27

STANDING COMMITTEE ON ENERGY

(2021-22)

SEVENTEENTH LOK SABHA

MINISTRY OF NEW AND RENEWABLE ENERGY

EVALUATION OF WIND ENERGY IN INDIA

TWENTY-SEVENTH REPORT

LOK SABHA SECRETARIAT
NEW DELHI

July, 2022/Sravana, 1944 (Saka)

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Presented to the Lok Sabha on 2nd August, 2022

Laid in the Rajya Sabha on 2nd August, 2022

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REPORT

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LOK SABHA

Shri Rajiv Ranjan Singh *alias* Lalan Singh - Chairperson

2. Shri Gurjeet Singh Aujla
3. Shri Devendra Singh Bhole
4. Shri Harish Dwivedi
5. Shri Sanjay Haribhau Jadhav
6. Shri Kishan Kapoor
7. Dr. A. Chella Kumar
8. Shri Sunil Kumar Mondal ^
9. Shri Uttam Kumar Reddy Nalamada
10. Shri Ashok Mahadeorao Nete
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17. Shri Gnanathiraviam S.
18. Shri Bellana Chandra Sekhar
19. Shri Shivkumar C. Udasi
20. Vacant**
21. Vacant#

RAJYA SABHA

22. Shri Ajit Kumar Bhuyan
23. Shri Rajendra Gehlot *
24. Shri Muzibulla Khan
25. Shri Maharaja Sanajaoba Leishemba
26. Shri S. Selvaganabathy *
27. Dr. Sudhanshu Trivedi
28. Shri K.T.S. Tulsi
29. Vacant$
30. Vacant &
31. Vacant^^

SECRETARIAT

1.	Dr. Ram Raj Rai	Joint Secretary
2.	Shri R.K. Suryanarayanan	Director
3.	Shri Kulmohan Singh Arora	Additional Director
4.	Ms. Deepika	Committee Officer

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^ Nominated as Member of the Committee w.e.f. 01.12.2021 vice Smt. Sajda Ahmed.

@ Nominated as Member of the Committee w.e.f. 07.02.2022 vice Shri Ramesh Chander Kaushik.

*** Shri Akhilesh Yadav ceased to be Member of the Committee consequent upon his resignation from membership of the Lok Sabha on 22.03.2022.*

 # Vacant since constitution of the Committee.

** Nominated as Member of the Committee w.e.f. 11.11.2021.*

$ Shri Jugalsinh Lokhandwala resigned from the membership of the Committee on 02.12.2021.

& Shri T.K.S. Elangovan ceased to be Member of the Committee consequent upon his retirement from the Rajya Sabha on 29.06.2022.

^^ Shri Sanjay Seth ceased to be Member of the Committee consequent upon his retirement from the Rajya Sabha on 04.07.2022.

LIST OF ABBREVIATIONS	
BE	Budget Estimates
CEA	Central Electricity Authority
CFA	Central Finance Assistance
Committee	Standing Committee on Energy (2021-22)
CoP-21	21st Session of the Conference of Parties held at Paris in 2015
CoP-26	26th Session of the Conference of Parties held at Glasgow in 2021
CUF	Capacity Utilisation Factor
DISCOM	Distribution Company
DPR	Detailed Project Report
EEZ	Exclusive Economic Zone
FDI	Foreign Direct Investment
FiT	Feed in Tariff
GBI	Generation Based Incentive
GW	Giga-watt
IPPs	Independent Power Producers
IREDA	Indian Renewable Energy Development Agency
ISTS	Inter State Transmission System
JERC	Joint Electricity Regulatory Commission
KWh	Kilo Watt hour
LC	Letter of Credit
LCOE	Levelized Cost of Energy
LiDAR	Light Detection and Ranging
LVRT	Low-Voltage Ride-through Capability
Ministry	Ministry of New and Renewable Energy
MNRE	Ministry of New and Renewable Energy
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MW	Megawatt
NIWE	National Institute of Wind Energy
NOC	No Objection Certificate
NPA	Non Performing Asset
PLF	Plant Load Factor
PM KUSUM	Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan
PPA	Power Purchase Agreements
PSU	Public Sector Undertaking
PV	Photo Voltaic
R&D	Research and Development
RECs	Renewable Energy Cerificates
RLMM	Revised List of Models and Manufacturers
RPO	Renewable Purchase Obligations
SECI	Solar Energy Corporation of India
SERC	State Electricity Regulatory Commission
VGF	Viability Gap Funding
WTG	Wind Turbine Generator

INTRODUCTION

I, the Chairperson, Standing Committee on Energy, having been authorized by the Committee to present the Report on their behalf, present this Twenty-Seventh Report of the Committee on 'Evaluation of Wind Energy in India' pertaining to the Ministry of New and Renewable Energy.

2. The Committee took evidence of representatives of the Ministry of New and Renewable Energy, Indian Renewable Energy Development Agency (IREDA), Solar Energy Corporation of India (SECI) and National Institute of Wind Energy (NIWE) on 14th December, 2021. The Committee wish to express their thanks to the representatives for appearing before the Committee and furnishing the desired information in connection with the issues relating to the subject.

3. The Report was considered and adopted by the Committee at their sitting held on 26th July, 2022.

4. The Committee place on record their appreciation for the assistance rendered to them by the officials of the Lok Sabha Secretariat attached to the Committee.

5. For the facility of reference and convenience, the observations and recommendations of the Committee have been printed in bold letters in Part-II of the Report.

New Delhi
26th July, 2022
Sravana 4, 1944 (Saka)

Rajiv Ranjan Singh *alias* Lalan Singh
Chairperson,
Standing Committee on Energy

REPORT

PART I
NARRATION ANALYSIS

CHAPTER I
INTRODUCTORY

1.1 India has fourth highest wind power installed capacity in the World. The Ministry has furnished that a total of 733.30 GW capacity of wind power have been installed worldwide (as on December 2020). The installed capacity of wind power in some of the leading Countries (as of 2020) are as under:

S. No.	Country	Installed Wind Power Capacity (GW)	Share of Wind Energy in their Electricity Mix (%)
1	PR China	282	6.12
2	USA	117.70	8.31
3	Germany	62.20	19.90
4	India	38.60	4.50
5	Spain	27.10	22.87
6	United Kingdom	24.70	21.07
7	France	17.40	6.74
8	Brazil	17.20	9.36
9	Canada	13.60	5.35
10	Italy	10.80	7.44
11	Rest of World	122	-

1.2 In 2015, due to commitments made at CoP-21 in Paris, the Government of India has set a target for installation of 175 GW of renewable energy capacity by the year 2022, which includes 60 GW from wind power. Recently, at CoP-26 in Glasgow, India has again made a commitment to increase its non-fossil fuel based installed energy capacity to 500 GW by 2030.

1.3 In response to a question about the expected share of wind energy in the new target of 500 GW of installed non-fossil fuel based energy capacity, the Ministry stated as follows:

"Central Electricity Authority (CEA) in its Report on 'Optimal Generation Capacity Mix for 2029-30' has estimated 140 GW of installed wind power capacity by 2030."

1.4 When asked about the action-plan of the Ministry in order to achieve the new target, the Ministry stated as follows:

"The Ministry has constituted a committee under the co-chairmanship of Secretary, MNRE and Secretary, Power to prepare Roadmap for Mission 500 GW. The first meeting of the committee was held on 13.01.2022 and accordingly, the following four sub-groups have been constituted:

Sub Group-I – Assess the requirement of Regulatory changes, RPO enforcement, Storage elements and Market Design to achieve 500 GW non fossil fuel capacity in a least cost manner.

