Development of Solar Power Sector in Telangana State, India

M.Sheshagiri[1], Dr.B.V.Sankerram[2]
[1] *Divisional Engineer, TSTRANSCO, Vidyut Soudha, Hyderabad, Telangana, India*
[2] *Professor, Department of Electrical and Electronics Engineering, College of Engineering Hyderabad, JNTUH, Hyderabad, Telangana, India*

***Abstract*- At the time of formation of state, the scenario of Telangana State Power Sector was with industrial power holidays, 5 to 6 hours agriculture supply to formers and unscheduled domestic power cuts in rural as well as urban areas. The estimated deficit of power was around 1000 to 1500 MW. With a huge deficit of power and as a power starved state, the future is expected to be in difficult situation. The state government initiatives like power procurement about 1000 MW as Long Term Agreements, commissioning of pending Thermal Power Projects of about 1800MW, made the state power sector to overcome crucial situation, provide uninterrupted power supply to the consumer. In last 2 years the state electricity has turned up beyond the expectations, without industrial power holidays, 9 hours day time agriculture sector and no domestic load shedding except emergencies. Eco friendly and green corridor policies like roof top metering, solar power policy 2015 and wind power policy 2016 were announced by the government to overcome the power deficit as early as possible and move towards power surplus position by 2020. The state weather forecast is also favourable for solar power generation, with hot and dry climate. In this paper, development solar power sector in Telangana State is depicted in graphical form.**

***Index Terms*- CEA- Central Electricity Authority, CERC –Central Electricity Regulatory Commission, DISCOMs- Distribution Companies, GOI- Government of India, MNRE- Ministry of New and Renewable Energy, RPPO-Renewable Power Purchase Obligation, TSERC – Telangana State Electricity Regulatory Commission.**

I. INTRODUCTION

Solar energy is produced from radiation of the sun. It is a natural and renewable energy. Its Clean, Nonpolluting, No emission of gases, Smoke, Dust, Environmental friendly, Green Power. The areas under the Deccan Plateau are characterized with hot summers and mild winters.

Telangana is geographically located in Deccan Plateau, is a semi-arid zone and has mostly hot and dry climate.

In Telangana region, the typical maximum temperature varies between 40^{o}C and 45^{o}C in May and the normal minimum temperature varies between 13^{o}C to 17^{o}C in December and January. The minimum temperature falls rapidly after October, and less than 10^{o}C has also been recorded on certain days. The semi-dry weather conditions in the state are favorable for the solar power sector.

To handle generation/ demand gap in next 2 to 3 years of time, the state government has decided to encourage the renewable energy sources which are to be realized faster than conventional thermal power plants. The state has prioritized the Solar Power Generation in view of the abundant Solar Potential availability and less time of commissioning.

II. LIMITATIONS OF CONVENTIONAL FUELS

The limitations with fossil fuels are:

- Limited fuels available on earth.
- Increasing Consumption of energy
- Polluted environment

As per the present consumption levels, it is estimated that-

- Crude oil will last only for 40 years.
- Gas will last for 60 years.
- Coal will be finished in nearly 200 years.

III. NON CONVENTIONAL CAPACITY ADDITION PLANNED

The Government of India (GOI) has set a target of 175 GW non-conventional power addition by the end of 2022 (Source MNRE) and 100 GW Solar Power by 2022(Source MNRE):

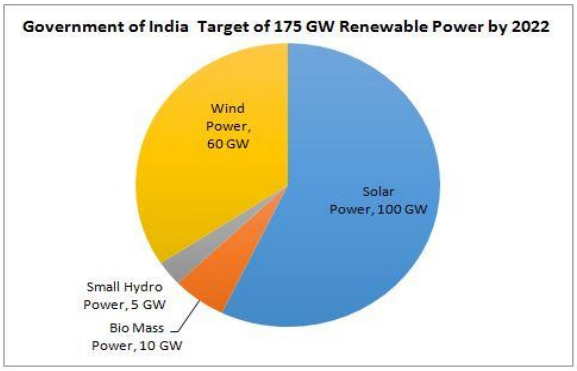

Fig.1. GOI Target of 175 GW Renewable Energy addition by 2022

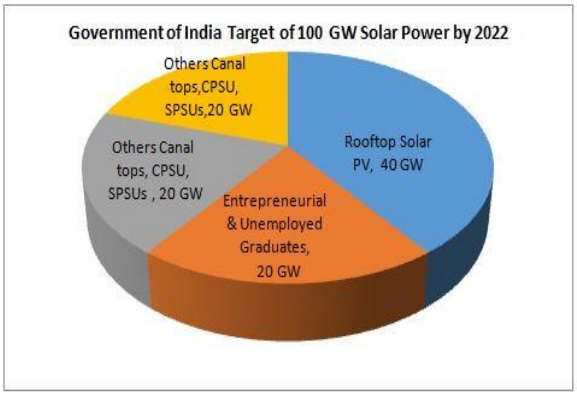

Fig.2 GOI Target of 100 MW Solar Power addition by 2022

Year wise targeted solar power addition plan of 100 GW by 2022 :

