01

STANDING COMMITTEE ON ENERGY

(2019-20)

SEVENTEENTH LOK SABHA

MINISTRY OF NEW AND RENEWABLE ENERGY

DEMANDS FOR GRANTS
(2019-20)

FIRST REPORT

LOK SABHA SECRETARIAT
NEW DELHI

December, 2019/Agrahayana, 1941 (Saka)

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Presented to Lok Sabha on 6th December, 2019

Laid in Rajya Sabha on 6th December, 2019

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REPORT

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SECRETARIAT

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2.	Shri N.K. Pandey	Director
3.	Ms. Deepika	Committee Officer

***** *Resigned from the membership of the Committee w.e.f. 21.11.2019*

INTRODUCTION

I, the Chairperson, Standing Committee on Energy, having been authorized by the Committee to present the Report on their behalf, present this First Report of the Committee on 'Demands for Grants of the Ministry of New and Renewable Energy for the year 2019-20'.

2. The Committee took evidence of the representatives of the Ministry of New and Renewable Energy on 25th October, 2019. The Committee wish to express their thanks to the representatives of the Ministry for appearing before the Committee for evidence and furnishing the desired information in connection with examination of Demands for Grants (2019-20).

3. The Report was adopted by the Committee at their sitting held on 3rd December, 2019.

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 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
December 04, 2019
Agrahayana 13, 1941 (Saka)

SHRI RAJIV RANJAN SINGH
alias LALAN SINGH
Chairperson,
Standing Committee on Energy

REPORT

PART I
NARRATION ANALYSIS

CHAPTER I
INTRODUCTORY

1.1 The Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India for all matters relating to new and renewable energy sources. The broad aim of the Ministry is to develop and deploy new and renewable energy for supplementing the energy requirements of the country. Under the Allocation of Business Rules, the MNRE has been assigned the following specific items:

- Research and development of biogas and programmes relating to biogas units;
- Commission for Additional Sources of Energy (CASE);
- Solar Energy including Solar Photovoltaic (SPV) devices and their development, production and applications;
- All matters relating to small/mini/micro hydel projects of, and below, 25 MW capacity,
- Programmes relating to improved chulhas and research and development thereof;
- Indian Renewable Energy Development Agency Limited;
- Research and development of other non-conventional/renewable Sources of energy and programmes relating thereto;
- Tidal Energy;
- Integrated Rural Energy Programme (IREP);
- Geothermal Energy.

1.2 India is endowed with vast Renewable Energy Potential. The estimated potential for renewable energy in the country from solar, wind, small hydro and biomass is given below, a substantial part of which is suitable for grid applications:

S. No	Resource	Estimated Potential (In MW)
1.	Solar Power	7,48,990
2.	Wind Power	3,02,251 *[at 100 m. height]*
3.	Small Hydro Power (up to 25 MW)	21133

4.	Biomass Power	17,536
5.	Cogeneration - Bagasse	5,000
6.	Waste to Energy:	2,556
Total		**10,97,469**

1.3 In Nationally Determined Contributions as per the Paris Accord on Climate Change, India made a pledge that by 2030, 40% of its installed power generation capacity shall be based on renewables. Keeping this in view and also keeping in view its commitment to a healthy planet, it was determined that 175 GW of renewable energy capacity will be installed by 2022. This includes 100 GW from solar, 60 GW from wind, 10 GW from biomass and 5 GW from small hydro power. The substantial higher capacity target will ensure greater energy security, improved energy access and enhanced employment opportunities. With the accomplishment of these ambitious targets, India will become one of the largest Green Energy producers in the world, surpassing several developed countries.

1.4 At the national level, over the years India has successfully created a positive outlook necessary to promote investment in, demand for and supply of renewable energy that includes Solar, Wind, Bio, Hydro and Waste to Energy. In addition to grid power, decentralized distributed electrification using renewable energy technologies provides economical options for meeting lighting, cooking and productive energy needs in rural areas.

1.5 Given below is the share of Renewable Energy capacity in total installed power capacity (as on 30.09.2019):

Sector	Capacity (in GW)	Percentage
Thermal	228.60 GW	(62.91%)
Nuclear	6.78 GW	(1.87%)
Hydro	45.4 GW	(12.49%)
Renewable	82.58 GW	(22.73%)
Total	**363.36 GW**	**(100%)**

CHAPTER II

DEMANDS FOR GRANTS OF THE MINISTRY FOR 2019-20

2.1 The Ministry of New and Renewable Energy presented Demand No. 69 to the Parliament for the financial year 2019-20 on 11th July, 2019. The Charged and Voted provisions made in the Revenue and the Capital Heads of the Budget are as under:

(Rs. in crore)

	Revenue	Capital	Total
Charged	---	---	---
Voted	5209.83	45.00	5254.83

2.2 A statement showing the details of the Budget Estimates for the year 2019-20 *vis-à-vis* that of Budget Estimates/Revised Estimates (BE/RE) of 2018-19 and Actuals of 2017-18 is given at ***Annexure-I*****.**

2.3 The Plan Outlay of the Ministry of New and Renewable Energy during the year 2018-19 and for the year 2019-20, as furnished by the Ministry, is given below:

(Rs. in crore)

Components of Plan Outlay of MNRE	**2018 -19**		**2019-20**
	BE	**RE**	**BE**
Budgetary Support	5146.63	5146.63	5254.83
IEBR	10316.84	10835.14	12353.81
Total	**15463.47**	**15981.77**	**17608.64**

2.4 On a query regarding the allocations sought by the Ministry of New and Renewable Energy for the year 2019-20 and the amount actually sanctioned by the Ministry of Finance, the Ministry stated that:

> "An allocation of Rs. 6731.93 crores was sought for the year 2019-20. Rs.5254.83 crores have been allocated by the Ministry of Finance (scheme component plus non-scheme component) for the year 2019-20 as given below":

Sl. No.	Name of Scheme	Demand 2019-20	Actual Allocation 2019-20
1	Grid Interactive Renewable Power	4902.96	4272.15
2	Off-Grid/Distributed and Decentralized Renewable Power	1125.40	688.00
3	Research and Development	240.00	60.00
4	Supporting Programmes	163.40	111.30
5	Non-scheme	300.17	123.38
Grand Total		**6731.93**	**5254.83**

2.5 When asked about the reasons for hike/reduction in Central Plan Outlay for the year 2019-20 as compared to the last year, the Ministry stated that:

> "For the year 2019-20 BE is Rs 5254.83 crore and BE/RE for the year 2018-19 was Rs 5146.63 crore. During the year 2019-20, there is an increase of Rs. 108.20 crore over the BE/RE of 2018-19 which is only about 2% increase. However the demand projected by the Ministry was Rs. 6731.93 crores".

2.6 When asked if the allocation made for the year 2019-20 would be sufficient to meet the requirement to achieve the physical targets, the Ministry stated that additional funds required, if any, would be sought at RE stage.

2.7 Given below is the Head-Wise allocation along with expenditure (as on October 15, 2019) for various heads of the Ministry for 2019-20:

Head	BE (2019-20) (Rs. in crores)	Actual Exp. 2019-20 (Rs. in crores) (as on 15.10.2019)
Grid Interactive Renewable power	4272.15	2372.56 (55.54 %)
Off-Grid/Distributed and Decentralized Renewable power	688.00	213.41 (31.02 %)
Research & Development	60.00	8.84 (14.73 %)
Supporting Programmes (Monitoring & Evaluation, HRD, I&PA, IT)	111.30	76.80 (69 %)
Non-Scheme	123.38	71.12 (57.64 %)
Total	**5254.83**	**2742.73 (51.20 %)**

2.8 Explaining about the expenditure of the Ministry in the current year, the Secretary of the Ministry deposed during evidence as under:

> "This year, our budget is around Rs. 5200 crore and we have made expenditure of Rs. 2700 crore already. Generally, we are asked to expend 50 per cent by September. I am very happy to inform the Committee that instead of 50 per cent we have made expenditure of 52 per cent. So, we have already gone beyond the expenditure what we were required to do. For our earlier schemes, we provide generation-based incentive for the wind sector. That is our earlier commitment. We do not have sufficient money for proving GBI for the wind sector for which we require additional money. Our problem is that we are unable to make expenditure in the North East. That is because wind is very poor in the North East. Solar again is very poor in the North East and land is not available. Had land been available, had solar intensity been better and had wind velocity been better, we would have been able to spend our 10 per cent of money in the North East. That is the place where we lack."

2.9 The Financial Allocations & Physical Targets for various schemes/programmes for 2019-20, as furnished by the Ministry are given below:

Grid Interactive Renewable power	**BE (Rs. in crores)**	**Physical Target**
Wind Power	920.00	3000 MW
Hydro power	182.90	100 MW
Bio Power	25.00	252 MW*
Solar power	2479.90	8500 MW
Green energy Corridors	500.00	6000 cKm (cumulative)
EAP	40.00	NA
Interest Bonds	124.35	NA

Off-Grid/Distributed and Decentralized Renewable power	**BE (Rs. in crores)**	**Physical Target**
Hydro power	8.00	Program discontinued. Budget provision is for catering pending liabilities.
Bio Power	50.00	Target already included in Grid power target of 252 MW
Solar power	525.00	400 MW eq.
Biogas Programme	100.00	76000 No.
Solar Cities/Green Buildings	5.00	NA

* Including Off grid bio power

2.10 Given below is the Renewable Energy Capacity addition in 2019-20 (as on 30.09.2019) as furnished by the Ministry:

Achievement in grid connected renewable power		
	Achievement (MW) (April - September, 2019)	**Cumulative Achievements (MW) (as on 30.09.2019)**
Wind Power	1304.36	36930.32
Solar Power - Ground Mounted	2479.07	28863.37
Solar Power - Roof Top	441.96	2238.31
Small Hydro Power	17.65	4610.80
BioPower (Biomass & Gasification and Bagasse Cogeneration)	28.00	9806.31
Waste to Power	1.50	139.80
Total	**4272.54**	**82588.91**

CHAPTER III

REVIEW OF PAST PERFORMANCE OF THE MINISTRY

I. BUDGET ALLOCATION AND UTILIZATION

3.1 The details of the year-wise allocation (BE/RE) along with expenditure for the years 2016-17, 2017-18, 2018-19 and the current year (upto October 16, 2019) are given below:

(Rs. in Crore)

	2016-17			2017-18			2018-19			2019-20	
	BE	RE	Actual Exp.	BE	RE	Actual Exp	BE	RE	Actual Exp	BE	Actual as on 16.10.2019
GBS+ NCEF*	5035.79	4360.13	3918.91	5472.84	4080.00	3768.37	5146.63	5146.63	4477.80	5254.83	2742.73
IEBR	9292.83	12401.52	8740.81	8293.73	9515.70	10541.27	10316.84	10835.14	10143.63	12353.81	4636.87
Total	14328.62	16761.65	12659.72	13766.57	13595.70	14309.64	15463.47	15981.77	14621.43	17608.64	7379.60

*NCEF support was only upto 2017-18.

3.2 When asked about the reasons for major variations in the BE/RE and actual expenditure during last three years, the Ministry stated that:

> "2016-17: MNRE was allowed to raise an additional Rs. 4000.00 crores through IREDA for implementation of MNRE programmes against which Rs 1640 Cr of GOI fully serviced bonds were raised. This led to increase in IEBR at RE stage. Reduction in RE of GBS was compensated through this additional funding.
>
> 2017-18 and 2018-19: The expenditure during 2017-18 was 92.37% and during 2018-19 was 86.97%. These shortfalls were due to not receiving adequate proposals from any of North Eastern states under various schemes. Research and development projects are continuous efforts in nature with duration of generally three to four years. Funds are released after completion of various milestones achieved and proper evaluation of the ongoing projects. As a result there was a shortfall in the actual expenditure as some of the milestones /evaluation could not be completed in time."

3.3 Quarter-wise utilization of Budget allocations during the last three years and the current year (upto October 15, 2019) are as given below:

FY	BE	RE	Actual Expenditure	Quarter			
				1st	2nd	3rd	4th
2016-17	5035.79	4360.13	3918.91	1522.13	1065.32	124.32	1207.14
2017-18	5472.84	4080.00	3768.37	940.52	1156.56	775.08	896.21
2018-19	5146.63	5146.63	4477.80	1337.57	1242.20	949.94	948.09
2019-20	5254.83	-	2742.73 (as on 15.10.2019)	875.74	1861.40	-	-

3.4 When asked about the reasons for such uneven expenditure in each quarter and if the quarterly expenditure during these years was as per the plan and norms, the Ministry stated that:

> "Quarterly expenditure is broadly in line with the Ministry of Finance norms. A periodical monitoring mechanism is already in place to ensure that phasing of expenditure is as per the norms prescribed by the Ministry of Finance."

3.5 Programme Head wise utilization of funds during the year 2018-19, as submitted by the Ministry, are as under:

Programme Head	Exp. as % of RE
Grid Interactive Renewable Power	91.39
Off-Grid/Distributed and Decentralised Renewable Power	71.42
Research, Development and International Co-operation	60.36
Supporting programmes and administrative charges	86.84
Non scheme component	70.93
Total	**86.97**

3.6 When asked about the Heads which could not get the required amount leading to non- achievement of targets, the Ministry stated that:

> "The funds for Grid Interactive head were inadequate. Additional funds of around 200 Cr. were arranged in the head at the RE stage through the savings from other programmes."

II EXTERNAL FINANCIAL ASSISTANCE

3.7 The Ministry furnished that externally aided projects supplement its efforts to address some specific technology and socio economic issues.

Currently the following two Externally Aided Projects are being implemented by the Ministry:

a) UNDP/GEF supported Project on "Scale Up of Access to Clean Energy for Rural Productive Uses";

b) Promoting business models for increasing penetration and scaling up of solar energy.

3.8 Explaining about the project "Scale Up of Access to Clean Energy for Rural Productive Uses", the Ministry furnished that:

"MNRE – UNDP/GEF project titled "Scale Up of Access to Clean Energy (ACE) for Rural Productive Uses" is an initiative to enhance the use of reliable and affordable renewable energy for rural productive uses/livelihoods in un-served and under-served areas in states of Assam, Madhya Pradesh and Odisha for strengthening rural livelihoods, improving income generation and reduce use of fossil fuels. The objective of project is to scale up access to clean energy for livelihoods in rural areas for reducing GHG emissions.

The duration of the project is 5 years w.e.f. 23 rd August, 2015 (extended till 30 June 2020). The estimated total project cost of this scheme is about US$ 23.04 Million (equivalent Rs.148 Cr.), with Rs.70 crores being the contribution of Government of India, Rs. 31 crore contribution from GEF and UNDP and Rs. 47 crores to be mobilized through sources such as State Govt. funds, CSR, beneficiary contribution, etc.

Project component

- Development and deployment of key Renewable Energy-rural livelihood application packages.
- Supply chain for Renewable Energy technology supply and service providers for enhancing rural livelihoods.
- Policy and regulatory support for Renewable Energy-rural livelihoods applications.
- Financial support for decentralised Renewable Energy-rural livelihoods applications."

3.9 When asked about the details regarding external assistance received and utilized in the above mentioned project, the Ministry stated that:

"The sources of such external assistance are Global Environment Facility (GEF) and UNDP funding. Assistance available is mainly for providing technical support in the form of conducting feasibility study, preparation of DPR, capacity building, creating awareness,

demonstration of projects, etc. External Financial Assistance received from GEF is as follows":

International Financial Assistance received during the year 2018-19	1.25 Cr {MNRE share - 1Cr} {GEF share - 0.25 Cr}
Fund Utilized (2018)	Rs 35,81,058
Fund Utilized (2019) (as on 30.9.2019)	Rs 17,80,924

3.10 In response to a query about project on "Promoting business models for increasing penetration and scaling up of solar energy", the Ministry stated that:

"MNRE-GEF-UNIDO project "Promoting business models for increasing penetration and scaling up of solar energy" was started in January 2015 for a period of 5 years. The project is implemented by MNRE through IREDA and UNID and is funded by GEF. The objective is to promote the deployment of Concentrated Solar Thermal (CST) projects in India for heating and cooling applications in potential industries to reduce energy consumption and Greenhouse Gas (GHG) emissions.

Support is available in the form of interest subvention and bridge loan against the available subsidy from the ministry. Interest subvention is also available for improving the manufacturing of CST system/components. The support is made available through IREDA by UNIDO. In addition technical support is provided for conducting feasibility study, preparation of DPR, capacity building, creating awareness, performance evaluation, etc.

The Project Management Unit looks after the implementation of the project who is monitored and advised by the Project Execution Committee (PEC) and Project Steering & Advisory Committee (PSAC)."

3.11 When asked about the details regarding external assistance received and utilized in the above mentioned project, the Ministry furnished:

"The sources of such external assistance are Global Environment Facility (GEF) and UNIDO funding. The manner in which the assistance is used to run the scheme in the priority areas is Interest subvention on loan availed from IREDA for the CST project. The assistance so received is of no consequence to fully or partly finance any scheme/programme of the renewable energy sector. External Financial Assistance received is as follows":

Expenditure status till 2018	3.204 million USD (₹23.2 crores approx.).
Funding received during 2018	0.275 million USD
Funding received during 2019	0.341 million USD (proposed)

III. FINANCIAL SUPPORT FROM NATIONAL CLEAN ENERGY AND ENVIRONMENT FUND (NCEEF)

3.12 On being asked about the details of financial support to MNRE from National Clean Energy and Environment Fund, the Ministry stated that:

> "From the financial year 2011-12 to 2017-18, an amount of Rs. 17,086.24 crore was allocated to MNRE from NCEEF. Since the year 2018-19, there has been no allocation from NCEEF to MNRE. However, this deficit was made up by allocation under Gross Budgetary Support. The details of allocation from NCEEF during the last three years are as under":

Year	Allocation from NCEEF to MNRE (Rs. Crore)
2016-17 (RE)	4,272.00
2017-18 (BE)	5,341.70
2018-19	Nil

3.13 When asked if the continued availability of funds from NCEEF has been affected due to Goods and Services Tax (GST), the Ministry furnished that:

> "The Goods and Services Tax (Compensation to States) Act, 2017 which has been notified in April 2017, provides that coal cess, along with some other cess would constitute GST Compensation Fund and the same would be utilized to compensate the States for five years to compensate them for potential losses on account of GST implementation. After five years any amount left would be shared on 50% basis between Centre and States.
>
> During the year 2019-20 the budgetary allocation is from gross budgetary support. No funds have been made available through NCEF. It is expected that adequate funds would be provided under the regular budget head through GBS. The Ministry will arrange additional financial resources, if need be, through:-
>
> - GoI serviced/Masala Bonds
> - Multilateral/bi lateral financial organizations."

3.14 When queried about the Renewable Energy Projects that have been recommended for financial support from NCEEF, the Ministry stated that:

> "From the year 2011-12 till date, the Inter-Ministerial Group (IMG), in consultation with the Ministries proposing the project, after examining the suitability as per the guidelines, has recommended 48 renewable energy projects posed by Ministry of New & Renewable Energy."

IV EFFECT OF GST ON RENEWABLE ENERGY SECTOR

3.15 When asked about the effect of GST on Renewable Energy Sector, the Ministry in its reply stated that:

> "Prior to implementation of GST, the goods/equipment/material required for initial setting up of Solar Power Generating Systems were exempt from payment of Central Excise Duty & were attracting a concessional rate of 5% for Basic Customs Duty on issuance of an end-use certificate from MNRE. Further, Solar PV modules which constitute more than 50% of the cost of the solar power generating system, were not attracting any duty. Subsequently, as per the notified GST rates, 'Renewable energy devices and spare parts for their manufacture', both under Chapter 84 (Mechanical Devices) and Chapter 85 (Electrical Devices), have been kept in 5% GST slab as follows:

Renewable energy devices and spare parts for their manufacture	**GST Rate: 5%**
a. Bio-gas plant b. Solar power based devices c. Solar power generating system d. Wind mills and wind operated electricity generator e. Waste to energy plants/ devices f. Solar lantern/ solar lamp g. Ocean waves/tidal waves energy devices/plants h. Photo voltaic cells, whether or not assembled in modules or made up into panels	

3.16 Further explaining the disputes/ambiguity regarding applicable rate of GST on Solar power Generating System, the Ministry stated that:

> "Especially w.r.t. Solar Power Generating System there were disputes/ambiguity regarding applicable rate of GST. In order to resolve the disputes regarding the applicable rate of GST, Ministry of Finance

vide its Notification No. 25/2018-Integrated Tax (Rate) dated 31.12.2018, has clarified the goods–to–services ratio for "Solar Power Generating System" as 70:30, with goods comprising 70% of value - taxable @5%, and services comprising balance value - taxable @ 18%. As the resultant effective rate of GST for "Solar Power Generating System" became 8.9 % *[(70% x 5%) + (30% x 18%)],* which is far more higher than the intended rate of 5% GST."

V PHYSICAL TARGETS AND ACHIEVEMENTS

3.17 In response to a query about the physical achievement *vis-a-vis* targets during 2016-17, 2017-18, 2018-19 and 2019-20 (upto September, 2019), the Ministry furnished:

PHYSICAL TARGETS AND ACHIEVEMENT DURING 2016-17, 2017-18, 2018-19 and 2019-20									
S. No.	**Programme/ System**	**2016-17**		**2017-18**		**2018-19**		**2019-20 (Upto 30.09.2019)**	
		Target	**Ach.**	**Target**	**Ach.**	**Target**	**Ach.**	**Target**	**Ach.**
GRID POWER (Capacities in MW)									
1	Wind Power	4000	5502.37	4000	1865.23	4000	1480.97	3000	1304.36
2	Small Hydro	150	105.9	100	105.95	100	107.35	100	17.65
3	Bio Mass	400	162	340	519	250	402	250	28
4	Waste to Power (Indstl./Urban)	10	23.50	5	24.00	5	0	2	1.50
5	Solar Power	12000	5525.98	10000	9362.64	11000	6529.20	8500	2921.03
OFF – GRID/DECENTRALISED POWER (Capacities in MWeq)									
6	Waste to Power	15	11.5	20	5.50	15	6.58	10	10.57
7	Biomass Gasifiers(Rural)	10	2.80	7.5	1.015	1	3.15	1	4.8
8	SPV Systems	100	155.50	150	216.63	200	244.20	400	19.89
OTHER RENEWABLE ENERGY SYSTEMS									
9	Family Type Biogas Plants (No. in lakh)	1.00	0.55	1.1	0.44	1.00	0.30	0.76	0.06

3.18 Detailing about the achievements of the Ministry, the Secretary, MNRE during the Evidence, deposed before the Committee:

"we have set a target of 175 GW of installing Renewable Energy capacity by 2022 in 2015. In 2015, that looked very ambitious. Out of 175 GW, 82,580 MW have already been established and 31,000 MW is under implementation. Other than this, 39,000 MW is under bidding. If we add all these capacitities which is under implementation and under-bidding and already implemented, so we reach a figure of 152.85 GW. So, with another 23 GW left, we are confident that by 2022, we would not only achieve the target but we would exceed the target. In fact,

today, we have become a global leader in the RE sector because we rank fourth if we exclude large hydro globally in setting about this installed capacity."