Sub Group-II – Assess the role of Open access, Decentralized PM-KUSUM, Roof Top Solar, Hydro Power in achieving the target of 500 GW.

Sub Group-III – Assessment of additional renewable energy capacity required for green Hydrogen production.

Sub Group-IV – Assessing the investment in transmission required for achieving 500 GW non-fossil fuel capacity in a cost effective manner, including use of storage elements in transmission planning."

1.5 Currently, India has the total wind power installed capacity of 40.71 GW (as on 31st May, 2022). The share of wind power in the total installed capacity mix in the Country has also been increasing steadily. It has gone up from 6% in 2007-08 to 10.2% as on 30th October 2021. However, in spite of the increase in wind power capacity in the Country, only a fraction of the Country's wind energy potential has been tapped till date.

CHAPTER II

EVALUATION OF WIND ENERGY

A. Wind Resource Assessment and Potential:

2.1 About the Wind Resource Assessment, the Ministry furnished the following:

> "The Wind Resource Assessment Programme has been in existence since 1986. Nearly 3000 number of wind monitoring stations have been installed for data collection. Out of this, more than 800 number of wind monitoring stations have been installed by National Institute of Wind Energy and currently 56 monitoring stations are operational."

2.2 The wind resource assessment conducted by the National Institute of Wind Energy estimates wind power potential of 302.20 GW at 100 meter above ground level and 695.50 GW at 120 meter above ground level in the Country. Out of this, potential of about 214 GW has been estimated with more than 30% CUF and about 57 GW with more than 35% CUF. The State and Union- territory wise wind power potential in the Country, as furnished by the Ministry, is given below:

State	Wind potential at 100 m above ground level	Wind potential at 120 m above ground level
Andaman& Nicobar Islands	8.43	1277
Andhra Pradesh	44228.6	74906
Arunachal Pradesh	0	274
Assam	0	246
Bihar	0	3650
Chandigarh	0	0
Chhattisgarh	76.59	348
Daman, Diu, Dadra	0	0
Delhi	0	0
Goa	0.84	8
Gujarat	84431.33	142560
Haryana	0	419

Himachal Pradesh	0	151
Jammu & Kashmir	0	3
Jharkhand	0	0
Karnataka	55857.36	124155
Kerala	1699.56	2311
Lakshadweep	7.67	31
Madhya Pradesh	10483.88	15404
Maharashtra	45394.34	98213
Manipur	0	0
Meghalaya	0	1
Mizoram	0	0
Nagaland	0	0
Odisha	3093.47	8346
Puducherry	152.83	382
Punjab	0	278
Rajasthan	18770.49	127756
Sikkim	0	0
Tamil Nadu	33799.65	68750
Telangana	4244.29	24835
Tripura	0	0
Uttar Pradesh	0	101
Uttarakhand	0	54
West Bengal	2.08	1050
Total in MW	**302251.49**	**695509**
Total in GW	**302.20**	**695.50**

2.3 When asked about the reasons for setting a lower installation target for wind power than solar power given the huge wind power potential and stronger domestic manufacturing in the wind sector, the Ministry stated as under:

> "Wind resource is highly site specific and available in eight states only, while solar resource is distributed across the Country. The wind resources assessment carried out by the National Institute of Wind Energy (NIWE) estimated a total wind energy potential of 695 GW at 120 meter hub height. However, it may be noted that, presently in order to make the tariff commercially attractive, the wind power installations sites chosen are those which have an annual average Capacity Utilization Factor (CUF) of at least 30%. Thus, considering availability of sites with an annual average of 30% CUF and above excluding the area where wind farms already exists and other exclusions such as protected

areas, airports, elevations etc., the total estimated wind energy potential would be much lower. Further, about 97% of these high wind resource potential sites are concentrated in eight states namely Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Telangana and Tamil Nadu. Majority of wind rich sites of the Country have already been exploited to a large extent. The recently market discovered tariffs have already started moving upwards and had reached up to Rs. 3 per kWh & thereafter stabilized near Rs. 2.70-2.80 per kWh during the last bids conducted by SECI. In addition right of way for approach roads & evacuation infrastructure is also becoming one of the bottlenecks for onshore wind projects. With best windy sites been already utilized, the tariff is expected to have upward movements for onshore wind energy in future."

B. Installed Capacity and Power Generation from Wind Energy:

2.4 As per Central Electricity Authority, the installed capacity of wind power and solar power was 21042.58 MW and 2631.93 MW respectively as on 31st March, 2014.

2.5 Against the overall target of 60 GW and 100 GW to be achieved by December 2022, the cumulative installed capacity of wind power and solar power are 40706.38 MW and 56951.33 MW as on 31st May, 2022.

2.6 About the possibility of achievement of the target by December 2022, the Secretary, Ministry of New and Renewable Energy, deposed during the evidence as under:

"It is true that our target is 60 GW by the year 2022. As per the current situation, we may not be able to reach 60 GW. This is not only true for wind, but also for the overall target for Renewable Energy. The delays are due to COVID and the impact of solar supply chain disruptions in China. Extension of five and a half months is given for the Scheduled Commissioning and additional extension on case-to-case basis is being considered for some projects as special dispensation to offset the effect of COVID. As a result, it will take us some more time to reach 175 GW."

2.7 The details of year wise capacity addition of Wind Energy, as furnished by the Ministry, are given below:

Year	Capacity Addition (MW)
2010-11	2349.25
2011-12	3196.66
2012-13	1700.30
2013-14	2078.88
2014-15	2311.775
2015-16	3423.05
2016-17	5502.37
2017-18	1865.235
2018-19	1480.965
2019-20	2117.785
2020-21	1503.30
2021-22	1110.525

2.8 The year wise share of Wind Energy in total installed power capacity in the Country, as furnished by the Ministry, is given below:

As on	Total Installed Power Capacity (MW)	Wind Power (MW)	% Wind Power of Total Capacity
31.03.11	173626.41	14155.94	8.15
31.03.12	199877.03	17352.60	8.68
31.03.13	223343.57	19052.90	8.53
31.03.14	248554.39	21131.78	8.50
31.03.15	274904.37	23443.555	8.53
31.03.16	305162.50	26777.39	8.77
31.03.17	326832.53	32279.76	9.88
31.03.18	344002.39	34144.995	9.93
31.03.19	356100.19	35625.96	10.00
31.03.20	370106.46	37743.745	10.20
31.03.21	382151.22	39247.045	10.27
31.12.21	393389.46	40082.70	10.19
31.03.22	399496.61	40357.58	10.10

2.9 The annual share of Wind Energy in the total power generated in the Country, as furnished by the Ministry, is given below:

Years	Total Generation (MU)	Wind Generation (MU)	Percentage of Wind Generation in total Generation
2013-14	1020209.10	31264.80	3.06
2014-15	1110392.21	33768.30	3.04
2015-16	1173603.14	33029.39	2.81
2016-17	1241689.15	46004.34	3.70
2017-18	1308145.74	52666.09	4.03
2018-19	1376095.79	62036.38	4.51
2019-20	1389160.93	64646.38	4.65
2020-21	1381855.15	60149.95	4.35
2021-22 (upto December, 2021)	1113712.35	58127.26	5.22

2.10 Regarding slow pace of installation of wind power as compared to solar power, the Secretary deposed as under:

> **"**It is true that, in comparison to Solar, the condition of wind is somewhat bad. ……..One of the main reasons for this is that wind power is comparatively more expensive than solar. It is also true that after the introduction of e-reverse bidding and e-reverse auction, the pace of wind projects have not been the same as before. We are in constant conversation with developers and their concern is that wind project development has certain factors which make some developers to deliberately quote lower prices for competition and then, they back out. We are now taking measures to prevent such thing."