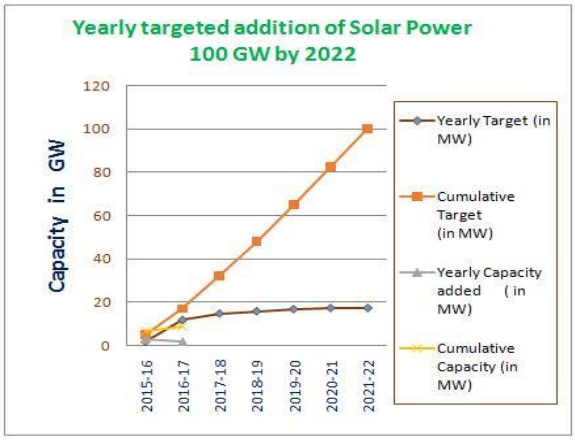

Fig.3 Year wise targeted Solar Power addition under 100 GW Plan by 2022

State wise target of solar capacity addition in Southern States under 100 GW solar plan by 2022:

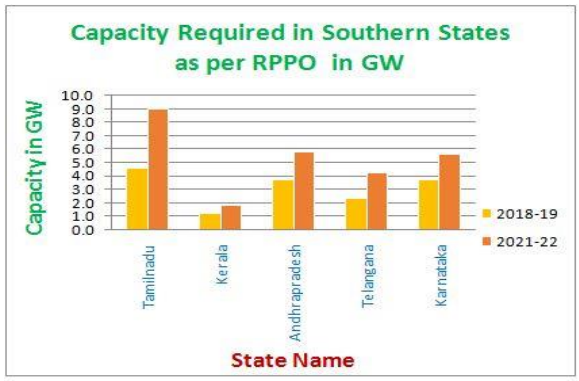

Fig.4 Southern States Targeted Solar Power Capacity Addition under 100 GW Plan by 2022

IV. TOTAL GENERATION INSTALLED CAPACITY

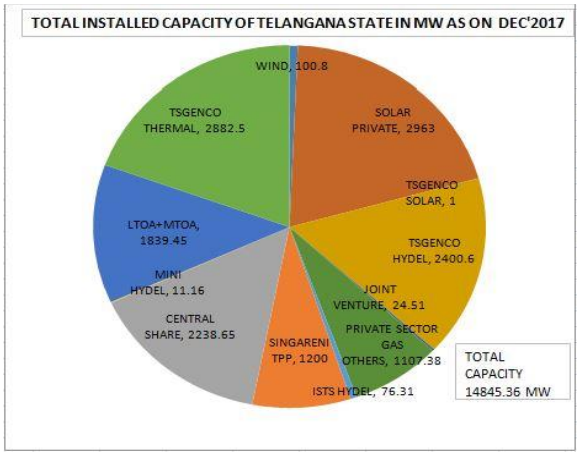

Fig.5 Total Installed Capacity in MW

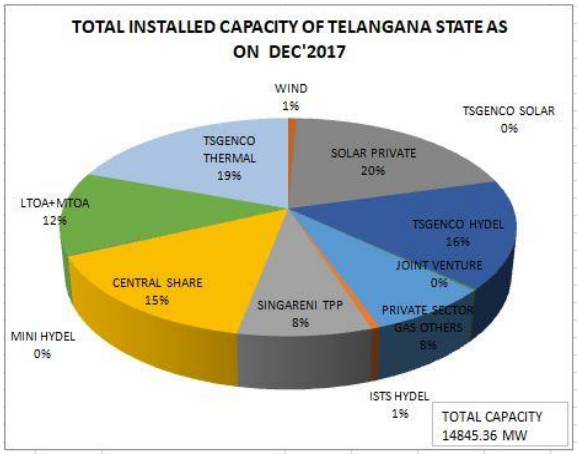

Fig.6 Total Installed Capacity as %

From the Fig.5 it can be observed that contribution of solar power to state is 2963 MW. Fig.6 indicates 20% of Total installed capacity as on Dec'2017.