3.19 Status of Renewable Energy projects as on 30th September, 2019 is given below:

Sector	Target (GW)	Installed capacity (GW) as on 30.09.2019	Under Implementation (GW)	Tendered (GW)	Total Installed/ Pipeline (GW)
Solar Power	100	31.1	19.36	35.27	85.73
Wind power	60	36.93	9.78	3.84	50.55
Bio Energy	10	9.94	0.00	0.00	9.94
Small Hydro	5	4.61	0.58	0.00	5.19
Wind Solar Hybrid	0	0	1.44	0.00	1.44
Total	**175**	**82.58**	**31.16**	**39.11**	**152.85**

VI GREEN ENERGY CORRIDOR

3.20 In its Annual Report (2018-19), the Ministry stated that in order to facilitate integration of large scale renewable generation capacity addition, the Cabinet Committee of Economic Affairs (CCEA) in Financial Year 2015-16, approved the creation of Intra-state Transmission System in the states of Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu, rich in renewable resource potential and where large capacity renewable power projects are planned, at an estimated cost of Rs.10,141.68 crore with Government of India contribution of Rs. 4056.67 crore in order to facilitate integration of large scale RE generation capacity.

3.21 The Ministry also stated that the activities envisaged under the project include establishment of Grid sub-stations of different voltage levels with aggregate transformation capacity of approx. 19000 MVA (Mega Volt Ampere) and installation of 9400 circuit kilometers (ckt-kms) (revised target) of transmission lines in these eight states. The project is scheduled to be completed by Financial Year 2019-20 with funding mechanism consisting of

40% Government of India Grant, 40% KfW loan (EUR 500 Million) and the remaining 20 percent as State contribution. Loan disbursement from KfW to States till September, 2019 is EUR 206 Million. The Project is anticipated to be commissioned by March 2021.

3.22 The Ministry furnished that 5050 ckm of transmission lines have been constructed and 4750 MVA capacity substations have been commissioned as on 30.09.2019. The following works, as submitted by the Ministry, have been completed in 2018-19:

"a) **Gujarat**: (i) LILO of both circuits of 220 KV D/C Tebhda – Nyara line at Moti Gop substation (M/C line); (ii) 220 kV320 MVA Bhachunda GIS substation (Dis. Kutch); (iii) LILO of one circuit of 220 kVD/C Akrimota – Nakhatrana line at Bhachunda; (iv) LILO of one circuit of 220 kV D/C Hadala – Sartanpar at 220 kV Wankaner; (v) LILO of one circuit of 220 KV D/C Gandhinagar TPS – Chhatral line at Vadavi (AL-59); (vi) 220 KV D/C Radhanpur – Sankhari line.

b) **Karnataka**: (i) 400/220 kV 1000 MVA Substation in Gadag (Doni); (ii) 220 kVDC LILO from 220 kV Gadag-Lingapur DC line to the 400/220 kV Narendra-Haveri first circuit to 220 kV Station Bidnal in Haveri and Dharwad districts.

c) **Madhya Pradesh**: (i) 220 kV Double Circuit Double Strung line from Julwaniya 400 kV S/s to Sendhwa 220 kV S/s; (ii) 220/132 kV S/s at Sendhwa; (iii) 132 kV Interconnector between Sendhwa 220 kV S/s and Sendhwa 132 kV S/s; (iv) 220 kV Double Circuit Double Strung line from Badnawar 400 kV S/s to Kanwan 220 kV S/s; (v) 220/132 kV S/s at Kanwan; (vi) 132 kV Inter connector between Kanwan 220 kV S/s and Kanwan 132 kV S/s; (vii) 132 kV Double Circuit Double Strung line from Kanwan 220 kVS/s to Teesgaon 132 kVS/s; (viii) Second circuit stringing of 132 kV Jhabua – Meghnagar 132 kV Double Circuit Single Strung line; (ix) 220/132 kVS/s at Gudgaon; (x) Second circuit stringing of Maihar – Amarpatan 132 kV Double Circuit Single Strung line; (xi) 220/132 kVS/s at Sailana 400 kVS/s; (xii) 220 kV Interconnector between Sailana 400 kVS/s and Ratlam Switching 220 kVS/s; (xiii) Second circuit stringing of A lot – Sitamau 132 kV Double Circuit Single Strung line.

d) **Rajasthan**: (i) 400 kVD/C Barmer – Bhinmal (PGCIL) line; (ii) 400 kV D/C Jaisalmer-2 Barmer line.

e) **Andhra Pradesh**: (i) 400 kV Quad Moose DC line from 400 kV Uravakonda Substation to 400 kV Hindupur Substation; (ii) Stringing of 2nd Ckt on 132 KV DC/SC Line from Badvel-Porumamilla line."

3.23 Further, the Ministry furnished that an Inter State Transmission System (ISTS) project is also being implemented for creation of Gujarat-Rajasthan-Panjab, and Tamilnadu-Andhra Pradesh transmission corridors and their further connection to the national Grid. The total project cost is Rs 11,369 crore with funding mechanism consisting of 30% PGCIL equity and 70% loan (KfW and AB). ISTS project includes 3200 cKm of transmission lines and sub-stations of aggregate transformation capacity of 18000 MVA, to be completed by 2020.

3.24 With respect to the Inter State Transmission System Project, it is submitted by the Ministry that EUR 475 Million of loan have been disbursed to PGCIL by KfW till September, 2019. 2850 ckm of transmission lines have been constructed and 14000 MVA capacity substations have already been commissioned.

CHAPTER IV

POWER FROM RENEWABLES: GRID INTERACTIVE AND OFF-GRID RENEWABLE POWER

4.1 According to the Ministry's annual report (2018-19), India has a wind potential of more than 300 GW at a hub height of 100 meter, solar potential of ~750 GW assuming 3% waste land is made available, small hydro potential of ~20 GW and bio energy potential of 25 GW. Further, there exists significant potential from decentralized distributed applications for meeting hot water requirement for residential, commercial and industrial sector through solar energy and also meeting cooking energy needs in the rural areas through biogas. Renewable energy also has the potential to usher in universal energy access. In a decentralized or standalone way, renewable energy is appropriate, scalable and viable solution for providing power to un-electrified or power deficient villages and hamlets. Capacity addition of 42.70 GW grid connected renewable power has been achieved during the last five years from April 2014 to March 2019.

4.2 An allocation of Rs. 4272.15 crore for the Grid Interactive Renewable Power and Rs. 688.00 crore for Off-Grid/Distributed and Decentralized Renewable Power have been made for the year 2019-20.

4.3 When asked about the details of financial utilization vis-à-vis allocation during the previous years under Grid-interactive and Off-Grid Renewable Power, the Ministry furnished as given below:

Year	BE	RE	Actual Expenditure
2016-17	4402	3899.15	3514.08
2017-18	4952.70	3752.00	3495.57
2018-19	4787.98	4900.45	4291.17
2019-20	4960	-	2703.90 (As on 15.10.2019)

4.4 On being asked to explain the reasons of shortfall in expenditure vis-a-vis BE/RE, the Ministry stated that:

"**Solar** : Adequate proposals were not received from NE states under various schemes of grid-connected solar power programmes. Therefore, there is substantial savings under the head. It is also to be mentioned that a new scheme for supporting NE states to go for RE power projects in their states has been introduced. The scheme has provision of back-ended financial support i.e. financial support will be provided after commissioning of the project. Therefore, it is expected that NE budget will be suitably spent this year through re-appropriation. Further, the Ministry has taken up with Ministry of DoNER to exempt this Ministry from utilization of 10% NE Funds. Further, in case of exemption is not possible, the earmarking may be reduced to 5% from 10%.

Small Hydro Power (SHP): In the year 2018-19, Allocation of Rs 90 crore was towards NE States, where neither new projects could be generated nor sanctioned since continuation of SHP scheme from 1st April 2017 to 31st March 2020 (commensurate with the duration of 14th Finance Commission) is under consideration of the CCEA, resulting non-utilisation of Rs.75.46 crore from NER head. Only old liability, created for projects commenced prior to 31st March 2017, is being cleared from the budget allocation. As the gestation period of an SHP is about four to five years, the old liability will continue to be serviced by March 2022.

Biomass Power/Bagasse Cogeneration sector: Biomass Power/Bagasse Cogeneration sector is facing problems such as non-signing of PPAs by DISCOMs, lack of working capital and non-availability of biomass. These issues are affecting the progress of the sector."

4.5 The Ministry was in the process of reviewing all its major programmes i.e. Solar, Wind, Small Hydro and Bio Power programmes. When asked about the outcome of this review process, the Ministry stated that:

"**Solar Power:**
Internal review of Solar Park Scheme was undertaken and necessary amendments regarding addition of new modes for implementation/ execution of Solar Park Scheme were added to facilitate individual/Solar Developer/ SECI for speedy development of solar parks. In addition, an appraisal of the National Solar Mission having all schemes was undertaken by M/s CRISIL after interacting with various stakeholders. Major recommendations/findings/suggestions of the report are summarized below:

i. Policy related

- Reconsider the need for continuation of VGF policy framework in subsequent phases
- Continue bundling scheme in subsequent phases
- Reconsider capital subsidy scheme for off grid systems
- Policy framework for utilization of stranded off grid systems
- Guaranteed off-take scheme/Export promotion scheme for promotion of solar manufacturing
- Align state-wise RPO targets in line with 100 GW solar target
- State-level bidding should be spread on a district wise/sub-station wise

ii. Infrastructure related

- Upgrade grid infrastructure
- Implementation of forecasting and scheduling protocol

iii. Bid/tender document related (grid and off grid)

- Remove cap on excess generation
- All new mini grid systems should have capability for grid synchronization and remote generation monitoring systems.
- Measures during backing down of solar power due to grid instability or unavailability of transmission line

iv. Capacity-building related

- Consumer awareness is important for the growth of rooftop solar generation. As such, focused programmes for consumer awareness are necessary.
- Capacity-building of execution/metering staff in utilities on implementation of solar rooftop net/gross metering is required.
- Better coordination between SNAs and urban local bodies is needed. A sustained campaign targeting resident welfare associations , industry associations, etc.is recommended.
- The new Scheme of MNRE , KUSUM, is to be widely publicized

Bio Power

Third party evaluation of earlier schemes were carried out and based on their recommendations, two new schemes for Biomass & Waste to energy have been notified.

SHP

An evaluation of SHP programme was done by M/s Deloitte in the year 2017. Based on outcome/recommendations of evaluation report, proposal for continuation of SHP programme from 01st April 2017 onward was developed, which was referred to EAC of PM in Dec. 2018. The EAC of PM again appraised the programme and gave its recommendation for continuation of SHP programme which is under consideration. As such SHP programme was first evaluated in 2017 by M/s Deloitte and then in 2019 by PMEAC.

Wind Power

A study was carried out by IIM Lucknow to acknowledge tariff based e-reverse auction versus closed e-bidding in wind & solar sector which recommended MNRE to continue with e-reverse auctions over closed e-bidding in both wind and solar sectors."

I. WIND ENERGY

4.6 When asked about the State-wise wind power potential, the Ministry stated that the assessment conducted by National Institute of Wind Energy (NIWE) indicates a gross wind power potential of 695GW at 120 meter and 302 GW at 100 meter above ground level in the country. Most of the wind potential exist in seven windy States as given below:

S. No.	State	Wind Power Potential (GW) at 100 mtr.	Wind Power Potential (GW) at 120 mtr.
1	Andhra Pradesh	44.23	74.90
2	Gujarat	84.43	142.56
3	Karnataka	55.86	124.15
4	Madhya Pradesh	10.48	15.40
5	Maharashtra	45.39	98.21
6	Rajasthan	18.77	127.75
7	Tamil Nadu	33.80	68.75
Sub Total		**292.97**	**651.72**
Other States		9.28	43.78
All India Total		**302.25**	**695.50**

4.7 Given below are the State-wise installed Wind Power Capacity as on 30.09.2019, as furnished by the Ministry:

STATE	Wind power capacity as on 30.9.2019 (MW)
Andhra Pradesh	4092.45
Gujarat	7046.77
Karnataka	4753.4
Kerala	62.5
Madhya Pradesh	2519.89
Maharashtra	4794.13
Rajasthan	4299.72
Tamil Nadu	9229.065
Telangana	128.1
Others	4.3
Total	**36930.325**

4.8 The status of wind power projects in the country, as on 30.9.2019, as furnished by the Ministry, are given below:

Cumulative commissioned capacity	36.93 GW
Projects under implementation	9.78 GW
Ongoing bids	3.84 GW
Total	**50.55 GW**

4.9 On being asked about Wind power capacity addition targets and achievements for the last three years, the Ministry furnished:

Year	Target (in MW)	Achievements (in MW)
2016-17	4000	5502
2017-18	4000	1865
2018-19	4000	1481

4.10 When asked to explain the reasons for non-achievement of targets, the Ministry stated that:

> "The Government has set a target of 175 GW of installed capacity of renewable energy sources by 2022, which includes 60 GW from Wind Power. The capacity additions till 2017 (i.e. 32.27 GW) were through Feed in Tariff (FiT) mechanism. Subsequently, the tariff regime has been shifted from Feed-in-Tariff (FiT) to bidding route, which has slightly disrupted the installation of projects. Presently, the wind power projects in the country are installed on the basis of commercial viability through tariff based competitive bidding process. In order to provide sufficient capacity to the developers, regular bids for wind energy projects are being issued. The status of bids and implementation of projects is being monitored regularly. The wind power projects of 1304 MW capacity has already been installed in the current financial year (upto 30.09.2019).

4.11 On a query about the fund utilization *vis-à-vis* allocation during the last three years, the Ministry furnished:

Year	Funds allocated (in Crores)	Funds utilized (in Crores)
2016-17	488.95	488.95
2017-18	750	750
2018-19	950	950

4.12 Regarding physical target and financial allocation for the year 2019-20, the Committee were informed that the physical target for wind power projects is 3 GW and an amount of Rs. 920 Crores has been allocated for disbursal of claims under wind Generation Based Incentive (GBI) Scheme.

4.13 When the Committee desired to know if the allocation for 2019-20 would be sufficient to meet the physical target set, the Ministry stated that an additional fund of about Rs. 600 Crores has been sought in Revised Estimates (RE) to cater the requirements of current financial year.

4.14 In reply to a query, the Ministry stated that the following major activities/ projects have been proposed to be undertaken during 2019-20:

- "Issuance of bids of 10 GW wind power capacity
- Notification of Indian Wind Turbine Certification Scheme
- Notification of standard bidding guidelines for wind solar hybrid projects."

4.15 When asked about the provisions of fiscal and financial incentives provided by the Government for wind energy sector, the Ministry stated:

> "The Government is promoting wind power projects in entire country through private sector investment by providing various fiscal and financial incentives such as Accelerated Depreciation benefit; concessional custom duty exemption on certain components of wind electric generators. Besides, Generation Based Incentive (GBI) Scheme was available for the wind projects commissioned before 31 March 2017. In addition, the inter-state transmission charges and losses have been waived off for wind and solar projects to be commissioned by March, 2022 so as to facilitate inter-state sale of wind and solar power."

4.16 Regarding Manufacturing Base in Wind Energy Sector, it was stated during the evidence that the annual production capacity of wind turbines is about 10 GW and all the major global WTG manufacturers have manufacturing units in the country. Around 70-80% indigenization has been achieved with strong domestic manufacturing in the wind sector. List of Models & Manufacturers (RLMM) of wind turbines are updated regularly by the ministry and at present, there are 18 manufacturers and 44 wind turbine models in the list.

4.17 Regarding harnessing of Off-Shore Wind Resources, the Ministry during the evidence submitted that:

- "The National Offshore Wind Energy Policy has been notified on 6th October 2015. The policy provides facilitative framework for development of off-shore wind power in the country.
- Initial studies indicate offshore wind energy potential of about 70 GW within the identified zones in the coasts Gujarat and Tamil Nadu only.
- First LiDAR (Light Detection and Ranging) installed and commissioned off Gujarat coast for gathering wind resource data. One year wind speed report has been published by NIWE. Five more LiDARs are planned to be installed (2 off the coast of Gujarat and 3 off the coast of Tamil Nadu).
- Ministry is planning to develop the first offshore wind energy project of 1 GW capacity off the coast of Gujarat. Required Geophysical study for 365 Sq. km has been completed and the geotechnical and met-ocean studies is under progress. All the stage-I clearances as per national offshore wind energy policy has been obtained for the proposed one GW project. Environmental Impact Assessment for the proposed one GW offshore project is being carried out by National institute of Oceanography, Goa."

4.18 Regarding Wind–Solar Hybrid Projects, the Ministry stated that the Wind-Solar Hybrid Policy has been issued in May, 2018 and furnished the following:

Wind-Solar Hybrid Projects awarded by SECI					
Sr. No	**Developer**	**Project Capacity (MW)**	**Tariff (INR/kWh)**	**Project Location**	**Scheduled Commissioning Date**
1	Mahoba Solar (UP) Private Limited	390	2.69	Rajasthan	03.12.2020
2	SBE Renewables Ten Private Limited	450	2.67	Tamil Nadu	03.12.2020
3	Adani Renewable Energy (Park) Gujarat Ltd.	600	2.69	Rajasthan	17.02.2021
Total		**1440**			
In addition to this, SECI has also issued a tender to install 160 MW capacity of wind-solar-battery hybrid project in Ramagiri, Andhra Pradesh					
Hero Future Energies has commissioned wind solar hybrid project by adding 28.8 MW of solar project to an existing 50 MW wind project (Total 78.8 MW hybrid project) in Raichur district, Karnataka.					

II. SOLAR ENERGY

4.19 The Ministry stated that based upon the availability of land and solar radiation, the potential of solar energy in the country has been assessed to be around 750 GWp. The state-wise details of installed capacity (as on 30.09.2019) as furnished by the Ministry, are given below:

S. No.	State/UT	Installed Capacity till 30-09-2019 (MW)
1	Andaman & Nicobar	12.19
2	Andhra Pradesh	3310.67
3	Arunachal Pradesh	5.61
4	Assam	41.23
5	Bihar	149.35
6	Chandigarh	36.99
7	Chhattisgarh	231.35
8	Dadar &Nagar	5.46
9	Daman & Diu	16.02
10	Delhi	132.15
11	Goa	4.78
12	Gujarat	2684.80
13	Haryana	243.95
14	Himachal Pradesh	28.56
15	Jammu & Kashmir	19.13
16	Jharkhand	38.23
17	Karnataka	6443.81
18	Kerala	141.36
19	Lakshadweep	0.75
20	Madhya Pradesh	2113.65
21	Maharashtra	1660.51
22	Manipur	4.11
23	Meghalaya	0.12
24	Mizoram	1.42
25	Nagaland	1.00
26	Odisha	397.28
27	Pondicherry	3.20
28	Punjab	947.10
29	Rajasthan	4241.47
30	Sikkim	0.07
31	Tamil Nadu	3097.97
32	Telangana	3620.75

33	Tripura	9.41
34	Uttar Pradesh	1045.10
35	Uttarakhand	314.99
36	West Bengal	97.16
Total		**31101.68**

4.20 On being asked about Action Plan of the Ministry to harness the available potential of Solar Energy, the Ministry stated that:

"The Government of India has revised the National Solar Mission target of Grid Connected Solar Power projects from 20,000 MW by 2022 to 100,000 MW by 2022. The Government has planned to achieve the target of 1,00,000 MW by setting up Distributed Rooftop Solar Projects and Medium &Large Scale Solar Projects. In order to promote and harness solar energy in the country, the Government has launched the following schemes:

i. Solar Park Scheme for setting up of over 50 Solar Parks and Ultra Mega Solar Power Projects targeting over 40,000 MW of solar power projects.
ii. Scheme for setting up 12000 MW of Grid-Connected Solar PV Power Projects by the Central Public Sector Undertakings (CPSUs) (Phase-II) and the Government organisations with Viability Gap Funding (VGF).
iii. VGF Scheme for setting up of 2000 MW of Grid Connected Solar PV Power Projects through SECI.
iv. VGF Scheme for setting up of 5000 MW of Grid Connected Solar PV Power Projects through SECI.
v. Installation of Grid Connected Solar Rooftop Power Plants.
vi. Off-Grid Solar PV Scheme.
vii. Pradhan Mantri-Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM)."

4.21 When the Committee desired to know about the year-wise budgetary allocation and actual expenditure for National Solar Mission, the Ministry furnished:

Year	BE (Rs. Crore)	RE (Rs. Crore)	Actual Expenditure (Rs. Crore)
2010-11	341.90	349.40	349.54
2011-12	492	652.30	652.06
2012-13	572.88	638.64	598.77
2013-14	566.77	779.97	692.28
2014-15	1587.50	1158.50	1158.19

2015-16	1947.00	3147.00	3146.24
2016-17	3140.00	2866.70	2590.59
2017-18	3361.00	2102.10	1889.93
2018-19	2893.75	2969.74	2524.65
2019-20	3004.90	-	1489.85 (as on 30.9.2019)

4.22 In reply to a query about the reasons for non-utilization of funds, the Ministry stated that:

> "Adequate proposals were not received from NE states under various schemes of grid-connected solar power programmes. Therefore, there is substantial savings under the head. It is also to be mentioned that a new scheme for supporting NE states to go for some power projects in their states has been introduced. The scheme has provision of back-ended financial support i.e. financial support will be provided after commissioning of the project. Therefore, it is expected that NE budget will be suitably spent this year through re-appropriation. Further, the Ministry has taken up with Ministry of DoNER to exempt this Ministry from utilization of 10% NE Funds. Further, in case of exemption is not possible, the earmarking may be reduced to 5% from 10%."

4.23 When asked about the physical achievements vis-a-vis targets with respect to the National Solar Mission, the Ministry furnished that against the target of 100 GW by 2022, the year-wise achievements are as under:

S. No	Year	Capacity added during year (MW)	Cumulative capacity (MW)
1.	Upto 2010	--	11 MW
2.	2010-11	25 MW	36 MW
3.	2011-12	994 MW	1030 MW
4.	2012-13	656 MW	1686 MW
5.	2013-14	945.9 MW	2631.9 MW
6.	2014-15	1112.07 MW	3743.97 MW
7.	2015-16	3018.883 MW	6762.853 MW
8.	2016-17	5525.98 MW	12288.83 MW
9.	2017-18	9362.67 MW	21651.46 MW
10.	2018-19	6529.20 MW	28180.66 MW
11.	2019-20	2921.02 MW	31101.68 MW (as on 30.09.2019)

4.24 When the Committee desired to know if there was any shortfall in achievements of physical targets, the Ministry furnished that:

> "There is no shortfall in achievement of target. Against the 100 GW target to be achieved by 2022, 31.1GW has already been commissioned by 30.09.2019. In addition, 19.36GW is under implementation while 35.27GW is under bidding. Thus 85.73GW is already at various stages of development and balance 15 GW would be bidded out in 2019-20, so that implementation is done before 2022. However, major constraints being faced by the developers in commissioning of solar are land acquisition, evacuation infrastructure, non-conducive state policy for development of solar and business environment such as willingness of DISCOMS to purchase solar power. Ministry is making its concerted efforts to sort out the issues with the help of all stakeholders."

4.25 When asked about the physical target and financial allocation for Solar Energy for the year 2019-20, the Committee were informed that targets of 8500 MW grid connected and 400 MW off-grid/decentralized Solar Power capacity installation have been set with allocation of Rs. 2479.90 crores and Rs 525.00 crores respectively.

4.26 On being asked if the budgetary allocation will be sufficient to achieve the physical target set with respect to Solar Sector for the year 2019-20, the Ministry stated that the budgetary allocation would be sufficient to achieve the desired level of target .

4.27 When asked if the Ministry is confident of achieving the target of 100 GW of Solar Power by 2022, the Ministry replied in affirmative and stated that:

> "The Ministry is confident of achieving the target by 2022 and has created a complete visibility/plan of achieving 100 GW of Solar Power as per following":-

Solar projects commissioned (as on 30.09.19)	31.10 GW
LOIs issued but not commissioned	19.36 GW
Tender issued but LOI not issued	35.27 GW
Total	**85.73 GW**
Balance tenders to be issued to reach 100 GW will be issued in 2019-20	

4.28 Assuring the Committee about achievement of target, the Secretary deposed:

> "we are confident that by 2022, we would not only achieve the target but we would exceed the target."