2.11 In response to a question about the viability of small wind energy projects, the Ministry stated as under:

> "The small wind energy projects (i.e. sub MW scale) are being installed in the country for captive consumption or third party sale. The wind turbine models of 225 kW and 250 kW capacities are listed in Revised List of Models and Manufacturers (RLMM) issued by MNRE."

2.12 On being asked about the possibility of off-grid wind power projects, the Ministry furnished the following:

> "The Offgrid wind power units are technically feasible to meet the local energy requirements. As on date, there is no specific scheme/ programme for installation of offgrid wind power projects. The captive

wind power plants are installed in the Country on the basis of their techo-economic viability. The capacity of captive wind power plants installed in major states are as under:

Gujarat	2203.845 MW
Rajasthan	198.390 MW
Maharashtra	129.30 MW (under state policy 2008 & 2015)
Andhra Pradesh	309.67 MW
Tamil Nadu	6252.875 MW
Karnataka	810.270 MW

2.13 When asked about the impact of lockdown imposed due to Covid-19 on Wind Energy Sector, the Ministry stated as under:

"The wind power projects have been delayed due to COVID-19 pandemic during the last and current financial year (i.e. 2020-21 and 2021-22). The industry reported that there has been supply chain disruption and shortage of skilled manpower during the pandemic. Further, the second surge of pandemic was followed by monsoon season in various parts of the Country. It has delayed the commissioning of projects and targets in the wind energy sector. Around 9 GW of wind power projects with an estimated investment of Rs 63,000 crore were under various stages of implementations during the pandemic, which were negatively impacted.

Considering the hardship caused to the developers and unprecedented situation arisen due to pandemic, Ministry has given extension of 5 months and 2.5 months on account of COVID-19 restrictions during 1st and 2nd wave respectively. Further, the activities related to renewable energy projects (including wind energy projects) were covered under essential activities and were allowed to continue even during lock down situation. Further, in order to provide relief to wind power project developers on account of supply chain disruption due to second COVID-19 surge, the Ministry decided that for wind power projects for which the PPA was signed and orders for WTGs were placed before 15th June, 2021, the implementing agencies can allow an additional time extension up to 3 (three) months in the Scheduled Commissioning Date. In addition, Ministry also permitted part commissioning of wind power projects in lot of 10 MW or more, in place of stipulated minimum capacity of 50 MW for part commissioning in the guidelines."

C. Cost of Installation and Plant Load Factor (PLF) of Wind Energy Power Plants

2.14 When asked about the per megawatt cost for installation of wind energy project vis-à-vis other power projects, the Ministry furnished the following:

Projects	Per Megawatt cost for installation (in Rs. Crore)
Solar Projects	3.5 – 4
Wind Projects	6 – 7
Small Hydro Projects	7.8-11
Large Hydro Projects	6-20
Bio Power Projects	5-6
Coal based Thermal Projects	8.34
Gas based Thermal Projects	5.11
Hydrogen Energy Projects	6.75-9 (excluding renewable capacity)
Wind-Solar Hybrid Plants	5.73

2.15 In response to a question about the plant load factor of wind power projects vis-à-vis other power projects, the Ministry stated as under:

> "The typical plant load factor (PLF) for wind power is 30-40%. Whereas, the PLF of thermal power plants and Hydro power plants is around 60%. For solar power plant, it is in the range of 18-25%. Although the gas based power plants are designed to operate at a higher PLF, but due to non-availability of adequate gas supply, the actual PLF of these plants are in the range of 20-25% in the Country."

C. Tender/Bidding in Wind Energy Sector:

2.16 The wind energy capacity additions till 2017 were through Feed-in-Tariff mechanism and subsequently, the tariff regime has been shifted from Feed-in-Tariff to bidding route. The Ministry furnished that the total funds disbursed under Generation based Incentive (GBI) Scheme is Rs. 7159.867 crore as on 30th November, 2021; total yearly fund outflow is Rs. 1000 crore to Rs. 1200 crore and estimated liability to be disbursed till the year 2027 is Rs. 5781 crore.

2.17 The Government issued 'Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Wind Power Projects' on 08.12.2017 and amended on 16.07.2019 with an objective to provide a framework for procurement of wind power through a transparent process of bidding including standardization of the process and defining of roles and responsibilities of various stakeholders. These Guidelines aim to enable the Distribution Licensees to procure wind power at competitive rates in a cost effective manner.

2.18 On being asked about the government agencies/PSUs involved in conducting bidding for wind energy projects, the Ministry stated the following:

> "The bids with respect to wind energy projects have been conducted by Solar Energy Corporation of India, NTPC Ltd. and DISCOMs of the States of Gujarat, Tamil Nadu and Maharashtra."

2.19 Major developers in wind energy sector, as furnished by the Ministry, are given below:

- Adani Green Energy Limited,
- ReNew Power Private Limited,
- Inox Green Energy Services Limited,
- Green Infra Wind Energy Limited,
- Ostro Kutch Wind Private Limited,
- Mytrah Energy India Private Limited,
- Alfanar Energy Private Limited,
- Betam Wind Energy Private Limited,
- Powerica Limited,
- Spring Energy Private Limited,
- Srijan Energy Systems Private Limited,
- BLP Energy Private Limited,
- Sita Kabini Renewables Private Limited,
- Ecoren Energy India Private Limited,
- CLP India Private Limited,
- JSW Future Energy Ltd, etc.

2.20 To enable DISCOMs of the States to fulfill their non-solar Renewable Purchase Obligation (RPO), through purchase of wind power at a tariff determined by transparent bidding process, MNRE through SECI has auctioned wind power projects in 11 tranches. Further, States of Gujarat, Maharashtra and Tamil Nadu have also auctioned Wind power capacities. Details of these projects, as furnished by the Ministry, are given below:

Sl. No	Bidding	Bid Capacity (MW)	Capacity awarded (MW)	Capacity cancelled (MW)	Net capacity (MW)	Capacity Commissioned (MW)	Bidding Agency	Min. Tariff (Rs./kwh)
1.	SECI-I	1000	1049.9	50	999.9	999.9	Central	3.46
2.	SECI-II	1000	1000	19.9	980.1	750.1	Central	2.64
3.	SECI-III	2000	2000	0	2000	950.2	Central	2.44
4.	SECI-IV	2000	2000	0	2000	636.7	Central	2.51
5.	Tamil Nadu	500	450	0	450	49.5	State	3.42
6.	Gujarat (GUVNL)	500	500	30	470	470	State	2.43
7.	Maharashtra (MSEDCL)	500	500	0	500	274.4	State	2.85
8.	SECI-V	1200	1190	0	1190	0	Central	2.76
9.	NTPC	1200	1150	1150	0	0	Central	2.77
10.	SECI – VI	1200	1200	0	1200	386.5	Central	2.82
11.	SECI – VII	1200	480	0	480	103.5	Central	2.79
12.	Gujarat GUVNL Ph.-II	1000	202.6	0	202.6	165	State	2.80
13.	SECI–VIII	1800	440	0	440	0	Central	2.83
14.	SECI IX	2500	970	0	970	0	Central	2.99
15.	SECI X	1200	1200	0	1200	0	Central	2.77
16.	SECI XI	1200	1200	0	1200	0	Central	2.69
Total		**20000**	**15532.5**	**1249.9**	**14282.6**	**4785.8**		