V. STATUS OF SOLAR POWER PROJECTS AS ON Dec'2017

Details of sales	Total Capacity in MW	Capacity Commissioned to Grid in MW	Capacity to be Commissioned in MW
Sale to DISCOM	3366.95	2756.66	610.29
Third Party Sale	280.53	133.90	146.63
Captive use	144.89	72.77	72.12
Total	3792.37	2963.33	829.04

VI. STATUS SOLAR POWER ADDITION IN TELANGANA

Fig.7 Year wise Solar Capacity Addition in MW

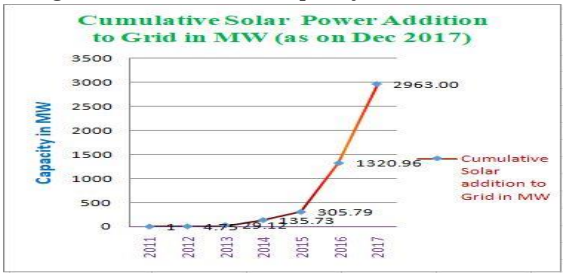

Fig.8 Year wise Cumulative Solar Capacity addition in MW

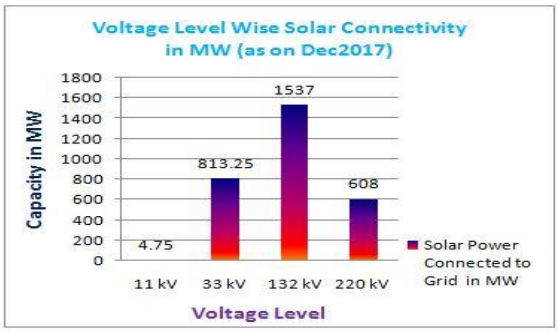

Fig.9 Voltage Level wise Solar Capacity Addition in MW

VII. CONCLUSION

The legal frame work provided under the Indian Electricity Act 2003, RPP Obligation under APERC Regulation 1 of 2012 (adopted by TSERC), Telangana State Solar Policy 2015 has given encouragement to the solar power producers. Solar power contribution is more to the average demand (overall energy consumption) than peak demand of the system.

The above Fig.7, Fig.8 and Fig.9, indicates solar generation capacity addition to the state grid during 2011 to 2017. The Year wise Capacity addition in MW in the State, in the initial years is quite less but during year 2016,2017 over 1000MW as seen from Fig.7. The cumulative solar capacity addition almost flat at initial years but shows sharp rise in last two years shown in Fig.8, gives positive indication for the future of solar power generation in Telangana. The voltage level wise solar capacity addition is shown in Fig.9, indicates major portion of capacity addition is done at 132 kV level. To be commissioned solar power plants about 829.04 MW may be expected to be synchronized with state grid in next year.

This paper is presented as a part of research work of author[1] under the guidance of author[2] and views expressed in this paper do not necessarily represent the views the Governments or Corporations or Institutions mentioned [1] to [16] in this paper or to which authors belong.

REFERENCES

[1] Ministry of new and renewable energy, GOI,http://mnre.gov.in/
[2] Indian Electricity Act,2003
[3] Telangana State Electricity Regulatory Commission, http://www.tserc. gov.in/
[4] Andhra Pradesh State Electricity Regulatory Commission, http:// www.aperc.gov.in/
[5] Telangana New and Renewable Energy Development Corporation Limited, http:// tnredcl.telangana.gov.in/
[6] Southern Power Distribution Company of Telangana Limited, https:// tssouthernpower.com/
[7] Telangana State Solar Policy 2015.
[8] Transmission Corporation of Telangana, http://transco.telangana.gov.in//

[9] Northern Power Distribution Company of Telangana Limited http:// www.tsnpdcl.in/
[10] Ministry of Power,GOI, www.powermin.nic.in
[11] Telangana State Power Generation Corporation Limited, http:// tsgenco.telangana.gov.in/
[12] http://ujwalbharat.gov.in/
[13] Solar Energy Corporation of India Limited, http://www.seci.gov.in/
[14] Central Electricity Regulatory Commission,www.cercind.gov. in
[15] http://www.moef.nic.in/modules/about-the-ministry/CCD/NAP_E.pdf
[16] http://www.moef.gov.in/sites/default/files/Telangana.pdf
[17] IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems, IEEE Std 519™-2014
[18] Shreemat Pandey, Vijai Shanker Singh, Naresh Pal Gangwar, M.M.Vijayvergia, Chandra Prakash, Deep Narayan Pandey, "Determinants of Success for Promoting Solar Energy in Rajasthan, India" ELSEVEIR, Renewable and Sustainable Energy Reviews 16(2012)3593-3598
[19] Ravi Ranjan Pandey, Ms. Sujata Arora, "Distributed Generation System: A Review and its Impact on India", International Research Journal of Engineering and Technology(IRJET),Volume:03, Issue:04,April 2016.
[20] Sweta, Mohamed Samir, " A Generalized Overview of Distribution Generation", International Journal of Emerging Research in Management & Technology, ISSN:2278-9359 (Volume-2,Issue-12), December 2013.
[21] Swami Prakash Srivastava, Surat Prakash Srivastava, "Solar Energy and its Future Role in Indian Economy", International Journal of Environmental Science : Development and