4.29 In reply to a query about measures taken to achieve the target, the Ministry stated:

> "The Government have launched several schemes for promotion of solar energy in the country. In addition, the Government is promoting solar power development by providing various fiscal and promotional incentives such as capital subsidy, accelerated depreciation, waiver of Inter State Transmission System (ISTS) charges and losses, viability gap funding (VGF), financing solar rooftop systems as part of home loan, and permitting Foreign Direct Investment up to 100 per cent under the automatic route."

4.30 The details of the Subsidies/support in terms of Central Financial Assistance (CFA) given by the Government for installation of Solar Projects, as furnished by the Ministry, are given at ***Annexure II***.

II.A GROUND MOUNTED SOLAR

4.31 Explaining about the present status regarding Large Ground Mounted Solar Projects against the target of 60 GW, the Ministry stated that as on 30.09.2019, 31100 MW of ground mounted projects have been set up in the country and it has been making concerted efforts in consultation with State Governments and different stakeholders to achieve the target set.

4.32 Explaining about the status of Solar Park Scheme, the Ministry during the evidence stated that the target under Solar Park Scheme was enhanced from 20 GW to 40 GW in 2017. As on date, 42 Solar Parks in 17 States with aggregate capacity of 23,329 MW have been approved. Aggregate capacity of around 13,900 MW have been tendered and about 6974 MW have already been commissioned in various solar parks as on 30.09.2019.

4.33 Regarding the status of Solar Parks, the Secretary, MNRE, during the evidence, deposed:

> "an assistance of Rs. 20 lacs was given in the original scheme of solar park; almost 22-23 parks have been set up in it. The problem is the land given by the state government, where there is either encroachment or it is uneven. Two or three major parks are functional, Kadappa, Reva parks. Now we have new scheme, it becomes very difficult to get land from the state. It takes much time in providing land ceiling, at places it takes more than one year to obtain clearance. Now central public sector undertakings will already acquire the land by forming special purpose vehicle with the state governments. Dedicated transmission will be given for acquiring the land so that the developer should not face any problem in setting up the project. There will be such plug and play system. As such we may avoid the problems."

4.34 Regarding installation of land mounted Solar Projects on barren land, the Secretary deposed:

> "Presently barren land is being used. There is no such information of any project being set up on agricultural land. Projects are being set up in Jaisalmer, Barmer, Bikaner etc. areas. Now we have provided that solar projects can be set up on barren land and if the land is agricultural the project can be set up by installing a panel on steel structure. It is happening at various places in India and abroad, also in Punjab. We have not limited the scheme on barren land only; structures can be set up on agricultural land to double the income of farmers."

4.35 The Ministry furnished the following major challenges in achieving the targets regarding Large Ground Mounted Solar Projects:

- unavailability of good Solar irradiance in the State,
- unavailability of conducive State policy for solar,
- unavailability of land,
- high cost of financing,
- lack of conducive business environment such as unwillingness of DISCOMS to purchase the solar power,
- lack of power evacuation infrastructure etc.

II.B ROOF-TOP SOLAR

4.36 In response to a query, the Ministry stated that in 2014, an assessment on potential SPV capacity in India was undertaken by the National Institute of Solar Energy (NISE) which estimated a rooftop SPV potential of 42.8 GW.

4.37 Given below is the revised target of phase II of the rooftop solar programme as per CCEA note:

Year	Capacity to be Commissioned (MW)
2019-20	3000
2020-21	6000
2021-22	12000
01.04.2022 to 31.12.2022	17000
Total	**38000***
* about 1826MW has been commissioned	

4.38 The year-wise cumulative installation details as reported by the Ministry, are as follows:

Upto 31.03.2015	Upto 31.03.2016	Upto 31.03.2017	Upto 31.03.2018	Upto 31.03.2019	Upto 15.10.2019
41MW	241MW	656 MW	1063MW	1436 MW	1826 MW

4.39 About the status of Solar Roof-top Programme, the Secretary deposed:

> "At that time, it was thought that 40,000 MW would come from rooftop solar. When we started implementing rooftop solar, we were facing a plethora of problems. Today, the reported figure of rooftop solar is just 2,600 MW. Our estimate is that people have installed rooftop solar panels way more than this reported 2,600 MW figure. Even if we take this figure, it is estimated that around 4,000 MW rooftop solar panels have been installed."

4.40 In response to a query regarding the reasons for slow progress of Rooftop Solar Programme, the Ministry stated:

- "Involvement of multiple stakeholder viz. State Nodal Agencies, DISCOMs, Public Sector Undertakings, Developers etc.
- Reluctance of DISCOMs due to revenue loss; availability of net—meter; CEIG inspection etc.
- Lack of mandatory notification/ Lack of State policies.
- Lack of uniform regulations."

4.41 Further explaining the reasons for slow progress of Roof-top Solar Programme, the Secretary, during the evidence, deposed:

> "the biggest problem is that of Discom. They don't want to install rooftop solar. They say that our residential and farm sectors are highly subsidised. Our institutional and commercial sectors are subsidising the costs. The viability of the rooftop solar is fit for commercial and institutional sectors. Once these commercial and institutional sectors install rooftop, who will subsidize for residential and farm sectors? So, Discom never wants to lose its high-value customers, that is, the commercial and institutional sectors.
>
> Secondly, our residential sector is again subsidised. If the cost of electricity for residential sector is higher, then every household would want to install solar. Since our electricity prices are lower and, at many places, 200 units are given free, nobody sees any profit in installing solar panels."

4.42 Assuring the Committee about achievement of Solar Roof-top target of 40 GW by 2022, the Secretary deposed:

> "We are promoting commercial and institutional establishments to install solar roof-tops to get their electricity. For this, the government is trying to promote open access and captive facilities. There is also a proposal to amend the tariff policy. As the rooftop solar becomes cheaper, the rooftop will grow. I believe that as the price of solar panels decreases by the year 2024, the demand in the residential sector will increase. We will be able to meet the 40,000 MW target that we have set for rooftop solar."

4.43 Elaborating the remedial steps taken by the Government for promotion of Roof-top Projects in the country, the Ministry furnished:

- "Providing central financial assistance (CFA) for residential/institutional/social sectors and achievement linked incentives for Government sectors rooftop solar projects installed in both urban/rural areas under phase I of the Rooftop Solar Programme through implementing agencies including State Nodal Agencies/Solar Energy Corporation of India, Govt. departments etc.
- Under phase II of the programme Electricity Distribution Companies (DISCOMs) have been made as implementing agencies and CFA is available for residential sector both in rural/urban areas. Incentives for the DISCOMs for achievement of additional capacity above baseline has also been provided for.

- Persuading States to notify the net/gross metering regulations for RTS projects. Now all the 36 States/UTs/SERCs have notified such regulations and/or tariff orders.
- Prepared model MoU, PPA and Capex Agreement for expeditious implementation of RTS projects in Govt. Sector.
- Allocate Ministry-wise expert PSUs for handholding and support in implementation of RTS projects in various Ministries/ Departments.
- Creation of SPIN-an online platform for expediting project approval, report submission and monitoring progress of implementation of RTS projects.
- Facilitated availability of concessional loans from World Bank and Asian Development Bank (ADB) through SBI and PNB respectively, for disbursal of loans to industrial and commercial sectors, where CFA/incentive is not being provided by the Ministry.
- Assisting States in development/integration of online portal and aggregation of demands related to rooftop solar projects."

4.44 On being asked about the status of actual implementation of the Net-Metering in the country, the Ministry stated:

"All the 36 State/Joint Electricity Regulatory Commission has issued net metering regulation/tariff orders. However, implementation of the same is different in various DISCOMs. The revenue erosion due to adoption of solar by high electricity tariff paying customer, availability of solar power during day time when there is less electricity demand by users and non-availability of solar power during peak demand time (say in evening) etc. are few of the concerns of the DISCOMs. From the users point of view the limitation of maximum capacity for installation of solar rooftop plants w.r.t. connected load of the consumer/DT capacity, availability of net meters, time taken for net metering connections by DISCOMs, inspection by Chief Electrical Inspectors to Government (CEIG) inspection, not allowing RESCO mode for net-metering, limiting net metering for certain sectors of consumers etc. are few concerns."

4.45 On being asked if any assessment has been done with regard to the cost of roof top Solar, the Ministry stated that:

"The benchmark cost for grid connected rooftop solar projects has been arrived with based on cost details received from different agencies including State Nodal Agencies, Solar Energy Corporation of India, system integrators etc. The present benchmark cost for FY 2019-20 is as follows":

Capacity	Benchmark cost (Rs/Wp) other than Special Category States	Benchmark cost (Rs/Wp) for Special category States*
Above 1 kW and upto 10 kW	54	59
Above 10 kW and upto 100 kW	48	53
Above 100 kW and upto 500 kW	45	50

*includes North Eastern States, Hilly States of Uttarakhand, Himachal Pradesh, J&K and UTs of Andaman & Nicobar Island and Lakshadweep

4.46 The Ministry furnished that the Solar roof tops are remunerative and the average payback period of such projects varies from 5-6 years and the expected life is upto 25 years.

4.47 When asked about the subsidy/CFA made available for promotion of Rooftop Solar Programme, the Ministry furnished:

"The Ministry in phase I has been implementing "Grid Connected Rooftop and Small Solar Power Plants Programme" which is providing subsidy upto 30% of benchmark cost for the general category states and upto 70 % of benchmark cost for special category states, i.e. North Eastern States including Sikkim, Uttarakhand, Himachal Pradesh, Jammu & Kashmir and Lakshadweep, Andaman & Nicobar Islands for installation of grid connected rooftop solar power plants in building of residential, institutional and social sector. For Government sector achievement linked incentives upto 25% of the benchmark cost in general category States/UTs and 60 % of the benchmark cost for special category States/UTs is provided. About 4200 MW is being targeted under this scheme (2100 MW with subsidy and 2100 MW without subsidy) by year 2019-20. So far, about 2098 MW solar rooftop systems have been sanctioned/ approved under the scheme. As on 15.10.2019 about 1826 MW of RTS system have been reported online as installed (with or without subsidy).

Phase II of the Grid connected rooftop solar programme was approved for with a target for achieving cumulative capacity of 40,000 MW from Rooftop Solar (RTS) Projects by the year 2022 in February 2019. The programme will be implemented with total central financial support of Rs. 11,814 crores through DISCOMs. Operational guidelines have been issued on 20th August 2019. In the Phase-II Programme, Central Financial Assistance (CFA) for the residential sector has been restructured. Important features of the Phase-II of RTS are as under: -

- Power Distributing companies (Discoms) will be the implementing agencies.

- Subsidy/CFA will be available for the residential sector only.
  - CFA under residential category will be provided for 4000 MW capacity and the same will be provided on the basis of benchmark cost or tender cost, which is lower.
  - 40% CFA for RTS systems up to 3 kW capacity and 20% for RTS system capacity beyond 3 kW and up to 10 kW. No CFA beyond 10 KW.
  - For Group Housing Societies/Residential Welfare Associations (GHS/RAW), CFA will be limited to 20% for RTS plants for supply of power to common facilities, however, the capacity eligible for CFA for GHS/RAW will be limited to 10 kW per house with maximum total capacity upto 500 kWp.
  - Residential Consumers/Group Housing Societies/ Residential Welfare Associations have to pay only balance amount after deducting the CFA to the empanelled vendor for installation of the RTS project
  - For availing the benefit of CFA, indigenously manufactured PV Modules and Cells are to be used.
- Performance based incentives will be provided to DISCOMs based on RTS capacity achieved in a financial year (i.e. 1st April to 31st March every year till the duration of the scheme) over and above the base capacity i.e. cumulative capacity achieved at the end of previous financial year as per following rates":

S.No	Parameter	Incentive
1	For installed capacity achieved upto 10% over and above of installed base capacity within a financial year.	No incentive
2	For installed capacity achieved above 10% and up to 15% over and above of installed based capacity within a financial year	5% of the applicable cost for capacity achieved above 10% of the installed base capacity
3	For installed capacity achieved beyond 15% over and above of installed based capacity within one financial year.	5% of the applicable cost for capacity achieved above 10% and up to 15% of the installed base capacity PLUS 10% of the applicable cost for capacity achieved beyond 15% of the installed base capacity.
Incentive to the Discoms will be available for the initial 18,000 MW only.		

II.C OFF-GRID/DECENTRALIZED SOLAR

4.48 During the evidence the Ministry stated that the major Off-Grid/decentralized components for Solar Sector are as follows:

- Streetlights
- Home-lights
- Study Lamps
- PM-KUSUM

4.49 Given below are the application-wise units installed:

Systems (SPV Off-grid Systems)	No. of units installed in 2018-19	Cumulative Number of units (as on 31.03.2019)
Solar Study lamp	27,49,798	58,23,710
Solar Home Lights	67,393	17,15,214
Solar Street Lights	53,969	6,59,218
Solar Power Plant	26,154.10	212.05 MWp
Solar Pumps	65,892	2,37,120

4.50 Detailing about the progress made in Off- Grid Solar Power Programme during 2019-20, the Ministry furnished:

- Solar Pumps - 6235 (upto 31.08.2019)
- Solar Lamps - 8, 39, 266 (upto 30.09.2019)

4.51 During the evidence, the Ministry stated that Off-Grid Scheme Phase - III was launched on 07.08.2018 with a financial outlay of 656 crore. The Scheme has a total capacity of 118 MWp to be achieved by March 2020 with following provisions:

- 3 lakh Solar Street Lights
- 25 Lakh Solar Study Lamp (in NE States and LWE districts)
- Standalone Solar Power Plants for public institutions (upto 25 kw each)

The Ministry also stated that sanction has been issued for 2.38 lakh Solar Street Lights, 17 lakh Solar Lamps and 40 MWp capacity Solar Power Plants.

4.52 The Ministry has also sanctioned a scheme to provide 70 lakh students in the states of Assam, Bihar, Jharkhand, Odisha and Uttar Pradesh which have more than 50% un-electrified households with high quality, affordable clean light through Solar Lamp. Tribal and remote blocks are given

preference based on level of kerosene consumption. About 55.76 lakh lamps have already been distributed.

4.53 Regarding the PM KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan) Scheme, the Ministry furnished that a total capacity of 25,750 MW is to be created under the scheme by the year 2022 with Central Financial Support of Rs. 34,422 crores. The Scheme consists of following three components:

Component A	10,000 MW of Grid connected Solar or any other Renewable Energy plants of individual plant size upto 2 MW.
Component B	17.50 Lakh stand-alone Solar water Pumps of individual capacity upto 7.5 HP.
Component C	Solarization of 10 Lakh Grid-connected Agriculture Pumps of individual capacity upto 7.5 HP.
Component-A and C to be implemented on pilot mode till 31.12.2019 for 1 GW and one lakh pumps respectively and Component-B on full-fledged basis	

4.54 Further explaining about PM-KUSUM, the Secretary, during the evidence, deposed:

> "about KUSUM, which has been aimed with three objectives, namely, to increase energy independence of the farmer; to enhance income of the farmers; and for de-dieselization of the farm sector. Under this Scheme, we would be supplying 1.75 million pumps over the next four years, which will be stand-alone solar pumps to the farms and one million pumps, which should be grid-connected. So, that is the platform which will be grid connected. In addition, we are encouraging farmers to do solar farming on their barren lands."

II.D SOLAR MANUFACTURING

4.55 Regarding status of Domestic Manufacturing in the Solar Sector, the Ministry furnished:

> "Currently, India has installed solar PV manufacturing capacity of around 3 GW for solar PV Cells and around 10 GW for solar PV modules and there is no commercial production in India for upstream stages of solar PV manufacturing like wafers, ingots and polysilicon.
>
> Based on the information available on the website of Department of Commerce, the details of import of solar PV cells and panels/ modules under the CTH 85414011, is as follows":

(in Million US $)

FY		2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 till Aug 2019 (prov.)
Value of Solar PV cells / modules imported in India under CTH 85414011	From China	597	603	1960	2817	3419	1694	413
	From Other Countries	114	218	385	380	419	466	158
	Total import	**711**	**821**	**2345**	**3197**	**3838**	**2160**	**571**

4.56 Explaining about the import of solar equipment, the Secretary during the evidence deposed:

> "today, around 85 per cent of solar equipment, solar cells and modules, have been imported from China and other countries like Vietnam and Malaysia etc. So, this is a major concern."

4.57 On being asked about the mechanism adopted by the Ministry to ensure the quality of material being used in solar projects, the Ministry stated:

- "In August 2017, Ministry of New & Renewable Energy has got notified, "Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Solar PV Power Projects", which clearly specifies the Technical Requirements for Grid Connected Solar PV Power Plants, thereby ensuring the quality of material/ equipment being used in solar PV projects.
- In order to further ensure quality of material/ equipment being used in solar PV projects, MNRE, on 05.09.2017, has brought out a Quality Control Order titled "Solar Photovoltaics, systems, Devices and Components Goods (Requirement for Compulsory Registration) Order 2017", thereby making BIS applicable for the Solar Sector.
- With the objective of ensuring reliability of Solar PV manufacturers and to protect the consumer interests and ensure larger energy security of the country, Ministry of New & Renewable Energy (MNRE), on 02.01.2019, has issued "Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019". The order provides for enlistment of eligible models and manufacturers of solar PV cells and modules complying with the BIS Standards and publish the same in a list called the "Approved List of Models and Manufacturers" (ALMM). Subsequent to March 2020, for all the projects bid out after 02.02.2019, only the models and manufacturers included in this list will be eligible for use in

Government/ Government assisted Projects/ Projects under Government Schemes & Programmes, installed in the country, including Projects set-up for sale of electricity to Government under "Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Solar PV Power Projects dated 3rd Aug' 2017 and the amendments thereof".

4.58 Regarding steps taken by the Ministry to ensure quality of material used in Solar Projects, the Secretary deposed:

> "what happens many a time is that people take up solar projects. They put a sub-standard model in it. But the capacity they possess starts to decline after a year. Those who are entrepreneurs or developers are making a project and selling it to someone else after one year. We find out the actual solar efficiencies in about three years.Now, we have made a principle that nobody will be able to dispose of a project before three years. Earlier, they could transfer the project after one, but now they can sell only after three years. So, we have put up this condition to ensure that whichever solar cells/modules and projects in the solar sector are put up, are of quality.
>
> we have specified that whosoever sets up manufacturing plant should have minimum efficiency of 21 per cent. We are not interested in obsolete technology. Any manufacturing in India must be of superior grade. We have given a standard to solar cells and modules being imported. If these don't meet the standards, we don't allow their imports and they don't fall under any scheme. So, we have brought non-tariff barriers because we cannot bring tariff barriers in solar cells and solar modules because of ITA-1 Agreement."

4.59 When asked about the challenges being faced in Domestic Manufacturing in the Solar Sector, the Ministry stated that:

- "The country does not have a manufacturing base for Poly-silicon, Ingots/wafers, the upstream stages of solar PV manufacturing chain, which is a very energy intensive process.
- Lack of integrated set up, economies of scale & modern technology resulting in higher cost of production.
- Price of solar equipment produced in the country is not competitive as compared to that of foreign manufacturers, especially Chinese manufacturers.
- The domestic manufactures have to borrow at higher interest rates, compared to foreign manufacturers, pushing up their cost of production.

- As per industry's views, some of the reasons for poor manufacturing capacity are high cost of land/ electricity, low capacity utilization, high cost of financing, and lack of skilled workforce."

4.60 Regarding support provided to encourage domestic manufacturing, the Ministry stated that:

"M-SIPS Scheme of Ministry of Electronics & Information Technology:

- 20-25% subsidy for investments in capital expenditure for setting up of electronic manufacturing facility.
- Reimbursement of Countervailing Duty (CVD)/ Excise Duty for capital equipment for the units outside Special Economic Zone (SEZ).

Government Producer Scheme for setting up Solar PV Power plants using domestically manufactured SPV cells & modules

Government has approved a Scheme for setting up of solar PV power plants by Government Producers (CPSUs/ State PSUs/ Govt. Organisations, etc.), in a WTO compliant manner, using domestically manufactured solar PV cells and modules to encourage Make in India in Solar PV Manufacturing sector.

Domestic Content Requirement**:**

Other that CPSU Scheme Phase-II mentioned above, solar PV power projects being implemented under MNRE's other Schemes like PM-KUSUM, Solar rooftop phase II, etc. are also mandated to source their requirement from domestic sources, in a WTO compliant manner. "

4.61 Regarding steps taken by the Government to encourage domestic manufacturing, the Secretary deposed:

" We have a manufacturing capacity of 3 GW of solar cells. Today many companies are making it. We manufacture about 10 GW of modules here. But our demand is much higher than that. We want all the solar cells and solar modules to be built in our country. We have just brought in a tender, which is called Solar Manufacturing linked PPA. Anyone can establish 1 GW of solar cell under it. We will give him a guaranteed market of 4 GW through PPP. So, this is an indirect subsidy. Here, the subsidy would come through the tariff. We also propose to float a scheme. Here we will give 30 or 40 per cent upfront capital subsidy to manufacturers for binging out the manufacturing here in the country. So, we are submitting that proposal to the Ministry of Finance, Department of Expenditure..

We are doing three things to promote Make in India. Wherever government assistance is given, solar cells and modules made in our country have to be used. For example, we have our Kusum scheme. In this scheme, solar pumps are provided with solar panels. Wherever

rooftop subsidies are being provided for the residential and commercial sectors. Similarly, there is one such CPSU scheme, where Government producers can produce energy for themselves and other government institutions. The solar panels and solar modules installed in these schemes should be made in our own country. We have also taken a third step also: that whichever company makes solar cells and modules, we will analyze whether they are able to produce as much or not. We are creating a non-tariff barrier to reduce import from outside. Apart from that we have come up with manufacturing linked bids also"

II.E FINANCIAL DEMAND AND VIABILITY OF SOLAR SECTOR

4.62 When asked if the financial demand of the Solar Sector has been aggregated with a view to arrange the finances for the sector, the Ministry stated:

> "Most solar power projects come in the country with private sector investment. For doing, additional around 70 GW, financing of around Rs. 2,80,000 Crore (@ Rs. 4 Cr/MW) will be required. Banks and NBFCs including IREDA provide funding to solar power projects. The major policy initiatives taken by the Government to mobilize long term financing for renewable energy projects, inter alia, extending new lines of credit to enable it enhance its concessional loan to RE projects, mobilizing project based concessional loans through multi-lateral and bi-lateral agencies i.e. World Bank, Asian Development Bank, KfW - Germany; inclusion of Renewable Energy Projects in Priority Sector Lending of Banks; and approval for issuance of tax free infrastructure bonds for funding renewable energy projects."

4.63 On being asked about the planning of the Ministry to finance solar projects when India's banking sector has been facing its own set of challenges, the Ministry stated as under:

> "Solar power projects come with private sector investments. Most nationalized banks and IREDA have been providing funds for such projects. In addition, 100% FDI is permitted. In view of large market in India, foreign funds manager have shown good interest in investing in India."

4.64 Explaining the problems faced by Renewable Energy Sector due to banking issues, the Secretary deposed:

"about banking issues, banks are very reluctant to provide debt to Renewable Energy sector. At present, both conventional power sectors and Renewable Energy sector are clubbed together for their loan basket. As there are lot of NPAs in power sector, so, they do not want to extend loan to the Renewable Energy sector. Therefore, we wrote to the Department of Financial Services that the loan basket and loan limit for conventional power sector should be separate from Renewable Energy sector and conventional power sector should not affect the development of Renewable Energy sector. So, this issue is still pending with the Department of Financial Services."