D. Off-Shore Wind Energy:

2.21 The Government had notified the 'National Offshore Wind Energy Policy' as per the Gazette Notification dated 6th October 2015. As per the policy, Ministry of New and Renewable Energy will act as the nodal ministry for development of Offshore Wind Energy in India and work in close coordination with other government entities for development and use of maritime space within the Exclusive Economic Zone (EEZ) of the Country in effective manner for production of grid quality electrical power for national consumption. National Institute of Wind Energy (NIWE), Chennai has been

designated as the nodal agency to execute various pre-feasibility activities relating to resource assessment, surveys and studies within EEZ (Exclusive Economic Zone), demarcation of offshore potential blocks and facilitating offshore wind energy project developers for setting up offshore wind energy farms.

2.22 When asked about the progress made with respect to assessment and harnessing of off-shore wind energy, the Ministry stated as under:

> "The National Institute of Wind Energy (NIWE), Chennai had commissioned a LiDAR (Light Detection and Ranging) equipment in November, 2017 for measurement of wind resource off the coast of Gujarat. Wind measurement data collection for two years has been completed and also validated with a ground mounted wind monitoring station at Jafrabad, Gujarat. NIWE has already published a report based on two years of collected data from the LiDAR. Further, required geophysical study for an area of about 365 Sq. km has been completed along with geotechnical studies for five bore holes in gulf of Khambhat, off Gujarat Coast. A rapid Environment Impact Assessment study has also been conducted through the National Institute of Oceanography for proposed one GW offshore wind energy project off Gujarat Coast. Further, Ministry is developing strategy and roadmap for installation of offshore wind projects off the coast of Gujarat and Tamil Nadu."

2.23 On being asked about the potential of off-shore wind energy in the Country, the Ministry stated the following:

> "Based on the preliminary assessment from satellite data and data available from other sources, 8 (eight) zones each in Gujarat and Tamil Nadu have been identified as potential offshore zones for exploitation of offshore wind energy potential. Initial assessment of offshore wind energy potential within the identified zones has been estimated to be about 70 GW off the coast of Gujarat & Tamil Nadu only."

2.24 In response to a question about the per megawatt cost and tariff of off-shore wind projects, the Ministry furnished the following:

"At present, the exact cost is not ascertained as there is no operational or under implementation offshore wind energy project in the Country. However, as per the Global offshore wind energy scenario, the per megawatt cost of offshore wind project would be in the range of Rs 20 crore to 25 crore and it may vary depending on various parameters such as technology, wind & marine conditions, distance from the shore etc., Further it is observed from the global scenario that the cost of the offshore wind projects reduces gradually as the cumulative installed capacity increases.

Considering the above, the Levelized Cost of Energy (LCoE) as per the Global offshore wind energy scenario would be in the range of Rs. 6.5–10 initially. Based on the global trend, it has been observed that with increasing economies of scale, more competitive supply chains and further technological improvements, the tariff can reduce significantly for subsequent projects."

2.25 On being asked whether the cost and tariff will be uniform for all the coastal states, the Ministry stated as under:

"The initial rates cannot be uniform for all coastal states since the cost of energy depends on various factors such as wind speed & bathymetry which are dynamic in nature. Further, geological parameters such as geophysical, geotechnical features, oceanography and met-ocean are different for different sites and play a critical role in determination of price. However, economies of scale, competitive supply chains and further technological improvements can reduce the cost of energy and the rates may be competitive among the coastal states in future."

2.26 When asked about the cost effectiveness and capacity utilization factor of off-shore wind projects vis-à-vis on-shore wind projects, the Ministry stated as follows:

"As per the initial analysis carried out by the National Institute of Wind Energy (NIWE), the annual average CUF of offshore wind energy projects in India ranges between 35%–55 % for Tamil Nadu and 35%-40% for Gujarat. In the case of onshore wind energy projects in India, the annual average CUF would range between 25%–40%. Currently,

onshore wind power projects are more cost effective, in comparison to the offshore wind energy."

2.27 In response to a question about the need to develop off-shore wind power when it is much costlier than on-shore wind power, the Secretary during the evidence, deposed as under:

"Mainly there are three reasons why we should develop offshore wind power – first; our targets are so high that we will need every source of energy including offshore wind power. Second; one of the advantages of developing offshore wind energy would be that the manufacturing of offshore wind turbines will be encouraged in the country. Third; due to certain characteristics of offshore wind energy such as seasonality etc., the contribution of offshore in firm wind power will be higher."

2.28 On being asked about the quantum of Viability Gap Funding required to make the off-shore wind energy projects viable, the Ministry furnished the following:

"A total Viability Gap Funding (VGF) of Rs. 14,212 Crores is estimated to establish 3 GW of offshore wind energy projects (1.0 GW off the coast of Gujarat and 2.0 GW off the coast of Tamil Nadu). In addition, separate transmission and evacuation infrastructure with an estimated cost of Rs. 13,500/- crores will be required to be built through Central Transmission Utility to enable power evacuation through these off shore wind power projects."

E. Wind – Solar Hybrid Projects:

2.29 About the Wind-Solar Hybrid Policy, the Ministry furnished the following:

"The Ministry issued National Wind-Solar Hybrid Policy on 14th May, 2018. The main objective of the policy is to provide a framework for promotion of large grid-connected wind-solar PV hybrid system for optimal and efficient utilization of wind and solar resources, transmission infrastructure and land. The wind-solar PV hybrid systems will help in reducing the variability in renewable power generation and achieving better grid stability. The policy also aims to encourage new

technologies, methods and way-outs involving combined operation of wind and solar PV plants."

2.30 The Ministry informed the Committee that the wind-solar hybrid projects of total 4250 MW capacity have been awarded under hybrid bids. The details of hybrid projects awarded by SECI and Maharashtra Discom (MSEDCL) as on 28.02.2022 are as under:

Sl. No.	Bid	Capacity Awarded (MW)	Capacity Commissioned (MW)	Bidding Agency	Bid Winners	Tariff
1.	Wind Solar Hybrid Tranche-I	840	100	Central	SBE Renewables Ten Pvt. Ltd (450 MW), Mahoba Solar (UP) Pvt. Ltd(390 MW)	2.67-2.69
2.	Wind Solar Hybrid Tranche-II	600	101.18	Central	Adani (600 MW)	2.69
3.	Wind Solar Hybrid Tranche-III	1110	0	Central	ABC Renewable(380 MW), Adani (600 MW), AMP Energy (130 MW)	2.41
4.	Wind Solar Hybrid Tranche-IV	1200	0	Central	NTPC (450 MW), NLC (150 MW), Project Ten (450 MW), Azure (150 MW)	2.34-2.35
5.	MSEDCL	500	0	State	Tata Power (300 MW) & Azure (200 MW)	2.62
Total		**4250**	**201.18**			

2.31 About its new initiative regarding Wind and Wind-Solar Hybrid Park Scheme, the Ministry furnished the following:

"In order to overcome challenges such as land, NoCs from Ministry of Defence and transmission infrastructure and to speed up the installation of wind power projects, a new Mode-9 for 'Development of Wind Parks/Wind-Solar Hybrid Park' is proposed under the existing solar park scheme. These Parks will provide a 'plug and play' solution (availability of land, transmission, necessary infrastructure and approvals in place) to the project developers for installing wind/wind-solar hybrid power projects. The minimum capacity of a park may be 50 MW.

