chart drawn below shows new roof top solar capacity addition that are expected in India by 2020 from all the three types of uses like commercial and government uses, industrial uses and residential uses as projected by BRIDGE TO INDIA.



Source: BRIDGE TO INDIA

Future of Solar Energy in India

In solar energy sector, many large projects have been proposed in India.

- Thar Desert has some of India's best solar power projects, estimated to generate 700 to 2,100 GW.
- The Diken in Neemuch district of Madhya Pradesh, India's biggest solar power plant.
- The Jawaharlal Nehru National Solar Mission (JNNSM) launched by the Centre is targeting 20,000 MW of solar energy power by 2022.
- Gujarat's pioneering solar power policy aims at 1,000 MW of solar energy generation.
- In July 2009, a \$19 billion solar power plan was unveiled, which projected to produce 20 GW of solar power by 2020.
- About 66 MW is installed for various applications in the rural area, amounting to be used in solar lanterns, street lighting systems and solar water pumps, etc.

Jawaharlal Nehru National Solar Mission (JNNSM) was launched in 11 Jan. 2009 with the target for Grid Connected Solar Projects of 20,000 MW by 2022. The Mission had adopted a three-phase approach. First four year (2009-13) had marked as Phase-I. The remaining 4 years of the twelfth Plan (2013-17) had been marked as Phase-II and the thirteenth Plan (2017-22) will be Phase-III of the project. The aim of this project was to add 1,000 MW of grid solar power by 2013, and another 3,000 MW by 2017. The target for 2017 may be higher based on the availability of international funds and technology transfer.

But in June 2015 The Union Cabinet of India gave approval for stepping up of India's solar power capacity goal under the Jawaharlal Nehru National Solar Mission (JNNSM) by five times, reaching 100 GW by 2022. The target will comprise of 40 GW rooftop and 57 GW through large and medium scale grid connected solar power plants. By this step of government India will become one of the greatest countries of the world in solar energy power generation. That new solar target of 100 GW is expected to abate over 170 million tons of CO₂ over its life cycle. The total investment will be around Rs.6, 00,000 cr. (@ Rs.6 cr. per MW at present rate) for 100 GW power generation. Table-3 shows the targets of power generation in different years.

Table-3 Target of Power Generation in JNNSM by 2022

Year	Rooftop type solar power project (MW)	Ground mounted type solar power project (mw)	Total (MW)
2015-16	200	1,800	2,000
2016-17	4,800	7,200	12,000
2017-18	5,000	10,000	15,000
2018-19	6,000	10,000	16,000
2019-20	7,000	10,000	17,000
2020-21	8,000	9,500	17,500
2021-22	9,000	8,500	17,500
Total	40,000	57,000	97,000

Source: RRJET, Vol-5, No-2, 2016

7. THE RECENT DEVELOPMENT:

The news published on 6th December, 2017 in the Business Standard Mumbai edition with a heading ‘Rays of hope for the solar alliance’ created numbers of opportunities for new entrepreneurs in India. The gist of the news published is given below:

In 2015, the prime minister of India, discussed to then French President Francois Hollande on the sidelines of the UN climate Change Conference in Paris. The efforts took shape in the form of International Solar Alliance (ISA), with its headquarters in Gurugram. An interim secretariat, inaugurated by Holland last year, has been functional since January 2016.

The ISA stepped to the next leap in its journey by becoming a treaty-based international inter-governmental organisation which will make it a more formal body than the loose conglomeration of countries that it is now. Indeed, this is a big step forward in shifting the world’s attention from fossil fuels to renewable energy. But equally important could be the ISA’s role in putting India on the fast track in reaching its renewable energy goals. As part of its climate change commitments, India has set a target to generate close to 40 per cent of its energy from renewable sources by 2022. The ISA by “ensuing access to affordable, reliable, sustainable and modern energy for all” could help the country access technology and funds that weren’t easily available before.

Already work on several projects in areas such as solar pumps, mini grids, rooftop panels, solar e-mobility and storage are under way. Three programmes-on scaling solar applications for agriculture use, affordable finance at scale, and scaling solar mini-grids-are aimed at achieving the overall goal of increasing solar energy deployment in the ISA member countries for achieving universal energy access and speeding up economic development.

In addition to these three, two more projects are in the offing: on solar rooftops panels and e-mobility and storage. Digital infopedia, a platform to enable policy makers, ministers and corporate leaders from ISA countries to interact, connect communicate and collaborate with one another, is another major initiative of the ISA so far.

Of all these programmes, the one on financing is currently taking centre stage. It is on accelerated path and the prime objective of the ISA currently. The official development budget for the 52 partner countries is \$102 billion. The first partner is the World Bank and the European Investment Bank. The ISA is looking to tap Indian corporations. Officials says close to \$2 billion is likely to be raised from them, although no firm commitment has been made by any company yet.

8. CONCLUSION:

As per the geographical location of the country, India stands to its benefit and has tremendous scope of generating solar energy. Solar Power Generation alone can cater more than 60-65% of our entire need of power. With the changing business dynamics in solar, the Government has started playing a vital role in the sector by extending attractive preferential tariff to the project developers. This has led to an increase in the number of players participating in the solar business and thus exploring the enormous existing potential. These encouraging developments would catapult India into the league of developed solar markets in the world.

Further, Country like India has very much unbalanced in electricity production. Production is less and consumption is very much. Solar power is very good option in India to increase power production. This is also very good for our environment protection and economic development. Keeping all these informations in mind it could be concluded that the future of new entrepreneurs are lies in investing and

exploring this sector. As there are ample scope in this sector, it could also be a sector of attraction to young Company Secretary Professionals who are interested to be a successful entrepreneur of their own.

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