4.65 In response to a query about investment attracted so far in the Solar Sector, the Ministry furnished that:

"Government has been promoting solar energy through fiscal and promotional incentives such as capital and/or interest subsidy, generation based incentive, accelerated depreciation, viability gap funding (VGF), financing solar rooftop systems as part of home loan, concessional excise and custom duties, preferential tariff for power generation from renewables, and Foreign direct investment up to 100 per cent under the automatic route etc. Apart from this, Government has also been supporting solar manufacturing through a Modified Special Incentive Package Scheme (M-SIPS) of Ministry of Electronics & Information Technology (MeitY). The Government has allowed 100% Foreign Direct Investment in Renewable energy sector including solar power industry through automatic route. Deptt of Promotion of Industry and Internal Trade has reported FDI equity inflow in Non-conventional energy sector in the last five years as under":

Year	FDI (in US$ Million)
2014-15	615.95
2015-16	776.51
2016-17	783.57
2017-18	1204.46
2018-19	1446.16
Total	**4826.65**

4.66 When asked about the companies involved in solar sector that are reporting loss in their venture and the tariff structure of such loss making companies, the Ministry stated that it has not received any such report.

4.67 Regarding NPAs in Renewable Energy Sector, the Secretary deposed:

> "We have never had NPAs in wind sector and solar sector. They have occurred only in hydro sector and biomass sector. That too, because of high tariff in the biomass and hydro sector. Here, for both wind and solar, the tariff is coming down. It is becoming an efficient sector for providing the loan and giving the finances. Today, our solar and wind projects are viable, but they will take no time to become NPAs, because the state discoms have to pay to generators on time. They are not able to pay them. Today, Rs 9,700 crore are pending for generators with the states. Now, till when the developers can give loan from their equity, from their own pocket. That is a very big problem. The Ministry has written to all state governments to clear their outstanding amounts. Till today a sum of Rs 9,700 crore has not been paid to the developers. This is a very big issue and an issue of concern. We apprehend that if the situation will not get improved, many of solar and wind projects may turn into NPAs."

4.68 In a rush to build market share in the sector, some players have become very aggressive in competitive auction process and are bidding very low tariff. There is a fear that some of these projects would become unviable because developers may find it difficult to raise funds and contain high project costs. On being asked to explain this situation along with remedial measures, the Ministry stated that:

> "The tariff is discovered through biddings held in open and transparent manner which results low tariff. It also depends upon market forces. In order to win a bid, developers may be playing with their margin of profit as well. As all this information remains with project developers, no definite reason can be correctly attributed. Further, reduction in solar power tariffs depends upon several factors like solar irradiance, cost of capital, logistics, Internal Rate of Return (IRR), guaranteed off-take and conducive government policies for promotion of solar energy and it is upto the project developers to bid for the projects keeping in view various factors including viability of projects."

4.69 Regarding the issue of aggressive bidding, the Secretary deposed that:

> "I would not call it an aggressive bidding because the rate of solar power and wind power differs from place to place and State to State and also depending on the cost of finances which developers able to obtain from their parent companies. The rates which are put at Rs. 2.44, those

projects have already been implemented. So, we cannot say that Rs. 2.44 was unviable. If those projects were not coming through then we would have said that Rs. 2.44 is unviable. They take lesser profit. Like Rs. 2.44 has come in Rajasthan but we cannot expect Rs. 2.44 in Andhra Pradesh or we cannot expect this in North East or in any other State. So, this is the difference."

4.70 On being asked about details of prices of solar power per unit quoted during last 2 years and the reasons for such steep decline in the cost of solar power, the Ministry stated:

"Major reason for cost reduction in solar sector is improvement in technology, economy of scale, better formulation of project design, transparent competitive bidding, low cost of funding from abroad etc. The details of tariffs discovered through competitive reverse bidding are given at ***Annexure III***."

III. BIOMASS POWER AND BAGASSE CO-GENERATION PROGRAMME

4.71 The Ministry has been promoting "Biomass Power and Bagasse Co-generation Programme" with the aim of recovering energy from biomass including bagasse, agricultural residues such as shells, husks, de-oiled cakes and wood from dedicated energy plantations for power generation. The potential for power generation from agricultural and agro-industrial residues is estimated at about 18 GW. With progressive higher steam temperature and pressure along with efficient project configuration in new sugar mills and modernization of existing ones, the potential of surplus power generation through bagasse cogeneration in sugar mills is estimated at around 8 GW. Thus the total estimated potential for biomass power is about 26 GW.

4.72 The Programme includes bagasse based cogeneration in sugar mills for export of surplus power to grid with the following objectives:

- To promote efficient and economic use of surplus biomass for power generation.
- To maximize surplus power generation from sugar mills using improved technologies.
- To promote technologies of co-generation for supplementing conventional power.

4.73 Reportedly over 500 biomass power and cogeneration projects with aggregate capacity of 9131 MW have been installed in the country upto September 2019. These projects have been commissioned mainly in the States of Tamil Nadu, Uttar Pradesh, Karnataka, Andhra Pradesh, Maharashtra, Chhattisgarh, west Bengal and Punjab.

4.74 State –wise Potential (as per Biomass Resource Atlas prepared by IISc in 2010-11) for Biomass/Bagasse Co-generation power, as furnished by the Ministry, is given below:

Sr. No.	State	Power Potential (MW)	
		Biomass	Bagasse
1	Punjab	3177.6	160
2	Maharashtra	1969.7	2200
3	Uttar Pradesh	1764.9	2000
4	Madhya Pradesh	1386.2	
5	Haryana	1375.1	100
6	Gujarat	1226.1	50
7	Karnataka	1222.1	1400
8	Tamil Nadu	1163.9	700
9	Rajasthan	1121.9	10
10	Kerala	864.4	
11	Andhra Pradesh	738.3	250
12	Bihar	645.9	200
13	West Bengal	529.2	
14	Orissa	432.7	
15	Assam	278.7	
16	Chhattisgarh	245.6	10
17	Himachal Pradesh	142.2	
18	Jharkhand	107.0	
19	Uttarakhand	88.3	80
20	Jammu & Kashmir	42.7	
21	Goa	26.1	
22	Manipur	15.3	
23	Meghalaya	11.4	
24	Nagaland	10.2	
25	Arunachal	9.3	
26	Tripura	3.0	
27	Sikkim	2.4	
28	Mizoram	1.2	
29	Telangana		100
Total		**18601.5**	**7260**

4.75 When asked about the State-wise installed capacity of Biomass/Bagasse Co-generation power, the Ministry furnished :

State	Cumulative (in MW) as on 30.09.2019	
	Biomass Power + Bagasse Cogeneration	Biomass (Non-Bagasse) Cogeneration
Andhra Pradesh	378.2	98.98
Bihar	113	8.20
Chhattisgarh	228	2.50
Gujarat	65.3	12
Haryana	121.4	84.26
Karnataka	1811.6	15.20
Madhya Pradesh	93	12.35
Maharashtra	2499.7	16.40
Telangana	158.1	1
Punjab	194	123.10
Rajasthan	119.3	2.00
Tamilnadu	969	28.55
Uttarakhand	73	57.50
Uttar Pradesh	1957.5	158.01
West Bengal	300	19.92
Odisha	50.4	8.82
Meghalaya	0	13.80
Kerala	0	0.72
Jharkhand	0	4.30
Himachal Pradesh	0	7.20
Total	**9131**	**674.81**

4.76 When asked about the physical achievements *vis-à-vis* targets under Biomass Power/Bagasse Cogeneration Programme during the previous years, the Ministry furnished:

Year	Target (MW)	Achievement (MW)
2016-17	400	162
2017-18	340	519
2018-19	250 (including both Bagasse and non-bagasse cogeneration)	402

4.77 Regarding reasons for non-achievement of the physical target in 2016-17, the Ministry stated that the Biomass Power/Bagasse Cogeneration sector was facing problems such as non-signing of PPAs by DISCOMs, lack of working capital and non-availability of biomass which resulted in slow progress.

4.78 On a query regarding the budgetary allocation *vis-à-vis* utilization for the last three years under Biomass Power/Bagasse Cogeneration Programme, the Ministry furnished:

Year	Allocation (R.E.) (in Rs Crores)	Utilization (in Rs Crores)
2016-17	17	10.30
2017-18	9	7.79
2018-19	8.50	6.83

4.79 When asked about the reasons for non-utilization of funds in the previous years, the Ministry stated:

> "Non-receipt of complete requisite documents as per the guidelines from the developers results in delay in project sanction resulting in non- utilization of funds."

4.80 Regarding physical targets and budgetary allocation for the year 2019-20, the Ministry stated:

Physical Target	Budgetary Allocation
250 MW	25 Crores – Grid (including bagasse and non-bagasse co-generation and WTE)
	28.50 Crores – Off Grid (including bagasse and non-bagasse co-generation and WTE)

4.81 On being asked if the allocation would be sufficient to meet the target set, the Ministry stated that the Budget allocation would be sufficient and if any additional funds are required that would be sought at RE stage.

4.82 When asked about the activities/projects proposed to be undertaken during 2019-20, the Ministry replied that the following major activities/projects are proposed to be undertaken during 2019-20:

- "Target of achieving 252 MW of Bio power
- Fresh study to be conducted for biomass resource assessment in the country."

4.83 Regarding the provisions of fiscal and financial incentives provided by the Government in Biomass/Bagasse Co-generation Sector, the Ministry furnished:

Project Type	CFA
Bagasse Co-generation by sugar mills	Rs 25 Lakhs / MW of surplus exportable power
Biomass (Non-Bagasse) co-generation in other industries	Rs 50 Lakhs /MW of installed capacity.

IV. SMALL HYDRO PROGRAMME

4.84 The Ministry of New and Renewable Energy is vested with the responsibility of developing Hydro Power Projects of capacity up to 25 MW. In cumulative terms, 1120 small hydropower projects aggregating to 4610.807 MW have been set up in various parts of the country. In addition, 115 projects of about 585 MW are in various stages of implementation as on 30.09.2019. The national target of SHP is to achieve a cumulative capacity of 5000 MW by 2022.

4.85 In response to a query, the Ministry stated that the identified potential of Small Hydro Power is 21133.62 MW from 7133 identified sites and installed Small Hydro Power capacity as on 30.09.2019 is 4610.807 MW. State wise details, as furnished by the Ministry, are given below:

Sl. No.	States	Total Potential		Total Projects Installed	
		Nos.	Capacity (MW)	Nos.	Capacity (MW)
1	Andhra Pradesh	359	409.32	44	162.11
2	Arunachal Pradesh	800	2064.92	156	131.105
3	Assam	106	201.99	6	34.11
4	Bihar	139	526.98	29	70.7
5	Chhattisgarh	199	1098.2	10	76
6	Goa	7	4.7	1	0.05
7	Gujarat	292	201.97	13	62.352
8	Haryana	33	107.4	9	73.5
9	Himachal Pradesh	1049	3460.34	190	870.21
10	Jammu & Kashmir	302	1707.45	45	180.03
11	Jharkhand	121	227.96	6	4.05
12	Karnataka	618	3726.49	169	1256.73
13	Kerala	238	647.15	34	222.02

14	Madhya Pradesh	299	820.44	12	95.91
15	Maharashtra	270	786.46	70	379.575
16	Manipur	110	99.95	8	5.45
17	Meghalaya	97	230.05	5	32.53
18	Mizoram	72	168.9	18	36.47
19	Nagaland	98	182.18	12	30.67
20	Odisha	220	286.22	10	64.625
21	Punjab	375	578.28	56	173.55
22	Rajasthan	64	51.67	10	23.85
23	Sikkim	88	266.64	17	52.11
24	Tamil Nadu	191	604.46	21	123.05
25	Telangana	94	102.25	30	90.87
26	Tripura	13	46.86	3	16.01
27	A&N Islands	7	7.27	1	5.25
28	Uttar Pradesh	251	460.75	9	25.1
29	Uttarakhand	442	1664.31	102	214.32
30	West Bengal	179	392.06	24	98.5
Total		**7133**	**21133.62**	**1120**	**4610.807**

4.86 On being asked about the physical targets and achievements under SHP programme during the previous years, the Ministry furnished:

S.No.	Year	Target (MW)	Achievement (MW)
1	2016-17	150	105.90
2	2017-18	100	105.96
3	2018-19	100	107.35

4.87 When the Committee queried about the non-achievements of target in 2016-17, the Ministry replied:

> "During 2016-17, the achievement was short of 44.10 MW. This shortfall pertains to actual commissioning of under construction SHP projects, as the projects got delayed due to cost overrun, change in design and other technical issues. The other reasons for the non-achievement of target are the difficult locations of SHP projects, short working season in hilly areas and natural calamities such as flash floods."

4.88 Details regarding Utilization of funds *vis-a-vis* allocation for the previous years under SHP, as furnished by the Ministry, are given below:

S. No	Year	Financial support (in Rs. Crore)		
		BE	RE	Expenditure
1	2016-17	125	125.00	124.70 +54.987 (from IREDA Bond Money) = 179.687

2	2017-18	138	123.50	123.92+23.57 (from IREDA Bond Money) =147.49
3	2018-19	218.50	218.50	137.36

4.89 In reply to a question about reasons for non-utilization of allocated budget, the Ministry stated that:

> "As may be seen above during the year 2016-17 and 2017-18, the actual expenditure is more than the budget made available at RE stage. In the year 2018-19, allocation of Rs 90 crore was towards NE States, where neither new projects could be generated nor sanctioned since continuation of SHP scheme from 1st April 2017 to 31st March 2020 (commensurate with the duration of 14th Finance Commission) is yet under consideration of the CCEA, resulting non-utilization of Rs. 75.46 crore from NER head. Only old liability, created for projects commenced prior to 31st March 2017, is being cleared from the budget allocation. As the gestation period of an SHP is about four to five years, the old liability will continue to be serviced by March 2022."

4.90 When asked about the physical target and budgetary allocation for SHP Programme for the year 2019-20, the Ministry stated that the Physical target is commissioning of 100 MW SHP projects where work was commenced prior to 31st March 2017 and budgetary allocation is Rs. 190.90 crore mainly to service the old liabilities.

4.91 On being asked if the allocation would be sufficient to achieve the target, the Ministry stated that:

> "The budget allocation of Rs 190.90 crore, needs rationalization as Rs 110 crore has been allocated under ST component. This needs to be relocated to general component to meet the liabilities created from previous year. The budget allocation for the general component (Rs 43 crore) is already exhausted, although a clear liability of another about 50 crore is pending."

4.92 Major activities/projects proposed to be undertaken under SHP Programme during 2019-20, as stated by the Ministry are given below:

- "Formulation of new scheme for implementation of Small Hydro Program in the country subject to approval of the CCEA Note.

- Achievement of 100 MW Capacity additions through Small Hydro during 2019-20 (starting commercial operation of projects commenced upto March 2017).
- Reassessing of SHP Potential in the country."

4.93 Regarding the provisions of fiscal/financial incentives provided by the Government, the Ministry stated that it has been providing Subsidies/Grants for following activities for the projects commenced on/before 31st March 2017:

- "Resource assessment, Detailed Survey and Investigation, DPR Preparation and Perspective Plans for States
- Capital Subsidy to State Sector Project
- Subsidy for Private Sector Projects
- Renovation and Modernisation of old SHP projects (State sector)
- Water Mills and Micro-hydel projects.
- Research and development, capacity building"

4.94 When the Committee wanted to know about progress with regard to National Mission on Small Hydro, the Ministry replied that it has a target of 5000 MW to be achieved by 2022, out of which 4610.807 MW capacity of Small Hydro has already been achieved as on 30.09.2019 and hence the idea of a separate National Mission on Small Hydro has been dropped.

4.95 Challenges faced in the SHP, as furnished by the Ministry, are given below:

- "Long time taken for clearances
- Rise in project cost
  - Benchmark cost recommended by AHEC for 2016 is Rs11.11cr/ MW.
  - Against 2005 Benchmark cost of Rs. 7.45cr/MW
- Short working season in hilly areas - Resulting to cost and time overrun
- Risk factor in financing - Long project cycle
- Unwillingness of DISCOMs to sign PPAs with higher tariffs SHP projects (In range of Rs. 5 to 6/kWh)
- Levy of Interstate Charges; unlike Solar & Wind where ISTS is waived
- Non-availability of Trained Manpower for O & M -at local level."

CHAPTER V

RENEWABLE ENERGY FOR RURAL APPLICATIONS

5.1 The Ministry of New and Renewable Energy have been supporting various programmes for the deployment of renewable energy systems and devices such as biogas plants, photovoltaic systems, biomass gasifiers, solar cookers and solar thermal systems, etc. for rural and semi-rural applications.

5.2 Given below are the programmes/schemes/projects being undertaken under Renewable Energy for Rural Applications, as furnished by the Ministry:

- "The National Biogas and Manure Management Programme (NBMMP) which has been implemented upto the year 2017-18 and thereafter, New National Biogas and Organic Manure Programme (NNBOMP) has been launched w.e.f. 01.04.2018 which aims at setting up small biogas plants for meeting cooking energy and lighting needs of mainly rural and semi-urban households of the country. So far, about 77,200 small biogas plant have been installed in the country during the previous two years and current year (up to 30.09.2019).
- The Ministry is also implementing Biogas based Power Generation (off-Grid) Programme with the objective of providing clean energy solution to reduce consumption of diesel, kerosene and electricity by installation of medium size biogas plants of size ranging from 30 M3 to 2500 M3 per day. Under this programme 40projects of 2.00 MWe aggregate capacity power generation have been setup during the previous two years and current year 2019-20."

5.3 Given below is the State-wise estimated potential and State/UT wise achievements for family/small biogas plants from 1981-82 to 2017-18 under the National Biogas and Manure Management Programme (NBMMP) and targets and achievements under New National Biogas and Organic Manure Programme (NNBOMP) during the period from 01.01.2018 to 31.03.2019:

State/ Union Territories	Estimated potential	Cumulative total Achievement upto 31/03/2018	Targets and achievements under National Biogas Programme (Nos. of Biogas Plants)	
			Target (2018-19)	Achievements from 01.01.2018 to 31.03.2019
1	2	3	4	5
Andhra Pradesh	1065000	553511	5000	3712
Arunachal Pradesh	7500	3552	400	39
Assam	307000	138423	7500	2165
Bihar	733000	129874	4500	0
Chhattisgarh	400000	56403	4000	3639
Goa	8000	4226	300	0
Gujarat	554000	434862	2600	865
Haryana	300000	62278	1700	272
Himachal Pradesh	125000	47645	900	12
Jammu & Kashmir	128000	3195	900	0
Jharkhand	100000	7796	2500	0
Karnataka	680000	497479	8900	9844
Kerala	150000	151397	3400	711
Madhya Pradesh	1491000	370957	7000	5117
Maharashtra	897000	909511	9500	13339
Manipur	38000	2128	400	0
Meghalaya	24000	10659	500	0
Mizoram	5000	5456	500	410
Nagaland	6700	7953	400	0
Odisha	605000	271605	4500	269
Punjab	411000	181993	5000	4058
Rajasthan	915000	71862	3700	394
Sikkim	7300	9044	300	0
Tamil Nadu	615000	223131	3100	65
Telangana	0	19644	2500	0
Tripura	28000	3643	500	20
Uttar Pradesh	1938000	440250	3550	237
Uttarakhand	83000	362915	2200	1357
West Bengal	695000	900	4000	0
A&N Islands	2200	97	0	0
Chandigarh	1400	169	200	0
Dadra & Nagar Haveli	2000	681	300	0
Daman and Diu			200	
Lakshadweep			300	
Delhi/New Delhi	12900	578	600	0
Puducherry	4300	17541	150	0
KVIC	-		8000	3553
TOTAL	**12339300**	**5001358**	**100000**	**50078**

5.4 When asked about the budgetary allocation and actual expenditure under Renewable Energy for Rural Applications during the last three years, the Ministry furnished:

"The details in respect of the National Biogas and Manure Management Programme, New National Biogas and Organic Manure Programme (NNBOMP) and Biogas based Power (off grid) generation Programme are given as under, for the previous three years :-

(Rs. in crore)

Sl. No.	Years	BE	RE	Actual Expenditure
1	2016-17	142.00	100.00	76.011
2	2017-18	134.00	94.00	67.70
3	2018-19	135.00	78.00	42.71

5.5 On being asked about the physical achievements *vis-à-vis* targets during the last three years, the Ministry furnished:

Biogas Programme	Yr. 2016-17		Yr. 2017-18		2018-19	
	Target No of Biogas plants	Achievement	Target	Achievement	Target	Achievement
Bio-Gas Programme (NBMMP/NNBOMP)	100000	54969	65180	43887	100000	26980
Biogas Power Generation (off-grid)	-	40	-	20	-	14

5.6 When asked about the reasons for continuous non-achievement of targets, the Ministry stated that:

"The major reasons for shortfall of physical targets under the National Biogas and Manure Management Programme are:

- low priority to the scheme at the state level.
- Most of the newly designated State Programme Implementing Agencies mainly the State Rural Development Departments could not initiate the implementation during 2018-19."

5.7 In response to a query about corrective measures taken by the Ministry so as to achieve the desired results, the Ministry stated:

"The Ministry has modified the old scheme, National Biogas and Manure Management Programme (NBMMP) and redesigned as New National Biogas and Organic Manure Programme (NNBOMP) so that the end users/farmers do not consider the biogas plant as only a means of cooking fuel but also accept the biogas plants as household avenue to

generate organic manure from biogas plants taking it as unit of organic bio-manure for organic farming and livelihood/employment generation. Focusing on the importance of improving and sustaining the health of soil and enhanced production of crops and improved environment and sanitation, the capacity of biogas plant under the New National Programme, NNBOMP has been enhanced from 6 M^3 to 25 M^3. This will bridge the gaps and provide coverage of the untapped potential.

The Ministry has got an independent evaluation study conducted through a third party to bring out the performance inter-alia various other performance indicators including operational status of installed biogas plants during the 12th Five Year Plan. The study report was received in February 2018. Based on the outcomes of the study and its recommendations the National Biogas and Manure Management Programme (NBMMP) was modified and re-designed as New National Biogas and Organic Manure Programme (NNBOMP) with effective from 01.04.2018."

5.8 Explaining the remedial measures taken into consideration by the Ministry during the year 2019-20, the Ministry stated that:

- "Keeping in view the quantum of the budget allocated for the programme, the potential and past years' performance of the States, the State-wise annual targets have been set at 76,000 plants for small bioga plants and 50 number of projects of medium size biogas plants for biogas based power generation (off-grid) and thermal / cooling applications.
- Accordingly, the State-wise and programme implementing State Nodal Department/Agency-wise targets for setting up small biogas plants were communicated on 10.07.2019 to all the States for implementation of the NNBOMP.
- PSU/NABARD/IREDA Banks have provision for financing loan for installation of biogas plants, efforts to make it that bank starts providing loans to the potential beneficries of biogas plants.
- Stress on popularising 100% biogas based engine for farmers for saving diesel / petrol/ electricity expenditure.
- New draft publicity scheme exclusively for Biogas Porgramme dissemination has been proposed to be implemented aggressively during the year to achieve the targets.
- Though higher CFA / subsidy support has been provisioned under the Biogas Schemes for the North Eastern Region States but proposals were not received from NER States under the Biogas Programmes. Therefore, there is substantial savings under the NER head. It is also to be mentioned that upto 50% funds release

during the implementation of the biogas power (Off-grid) projects can be released for NER states and the schemes norms allows for that whereas the scheme has provision of only back-ended financial support i.e. financial support will be provided after commissioning of the Biogas Power projects in rest of the country. Therefore, it is expected that NE budget will be suitably spent this year through re-appropriation. Further, the Ministry has planned to have separate review of the Biogas Schemes for all the NER States very shortly."