The Ministry will provide following central financial assistance to the park developer:

a) CFA upto Rs 25 Lakh per Park to the park developer for DPR preparation

b) CFA @Rs 20 Lakh per MW or 30% of the park development cost to park developer, whichever is lower.

c) The grant will be managed and released by SECI on behalf of MNRE for which SECI will be given a fund handling fee of one per cent of the grant released.

Wind and Wind-Solar Hybrid Park Scheme is proposed to be notified as a separate mode (mode-9) under Solar Park Scheme."

2.32 The details of potential sites for wind and wind-solar hybrid parks, as furnished by the Ministry, are given below:

State	District	Area (sq. km) available	CUF (%) @ P50	Installable Potential (MW) [assuming 5 MW/sq.km]
Tamil Nadu	Tirunelveli	68	36.3	340
	Tuticorin	169	35.1	845
	Coimbatore & partially Palakkad (Kerala)	351	40.8	1755
	Tiruchirappalli & Perambalur	547	34.9	2735
Karnataka	Tumakuru	530	36.3	2650
	Chitradurga & Davangere	1020	34.3-35.1	5100
	Bellary & Davangere	924	34.7	4620
	Chitradurga	269	34.9	1345
Gujarat	Junagadh & Porbandar	2900	35.3	14500
	Kutch	2349	37.5- 39.4	11745
Rajasthan	Barmer	374	30.4	1870
Madhya Pradesh	West Nimar	220	31.6	1100
Telangana	Ranga Reddy	543	31.2-32.2	2715
Andhra Pradesh	Anantapur	361	34.9	1805
Total (MW)				**53125**

F. Manufacturing Base for Wind Energy:

2.33 In response to a question about the status of domestic manufacturing in wind energy sector, the Ministry stated the following:

"The Wind Turbine Generator technology has evolved and state-of-the-art technologies are available in the Country for the manufacturing of wind turbines. Around 70-80% indigenization has been achieved with strong domestic manufacturing in the wind sector. Ministry has put in place a procedure to enlist type and quality certified wind turbines under 'Revised List of Models & Manufacturers' (RLMM). It also mandates that Hub and Nacelle assembly / manufacturing facility shall be in India. All the major global players in this field have their presence in the Country and over 35 different models of wind turbines are being manufactured by 15 different companies, through (i) joint ventures under licensed production (ii) subsidiaries of foreign companies, and (iii) Indian companies with their own technology. The unit size of machines has gone up to 3.6 MW."

2.34 When asked about the current annual production capacity of wind turbines in the Country, the Ministry stated as under:

"The current annual production capacity of wind turbines in the Country is around 12000 MW. Wind turbines and components are exported to the US, Australia, Europe, Brazil and Asian Countries. The list of wind turbine manufacturers with units in the Country is as follows:

Manufacturer	**Country of origin**	**Turbine Size (MW)**	**Estimated Annual Manufacturing Capacity (MW)**
GE India Industrial	USA	2.4 – 2.7	1000
Suzlon Energy Ltd.	India	2.1 – 2.8	3000
Vestas Wind Technology	Denmark	2.0 – 2.2	1000
Siemens Gamesa Renewable Power	Spain-Germany	2.0 – 3.6	3000
Envision Wind Power Technologies	China	2.3 – 2.5	600
Inox Wind Ltd.	India	2.0	1600
Senvion Wind Technology	Germany	2.3	400
PASL Wind Solution (P) Ltd	India	0.8 – 1.5	-
Nordex India Pvt. Ltd.	Germany	3.0	840
Regen Powertech	India	1.5 – 2.0	1050
Siva Wind Turbine India	India	0.225 – 0.25	50
Para Enterprises Pvt. Ltd./	India	0.75	150

Pioneer Wincon Energy Systems			
Emergya Wind Turbine	The Netherlands	1.0	100
Total			**12790**

G. Incentives Available for Wind Energy Sector:

2.35 About the steps taken by the Government to promote Wind Energy, the Ministry furnished the following:

- "Permitting Foreign Direct Investment (FDI) up to 100 percent under the automatic route;
- Waiver of Inter State Transmission System (ISTS) charges for inter-state sale of solar and wind power for projects to be commissioned by 30th June 2025;
- Declaration of trajectory for Renewable Purchase Obligation (RPO) up to the year 2022;
- Setting up of Ultra Mega Renewable Energy Parks to provide land and transmission to renewable energy developers on a plug and play basis;
- Laying of new transmission lines and creating new sub-station capacity for evacuation of renewable power;
- Setting up of Project Development Cell for attracting and facilitating investments;
- Standard Bidding Guidelines for tariff based competitive bidding process for procurement of Power from Grid Connected Solar PV and Wind Projects;
- Government has issued orders that power shall be dispatched against Letter of Credit (LC) or advance payment to ensure timely payment by distribution licensees to renewable energy generators;
- Conducting skill development programmes to create a pool of skilled manpower for implementation, operation and maintenance of renewable energy projects;
- Concessional custom duty exemption on certain components required for manufacturing of wind electric generators;
- Generation Based Incentive (GBI) is being provided to the wind projects commissioned on or before 31st March, 2017;
- Technical support including wind resource assessment and identification of potential sites through the National Institute of Wind Energy, Chennai."

H. Investment in Wind Energy Sector by IREDA:

2.36 Details regarding funding done by IREDA for wind power projects, as furnished by the Ministry, are given below:

Year	Sanctions (in Rs. crore)	Disbursement (in Rs. crore)	No. of Projects	Sanctioned Capacity (in MW)	Commissioned Capacity (in MW)
2016-17	2460.50	2535.59	12	806.50	1058.00
2017-18	3369.13	2823.49	20	1426.10	430.80
2018-19	1524.94	1557.16	9	515.70	755.10
2019-20	1610.55	1057.11	12	892.40	159.60
2020-21	524.72	900.65	5	99.40	73.50
2021-22 (as on 30-11-2021)	741.10	261.41	1	148.50	547.56
Cumulative	**27403.04**	**18620.08**	**746**	**10540.34**	**7301.14**

2.37 When asked about the reasons for decline in IREDA's sanctioned and disbursed amount for wind power projects, the Ministry stated the following:

> "There was paradigm shift in the tariff model from Feed-in-Tariff to competitive bidding in 2017. Due to this there was a transition from relatively high tariff of ₹ 4-5/unit to ₹ 2.5-3/unit and caused a reduction in profitability of the wind projects. The annual average installation prior to introduction of competitive bidding has been in the range of about 2.5 GW (3 years prior to competitive regime). However post competitive bidding, the annual installation came down to around 1.5 GW. In FY17, the installation was 5.5 GW and in the very next year i.e in FY18, the installation came down to around 1.8 GW. After the introduction of competitive bidding, there has been a drop in the number of loan applications and as a result the total loan sanctioned has been lower compared to earlier years. During the competitive bidding regime, the size of wind power projects have considerably increased and these projects are being awarded to large IPPs/ developers. Such IPPs/developers have multiple options for securing finance including international debts at competitive rates."

2.38 About NPAs in Wind Energy Sector, CMD, IREDA deposed as under:

> "Our total NPA is Rs. 2,023 crore. Out of this, Rs 400 crore is for wind projects and Rs. 200 crore is for wind infrastructure which is

given for development of manufacturing facility. Most of these NPAs are very old, pertaining to the years 2002 to 2011. Two projects each have been declared NPAs in the years 2021-22 and 2020-21. The NPAs in the wind sector are mostly due to non-payment of money by the DISCOMs. We have convened meetings with the distribution companies, both under the chairmanship of Hon'ble Minister and also directly. We are also writing letters to them. Apart from this, we do not have any other medium to get the payment from them."

2.39 The state-wise renewable energy dues of the wind energy developers as per the Renewable Energy Dues Portal maintained by IREDA, as furnished by the Ministry, is given below:

State	**Renewable Energy Overdues as on 31.03.2022 (in Rs. Crore)**
Andhra Pradesh	5198.91
Tamil Nadu	2702.57
Telangana	2083.62
Karnataka	1659.84
Maharashtra	858.83
Madhya Pradesh	732.57
Rajasthan	655.19
Others	355.46
Total	**14246.99**

2.40 On being asked about the steps taken by the Ministry/IREDA to ensure timely payment of dues, the Ministry stated as follows:

"The Ministry has emphasized time and again that State DISCOMs should ensure timely payment to the renewable energy generators. Further, any such grievances received from the renewable energy generators are taken up at appropriate level with the concerned State for early resolution of the same. Ministry of Power issued orders in June/July 2019 for not allowing procurement of power from power exchanges and not granting short term open access, if Letter of Credit (LC) provision which is part of the PPAs and acts as payment security mechanism for generators, is not in place or payment is not made in advance. As per orders, the LC shall be opened against the power purchases made from 1st August 2019 onwards. Further, Ministry of

Power has notified 'The Electricity (Late Payment Surcharge) Rules, 2021' dated 22nd February, 2021.

In addition, IREDA has a scheme to extend financial assistance in the form of Short-Term Loans to DISCOMs at preferential rates wherein the funds could be utilized for Payment to Renewable Energy Generators. During the financial year 2020-21, IREDA has disbursed Rs. 3,610 crores to various State DISCOMs. Similarly, during financial year 2021-22, IREDA has disbursed Rs. 1,875 crores to State DISCOMs, as on 31.01.2022."

I. National Institute of Wind Energy (NIWE)

2.41 NIWE which is the technical arm for wind power is an autonomous institute under the aegis of the Ministry of New and Renewable Energy. As per the Ministry, the following major activities are being carried out by NIWE:

- "Wind Resource Assessment;
- Development of an online registry of wind turbines installed across the Country;
- Wind Power Forecasting and Scheduling;
- Wind Turbine Testing;
- Offshore Wind Resource Assessment;
- Geophysical and Geotechnical Studies;
- Standards and Certification;
- International and National Training Courses;
- Solar Radiation Resource Assessment;
- Research and Development Activities."

2.42 When asked about Research and Development (R&D) activities that are being undertaken at National Institute of Wind Energy, the Ministry furnished the following:

"In order to facilitate the wind energy sector and achievement of target, NIWE has taken up the following R&D activities:

(a) Integrated Wind and Solar Resource Assessment through mapping measurements: The outcome of the project includes preparation of wind power potential of the Country at 120 meter & 150 meter above ground level and preparation of wind-solar hybrid map of the Country at 120 m above ground level.

(b) Wind and Solar Power Forecasting: For better integration of wind and solar generation, NIWE has established a 'Centre for Excellence in Forecasting' and developed an in-house data management system, monitoring system, forecast simulation tools and security system for providing wind and solar power forecasting services to utilities. NIWE has created an operational forecast system with simulation tools, to predict the wind power up to 7 days ahead.

(c) Met-Ocean Measurements (Wind, Wave, Tide, Current, Water Level, etc.,) at Gulf of Khambhat (Gujarat) and Gulf of Mannar (Tamil Nadu) for fostering the growth of offshore wind in the Country: The outcome of the project will foster the growth of offshore wind energy in the Country in a systematic manner and boost investor confidence, which will help in achieving the National targets in the sector.

(d) Indo-Danish Research Project on 'Maintenance and Repair Strategy for Wind Energy Development' in collaboration with Denmark Technical University and industrial partners: The project envisages providing the Indian wind energy industry with guidelines and approaches for efficient repair, ensuring the long-term integrity and reliable work of wind turbines.

(e) R&D project titled 'Optimized Design and Operation of Hybrid Power Plant (HYBRIDize)': The objective of the project is to provide a framework for promotion of a large grid connected wind-solar PV hybrid system for optimal and efficient utilization of transmission infrastructure and land, reducing the variability in renewable power generation and achieving better grid stability."

2.43 On being asked about the details regarding Budget Estimate, Revised Estimate and Actual Expenditure with respect to National Institute of Wind Energy during the last five years, the Ministry furnished the following:

Year	Budget Estimate (in Rs. Crores)	Revised Estimate (in Rs. Crores)	Funds utilized (in Rs. Crores)
2016-17	25	25	25
2017-18	25	23	23
2018-19	20	0	0
2019-20	17	23	23
2020-21	1.5	13.5	13.5
2021-22	20.84	20	20

2.44 In response to a question about zero revised estimate and utilization in the financial year 2018-19, the Ministry stated the following:

> "The low utilization of allocated funds during 2018-19 was due to activities relating to offshore wind generation, such as Geo-technical study of Offshore. Geo-Technical and Geo-Physical Survey, which was being carried out for the first time in the Country and preparation of necessary technical documentation took up considerable time. Further, low utilization of funds was also due to poor response to their tenders floated for the procurement of equipment in order to develop the testing facility for active power control, reactive control, frequency response and other grid requirements in Wind Turbines, LVRT, etc. During 2018-19, unspent balances from previous years were available with NIWE to carry out activities."

J. Renewable Purchase Obligation

2.45 Regarding Renewable Purchase Obligation, the Ministry furnished the following:

> In pursuance of the Electricity Act 2003, the Tariff policy of 2016 mandates the Appropriate Commission to fix a minimum percentage of the total consumption of electricity in the area of a distribution licensee for purchase of energy from renewable energy sources. Under the Renewable Purchase Obligation (RPO) any obligated entity can meet its RPO target by setting-up its own renewable energy generating plant, purchasing power from any renewable energy generator or purchasing Renewable Energy Certificates (RECs)."

2.46 When asked about the number of States that have fulfilled the targets as per RPO trajectory, the Ministry stated as under:

> "Four states, namely- Himachal Pradesh, Karnataka, Andhra Pradesh and Tamil Nadu have fulfilled the RPO target of 19% as per National RPO trajectory notified by Ministry of Power for the year 2020-21."

2.47 On being asked whether the mechanism of RPO needs a relook as it is not able to serve the intended purpose, the Ministry stated as under:

"A committee has been constituted for laying down the RPO trajectory till 2030. The committee has submitted its report to Ministry of Power and the RPO trajectory upto 2030 is under finalization."