5.9 On being queried about the details of targets (physical and financial) of different Programmes/Schemes for the year 2019-20, the Ministry stated:

Programme /Scheme Biogas under Off-Grid/ Distributed and Decentralized Renewable Power-	**Allocation 2019-20** (Rs. in crores)	**Physical Target**	**Achievement as on 30.09.2019**
New National Biogas and Organic Manure Programme (NNBOMP)	₹ 100.00 Proposed RE - Rs 54 cr Expenditure as on 30.09.2019 - Rs 16.61 cr	76,000 Nos. of small biogas plants	6338
Biogas based Power Generation (Off Grid) and Thermal Energy application Programme (BPGTP)		25 Nos. projects of medium size biogas plants (3 KWe to 250 KWe)	

5.10 Details regarding Biogas Power Generation (Off-grid) and Thermal application Programme, as furnished by the Ministry, are given below:

- New targets set for the current year, 2019-20 : 50 projects
- Proposals received upto date : 27
- Projects under processing : 15
- Project not found appropriate : 05
- Project sanctioned upto date : 07
- Total biogas generation capacity sanctioned : 3160 m^3
- Cumulative power generation : 387 kW
- Cumulative achievements upto 2019-20 : 313 projects
- Equivalent total power generation capacity : 7.150MW
- Equivalent total Biogas generation capacity : 69680 m^3

CHAPTER VI

RENEWABLE ENERGY FOR URBAN, INDUSTRIAL AND COMMERCIAL APPLICATIONS

6.1 The programmes being implemented under Renewable Energy for Urban, Industrial and Commercial Applications include:

- Energy Efficient Solar /Green Building Programme;
- Waste to Energy; and
- Energy from Urban, Industrial and Agricultural Waste/Residues including Biomass Co-generation (non-bagasse) in Industry.

6.2 Explaining about the Programme on Energy from Urban, Industrial and Agricultural Wastes/Residues., the Ministry stated that:

> "The main objective of the programme is to promote setting up of projects for recovery of energy from urban, industrial and agricultural wastes and to create conducive conditions and environment, with fiscal and financial regime to develop, demonstrate and disseminate utilization of wastes and residues for recovery of energy.
>
> The scheme provides for Central Financial Assistance (CFA) in the form of capital subsidy and Grants-in-Aid in respect of the Biogas production from Industrial waste; Power generation or production of bio-CNG from biogas produced from sewage and industrial wastes or from Urban and Agricultural wastes through biomethanation, combustion, gasification, pyrolysis or a combination thereof are being supported which are proven and are environmentally benign technologies."

6.3 The Ministry furnished that as of now, 199 waste-to-energy plants based on Municipal Solid Waste (MSW), Urban, Industrial and agricultural waste/residues for generation of power, biogas and BioCNG to meet thermal and electrical energy needs of industries and for production of Bio-CNG for transportation as well as cooking fuel etc have been installed in India. These plants have been established involving industries and private sector following Public Private Partnership (PPP) model. State-wise details of waste-to-energy plants with installed capacity and number of plants set up, as on 31.08.2019, are as follows:

Sl. No.	Name of State / Union Territories	MSW based Power Plants	Agricultural, Urban & Industrial Effluent/Waste based Waste to Energy plants				Total (Grid & Off grid)
		Power (Grid)	Power (Grid)	Power (Off-grid)	Biogas (Off-grid)	Bio-CNG (Off-grid)	
		MW (No. of plants)	MW (No. of plants)	MW (No. of plants)	m^3/day (No. of plants)	Kg/day (No. of plants)	MWeq
1	Andhra Pradesh	-	23.16 (4)	17.66 (11)	80,540 (6)	-	47.53 (21)
2	Bihar	-	-	-	12,000 (1)	-	1.00 (1)
3	Chhattisgarh	-	-	0.33 (1)	-	-	0.33 (1)
4	Delhi	52.00 (3)	-	-	-	-	52.00 (3)
5	Gujarat	-	-	11.275 (10)	24,800(4)	28338 (5)	19.25 (19)
6	Haryana	-	-	4.0 (2)	-	4250 (3)	4.89 (5)
7	Himachal Pradesh	-	-	-	12,000 (1)	-	1.00 (1)
8	Karnataka	-	1.00 (1)	5.8 (4)	58,060 (3)	9521 (3)	14.62 (11)
9	Kerala	-	-	-	2,760 (1)	-	0.23 (1)
10	Madhya Pradesh	11.5 (1)	3.9 (2)	-	27,014 (5)	1,200 (1)	17.90(9)
11	Maharashtra	3.00 (1)	9.59 (3)	16.13 (11)	1,09636 (10)	27,723 (4)	43.63 (29)
12	Punjab	-	10.75 (4)	4.17 (3)	34796 (5)	1,847 (1)	18.20 (13)
13	Rajasthan	-	-	3.0 (1)	-	4,000 (2)	3.83 (3)
14	Tamil Nadu	-	6.4 (3)	4.05 (3)	1,50218 (28)	-	22.97 (34)
15	Telangana	-	18.5 (3)	1.0 (1)	29100 (4)	-	21.93 (8)
16	Uttar Pradesh	-	-	44.63 (22)	62,320 (6)	2,000 (1)	50.24 (29)
17	Uttarakhand	-	-	1.89 (2)	67,260 (5)	5,880 (2)	8.72 (9)
18	West Bengal	-	-	-	14,000(2)	-	1.17 (2)
Total		66.5 (5)	73.3 (20)	114.93 (71)*	6,84,504 (81)	84,759 (22)	329.43 (199)
		254.73MW			57.04 MWeq	17.66 MWeq	
GRID- 139.80 MW (25)				OFF-GRID -189.63 MWeq (174)			

6.4 When asked about the physical and financial achievements *vis-à-vis* targets under Urban, Industrial and Commercial Applications during last three years, the Ministry furnished the following about Waste to Energy Programme:

	Physical (MWeq)		Financial (Rs in Cr)	
Year	**Target**	**Achievement**	**Target**	**Achievement**
2016-17	25	34.99*	25.5	16.75
2017-18	25	29.50*	35	15.07
2018-19	20	6.58	22	00

* physical achievement as reported by developers

6.5 In response to a query, the Ministry stated that the major reasons for non-achievement of target and low utilization of funds in 2018-19 are as given below:

- "Long delays in obtaining all statuary clearances by project developer from various agencies such as delays in obtaining NOC from State Pollution Control Board, loan approvals from the banks and Appraisal Note, signing of PPA, Approval for filling & storage of CBG/BioCNG from Petroleum and Explosives Safety Organisation (PESO), etc.
- Delay in procurement of equipment, construction, leads to the delay in project commissioning and successful operational trial and hence delay in submitting Performance report for generation for 3 months, Inspection report of the Project by State Nodal agencies.
- Unavailability of Scheme to support MSW based Waste to Energy projects."

6.6 When asked to furnish the budgetary allocation along with physical targets for schemes/technologies under Renewable Energy for Urban, Industrial and Commercial Applications for the year 2019-20, the Ministry stated:

Waste to Energy Programme and Biomass programme	**Target for FY 2019-20**		
	Grid	**Off-Grid**	**Total**
Financial	Rs. 25 Crore	Rs. 28.5 Crore	Rs. 53.5 Crore
Physical	2 MW	10 MW	12 MW

6.7 When the Committee desired to know about the steps taken/proposed to be taken by the Ministry to achieve the targets during 2019-20, the Ministry stated:

"The utilization of funds are dependent upon timely submission of statutary clearances by Project Developers from various agencies (like NOC from State Pollution Control Board), Appraisal Note from the bank,

signing of PPA, Approval for filling & storage of CBG from Petroleum and Explosives Safety Organization (PESO), Analysis Report of Effluent quantity and characteristics from accredited lab) and Performance report for generation, Inspection report of the Project by Executive Engineer of SNAs which are mandatory for releasing central financial assistance.

Ministry is following up with developer for timely installation of the project and has advised all SNAs to send the proposals complete in all respects so as to ensure smooth fund flow for the projects under execution. In addition, Ministry also supporting awareness programmes involving industrial sector to develop suitable proposals for meeting captive thermal and electrical needs."

6.8 Financial incentives provided by the Government for Renewable Energy for Urban, Industrial and Commercial Applications, as furnished by the Ministry are given below:

"Financial assistance available under the Programme on Energy from Urban, Industrial and Agricultural Wastes/ Residues for setting up Waste to Energy plant is as follows:

- Biogas generation : Rs 1.0 crore per 12000cum/day;
- BioCNG generation (including setting of Biogas plant) : Rs 4.0 Crore per 4800Kg/day;
- Power generation based on Biogas (including setting of Biogas plant): Rs 3.0 Crore per MW.
- Biomass Gasifier:
  - Rs. 2,500 per kW_e with duel fuel engines for electrical application
  - Rs. 15,000 per kW_e with 100% gas engines for electrical application
  - Rs. 2 lakh per 300 kW_{th} for thermal applications."

6.9 On a query about Fiscal Incentives, the Ministry furnished:

- "Concessional Customs Duty and GST at rate of 5% for initial setting up of grid connected projects for power generation or production of BioCNG from wastes;
- Preferential Tariff announced by the CERC /SERC."

6.10 When asked about the modes of financing, existing financial support available and possible options for funding capital and operation & maintenance costs with respect to W to E Plants, the Ministry stated:

"The Government of India, through various schemes extends financial support for introducing appropriate solid waste management systems and for setting up processing and disposal facilities. These include the following:

- Viability Gap Funding Swacch Bharat Mission of MoHUA.
- Loan from IREDA
- Grants from MNRE for Supporting W to E Projects
- Preferential Tariff by Regulators.
- Support for Purchase of Bio-CNG from Ministry of Petroleum and Natural Gas."

CHAPTER VII

RESEARCH, DESIGN, DEVELOPMENT AND DEMONSTRATION IN RENEWABLE ENERGY SECTOR

7.1 Research, design, development and technology demonstration for its validation are the core requirements for the growth of New & Renewable Energy. The Ministry supports Research, Development and Demonstration (RD&D) to develop new and renewable energy technologies, processes, materials, components, sub-systems, products & services, standards and resource assessment so as to indigenously manufacture new and renewable energy systems and devices. The objective of the programme is to make the industry globally competitive and renewable energy generation and supply self-sustainable/profitable and thereby contribute to increased share in total energy mix in the country.

7.2 RD&D Projects received from R&D institutions/Universities, industries, NGO's etc. in the field of solar, wind, solar-wind hybrid, storage, small hydro power, biogas, hydrogen and fuel cells, geothermal, etc. are considered by the Ministry for financial support. A comprehensive policy framework on RD&D is in place to support RD&D in new and renewable energy sector, including associating and supporting RD&D earned out by industry for market development. The Ministry provides upto 100% financial support to Government/non-profit research organizations/NGOs and 50% to industry.

7.3 When asked about the budgetary allocation and the actual expenditure incurred on RD&D in New & Renewable Energy during the last three years, the Ministry furnished:

Year	BE	RE	Expenditure
2016-17	90.00	60.00	45.44
2017-18	144.00	81.00	52.98
2018-19	94.00	43.00	25.43

7.4 On a query regarding non achievement of targets and low utilization of funds during the previous years, the Ministry stated that:

> "R&D projects are continuous in nature with duration of generally three to four years. Funds are released after completion of various mile stones and proper evaluation of the ongoing projects."

7.5 Regarding low utilization of funds, the Secretary deposed:

> "We have identified certain areas for research like next generation solar cells, storage, efficiency of windmills, next generation of biogas plants, hydrogen etc. We want our research to be focussed. So, we have taken a conscious decision in the Ministry that we will spend money only on those projects which are important to the sector. We are also developing networks of the institutions like IITs, Indian Institute of Science, National Institute of Solar Energy, National Institute of Wind Energy so that they can collaborate research. We are very conscious of the fact that we will spend money in R&D only on those areas, those projects which will produce the desired results and where we want to go. Otherwise, if I open it to all, I can spend this money in no time."

7.6 Given below are the major Programme/Research undertaken and achievements made during the last three years, as furnished by the Ministry:

> "Major programmes were supported in the area of Solar Photovoltaic, Solar Thermal, hydrogen, fuel cells and wind-solar hybrid systems. In solar, high efficiency crystalline silicon solar cells of 19.4% efficiency was achieved in lab scale under a project at IIT, Bombay. Support for developing solar cells using other materials, storage and power electronic system was provided to R&D/academic institutions. Indigenous Silicon ingot has been prepared at SSN College of Engineering in Tamil Nadu and cost effective reliable Solar-powered Clean Drinking Water Systems suitable for various locations are installed in the different part of the country. Support for developing solar thermal system and component was provided for technology development and demonstration for utilizing solar energy for thermal and power generation applications. One such project, 1MWe Solar Thermal Power Plant with 16 hours thermal storage has set up at Mount Abu by World Renewable Spiritual Trust (WRST), Mumbai which is running successfully. IISc Bangalore has developed a supercritical CO_2 Turbomachinery along with high efficiency receiver for solar thermal power plants which would be the next step for closed loop CO_2 cycle waterless solar thermal power plant. Research and Development supported in hydrogen and fuel cells focused on technology

development and demonstration for hydrogen production and storage for stationary and transport applications.

R&D in hydrogen and fuel cells will focus on production of hydrogen through renewable resources in cost-effective manner, its safe and efficient storage, development of efficient, indigenous and affordable fuel cells for stationary and transport applications, and demonstration of hydrogen and fuel cell technologies in various niche applications."

7.7 Regarding achievements in R&D, the Secretary deposed:

"NISE has developed a solar dryer for fruits and vegetables. We are going to give 300 such solar dryer to Jammu and Kashmir. World Bank and J&K Government is giving funds for this. Earlier, there used to be open drying. In open drying, there is contamination. It takes longer time. Now, if we do solar drying, there is zero contamination, there is no dust. Drying is faster and farmer gets a better produce. You will be surprised that in Barmer area, solar drying is being used for drying up the khajoors. This equipment which is being used in Barmer was not supplied by us. This has been devised by the farmer himself. What he has done is, he has put solar cells; he has put a plate. He heats up that plate and dries up khajoors. So, we have designed that equipment and we have now upgraded this technology and we have given it to many industrial houses. Similarly, we have done for solar cooling. We are also doing for solar chilling and also for solar heating. These advancements have been made by our National Institute of Solar Energy. We also have the National Institute of Wind Energy. Wind intensity keeps on changing by the day, by the time, by the year. For integrating wind energy into the grid, we require forecasting and scheduling. So, in forecasting and scheduling, we had to do research. Last year, we did the research and we improved on the Forecasting and Scheduling Programme. For this, we got an award from the Government of India; the gold award came to our Ministry. We are doing research which is application oriented. Now we are also doing research on the latest generation of solar cells which is called PERC cells. That is also being done in the National Institute of Solar Energy. So, for R&D, we are giving money only to those projects which will bring benefit to the nation."

7.8 Regarding the Budgetary Allocation for the year 2019-20, the Ministry informed that budgetary allocation for the year 2019-20 is Rs. 60.00 crores.

7.9 When the Committee desired to know about the thrust areas identified for R&D support for the year 2019-20, the Ministry informed:

> **"**Support will be provided for development, demonstration, testing, standardization, and validation of technologies/ systems/ components with emphasis on application oriented R&D, improving efficiency, reliability and cost effective for indigenous development and manufacture. Industry association will be encouraged. In solar thermal, the thrust areas include development of solar thermal technology for power generation and industrial process/heat, storage systems, hybridization, etc. In SPV, thrust is on improving Si PV efficiency, reducing the cost, developing new material solar cells, making Si material from sand, improving modules quality and reliability, development of standard designs for support structure for SPV systems, materials and fabrication technology for solar cells and modules, inverters, power conditioning units, grid integration, etc. In addition, focus would be on storage solutions. The thrust areas in biogas included development of efficient and cost effective designs of biogas plants, standardization of multiple designs of biogas plants, standardization of biogas slurry based bio-fertilizer, bio-manure up-gradation, development of biogas purification systems, development of efficient biogas engine for power generation. In wind, the thrust areas include wind turbine system design, integration, off-shore technology and wind solar hybrid system. In SHP, thrust areas include development of ultra-low head turbines (below 3m), generators, monitoring systems, pumped storage systems, etc. R&D in hydrogen and fuel cells will focus on hydrogen production from various feedstock, technology for storage and development of efficient and cost effective fuel cells for stationary, transport applications."

7.10 On being asked about the steps taken up by the Government, specifically with regard to facilitating research, design and development for technological advancements in Renewable Energy Sector, the Ministry replied:

> "The Ministry supported projects to various R&D/academic institutes/industries to strengthen them for pursuing advanced research for technology development and demonstration in the area of solar, wind, bio-energy, hydrogen and fuel cells.
>
> The Ministry has recently issued a comprehensive RD&D Programme for implementation during the period 2017-18 to 2019-20 with emphasis on integrating technology development with innovation and start-ups for promoting indigenous development and manufacture of New & Renewable Energy Systems/devices/components for various applications. The scheme is implemented in form of projects with

identified deliverables. The project proposals are invited in line with thrust areas of MNRE in place of normal submission of project proposals by investigators, which is done through hosting the expression of interest on the Ministry's website/national dailies from time to time. The proposals for consideration for sanction are supported with proper appraisal by a Project Appraisal Committee taking into consideration the assessment for scalability with commercial potential."

7.11 Detailing the Research and Development (R&D) activities being undertaken at the Solar Energy Corporation of India (SECI)/National Institute of Solar Energy (NISE) for intensive harnessing of Solar Energy potential in the country, the Ministry informed:

"R&D activities carried out by NISE

- National Primary Standard Facility for Solar Cell Calibration with NPL, Delhi and NISE Gurugram.
- Development of high efficiency (21%/ 19%) PERC type of c-Si/mc-Si solar cells.
- Development and field testing of Solar powered clean drinking water systems for communities without piped water line and electricity with collaboration with Industry. Successful prototypes have been developed and being install at various location in the Country.
- Development of Modular Central Receiver Concentrated Solar Power Plant for Decentralized Power Generation.
- Setting Up of a Centre of Excellence on Hydrogen Energy at National Institute of Solar Energy (NISE), Gwal Pahari, Haryana

R&D activities carried out by SECI

- To study the technical feasibility of Lithium Titanium Oxide (LTO) Battery for energy storage in PV Power Plants to be deployed in the environmental conditions prevailing at Siachin Glacier."

7.12 Regarding the technological up gradation undergoing with regard to solar PV and Solar Thermal, the Ministry stated:

"In solar PV, R&D efforts are directed towards developing higher efficiency solar cells up to 22% and beyond, high efficiently inverters and other power electronic devices, high energy density battery storage systems, etc. In solar thermal, R&D efforts are directed towards technology development and demonstration of utilizing solar thermal energy for industrial process heating applications, power generation, developing solar thermal storage systems, etc."

7.13 Regarding research in the area of battery storage, the representative of the Ministry deposed:

> "In the battery storage, in the NISE, we are doing some research to increase the efficiency of the battery, testing of the battery so that the low cost storage solution could be given, but it is certain that battery storage can be done only up to a certain limit. For the entire capacity of the plant, it may not be possible, but at least to meet the shocks of the non-availability of the solar or the wind, it can be done. That is the solution which is available right now."

7.14 With respect to the viability and affordability of storage batteries, the representative of the Ministry, during the evidence stated:

> "Basically, now the battery technology, which is popular, is lithium-ion battery. If we average with the western cost, the cost comes to one rupee per unit per hour. So, the tariff is very high. The way the battery costs are falling, as the solar was falling earlier, it is expected that by 2022-23. We will be able to have a stored battery plus solar power at Rs. 3-3.50. Then, it will become very viable."

CHAPTER VIII

PSUs/INSTITUTIONS UNDER THE MINISTRY OF NEW AND RENEWABLE ENERGY

8.1 To support this Ministry, there are five institutions i.e. two Public Sector Undertakings - Indian Renewable Energy Development Agency (IREDA) and Solar Energy Corporation of India (SECI) and three autonomous bodies- National Institute of Solar Energy (NISE), National Institute of Wind Energy (NIWE), and National Institute of Bio Energy (NIBE). NISE is located at Gwal Pahari in district Gurugram, Haryana and serves as the technical focal point for solar energy research & development. NIWE has been established in Chennai, Tamil Nadu and serve as the technical focal point for wind power research & development. NIBE is located in district Kapurthala, Punjab and is focusing on research & development in Bio energy. IREDA is a Non-Banking Financial Institution located in New Delhi, under the administrative control of this Ministry, provides term-loans for renewable energy and energy efficiency projects. SECI is a section 3 company under the Companies Act situated in New Delhi. It assists the Ministry and functions as the implementing and executing arm for the Jawaharlal Nehru National Solar Mission.

8.2 Details regarding PSUs/Institutions under MNRE, as furnished by the Ministry, are given below:

S.No.	Institution	Objective/Focus Areas	BE 2019-20 (Rs crores)
1	Solar Energy Corporation of India	Facilitating Implementation of Renewable Energy Programmes	-
2	Indian Renewable Energy Development Agency (IREDA)	Term-loans for RE and EE Projects	-
3	National Institute of Solar Energy (NISE)	Solar Energy Development	15
4	Sardar Swaran Singh National Institute of Renewable Energy (SSS-NIRE)	Bio-energy Development.	5.42
5	National institute of Wind Energy (NIWE)	Wind Energy	17

I INDIAN RENEWABLE ENERGY DEVELOPMENT AGENCY (IREDA)

8.3 IREDA is a Mini Ratna (Category-I) GoI Enterprise and a non-banking financial institution engaged in promoting, developing and extending financial assistance for setting up projects relating to new and renewable energy and energy efficiency/conservation.

8.4 On being asked about the financial allocation vis-à-vis utilization during the previous years, the Ministry stated that since IREDA is a Mini Ratna , Category –I PSU , it has not received any allocation in the last 3 years in terms of equity from the Government of India. However the Company raises resources and funds for disbursements through Internal and raised resources.

8.5 When asked about the performance of IREDA during the last three years, the Ministry furnished:

Operations	FY 16-17	FY 17-18	FY 18-19
Sanctions	10199.01	12130.01	11941.87
Disbursements	6593.49	8328.38	9385.37
Total Income	1481.67	1813.18	2022.79
Profit Before Tax	528.18	538.97	311.30
Profit After Tax	365.02	370.44	244.13
Dividend for the year	125.50	126.84	128.19
MoU Ratings	Excellent	Excellent	Expected to be Very Good

Note : Ireda has applied Ind AS from FY 18-19 and RBI has withdrawn exemptions which were available to Government Companies w.r.t. the prudential norms vide RBI circular dated 31.05.19.

8.6 About achievements of IREDA, the Secretary, during the evidence deposed:

> "As far as the IREDA's performance is concerned, our corporation is running in profit. There were no major audit objections as far as their functioning is concerned. IREDA in fact has taken a lead. Power Finance Corporation, Rural Electricity Corporation and IREDA provide loans to RE sector. For its prepayment, we charge five per cent. If these agencies charge five per cent, then the developers find it very difficult to incur that loss. So, IREDA took an initiative and they reduced the prepayment charges to two per cent. Now the developers can make prepayment earlier at a lesser rate and the money which comes from prepayment, we can reuse this money for development of other projects. So, IREDA has taken this new initiative. Now, PFC and REC are following the footsteps."