PART –II

OBSERVATIONS/RECOMMENDATIONS OF THE COMMITTEE

1. The Committee note that the wind resource assessment conducted by the National Institute of Wind Energy has estimated wind power potential of 302.20 GW at 100 meter above ground level and 695.50 GW at 120 meter above ground level in the Country. Further, the Committee have been informed that in order to make the tariff commercially attractive, the wind power installation sites chosen are those which have an annual average Capacity Utilization Factor (CUF) of at least 30%. However, it has also been submitted that potential of about 214 GW has been estimated with more than 30% CUF and about 57 GW with more than 35% CUF. It implies that more than 200 GW of wind power can be installed in the Country with commercially attractive tariff. However, the cumulative installed capacity of wind power is only 40.71 GW as on 31st May, 2022 i.e. less than one fifth of the commercially exploitable potential. The reasons attributed to the slow pace of capacity addition in wind energy sector are shift in tariff regime from Feed-in-Tariff to Bidding Mechanism, aggressive bidding by developers, less availability of wind rich sites, etc. The Committee feel that only a fraction of the Country's wind potential has been tapped till date amounting to under-utilization of available natural resource.

Moreover, the Committee observe that the installed capacity of wind power was 21042.58 MW as on 31st March, 2014 which has increased to 40706.38 MW as on 30th May, 2022 i.e. an increase of 93.45% in 8 years. On the other hand, installed capacity of solar power has exponentially increased by 2063.86% during the same period. It gives an impression that solar energy has been prioritized over wind energy despite heavy dependence on imports in solar energy sector. Therefore, keeping in view the fact that India has strong domestic

manufacturing in wind energy sector and wind turbines along with other related components are exported to USA, Australia, Europe, Brazil and other Asian Countries, the Committee recommend that the wind energy sector should be given due priority vis-à-vis solar energy sector in order to maintain a balanced energy mix and also to allow the sector to reach its potential.

2. The Committee note that most of the wind energy potential of the Country is available in only eight states namely, Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Telangana and Tamil Nadu. It has been submitted that wind resource is highly site specific and majority of wind rich sites of the Country have already been exploited to a large extent. In this regard, the Committee are of the opinion that there is a need to repower the old wind turbines which not only have completed their life-cycle but also occupy the best wind sites. The Committee, therefore recommend that:

i) Old and less efficient wind turbines should be retired and replaced with technologically advanced and more efficient wind turbines so as to ensure maximum use of the available natural resource, land and evacuation infrastructure.

ii) The Ministry should formulate policy for repowering of old turbines so as to boost wind power generation in the Country.

iii) The Ministry should also issue guidelines for recycling of the old turbines.

3. The Committee have been informed that the wind energy capacity addition till the year 2017 was through Feed in Tariff (FiT) mechanism and subsequently, the tariff regime has been shifted from Feed-in-Tariff (FiT) to bidding route which has disrupted the installation of projects.

Due to this shift, there was a transition from relatively high tariff of ₹ 4-5/unit to more competitive tariff of ₹ 2.5-3/unit causing a reduction in profitability of the wind projects. Further, in the competitive bidding regime, the size of wind power projects has considerably increased and these projects are being awarded to large IPPs/developers. It has also been submitted that some of the developers resort to aggressive bidding, thus lowering the prices to unsustainable level and then back out of the project. In view of the Committee, there is an urgent need of strict action against such developers in order to maintain the sanctity of the bidding process and save the time and efforts of the bidding agencies like Solar Energy Corporation of India, NTPC Ltd. etc. The Committee therefore, recommend that provisions for imposition of heavy penalty on developers should be made in case they back out unilaterally and persistent defaulters should be blacklisted.

4. The Committee note that 'National Offshore Wind Energy Policy' was notified on 6th October 2015 for development and use of maritime space within the Exclusive Economic Zone (EEZ) of the Country for production of grid quality electrical power for national consumption. It has been submitted that eight zones each in Gujarat and Tamil Nadu have been identified as potential offshore zones. Initial offshore wind energy potential within these identified zones has been estimated to be about 70 GW off the coast of Gujarat & Tamil Nadu. However, no off-shore wind project has been established in the Country till date. The Committee observe that although, currently off-shore wind power is costly in comparison to on-shore wind power, but off-shore wind energy projects have significantly higher Capacity Utilization Factor as compared to on-shore wind energy projects. Further, as per global trends, the cost of the off-shore wind energy projects reduce gradually

with an increase of cumulative installed capacity. Moreover, in order to achieve the enhanced target of 500 GW of non-fossil fuel based installed energy capacity by 2030; there is a need to harness every possible renewable energy resource. The Committee, therefore recommend that off-shore wind energy projects should be established off-the coast of Gujarat and Tamil Nadu after proper environmental impact assessment in a time bound manner. The Committee also desire that initially, Viability Gap Funding may be provided in order to make off-shore wind energy projects viable and associated transmission infrastructure needs to be built to enable power evacuation from these projects. The Committee further desire that off-shore wind potential should also be explored in coastal areas other than Gujarat and Tamil Nadu along India's 7,600 km long coastline.

5. The Committee note that the Government issued National Wind-Solar Hybrid Policy on 14th May, 2018 with the objective to provide a framework for promotion of large grid-connected wind-solar PV hybrid system for optimal and efficient utilization of wind and solar resources, transmission infrastructure and land. It has been submitted that wind-solar hybrid projects with capacity of 4250 MW have been awarded, out of which 201.18 MW have been commissioned in the Country as on 28th February, 2022. Further, fourteen sites in seven States have been identified for development of Wind Parks/Wind-Solar Hybrid Park with installable potential of 53,125 MW. The Committee feel that wind and solar energy are complementary to each other since solar power can be harnessed only during the day, while wind power projects are more productive during the night and thus, the capacity utilization factor of the hybrid plants will be more as compared to standalone solar and wind energy plants. The Committee, therefore recommend that the

Ministry should promote setting up of wind-solar hybrid power plants so that the maximum of installable potential of more than 50 GW can be harnessed with added benefits of greater grid stability, lower generation variability, efficient utilization of evacuation infrastructure and optimum use of land resources.

6. The Committee have been informed that IREDA has disbursed a cumulative amount of Rs. 18,620.08 crore for 746 wind power projects of 10,540.34 MW till 30th November, 2021 with NPAs of Rs. 600 crore in wind energy sector. It has been submitted that one of the reasons for most of these NPAs is non-payment of dues by Discoms. It is also furnished that Rs. 14246.99 crore of wind energy developers are overdue as on 31st March, 2022 mainly on the States of Andhra Pradesh, Tamil Nadu, Telangana, Karnataka, Maharashtra, Madhya Pradesh, Rajasthan, etc. In view of the above, the Committee recommend that the Ministry should pursue with the concerned State Governments in order to ensure timely payment of dues to wind energy developers and intimate the Committee about the outcome thereof.

7. The Committee note that in pursuance of the Electricity Act 2003, the Tariff Policy of 2016 mandates the Appropriate Commission to fix a minimum percentage of the total consumption of electricity in the area of a distribution licensee for purchase from renewable energy sources. Under the Renewable Purchase Obligation (RPO), any obligated entity can meet its RPO target by setting-up its own renewable energy generating plant, purchasing power from any renewable energy generator or purchasing Renewable Energy Certificates (RECs). It has been submitted that only four states, namely - Himachal Pradesh, Karnataka, Andhra Pradesh and Tamil Nadu have fulfilled the RPO

target of 19% as per National RPO trajectory notified by the Ministry of Power for the year 2020-21. While expressing their displeasure about the non-compliance of RPO trajectory, the Committee recommend that the Ministry should actively pursue all the SERCs/JERCs for ensuring RPO compliance and enforcing penalty against defaulting obligated entities.