8.7 The achievements of IREDA in terms of MoU for the year 2018-19 are given below:

S. N.	Performance Criteria	MOU Targets		Achievement (18-19)	Reason
		Excellent	Very Good		
1	Turnover (Revenue from Operations) (Rs./Cr.)	2050	1950	2020	Deferral of income due to Ind AS accounting .
2	Operating Profit as a % of Revenue from operations	26%	23%	18.96%	• Withdrawal of exemption available to Govt. Co.s • Higher asset provisioning • Investment in CP _ILFS • Exceptional Item _FITL technically written off
3	Return on Investment (PAT / Av. Net Worth)	12.50%	10%	10.65%	
4	Disbursement /available funds	85%	77%	94.23%	
5	Overdue Loans / Total Loans (Net)	0.75%	1.25%	0.79%	• Stringent norms • Poor health of Discoms
6	NPA / Total Loans (Net)	3.60%	3.70%	3.74%	
7	Cost of raising funds through bonds as compared to similarly rated CPSEs / entities as per Reuters.	-1 bps	+0 bps	-16 bps	
8	HR parameters				
	Assessment of level in line with people Capability Maturity Model (PCMM) or its equivalent in the CPSE & placing the matter before the Board for taking a decision whether to go for up-gradation in level and, if yes, getting the approval for the timelines from the Board and if no, justifiable reason to be recorded in the Board Resolution (Corrigendum to Minutes of the IMC Meeting on MoU 2018-19. vide letter OM no.M-01/0094/2018-DPE(MoU) dated 30/05/2018).	31.12.18	31.01.19	31.12.18	
	Preparation of Career Paths for all levels and its approval by the Board (E0 & above) (Date)	31.12.18	31.01.19	31.12.18	
	Talent Management and career progression by imparting at least one week training in Centre of Excellence within India e.g. IITs, IIMs, NITs, ICAI, etc. (% of executives)	15	12	27	
9	Sanction of loan for Bio Energy, Palletization of Agro Waste, Small Hydro & Waste to Energy (Rs./Cr.)	500	450	566.38	

8.8 Given below are the details regarding major budgeted resource raising by IREDA for FY 19-20, as submitted by the Ministry :

1.	Repayment by Borrowers	Rs. 6000 Cr
2.	Foreign lines of credit	Rs. 1140 Cr
3.	Bank Term Loan/Overdraft	Rs. 1400 Cr
4.	Bonds	Rs. 2500 Cr
5.	Total	Rs. 11040 Cr

8.9 IREDA's physical targets for the year 2019-20, as furnished by the Ministry, are as under:

Operations	**FY 19-20**
Sanctions	15000
Disbursements	10700
Total Income	2300
Profit Before Tax	404
Profit After Tax	268

8.10 In reply to a query regarding the major activities/projects proposed to be undertaken by IREDA during 2019-20, the Ministry stated as under:

> "IREDA is in the process of launching an IPO in the FY 2019-20, raising equity of approx.. 550 Cr -600 Cr.. through public subscription. The Board also launched a new product to meet the short term capital needs of state owned DISCOMs to meet their Renewable Energy purchase obligation (RPO).The Board has also introduced the securitization of the GBI claims."

II SOLAR ENERGY CORPORATION OF INDIA (SECI)

8.11 On being asked about the financial allocation vis-à-vis utilization during the previous years, the Ministry furnished the following details:

Equity support received from MNRE		
Year	Allocation	Utilization
FY 2016-17	Rs. 100 Cr.	the funds received have been utilized for CAPEX activities & to meet the working capital requirements.
FY 2017-18	Rs. 50 Cr.	
FY 2018-19	NIL	

8.12 The MoU targets and achievement for the year 2018-19, alongwith reasons for non-achievement (as applicable) are given below:

S. No	Evaluation Criteria	Unit	MoU target	Actual (2018-19)	Reasons for non-achievement
1	Revenue from Operations (Net)	Rs. Cr.	2600	3235.13	NA
2	Operating Profit/surplus as a percentage of revenue from operations (Net)	%	5.00%	5.30%	NA
3	PAT as percentage of Avg Net Worth	%	15.00%	25.86%	NA
4	Trading of solar power	MU	5300	6840.83	NA
5	Completion of milestones of clients orders/ agreements without time overrun in respect of PMC projects	%	100.00%	100%	NA
6	CAPEX	Rs. Cr.	160	55.88	Delays on account of land acquisition and clarity on transmission system for 160 MW solar-wind hybrid project in Andhra Pradesh
7	Percentage of Value of CAPEX contracts/projects running/ completed without time/cost overrun to total value of CAPEX contracts running/completed during the year	%	100%	100%	NA
8	Trade receivables (net) as number of days of revenue from operations (gross)	No. of Days	45	80	Non-realization of payments on time from some Discoms inspite of regular follow-ups
9	Assessment of level of People Capability Maturity Model in the CPSE and placing the matter before the board for taking a decision whether to go for upgradation in level and, if yes, getting the approval for the timelines from the Board. If no, justifiable reason to be recorded in the Board resolution	Date	31.12.18	28.12.2018	NA
10	Online Human Resource Management System (HRMS) implementation (consisting of online employee data administration, employee self-service, exit procedure, talent management etc.) and its integration with Finance	Date	31.12.18	18.12.2018	NA
11	Assessment of level of Project Management Maturity Model (Pro MMM) in the CPSE and placing the matter before the Board for taking a decision whether to go for upgradation in level and, if, yes, getting the approval for the timelines from the Board. If not, justifiable reason to be recorded in the Board resolution	Date	31.12.18	28.12.2018	NA

8.13 When inquired about the financial allocation for the year 2019-20, the Ministry stated that SECI did not seek any equity support from the Ministry for the year 2019-20, as the activities will be carried out from the internal resources of the company and external borrowings.

8.14 MoU Targets for the year 2019-20, as furnished by the Ministry, are given below:

S. No.	Evaluation criteria	Unit	MoU target (2019-20)
1	Revenue from Operations (Net)	Rs. Cr.	3800
2	Operating Profit/ surplus as a percentage of revenue from operations (Net)	%	5.50
3	PAT as percentage of Average Net Worth	%	25
4	Trading of renewable power	MU	8400
5	Award of work for RE projects	MW	13000
6	Completion of milestones of clients orders/ agreements without time overrun in respect of PMC projects	%	100
7	CAPEX	Rs. Cr.	300
8	Percentage of Value of CAPEX contracts/ projects running/ completed during the year without time/cost overrun to total value of CAPEX contracts running/ completed during the year	%	100
9	Trade receivables (net) as number of days of revenue from operations (gross)	No. of Days	60
10	Achievement of HR parameters of continuous nature as per list given in Annexure	No. of parameters	7
11	Capability development programmes for executives to build their technical & managerial competencies for higher positions with special focus on web learning programmes	No. of programmes	15
12	Award of works for innovative technology project under PMC/with own investment	MW	150

8.15 In reply to a query regarding the major activities/projects proposed to be undertaken by SECI during 2019-20, the Ministry stated as under:

"SECI is implementing a number of MNRE schemes/tenders. The major tenders to be implemented in FY 2019-20 are as follows:

- 7500 MW Solar PV Projects in Leh and Kargil Districts, Jammu & Kashmir;
- 6000 MW ISTS Connected Solar PV Power Plant linked with 2000 MW (Per Annum) Solar Manufacturing Plant;

- 1200 MW ISTS Connected RE projects with Peak Power Supply;
- 1500 MW CPSU Scheme Including Mini and Micro Grid Connected Solar PV projects.

  Additionally, the major CAPEX projects proposed to be undertaken during FY 2019-20 are as follows:
- 160 MW solar-wind hybrid project in Andhra Pradesh;
- 150 MW floating solar project in Jharkhand;
- 200 MW floating solar project in Uttarakhand;
- 25 MW solarization project in UT of Lakshadweep;
- 100 MW solar with storage project in Chhattisgarh."

III NATIONAL INSTITUTE OF SOLAR ENERGY (NISE)

8.16 When asked about the performance of NISE during 2018-19, the Ministry furnished:

- "Implementation of an R&D Project entitled "Setting up facility for Calibration of Solar Radiation Measuring Sensors and its analysis/modeling based on ground surface measurements", funded by MNRE.
- Supply of Clean Drinking Water through IoT based Solar Powered Station at a large village in Haryana through automated dispensing while improving the water table: Pilot-Faridpur, funded by DST.
- Implementation of a R&D Project entitled "Design and Development of 'High Efficiency Solar Water Pumping Systems", funded by MNRE.
- Implementation of an R&D Project entitled "Setting up of a Centre of Excellence on Hydrogen Energy" at NISE, funded by MNRE.
- Solar powered cold storage unit with thermal storage.
- Solar thermal based cooking system with thermal battery.
- Solar powered bulk milk cooler unit with thermal storage
- Design and development of an innovative dryer
- Biofuel generation from biomass using solar thermal energy
- Development of Solar Induction controller for Induction based cooking system.
- Development of Solar VFD controller for air conditioner.
- Under Skill Development the following trainings were organized":

Sl. No.	Type of Training	Training Programmes organized (Nos.)	Participants Trained (Nos.)
1.	Suryamitra Skill Development Programme	418	11749
2.	National Trainings on Solar Energy	11	299
3.	International Trainings on Solar Energy (ITEC, IAFS etc.)	10	255

4.	Varunmitra Solar Water Pumping Training Programmes	20	425
5.	Rooftop Solar Grid Engineer Training Programme	22	923
6.	DISCOM Engineers Training Programme: Utility Engineers Programme Entrepreneurship Programme	63 21	2419 866
7.	Six months Advanced Solar Professionals Course	02 batches	73

8.17 On being asked about the financial allocation vis-à-vis utilization during the previous years, the Ministry furnished the following details:

Year	Financial Allocation (Rs. in Crore)	Actual Utilization (Rs. in Crore)
2016-17	20.00	13.70
2017-18	18.00	15.21
2018-19	18.00	18.11

8.18 In response to a query regarding reasons for non-utilization of the allocated funds, the Ministry stated that during FY 2016-17 and 2017-18 due to partial filling of regular posts and delay in procurement of capital equipment, the full Grant under Salary and Capital Heads could not be utilized.

8.19 When inquired about the financial allocation for the year 2019-20, the Ministry stated that Rs 15.00 crore have been approved under following Heads:

- General - Rs.6.00 Crore
- Capital - Rs.6.00 Crore
- Salary - Rs.3.00 Crore

8.20 On being asked if the allocated funds will be sufficient to meet the target set, the Ministry stated that:

> "the fund will not be sufficient under Capital Head. The request for supplementary enhancement under Capital Head will be submitted separately. The requirement for an amount of Rs.11.60 Crore is estimated under Capital Head during 2019-20."

IV NATIONAL INSTITUTE OF WIND ENERGY (NIWE)

8.21 When asked about the performance of NIWE during the previous years, the Ministry furnished:

- "Wind potential GIS map has been developed at 120m for the whole country.
- Indian Wind Turbine Certification Scheme (IWTCS), an holistic certification scheme which covers the entire spectrum of wind turbine life cycle has been prepared and submitted to MNRE.
- Wind Resource Assessment in uncovered / new areas:
  - ✓ Chhattisgarh – Installation and commissioning of 10 nos. of 100 m WMS completed and the interim reports sent to CREDA/ MNRE
  - ✓ Telangana & Kerala – 5 nos. and 2 nos. of 100 m WMS are successfully installed and commissioned in the State of Telangana and Kerala respectively.
  - ✓ North Eastern States including Sikkim at 50 M Level: Out of 50 nos. of 50 m masts, 44 nos. of 50 m WMS were installed and data collection are under progress. For remaining six masts, use of telecom towers for wind measurement is envisaged.
  - ✓ 50 nos. of telecom towers are identified for WRA activities, out of which, 47 nos. of Telecom towers were mounted with wind sensors in North Eastern States.
- Commissioned four nos. of 100 m wind monitoring stations for wind forecasting and data collection from these sites are under progress.
  1. Kavalkinaru in Tirunelveli District.
  2. Veeranam in Tirunelveli District.
  3. Radhapuram in Tirunelveli District.
  4. Muppandal (Dalmia site) in Kanyakumari District.
- For offshore wind resource assessment, construction of monopile together with platform for mounting the offshore LIDAR Completed and the measurements are underway.
- Near shore Wind Resource Assessment at Gujarat: A 100 m wind monitoring station was installed and Commissioned at Jaffrabad, off Gujarat coast and data collection is underway.
- One-year data collection completed using LiDAR along with nearshore wind masts. After the requisite data quality checks and analysis, the detailed report was submitted to MNRE. Further, the time-series data was also uploaded in NIWE website for the benefit of the stakeholders.
- NIWE floated "Expression of Interest" for the first offshore wind energy project of India and has evinced a keen interest in developing 1000 MW offshore wind energy project in Gulf of Khambat, off the coast of Gujarat.

- The field investigations for geophysical survey (302 sq.km area) has been completed for the proposed offshore wind farm project at Gulf of Khambat off Gujarat coast.
- Successfully completed 5 years ground measurements at Dhanushkodi site and the data collection is being continued for Lidar data correlation /validation.
- Renewable Energy forecasting : NIWE established VG forecasting laboratory in year 2017 under the project Centre for Excellence in VG Forecasting with a major objective to create a State of Art Forecasting Laboratory in NIWE for providing wind and solar power forecasting services to Indian Industry.
- Consultancy projects focused on various wind farm developmental needs, such as, micro siting, technical due diligence, installation and commissioning of wind monitoring stations, wind power density map, power curve guarantee test, and pre-feasibility study were undertaken for a variety of clients from public/government/private sector. In the last three years, 288 projects were successfully completed.
- The Geo-tagging portal has been successfully prepared and data to the tune of 28 GW have been uploaded into the portal. The portal has been shared to MNRE.
- Repowering studies for existing wind turbines installed in Muppandal area of Tamil Nadu was completed and the detailed report was submitted to MNRE.
- Evaluation / Monitoring against Milestones for RC Approved external projects. The research projects undertaken includes A Novel Hybrid Energy System for Supplying Isolated loads with FPGA based Energy Management Scheme, Control of Multi-Input Converter for Hybrid Wind Solar Battery Based System and Wind Driven Air Storage System
- PLF Study undertaken on WT & SPV Assets both at WTRS & NIWE
- Pan India Research Network Meeting- Industry and Academia Amalgamation was initiated for deliberations and brainstorming on the Research & Development needs of the Indian wind energy sector that would facilitate the Indian wind industry march to become the global leader in all the facets of the wind energy technology.
- NIWE- Academic Associate Programme (AAP): To encourage students to choose renewable energy as their career option, NIWE provides Internships in the field of renewable energy every year. The internship is called as “NIWE- Academic Associate Programme (AAP)”. NIWE-AAP provides opportunities for the students to work with scientists/engineers on NIWE’s various projects.
- Health / condition monitoring at experimental / R&D wind farm at Kayathar on 2MW Wind Turbine

- 20 training courses (16 international and 4 national) have been successfully conducted during the last three financial years.
- NIWE is the accredited Type Testing facility for Large and Small Wind Turbines. In the last 3 year the following testing services has been provided;
    - Completed power curve measurements and special measurement for loads of Pioneer 750 kW WT with 49 rotor diameter of M/s. Para Enterprises Pvt Ltd.
    - Completed power curve measurement of INOX, 2000 kW WT with 113 rotor diameter of M/s. Inox Wind Ltd.
    - Site Feasibility Study (SFS) for Type Testing of Pioneer 750 kW wind turbine with 57 rotor a diameter of M/s. Para Enterprises Pvt Ltd.
    - Type Testing of M/s. Xyron Technologies Ltd (1000 kW, 52.02 rotor diameter), Richadewda, Ratlam (Dist), MadhyaPradesh
    - Type Testing of Inox 2000 kW WT with 113 m rotor diameter at Kidi village, Babra Taluk, Amreli (Dist), Gujarat of M/s. Inox Wind Ltd
    - Power Curve Measurements of Regen 1500 kW WT with VENSYS 89 m rotot diameter at Vagarai Village, Dindigul (Dist), Tamilnadu near Dharapuram of M/s. Regen Powertech Pvt Ltd.
    - Site Calibration for Power Curve Measurements of TUV 1700 kW WT with 103 rotor diameter at Badval, Kadapa District, Andhra Pradesh of M/s. TUV India Pvt Ltd.
    - Completed type testing of SM2 (1kW) wind turbine of M/s. Windstream,Vaata Smart Vertical Axis 5.5 kW wind turbine of M/s. Vaata Smart Ltd
- Experimental study by introducing suitably fabricated improved version of gear oil cooler with provision of Air Ventilator and increased Radiator Fins in one of the 200 kW MICON WEG for better Gear Oil temperature reduction.
- Solarisation of wind farm at WTRS, Kayathar.
- Under NIWE-TUV Rheinland cooperation two certification projects have been completed during 2016-17.
    - ❖ V39 – 500kW with 47m rotor diameter/500kW – M/s RRB Energy Limited.
    - ❖ Pawan Shakthi – 600kW/600kW - M/s RRB Energy Limited.
    - ❖ GWL 225 / 225kW – M/s Southern Wind Farms Limited."

8.22 On being asked about financial allocation vis-à-vis utilization during the previous years, the Ministry furnished the following details:

(Rs. in lakhs)

WIND			
Particulars	**2016-17**	**2017-18**	**2018-19**
Grant Carry Forward	1361.00	2364.21	2978.55
Grant Received during the year	2525.00	2300.00	-
Interest earned & other receipts	165.49	118.04	157.20
Fund available	**4051.49**	**4782.25**	**3135.75**
Grant Utilized	1687.27	1803.70	3157.57

RDD PACK			
Particulars	**2016-17**	**2017-18**	**2018-19**
Grant-Carry Forwarded	-	-	1356.000
Grant Received	-	1356.000	
Grant Utilized	-		2.434

SOLAR-SRRA			
Particulars	**2016-17**	**2017-18**	**2018-19**
Grant-Carry Forwarded	146.280	48.486	205.005
Grant Received	119.000	457.952	212.072
Grant Utilized	225.993	306.886	275.822

Note: 1. Carry forward amount includes interest earned up to 2017-18.

2. Unspent amount at the end of 2018-19 refunded to Ministry.

8.23 When inquired about the financial allocation for the year 2019-20, the Ministry stated that a sum of Rs. 17 crores (Capital Rs.10.50 Crores and Revenue Rs.6.50 crores) has been allocated and an additional requirement of funds to the tune of Rs.24.44 crores will be sought during RE stage 2019-20.

8.24 When queried about the major activities/projects proposed to be undertaken during 2019-20, the Ministry furnished:

- "Wind Turbine Testing Program: Building Quality Assurance & Capacity
- Procurement LVRT & HVRT testing facility and initiating testing of FRT
- Lab Accreditation related - Establishment of Quality Assurance Comparison Measurements at 2 Research Wind Turbines in WTRS, Kayathar
- DST DTU (Denmark Technical University) Project – Hybridize (Three years Research Project starting 2019-20)
- Establishment of Renewable Energy Demo Lab at Wind Turbine Test station at Kayathar, Tamilnadu
- Small Wind Turbine hub Facility for Design and Component Testing at the Renewable Demonstration Lab in WTRS, Kayathar
- RLMM online portal facilitate the submission of documentation by Manufacturers
- Development of Long-term Wind Speed Forecasting Using Hybrid Model

- IoT Based Smart wind farm to enable the real-time remote monitoring and control
- RE Forecasting (Centre for Excellence in VG power forecasting)
- Design and Development of indigenous Grid emulator facility
- Design and Development of indigenous LVRT facility
- Design and Development of PMM for Roof-top Wind turbine
- International Conference on "Wind & Solar resource assessment"
- PAN India Network meet
- Wind & Solar Zone classification for Tamilnadu
- NIWE- Academic Associate Programme (AAP)
- Paper & Publications by the Scientists at reputed journals/ conference
- Certification division has submitted the application form along with the requisite documents to National Accreditation Board for Certification Bodies (NABCB) in connection with obtaining accreditation for the type certification services as per ISO/IEC 17065 standard.
- Two certification projects will be undertaken during the 2019-20.
- Implementation and Continual improvement of ISO 9001: 2015 QMS certification system in the certification division is ongoing.
- Approval has been received for DST DTU Hybridize project with financial allocation from Government of India.
- Creation of Data Center in NIWE, Chennai and Disaster recovery at WTRS, Kayathar.
- Finalised draft document of the holistic certification scheme viz., Indian Wind Turbine Certification Scheme (IWTCS) which covers the entire spectrum of wind turbine life cycle."

V NATIONAL INSTITUTE OF BIO ENERGY (NIBE)

8.25 When asked about the performance of NIBE during the previous years, the Ministry furnished:

Year	No. of New R&D Activities Undertaken		Total No. of New R&D Activities Undertaken	No. of R&D Activities Completed		Total No. of R&D Activities Completed
	Sponsored	In-house		Sponsored	In-house	
2016-17	2	7	9	1	4	5
2017-18	1	3	4	1	2	3
2018-19	0	2	2	1	1	2

8.26 On being asked about the financial allocation vis-à-vis utilization during the previous years, the Ministry furnished the following details:

Year	Sanctioned Budget including carry forward amount (Rs in lakhs)	Budget received from MNRE (Rs in lakhs)	Revenue generated through services provided (Rs in lakhs)	Expenditure incurred
2016-17	970.50	Nil	11.32	450.79
2017-18	631.00	100.00	6.45	305.47
2018-19 up to 28-02-19	526.98	100.00	4.09	285.11

8.27 In response to a query, the Ministry stated that the reasons behind non utilization of funds are following:

- "lack of technical and scientific manpower,
- Lack of regular financial/administrative authority (Director General) at the Institute,
- Very limited new activities were carried out due to acute shortage of manpower."

8.28 Physical targets and financial allocation for the year 2019-20, as furnished by the Ministry, are given below:

Sl. No	**Items/Activity**	**Physical target (T)**	**Target timeline (A)**	**Weightage (%) (W)**	**Score =Wx(A/T)**
1	**2**	**3**	**4**	**5**	**6**
[A]	**PHYSICAL TARGETS**	**--**		**70**	
(a)	To carry out and facilitate research, design, development, testing, standardization and technology demonstration eventually leading to commercialization of RD&D output--			**36**	
I	Formulation and submission of R&D projects for funding	03 projects	One each in Q2, Q3 and Q4 of FY 2019-20	*9*	
Ii	Execution of R&D projects	02 nos. Of projects	Ongoing R&D projects are already in the final stage. The progress report shall be prepared and submitted by 31.12.2019	*6*	
iii	Proposal submission for setting up R&D-cum-Technology Demonstration plants	03 nos.	31.12.2019	*9*	
iv	Research paper/ Book chapter/ Book Publications	06 nos.	2 research papers in each Q2, Q3 and Q4.	*12*	
(b)	To undertake and facilitate human resource development and training including doctoral and post-doctoral research in the area of bio-energy --			**20**	
I	Filling up and continuation of all Permanent posts in SSS-NIBE	26 posts	Amendment in RR: 30.09.2019 Adv: 31.10.2019 Hiring latest by: 31.03.2020	*5*	

Ii	Project Training to Masters & Ph.D. students from other Institutions/ Universities	06 nos.	This is ongoing process	*5*	
iii	Outsourced manpower for carrying out R&D and Administrative activities	14 nos.	Tendered by 30.09.2019	*5*	
Iv	Organization of Conference/ Workshop/ Training programmes	02 nos.	Nov 2019 Feb 2020	*5*	
(c)	To create facilities for operationalization of the Institute --			**14**	
I	Repair and maintenance of civil/electrical work	--	31/12/2019	3	
Ii	AMC/CMC laboratory equipment for proper functioning	-	Award of contract by 31/10/2019	3	
iii	Setting-up of NKN connectivity	-	31/12/2019	3	
Iv	MoU with other Institutions/Universities	05 nos.	31.12.2019	5	
[B]	**FINANCIAL TARGETS (ITEMS)**	**Target**	**Target timeline**	**30%**	
(d)	**Receipt from operation/ revenue generation**	**(Rs. in Crore)**		**10**	
I	Revenue generation as fees charged for testing	0.01	31.03.2020	*3%*	
Ii	Revenue generation as fees charged for Capacity Building/Training Activities	0.04	31.03.2020	*3%*	
iii	Consultancy Services	0.1	31.03.2020	*2%*	
Iv	Others- Service Charges, Application fees, interest of corpus etc.	0.85	31.03.2020	*2%*	
	TOTAL	**1.00**			
(e)	**Audit & Accounts/Others**	--		**10**	
I	Statutory Audit	--	30.09.2019	*3%*	
Ii	Organizing the Finance Committee meetings (2 Nos.)	--	Sept 2019 January 2020	4%	
iii	Timely submission of Annual Report	--	30.11.2019	*3%*	
(f)	**Utilization of Grants**	**--**		**10**	
I	General	1.00	31.03.2020	3%	
Ii	Salary	1.00	31.03.2020	3%	
iii	Capital Asset	1.00 +1.42(additional requirement)	31.03.2020	4%	
	Total	**5.42**		-	
	GRAND TOTAL (a) to (h)			**100**	

8.29 The Ministry also stated that an additional demand of INR 1.42 Crore will be requested by NIBE, if the expected expenditure can be made in time.