New Delhi
26th July, 2022
Sravana 4, 1944 (Saka)

Rajiv Ranjan Singh *alias* Lalan Singh
Chairperson,
Standing Committee on Energy

ANNEXURE-I

STANDING COMMITEE ON ENERGY

MINUTES OF FIFTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2021-22) HELD ON 14th DECEMBER, 2021 IN COMMITTEE ROOM No. '2', PARLIAMENT HOUSE ANNEXE EXTENSION, NEW DELHI

The Committee sat from 1500 hrs to 1630 hrs.

LOK SABHA

Shri Rajiv Ranjan Singh alias Lalan Singh - Chairperson

2. Shri Devendra Singh Bhole
3. Shri Kishan Kapoor
4. Shri Ramesh Chander Kaushik
5. Shri Uttam Kumar Reddy Nalamada
6. Shri Ashok Mahadeorao Nete
7. Shri Velusamy P.
8. Shri Parbatbhai Savabhai Patel
9. Shri Dipsinh Shankarsinh Rathod
10. Shri Gnanathiraviam S.
11. Shri Shivkumar C. Udasi

RAJYA SABHA

12. Shri Rajendra Gehlot
13. Shri S. Selvaganabathy
14. Shri Sanjay Seth
15. Dr. Sudhanshu Trivedi

SECRETARIAT

1. Shri R.C. Tiwari - Additional Secretary
2. Shri R.K. Suryanarayanan - Director
3. Shri Kulmohan Singh Arora - Additional Director

WITNESSES

MINISTRY OF NEW AND RENEWABLE ENERGY

1.	Shri Indu Shekhar Chaturvedi	Secretary
2.	Shri Dinesh Dayanand Jagdale	Joint Secretary

PUBLIC SECTOR UNDERTAKINGS/AUTONOMOUS BODIES

3.	Shri Pradip Kumar Das	CMD, IREDA
4.	Ms. Suman Sharma	MD, SECI
5.	Dr. K. Balaraman	DG, NIWE

2. At the outset, the Hon'ble Chairperson welcomed the representatives of the Ministry of New and Renewable Energy, Indian Renewable Energy Development Agency (IREDA), Solar Energy Corporation of India (SECI) and National Institute of Wind Energy (NIWE) to the sitting and informed that the sitting had been called for evidence on the subject 'Evaluation of Wind Energy in India'. The Chairperson also apprised them about the provisions of Directions 55(1) and 58 of the Directions by the Hon'ble Speaker.

3. During the discussion, a power-point presentation was made by the representative of the Ministry on the subject which, *inter-alia,* covered Wind Resource Assessment, Wind Power Potential, Wind and Solar Power installed capacity, Power Generation from Wind Projects, Incentives available for Wind Sector, Generation based Incentive Scheme, Standard Bidding Guidelines-2017, Falling Renewable Energy Tariff, Wind-Solar Hybrid Projects, Innovative Bids for Promoting Wind Power, Make in India in Wind Energy Sector, Revised List of Models and Manufacturers, Key Component Manufacturers in India, Wind-Solar Hybrid Park Scheme, Potential Sites for Wind-Solar Hybrid Parks, Wind Turbine Generators Quality Control Order, Offshore Wind Potential Survey, Wind Power Projects funded by IREDA, Research focus of NIWE, International Research Activities, etc.

4. The Committee, *inter-alia,* deliberated upon the following points with representatives of the Ministry, IREDA, SECI and NIWE:

a) Progress made in harnessing of off-shore wind potential so far;

b) Cost of installation of off-shore wind project *vis-a-vis* on-shore wind project;

c) Research and development activities undertaken and technological advancements made by NIWE in recent years to support wind energy sector;

d) Reasons for delay/cancellation of tenders related to Wind Energy Projects;

e) Issues related to non-signing/cancellation/renegotiation of PPAs in Wind Energy Sector;

f) Issues related to delay in payment of dues to renewable energy developers by Discoms;

g) Quantum of investment by IREDA in wind energy sector and its non-performing assets specifically related to wind power;

h) Issues related to non-compliance of Renewable Purchase Obligation;

i) Action Plan to increase the installed capacity of renewable power to 500 GW by 2030.

5. Hon'ble Members also sought clarifications on various other issues relating to the subject and representatives of the Ministry, IREDA, SECI and NIWE responded to the same. The Committee directed the representatives to furnish written replies to all those queries which could not be readily responded to by them at the earliest.

The Committee then adjourned.

ANNEXURE – II

STANDING COMMITTEE ON ENERGY

MINUTES OF THE THIRTEENTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2021-22) HELD ON 26th JULY, 2022 IN HON'BLE CHAIRPERSON'S CHAMBER, ROOM NO. 111, PARLIAMENT HOUSE ANNEXE EXTENSION, NEW DELHI

The Committee sat from 1530 hours to 1615 hours

LOK SABHA

Shri Rajiv Ranjan Singh alias Lalan Singh - Chairperson

2. Shri Gurjeet Singh Aujla
3. Shri Sanjay Haribhau Jadhav
4. Dr. A. Chellakumar
5. Shri Sunil Kumar Mondal
6. Shri Ashok Mahadeorao Nete
7. Shri Velusamy P.
8. Shri Gyaneshwar Patil
9. Shri Bellana Chandra Sekhar
10. Shri Shivkumar C. Udasi

RAJYA SABHA

11. Shri Ajit Kumar Bhuyan
12. Shri Rajendra Gehlot
13. Shri Muzibulla Khan
14. Shri Maharaja Sanajaoba Leishemba
15. Shri S. Selvaganabathy
16. Dr. Sudhanshu Trivedi

SECRETARIAT

1.	Dr. Ram Raj Rai	Joint Secretary
2.	Shri R.K. Suryanarayanan	Director
3.	Shri Kulmohan Singh Arora	Additional Director

2. At the outset, the Chairperson welcomed the Members and apprised them about the agenda of the sitting. The Committee then took up for consideration and adoption the following draft Reports:

(i) Report on the subject 'Review of Power Tariff Policy - Need for uniformity in tariff structure across the Country'.
(ii) Report on the subject 'Evaluation of Wind Energy in India'.
(iii) Report on action-taken by the Government on observations/ recommendations contained in Seventeenth Report (17th Lok Sabha) on the subject 'Action Plan for Achievement of 175 GW Renewable Energy Target'.
(iv) Report on action-taken by the Government on observations/ recommendations contained in Eighteenth Report (17th Lok Sabha) on the subject 'Development of Coal Blocks allocated to Power Sector Companies'.
(v) Report on action-taken by the Government on observations/ recommendations contained in Nineteenth Report (17th Lok Sabha) on the subject 'Delay in Execution/Completion of Power Projects by Power Sector Companies'.

3. After discussing the contents of the Reports, the Committee adopted the aforementioned draft Reports without any amendment/modification. The Committee also authorized the Chairperson to finalize the above-mentioned Reports and present the same to both Houses of the Parliament.

The Committee then adjourned.

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