8.30 When queried about the major activities/projects proposed to be undertaken during 2019-20, the Ministry furnished:

Division	R&D plan for 2019-20
Common R&D Plans of the Institute (for all the three divisions)	• Training to Masters & Ph.D. students from other Institutions/ Universities in project mode and internship. • Organization of Workshop/ Training programmes (3 Nos) • MoU with other Institutions/Universities and collaborative research project formulation, introduction of (M Tech) Renewable Energy Technology program with NIT Jalandhar
Specific task for the three divisions	
Biochemical Conversion Division	• Formulation and submission of two R&D projects for funding on theme of a) Waste to Energy and (b) CO_2 sequestration. • Continuation of the ongoing projects of 'Bio-refining approach for generation of chemicals and bioethanol from indigenous lignocelluloses agrowaste' towards final documentation. • Continuation of the ongoing projects of 'Bio-refining of sugarcane baggase for the production of bioethanol and value-added products' towards final documentation. • Consultancy projects from stakeholders • Patent writing
Chemical Conversion Division	• Formulation and submission of at-least 2 R&D projects for funding: 1. aviation fuel from waste cooking oil 2. biomass waste resource potential study in the state of Punjab for biofuel production 3. Corn Stover to carbonaceous catalyst for glycerol valorisation. • MSW to Energy project for gasification to power generation 100 kW (project formulation, submission and defense in funding agency/ MNRE) (project cost tentative (INR 2.5 Crore) • Research paper/ Book chapter/ Book Publications
Thermochemical Conversion Division	• Upgradation of biomass cookstove testing Centre to PM 2.5 test set up. • Formulation and submission of at-least 2 R&D projects for funding: 1. Solar Biomass Hybrid System for carbonization of waste biomass 2. Experimental investigation of different agro-waste based biomass briquette in a 10kW gasifier system for power generation. • Design and testing of solar biomass waste decomposer • Research paper/ Book chapter/ Book Publications

PART –II

OBSERVATIONS/RECOMMENDATIONS OF THE COMMITTEE

DEMANDS FOR GRANTS OF THE MINISTRY FOR 2019-20

1. The Committee note that an allocation of Rs. 6731.93 crore was sought by the Ministry for 2019-20, but Rs. 5254.83 crore have actually been sanctioned i.e. Rs. 1477.10 crore less than the required amount. However, there is an increase of Rs 108.20 crore in 2019-20 (BE) as compared to the previous year i.e. an increase of meagre 2 % which does not seem to be in sync with the humongous targets assigned to the Ministry. But at the same time, the Ministry had not been able to fully utilize the allocated amount in the last three years. The Committee are informed that more than 50% of the allocated funds for 2019-20 have already been utilized by the Ministry (as on 15.10.2019)

Although the Ministry has repeatedly failed to utilize the allocated amount during the previous years, keeping in view the high targets assigned to the Ministry, the Committee recommend that additional funds, if required, may be provided to the Ministry at RE stage.

2. The Committee note that for 2019-20, the physical targets assigned to the Ministry include 11,852 MW of Grid Interactive Renewable Power, 6000 ckm (cumulative) of Green Energy Corridor, 76,000 number of Biogass Plants, 400 MW of Off-Grid Solar Power, etc., with an allocation of Rs. 4272.15 crore for Grid Interactive Renewable Power and Rs. 688.00 crore for Off-Grid/Distributed/Decentralized Renewable Power. The Committee are informed that grid interactive renewable energy capacity addition of 4272.54 MW have been achieved during the current year from April to September 2019 which is about 36 % of the total capacity targeted to be achieved in the current financial year.

The Committee hope that the Ministry will achieve the remaining 64% of the targets set for the year 2019-20 till March 2020. The Committee, therefore, recommend that the Ministry should analyse its past performance and make all out efforts to achieve the envisaged targets. The Committee may be apprised of the analysis done and lessons learnt from the previous years' performance by the Ministry.

BUDGET ALLOCATION AND UTILIZATION

3. The Committee appreciate the Ministry for its efforts in mobilising extra funds through IEBR which forms a major part of its expenditure year on year. The Committee note that the Gross Budgetary Support to the Ministry was decreased at RE stage for the years 2016-17 and 2017-18, while it remained constant for the year 2018-19. However the Ministry has not been able to fully utilise even the decreased allocations during the last three years. It could utilise 89.88%, 92.37% and 86.97% of revised budgetary allocations during the years 2016-17, 2017-18 and 2018-19 respectively. Reasons cited for shortfall in utilisation during 2018-19 are same as that of the previous year, so it may be construed that the Ministry did not take any corrective action to solve the problems. Also, it has been submitted that funds from other heads were transferred to Grid Interactive head at RE stage due to inadequacy in that particular head.

The Committee are of the opinion that decrease in budgetary allocation at RE and low utilisation of even the decreased allocated funds are symptomatic of the poor financial planning by the Ministry. In view of the ambitious targets to be achieved, this situation is beyond comprehension. The Committee, therefore recommend that the Ministry should focus on proper and exhaustive utilisation of allocated funds and take remedial measures against factors responsible for low utilisation.

FINANCIAL SUPPORT FROM NATIONAL CLEAN ENERGY AND ENVIRONMENT FUND (NCEEF)

4. The Committee note that from the financial year 2011-12 to 2017-18, an amount of Rs. 17,086.24 crore was allocated to MNRE from NCEEF and Inter-Ministerial Group has recommended 48 Renewable Energy Projects for NCEEF support. The Committee are informed that there has been no allocation from NCEEF to MNRE since 2018-19 as the coal cess which formed the NCEEF would now constitute GST compensation Fund as per Goods and Service Tax (Compensation to States) Act, 2017 and the same would be utilised to compensate the states for potential losses on account of GST implementation for five years. Keeping in view discontinuation of financial support from NCEEF, the Committee recommend that the Ministry should make concerted efforts to mobilise additional fund through Government of India serviced Masala Bonds and Multilateral/Bilateral Financial Organisations.

EFFECT OF GST ON RENEWABLE ENERGY SECTOR

5. The Committee note that prior to implementation of GST, the goods/equipment/material required for setting up of Solar Power Generating Systems were exempt from payment of Central Excise Duty and attracted a concessional rate of 5% of Basic Custom Duty on issuance of an end-use certificate from MNRE. Further, Solar PV Modules which constitute more than 50% of the cost of Solar Power Generating Systems, did not attract any duty.

It is submitted that as per the notified GST rates, Renewable Energy devices and spare parts have been kept in 5% GST slab. The Committee observe that there are lot of disputes/ambiguities regarding applicable rate of GST on Solar Power Generating Systems. In order to resolve these disputes/ambiguities, the Ministry of Finance vide its

Notification No. 25/2018-Integrated Tax (Rate) dated 31.12.2018 clarified the goods–to–services ratio for Solar Power Generating System as 70:30, with goods comprising 70% of value taxable @ 5% and services comprising balance value taxable @ 18%, resulting into effective rate of GST for Solar Power Generating System as 8.9 % [(70% x 5%) + (30% x 18%)], which is far more higher than the intended rate of 5%.

The Committee are of the opinion that this prevailing ambiguity regarding applicable rate of GST is not healthy for the Renewable Energy Sector as Renewable Energy devices and spare parts have been kept in 5% GST slab whereas the effective rate has come out to be about 9%. Such a situation will lead to increase in generation cost and pose a threat to the viability of the ongoing projects, ultimately hampering the target achievement. The Committee want the Ministry to take up this matter with the Ministry of Finance on urgent basis. The Committee, therefore, recommend that the Ministry should pursue this issue regarding applicable rate of GST with the Ministry of Finance for necessary clarification or review of its above mentioned notification without any further delay so that the effective rate of GST on Solar Power Generating Systems remain as close to 5% as possible.

PHYSICAL TARGETS AND ACHIEVEMENTS

6. The Committee observe with deep concern that the Ministry has continuously failed to achieve its yearly targets. For the years 2016-17 and 2017-18, against the Grid connected Renewable Energy target of 16,560 MW and 14,445 MW , the Ministry could achieve 11,319.75 MW and 11,876.82 MW respectively. Similarly, during the year 2018-19, 8,519.52 MW could be installed against the target of 15,355 MW i.e. a shortfall of 44.50 %. Physical achievement with respect to Family type

Biogas Plants is also not up to the mark. Given the time bound target of 175 GW by 2022, such performances are disappointing notwithstanding the continuous assurance of the Ministry to the contrary.

For the current year (2019-20), the Ministry has been assigned a target of 11,852 MW of grid power. Out of which, 4,272.54 MW have been installed as on 30.09.2019. The Committee hope that the Ministry will strive hard to achieve the target in the current year. The Committee feel that year-on-year shortfall in achievement of targets may hamper the entire Mission of achieving 175 GW by 2022 which in turn may reflect poorly upon the commitment and sincerity of the Ministry. The Committee, therefore, recommend that:

a) The Ministry should identify the weak areas and take corrective actions without any further delay.

b) It should also ensure continuous monitoring of the implementing agencies.

GREEN ENERGY CORRIDOR

7. The Committee note that under Green Energy Corridor Project, there is a target of establishment of Grid sub-stations of different voltage levels with aggregate transmission capacity of approx. 19000 MVA (Mega Volt Ampere) and installation of 9400 ckt-kms (Circuit kilometres) of transmission lines in the states of Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu with funding mechanism consisting of 40% GoI Grant, 40% KfW loan (EUR 500 Million) and the remaining 20 % as State contribution. It has been submitted that the project would be completed by March 2020. The Committee also note that as on September 30, 2019, 5050 ckt-kms of transmission lines have been constructed and 4750 MVA capacity substations have been

commissioned. It can be deduced from the data provided, that to meet the given target, 4350 ckt-kms of transmission lines have to be installed and grid substations of aggregate capacity of 14250 MVA have to be established in just six months i.e. upto March 2020 so as to meet the deadline.

The Committee know that for 2018-19, the Ministry was provided Rs. 600 crore (BE) for Green Energy Corridor with a physical target of 3000 ckt-kms (cumulative) and for 2019-20, an allocation of Rs. 500 crore (BE) has been made with a physical target of 6000 ckt-kms (cumulative). In the view of the Committee, this cumulative target of 6000 ckt- kms for 2019-20 is beyond comprehension when the Ministry had the original target to install 9400 ckt-kms (cumulative) by March, 2020. The Ministry seems to be proclaiming its failure to achieve the envisaged target. It shows the unrealistic assessment of physical targets set by the Ministry.

The Committee are highly disappointed with performance of the Ministry with respect to Green Energy Corridor. The Committee, therefore, recommend that the Ministry should work on mission mode to get the Green Energy Corridor ready within the reasonable time frame in order to avoid grid congestion and to facilitate integration and evacuation of large scale renewable power capacity.

WIND ENERGY

8. The Committee note that the Wind Power Potential in the country at 100 meters above ground level, as assessed by the National Institute of Wind Energy, is 302.25 GW. Against this, a total capacity of 36,930.325 MW has reportedly been installed as on September 30, 2019. The Committee are informed that besides commissioned capacity of 36.93 GW, a capacity of 9.78 GW is under implementation and bids are undergoing for another 3.84 GW.

The Committee observe that while the Ministry outperformed its target in 2016-17, it remained miserably short of its target in 2017-18 and 2018-19. Its achievements in the Wind Energy Sector during the years 2016-17, 2017-18 and 2018-19 were about 137%, 47% and 37% of the targets respectively. The Committee feel that the Ministry was clearly not able to keep up the momentum it acquired in 2016-17 as its performance in subsequent years are highly disappointing. The budget allocated for each of the three years i.e. 2016-17, 2017-18 and 2018-19 have reportedly been fully utilized.

The Committee are informed that for the year 2019-20, a physical target of 3000 MW has been set with a budgetary allocation of Rs. 920 crore which also includes disbursal under Generation Based Incentive Scheme. The Ministry has also submitted that an additional amount of Rs 600 crores has been sought in RE to cater the requirements of current financial year. The Committee observe that a Wind Power capacity addition of 1304.36 MW has been achieved from April to September 2019 against the target of 3000 MW. It means a capacity of 1695.64 MW has to be installed in the remaining six months. The Committee hope that the Ministry will achieve its target of the current year unlike the previous years. The Committee, therefore, recommend that:

i) The Ministry should make concerted efforts to achieve the physical target of 3000 MW wind energy capacity for the year 2019-20 and the overall target of 60 GW in a time bound manner.

ii) The Ministry should look into the reasons responsible for non-achievement of the physical target in 2017-18 and 2018-19 and take corrective measures for the same. The Committee may be apprised of the reasons and corrective measures taken in this regard.

9. The Committee note that there is 10 GW of annual production capacity of Wind Turbines and all the major global WTG manufactures have manufacturing units in the country. The Committee congratulate the Ministry for the fact that around 70-80% indigenization has been achieved in Wind Energy Sector.

The Committee are informed that off-shore wind energy potential of about 70 GW has been identified along the coasts of Gujarat and Tamil Nadu and there is a plan to develop the first off-shore Wind Energy Project of 1 GW capacity off the coast of Gujarat. The Committee also note with satisfaction that SECI has awarded three Wind-Solar Hybrid Projects of total capacity of 1440 MW in the States of Rajasthan and Tamil Nadu and issued a tender to install 160 MW capacity of Wind-Solar Hybrid Project in the State of Andhra Pradesh. The Committee are of the opinion that Wind and Solar are complementary and hybridizing these two would help in minimizing the variability apart from optimally utilizing the infrastructure, including land and transmission system. The Committee feel that these new initiatives will diversify the Ministry's resources and work as a cushion against any shortfall in already planned capacity of 175 GW of installed Renewable Energy Capacity by 2022. The Committee, therefore, recommend that:

i) The Ministry should take forward the lead achieved in Wind Energy Manufacturing and strive for maximum indigenization of Wind Turbines Manufacturing.

ii) The Ministry should not only ensure achievement of the target of 5 GW of off-shore wind capacity by 2022 but also try to develop maximum capacity out of the potential of 70 GW in both the States of Gujarat and Tamil Nadu.

iii) The Ministry should encourage the Wind–Solar Hybrid Projects as much as possible in order to minimize the intermittency of Renewable Power.

SOLAR ENERGY

10. The Committee note that there is a potential of about 750 GW of Solar Energy in the Country and a target of 100 GW of Solar Capacity has been set to be achieved by 2022. As on September 30, 2019, a capacity of 31,101.68 MW has already been commissioned. The Committee feel that the Ministry have a huge task before it to commission remaining 68,898.32 MW of Solar Energy Capacity in just about two and a half years as to meet the stipulated target of 1,00,000 MW Solar Energy Capacity by 2022, with an average of more than 27,000 MW per year. Although the Ministry has given assurance to the Committee about time bound achievement of target but the Committee are skeptical about this claim.

The Committee observe that for the year 2016-17, 2017-18 and 2018-19, against the targets of 12000 MW, 10000 MW and 11000 MW of Grid-connected Solar Power, the Ministry had been able to achieve 5525.98 GW, 9362.67 MW and 6529.20 GW with utilization of Rs 2590.59 crore, Rs. 1889.93 crore and Rs 2524.65 crore respectively. It means the target achievement was 46%, 94% and 60% in the respective years. The Committee find that there is no synchronozation with respect to achievement of financial and physical targets, as there is higher physical achievement with lesser financial utilization and lesser physical achievement with higher financial utilization. The Committee are concerned with such haphazard performance of the Ministry in Solar Sector. For the current year, a target of 8500 MW of grid connected Solar Power has been set with an allocation of Rs 2479.90 crore and the Ministry has been able to achieve 2921.02 MW with utilization of Rs

1489.85 crore as on September 30, 2019. Therefore, 5578.98 MW (~65% of the target) are left to be achieved in remaining six months.

The Committee find that the Ministry has continuously been missing on its yearly Solar Energy capacity addition targets, so the Committee are dissatisfied with the performance of the Ministry in Solar Energy Sector and feel that with such performance, the target of 100 GW will be very hard to achieve. The Committee, therefore, recommend that:

i) The Ministry should work hard so as to achieve the target of 8500 MW set for the year 2019-20.

ii) The Ministry should play a proactive role in monitoring the progress of various Solar Energy Projects.

iii) The Ministry should make sustained efforts to find solutions for the constraints being faced in the commissioning of Solar Projects in consultation with other agencies concerned in a time bound manner.

11. The Committee note that NISE has estimated a Roof-top SPV potential of 42.8 GW. Accordingly, a target of 40 GW of installed Roof-top Solar Power by 2022 has been set by the Government. The Committee know that as per the year-wise targets set by the Ministry so as to install 40 GW by 2022, there should have been an installed Roof-top Solar Power (RTS) Capacity of 16,000 MW by 2018-19. But, as on October 15, 2019, only 1826 MW of RTS Capacity has reportedly been installed i.e. the achievement is only 11.50 % of the target. The Committee are highly disappointed with the dismal performance of the Ministry in this Sector. CCEA has now revised the yearly RTS targets according to which a capacity of 3000 MW has to be commissioned during 2019-20.

The Committee feel that Roof-top Systems are not remunerative due to high maintenance cost and delay in disbursement of subsidy despite Ministry's assertion to the contrary. The Committee are of the

opinion that given the performance of the Ministry in this Sector till date, the Roof-top Solar target of 40 GW by 2022 is unrealistic and it is highly unlikely that this target will be met. The Committee are of the considered view that the Ministry should give this programme a serious relook, otherwise it will derail the entire National Solar Mission. The Committee, therefore, recommend that:

i) The process of subsidy disbursement should be made simpler and faster and the Ministry should widely advertise the benefits of having a Roof-top Solar Projects and the incentives provided by the Government for the same so as to spread awareness among the masses.

ii) The Ministry should make arrangements so that the cost payable by the consumer may be recovered through monthly installments as people are generally reluctant to invest the whole amount at a time.

iii) Single Window Clearance System should be adopted for approvals like connectivity, net-metering, electricity inspection, limitation in sanctioned load, etc.

iv) The Ministry should have regular review meetings with the implementing agencies.

12. The Committee note that there are 2,37,120 units of Solar Pumps installed in the country (as on March 31, 2019). Further, the Committee are informed that a new initiative 'PM-KUSUM' has been announced to empower farmers by giving them 17.50 lakh stand-alone pumps with capacity upto 7.5 HP for replacement of existing diesel pumps/irrigation systems and Solarization of 10 lakh Grid connected Agricultural Pumps by the year 2022. According to this scheme, the farmers can supply the excess power to the grid and earn an additional income. The Scheme

also includes installation of 10,000 MW of Grid Connected Solar or any other RE Power Plants of individual plant size upto 2 MW.

The Committee appreciate the Government for its efforts to empower farmers. But, the Committee feel that the number of agricultural pumps provided under the scheme are meagre as compared to total number of intended target group. Further, the Committee are concerned that already financially constrained DISCOMs may not be able to pay the farmers for the excess power supplied to the grid. The Committee are of the opinion that non-payment of dues by the DISCOMs will further alienate the farmers and will definitely have serious repercussions for the scheme. The Committee, therefore, recommend that:

i) The Ministry should formulate some mechanism to ensure payment from DISCOMs to farmers, if they choose to send excess power to the Grid. The Committee would like to know about the details of any such mechanism as early as possible.

ii) The Ministry should also ensure quality, sustainability and maintenance of installed Solar Pumps.

13. The Committee note that there is an installed Solar PV Manufacturing capacity of 3 GW for Solar PV Cells and around 10 GW for Solar PV Modules and there is no commercial production in India for upstream stages of Solar PV manufacturing like wafers, ingots and polysilicon. The Ministry has submitted that the price of Solar equipment produced in the Country is not competitive as compared to that of foreign manufacturers, especially Chinese manufacturers and about 85% of Solar equipment/Cells/Modules are imported from China and other countries like Vietnam and Malaysia. The Committee are informed that the reasons for poor domestic manufacturing capacity include lack of integrated set up, high cost of land/electricity, lack of

skilled workforce, low capacity utilization, lack of economies of scale, high cost of financing & lack of modern technology resulting in higher cost of production, etc.

The Committee are concerned about the lack of domestic Solar Manufacturing Capacity in the Country. The Committee are of the view that it is necessary for India to support Domestic Solar Manufacturing as over-reliance on any single foreign country puts Indian Solar Sector at a risk of disruption in supply chain and cripple indigenization of the Sector. The Committee feel that Renewable Energy Sector can not be sustained on imported equipments in the long term. The Committee, therefore, recommend that:

i) The Ministry should urgently formulate a dedicated programme to support Solar Manufacturing in the country.

ii) The Ministry should work to provide subsidy/Viability Gap Funding (VGF) and low interest rate loans to domestic manufacturers so as to make them competitive.

14. The Committee note that financing of about Rs. 2,80,000 Crore (@ Rs. 4 Cr/MW) will be required for additional 70 GW. It is also submitted before the Committee that banks are reluctant to provide debt/loan to Renewable Energy sector as there are lot of NPAs in power sector and at present, both conventional power sector and Renewable Energy sector are clubbed together for their loan basket. The Committee find that while Small Hydro and Biomass Sector have NPAs, Wind and Solar Sector do not have any NPA till date. But, the Committee are informed that about Rs 9700 crore of developers/generators are due on States/DISCOMs and if the same is not paid back, many of the solar and wind projects may also turn into NPAs. The Committee, therefore, recommend that:

i) The loan basket and loan limit for conventional power sector should be separate from that of Renewable Energy sector so that the development of this sector does not get affected due to prevalence of NPAs in conventional power sector.

ii) The Ministry should hold discussions with the State Governments and come up with guidelines/directives so as to ensure timely payment from DISCOMs to developers/generators.

BIOMASS POWER AND BAGASSE CO-GENERATION PROGRAMME

15. The Committee note that the estimated potential for power generation from Biomass/Bagasse Co-generation in the country is about 26 GW. Against this, a cumulative capacity of 9131 MW has reportedly been installed in the country (as on September 30, 2019). The Committee are satisfied with the performance of the Ministry in this sector as the Ministry has outperformed during the last two years. For the year 2017-18 and 2018-19, against the targets of 340 MW and 250 MW, capacity addition of 519 MW and 402 MW respectively have been achieved. The amount allocated for the last two years were Rs. 9 crore and Rs. 8.5 crore, respectively, which have not been fully utilized. The Committee observe that for the year 2019-20, a physical target of 250 MW has been fixed with an outlay of Rs. 53.50 crore and it is submitted that the allocation will be sufficient to achieve the set target. However, the Ministry has not furnished any special reason for drastic increase in budgetary allocation in 2019-20 with physical target remaining the same as that of the last year. The Committee, therefore, recommend that:

i) The Ministry should maintain its performance of previous years in achievement of the physical target for the year 2019-20.

ii) More projects on Biomass/Bagasse Co-generation should be encouraged, especially in those States with high potential like

Punjab, Haryana, Madhya Pradesh, Rajasthan, etc. where the installed capacity is low as compared to potential.

iii) The technologies used in the sector should be upgraded and improved, keeping in mind the cost effectiveness and viability of the projects.

iv) Fresh study for biomass resource assessment may be conducted in a time bound manner.

SMALL HYDRO POWER

16. The Committee note that the identified potential for power generation from Small Hydro Projects (upto 25 MW capacity) is around 21,133.62 MW from 7133 identified sites all over the country. Against this estimated potential, a cumulative capacity of 4610.807 MW has been installed (as on September 30, 2019). The Committee find that the performance of the Ministry in this sector has been good. During 2016-17, 2017-18 and 2018-19, against the target of 150 MW, 100 MW and 100 MW, a capacity addition of 105.90 MW, 105.96 MW, and 107.35 MW respectively have been installed and the expenditure during this period have been more than the allocated amount except in 2018-19. However, there are apprehension that instead of striving to achieve the yearly target of 250 MW that was there before 2016-17, the Ministry has lowered its target from 250 MW in 2014-15 and 2015-16 to 100 MW 2017-18 onwards. The Committee observe that for the year 2019-20, the budgetary allocation has been Rs. 190.90 crore with a physical target of 100 MW. The Committee are also apprised that the National Mission on Small Hydro has been dropped. Some of the challenges faced in the SHP Sector are short working season in the hilly areas, unwillingness of DISCOMs to sign PPAs, levy of inter-state charges, long time taken for clearances, etc. It is also submitted that the new projects could not be sanctioned in North Eastern States since the continuation of SHP scheme

from April 2017 to March 2020 is still under consideration of CCEA . The Committee, therefore, recommend that:

i) The Ministry should formulate new scheme for implementation of Small Hydro Projects so as to revamp the small hydro sector in the country especially in North Eastern Region.

ii) Reassessment of SHP potential in the country should be taken up in a time bound manner.

iii) The Government may critically review its performance under the SHP sector and ensure that the factors which hinder the growth of the sector are addressed.

iv) The Ministry should make efforts in consultation with concerned stakeholders to ensure that the interstate charges/cess are not levied on SHP and these projects are exempted from providing free power so as to give a fillip to the Sector.

RENEWABLE ENERGY FOR RURAL APPLICATIONS

17. The Committee are informed that Renewable Energy for Rural Applications includes the New National Bio-Gas and Organic Manure Programme (NNBOMP) and Bio-Gas based Power Generation (0ff-Grid) Programme. NNBOMP aims at setting up small biogas plants for meeting cooking and lighting needs of mainly rural and semi-urban households of the country, while Bio-gas based Power Generation Programme provides clean energy solution to reduce consumption of diesel and kerosene by installation of medium size biogas plants.

The Committee observe that from the year 2016-17 to 2019-20, allocation for this Sector has been considerably reduced and the Ministry has consistently failed to achieve the physical targets and utilize even the reduced financial allocation. During the year 2018-19, against the Financial Allocation (RE) of Rs. 78 crore, only Rs. 42.71 crore

(56 %) have been utilized and against the physical target of 1 lakh Bio-Gas Plants, the Ministry has been able to set up only 26980 such plants (~27 %). The Committee feel that the performance of the Ministry is discouraging in this sector. The Committee are informed that the non-achievement of Bio-Gas target is due to low priority given to this scheme at the State level.

The Committee note that during the year 2019-20, only 6338 small bio-gas plants have been set up against the target of 76000 such plants and only Rs 16.61 crore have been utilized against the financial allocation of Rs 100 crore as on September 30, 2019. The Committee are concerned that this year too, the Ministry may fail to achieve its target by a massive margin. The Committee are of the view that apart from electricity generation, Bio-Gas Plants help millions of rural folk by meeting their cooking and other energy requirements. The Committee, therefore, recommend that:

i) The Ministry should strive hard to achieve their physical targets so as to provide clean energy solutions to the rural poor specially women and children.

ii) The Ministry should hold discussions with the State authorities so as to encourage them to give due priority to this scheme as without their cooperation, this scheme can not bear desired results.

iii) The scheme should be properly publicised in order to spread awareness among rural folks.

RENEWABLE ENERGY FOR URBAN, INDUSTRIAL AND COMMERCIAL APPLICATIONS

18. The Committee note that the programmes under the head 'Renewable Energy for Urban, Industrial and Commercial Applications' include Energy efficient Solar/Green Buildings Programme; Energy from

Urban, Industrial and Agricultural Waste including Biomass Cogeneration in Industry and Waste to Energy Programme. The Committee observe that during 2018-19, 6.58 MW could be achieved against the target of 20 MW under Waste to Energy Programme. Further, against the financial allocation of Rs. 22 crore, no amount was utilized during the same year. The Committee find that performance in Waste to Energy Sector is not up to the mark, both in financial as well as physical terms.

The Committee are informed that as of now, 199 waste-to-energy plants based on Municipal Solid Waste (MSW) and Urban, Industrial and agricultural waste/residues have been set up for generation of power, biogas and bio-CNG to meet thermal and electrical needs of the industries and for production of Bio-CNG for transportation as well as cooking fuel etc. But, these Plants, reportedly, are not doing well in terms of viability and profitability, due to various reasons like unavailability of any supporting scheme, long delays in obtaining statutory clearances, etc.

The Committee note that for 2019-20, a budgetary allocation of Rs. 53.50 crore with a physical target of 15 MW has been assigned for Waste to Energy and Biomass Programmes. The Committee hope that the Ministry will ensure achievement of its target during the current year. The Committee, therefore, recommend that:

i) The Ministry should formulate a dedicated scheme to support waste to energy projects.

ii) In view of the importance of waste to energy programme, there should be an integrated strategy to manage/streamline all activities under this programme so as to avoid delay in obtaining statutory clearances/ approvals from various agencies.

iii) The Ministry should encourage States/Municipal Corporations and other stakeholders to come up with suitable proposals for recovery of Energy from Urban, Industrial and Agricultural Wastes.

RESEARCH, DESIGN, DEMONSTRATION AND DEVELOPMENT IN RENEWABLE ENERGY SECTOR

19. The Committee note that Budgetary Allocation under RDD&D for the years 2016-17, 2017-18 and 2018-19 were drastically reduced at RE stage i.e. in 2016-17, BE of Rs. 90 crore was reduced to Rs. 60 crore, in 2017-18, BE of Rs. 144 crore was reduced to Rs. 81 crore and in 2018-19, BE of Rs 94 crore was reduced to 43 crore at RE stage . It is found that even the reduced amount could not be fully utilized. Keeping in view the fact that there are three institutions dedicated to research in Renewable Energy Sector namely NISE, NIWE and NIBE, the Committee are not able to understand this inability of the Ministry to utilize the allocated amount. Regarding the major programmes/research activities undertaken during the last three years, the Committee are informed that RD&D is being supported in the field of Solar Photovoltaic, Solar Thermal, Hydrogen fuel Cells and Wind-Solar Hybrid Systems.

The Committee note that an amount of Rs. 60.00 crore has been allocated under RDD&D for the year 2019-20. The Committee are informed that during the year 2019-20, thrust will be on development of solar thermal technology, improving Si PV efficiency, developing new material solar cells, storage solutions, development of efficient and cost effective designs of biogas plants, off-shore technology and wind solar hybrid systems, pumped storage systems, technology for storage and development of efficient and cost effective fuel cells, etc. The Committee, therefore recommend that:

i) The Ministry should focus on maximum utilization of allocated funds so that Research, Design, Demonstration and Development in Renewable Energy Sector do not suffer due to low utilization of sanctioned amount.

ii) The Ministry should ensure a coordinated approach for successful collaboration among the technological and R&D institutions and industry to achieve the goal of renewable energy technology development.

iii) The Ministry should also ensure constant monitoring of all R&D projects with a view to evaluating their functioning in a cost effective and result-oriented manner.

PSUs/INSTITUTIONS UNDER THE MINISTRY

20. The Committee note that IREDA is a non-banking financial institution engaged in promoting, developing and extending financial support for setting up projects relating to new and renewable energy and energy efficiency/ conservation. After scrutiny of the data provided, the Committee feel that the performance of IREDA has been good as its MoU ratings has been "Excellent" for the years 2016-17 and 2017-18 and the same is expected to be "very good" for the year 2018-19. However, its NPA of 3.74 % during 2018-19 is the cause for concern. The Committee, therefore recommend that IREDA should work towards reducing its NPA in accordance with the target set.

21. The Committee note that SECI has achieved most of its MoU targets during the year 2018-19 which is an improvement over the last two years. The Committee observe that SECI received Rs. 100 crore and 50 crore during 2016-17 and 2017-18 respectively. However, data related to fund utilization during the same period has not been furnished. It has been submitted that for the year 2019-20, SECI has not sought any equity

support from the Ministry as the new projects to be undertaken in the current year will be carried out from its internal resources and external borrowings. SECI has a target to issue tenders for about 16,000 MW of Solar Projects among other activities during 2019-20. The Committee, therefore, recommend that being the implementing and executing arm for the National Solar Mission, SECI should make more efforts towards achieving its targets so that the overall target of 100 GW of Solar Energy can be achieved by 2022.

22. The Committee note that major achievements of NISE during the last year include Solar powered cold storage unit with thermal storage, solar powered bulk milk cooler unit, design and development of an innovative dryer, development of solar induction controller for induction based cooking system, implementation of Suryamitra Skill Development programme, etc. The Committee observe that NISE could not fully utilize the allocated amount, especially during 2016-17 and 2017-18. However, it utilized the full allocated amount in 2018-19. The Committee also note that for 2019-20, an amount of Rs. 15.00 Crore has been allocated to NISE. It is submitted that the allocated funds under capital head will not be sufficient and there is a requirement of Rs 11.60 crore against the allocated amount of Rs 6.00 crore. The Committee, therefore, recommend that:

i) More funds should be provided to NISE under capital head so that its proposed activities/projects may be carried out as planned.

ii) NISE should take up research projects for increasing the efficiency of Solar Cells and development of storage system.

23. The Committee note that major activities at NIWE during the last few years include development of wind potential GIS map at 120 m for the whole country, Offshore Wind resource Assessment, preparation of Geo-tagging portal, testing of Wind Turbines and solarization of wine farm, etc. The Committee find that fund utilization by NIWE, during the last three years i.e. 2016-17, 2017-18 and 2018-19 have been poor. The Committee are informed that for the year 2019-20, a sum of Rs. 19 crores has been approved and an additional fund of Rs 24.44 crore will be sought during RE stage. The Committee, therefore, recommend that:

i) NIWE should take corrective steps for alleviation of reasons responsible for low utilization of allocated funds, so as to achieve the projected targets with proper and exhaustive utilization of fund allocated.

ii) The Committee should be apprised of corrective steps taken in this regard.

24. The Committee note that the total number of R&D activities/projects undertaken and completed by NIBE during the last few years have been decreasing. The institute has undertaken and completed only two R&D activities during the year 2018-19 reportedly due to acute shortage of manpower. The Committee observe that NIBE generates some revenue by providing services, but the same has also been decreasing over the years. The Committee are informed that for 2019-20, the budget allocation is Rs. 3 crore. The Committee, therefore, recommend that:

i) NIBE should work towards making Bio-Gas/Bagasse Power Plants sustainable and viable through appropriate technological development.

ii) It may work towards finding a viable alternative to stubble burning so as to alleviate the problem of air pollution in the country especially in Northern India.

iii) The Ministry should take steps to solve the problem of acute shortage of technical and scientific manpower at NIBE through recruitment/deputation as soon as possible.

iv) The Ministry should provide more funds to NIBE because the it will help in proper utilization of agricultural residues for generation of power and other environment- friendly use.

NEW DELHI
December 04, 2019
Agrahayana 13, 1941 (Saka)

SHRI RAJIV RANJAN SINGH
alias LALAN SINGH
Chairperson,
STANDING COMMITTEE ON ENERGY

ANNEXURE-I

Details of the Budget Estimates for the year 2019-20 vis-à-vis BE/RE of 2018-19 and Actuals of 2017-18

मांग संख्या DEMAND NO. 69

नवीन तथा नवीकरणीय ऊर्जा मंत्रालय MINISTRY OF NEW AND RENEWABLE ENERGY

I. नवीन तथा नवीकरणीय ऊर्जा मंत्रालय के संबंध में 31 मार्च, 2020 को समाप्त होने वाले वर्ष में व्यय के लिये आवश्यक धनराशि का अनुमान।

I. Estimates of the amount required in the year ending 31st March, 2020 to defray charges in respect of **MINISTRY OF NEW AND RENEWABLE ENERGY**

	राजस्व Revenue	पूंजी Capital	जोड़ Total	(₹ करोड़ / In ₹ crores)
भारित Charged :	...	...	...	
स्वीकृत Voted :	5209.83	45.00	5254.83	

II. शीर्ष जिनकी अन्तर्गत **नवीन तथा नवीकरणीय ऊर्जा मंत्रालय** की ओर से इस अनुदान का हिसाब दिखाया जाएगा।

II. The Heads under which this Grant will be accounted for on behalf of the **MINISTRY OF NEW AND RENEWABLE ENERGY**

		मुख्य शीर्ष Major Head	वास्तविक 2017-2018 Actuals	बजट अनुमान 2018-2019 Budget Estimates	संशोधित अनुमान 2018-2019 Revised Estimates	बजट अनुमान 2019-2020 Budget Estimates
राजस्व भाग	***REVENUE SECTION***					
सचिवालय- आर्थिक सेवाएं	Secretariat-Economic Services	3451	36.82	40.03	42.06	43.38
पूर्वोत्तर क्षेत्र	North Eastern Areas	2552	...	504.53	504.53	513.00
नवीन तथा नवीकरणीय ऊर्जा	New and Renewable Energy	2810	7368.39	4561.67	4559.64	4653.45
जोड़ - राजस्व भाग	**Total-Revenue Section**		**7405.21**	**5106.23**	**5106.23**	**5209.83**
पूंजी भाग	***CAPITAL SECTION***					
नवीन तथा नवीकरणीय ऊर्जा पर पूंजी परिव्यय	Capital Outlay on New and Renewable Energy	4810	51.00	40.40	40.40	45.00
जोड़ - पूंजी भाग	**Total-Capital Section**		**51.00**	**40.40**	**40.40**	**45.00**
कुल जोड़	***GRAND TOTAL***		***7456.21***	***5146.63***	***5146.63***	***5254.83***

टिप्पणी: उपरोक्त अनुमानों में नीचे दिखाई गई वसूलियां शामिल नहीं हैं, जिन्हें व्यय में से घटा कर लेखों में समायोजित कर लिया जाता है।

Note: The above estimates do not include the recoveries shown below which are adjusted in reduction of expenditure

राजस्व भाग	***Revenue Section***					
नवीन तथा नवीकरणीय ऊर्जा	New and Renewable Energy	2810	-3761.59	...	...	...
जोड़ - राजस्व भाग	**Total-Revenue Section**		**-3761.59**	...	...	...
पूंजी भाग	***Capital Section***					
नवीन तथा नवीकरणीय ऊर्जा पर पूंजी परिव्यय	Capital Outlay on New and Renewable Energy	4810	-50.00	...	...	...
जोड़ - पूंजी भाग	**Total-Capital Section**		**-50.00**	...	...	...
जोड़ - वसूलियां	***Total Recoveries***		***-3811.59***	...	...	...

उपर्युक्त वसूलियों को घटा कर व्यय व्यवस्था इस प्रकार होगी:

The expenditure provisions, net of the above recoveries, will be as under:

राजस्व	Revenue	3643.62	5106.23	5106.23	5209.83
पूंजी	Capital	1.00	40.40	40.40	45.00
जोड़	**Total**	**3644.62**	**5146.63**	**5146.63**	**5254.83**

ANNEXURE-II

Subsidies/support in terms of Central Financial Assistance (CFA) given by the Government for installation of Solar Projects

Scheme	Central Financial Assistance/Subsidy
Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects	Rs.20 lakhs/MW or 30% of the project cost including Grid-connectivity cost, whichever is lower CFA upto Rs 25.00 lakh per park for DPR preparation of solar parks, conducting surveys, etc.
Operationalization of 300 MW Solar PV Projects by defence establishment and para military forces	The bidders selected on the basis of bids for minimum VGF requirement for the project with commitment to supply solar power at Rs. 5.50/KWh for 25 years. The upper limits of the VGF are as follows: Category-I: Rs.2.5 crore/MW for project capacity up to 5 MW or 30% of the project cost whichever is lower; Category-II: Rs. 2 crore/MW for project capacity greater than 5 MW up to 25 MW or 30% of the project cost whichever is lower; and Category-III: Rs. 1.5 crore /MW for project capacity greater than 25 MW or 30% of the project cost whichever is lower. Keeping in view the technology upgradation and economies of scales, the upper limit of VGF was revised on 17.02.2017 to @ Rs. 1.10 Cr./MW for all projects irrespective of sizes for which tenders were not brought out.
Scheme for Setting up of 750 MW Grid-connected Solar PV Power Projects under Batch-1 of Phase-II of JNNSM with Viability Gap Funding Support	The selection of the bidders has been based on the Viability Gap Funding (VGF) required for the project in an ascending order upto the full capacity. Viability Gap Funding (VGF) is limited to 30% of the project cost or 2.5 crore per MW, whichever is lower. Solar Energy Corporation of India (SECI) has signed PPA with such project developers for purchasing entire power from the project for 25 years at 5.45 Rs. per unit (4.75 Rs. per unit for projects availing accelerated depreciation).
Scheme for Setting up of 2000 MW Grid-connected Solar PV Power Projects under Batch-III of Phase-II of JNNSM with Viability Gap Funding Support	The Project developer is provided a viability gap funding based on his bid. The upper limit for VGF is kept at Rs.1.0 Crore/MW for open category (Rs. 1.31 Crore/MW for projects in DCR category).
Scheme for Setting up of 5000 MW Grid-connected Solar PV Power Projects under Batch-IV of Phase-II of JNNSM with Viability Gap Funding Support	The Project developer is provided a Viability Gap Funding based on his bid. The upper limit for VGF is kept at Rs. 1.0 crore/MW for open category and Rs. 1.25 crore/MW for projects in DCR category. SECI will select projects through competitive e-bidding based on minimum VGF sought (quoted in INR/MW), or there may be a provision for quoting a discounted tariff (quoted in INR/kWh).

Scheme	Central Financial Assistance/Subsidy
Grid Connected Rooftop	• 40% CFA for RTS systems up to 3 kW capacity and 20% for RTS system capacity beyond 3 kW and up to 10 kW. No CFA beyond 10 KW • For Group Housing Societies/Residential Welfare Associations (GHS/RAW), CFA will be limited to 20% for RTS plants for supply of power to common facilities, however, the capacity eligible for CFA for GHS/RAW will be limited to 10 kW per house with maximum total capacity upto 500 kWp.
Pilot-cum-demonstration project for development of grid connected solar PV power plants on canal banks and canal tops	Financial support of Rs.3 crore/MW or 30% of the project cost, whichever is lower, for Canal Top SPV projects and Rs. 1.5 crore/MW or 30% of the project cost, whichever is lower, for Canal Bank SPV projects. Total CFA of upto Rs.225 crore for *100 MW (50 MW on Canal Tops and 50 MW on Canal Banks)* to be disbursed over a period of maximum 2 years post sanctioning of the plants as under: upto 40% on sanctioning of the projects. 60% on successful commissioning of the projects. Service charge to SECI @1% of project cost.
Scheme for setting up of 1000 MW of Grid-Connected Solar PV Power projects by Central Public Sector Undertakings (CPSUs) under Batch- V of Phase II of JNNSM	Viability Gap Funding (VGF) provided through SECI at a fixed rate of Rs. 1 Cr/ MW for projects where domestically produced cells and modules are used and Rs. 50 lakh/ MW in cases where domestically produced modules are used. VGF released in two tranches as follows: 50% on successful commissioning of the full capacity of project (COD). Balance 50% after one year of successful operation of the project.
Off-Grid scheme-SPV lighting systems and power plants, Solar Pumps	1. Lighting Systems A. Solar study lamps: Benchmark Cost = Rs. 160/Wp CFA=Rs. 136/Wp B. Street lights with Lithium Ferro Phosphate batteries: Benchmark cost= Rs. 299/Wp: CFA= Rs. 89.7/Wp 2. Solar Power plants with battery backup for 6 hours and capacity up to 10 kWp: Benchmark Cost = Rs. 94/Wp: CFA=Rs. 28.2/Wp 3. Solar Pumps A. 3 HP (DC): Benchmark Cost = Rs. 74,000/HP: CFA=Rs. 22,200/HP B. 5 HP (DC): Benchmark Cost = Rs. 66,000/HP: CFA=Rs. 19,800/HP C. 3 HP (AC): Benchmark Cost = Rs. 67,000/HP: CFA=Rs. 20,100/HP D. 5 HP (AC): Benchmark Cost = Rs. 56,000/HP: CFA=Rs. 16,800/HP E. 7.5 HP (AC/DC): Benchmark Cost = Rs. 56000 CFA = Rs. 16,800/HP 4. Solarization of existing agricultural pumps: (i) Upto 10 KW: Banchmark cost = Rs 54/Wp CFA = 16.2/Wp (ii) Above 10 Kw: Banchmark Cost = Rs 48/Wp CFA = 14.4/Wp

<table>
<tr><th>Scheme</th><th>Central Financial Assistance/Subsidy</th></tr>
<tr><td>PM - KUSUM</td><td>Component A: Setting up of 10,000 MW of Decentralized Ground/Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants
MNRE will provide Procurement Based Incentive (PBI) to the DISCOMs @ 40 paise/kWh or Rs.6.60 lakhs/MW/year, whichever is lower, for buying solar/ other renewable power under this scheme. The PBI will be given to the DISCOMs for a period of five years from the Commercial Operation Date of the plant. Therefore, the total PBI that shall be payable to DISCOMs will be Rs. 33 Lakh per MW.
Component B: Installation of 17.50 Lakh Stand-alone Solar Pumps
CFA of 30% of the benchmark cost or the tender cost, whichever is lower, of the stand-alone solar Agriculture pump will be provided.
However, in North Eastern States, Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttarakhand, Lakshadweep and A&N Islands, CFA of 50% of the benchmark cost or the tender cost, whichever is lower, of the stand-alone solar pump will be provided.
Component C: Solarisation of 10 Lakh Grid Connected Agriculture Pumps
CFA of 30% of the benchmark cost or the tender cost, whichever is lower, of the solar PV component will be provided. However, in North Eastern States, Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttarakhand, Lakshadweep and A&N Islands, CFA of 50% of the benchmark cost or the tender cost, whichever is lower, of the solar PV component will be provided.</td></tr>
<tr><td>Concentrated Solar Thermal (CST)</td><td>Subsidy rate:
@ 20% of the bench mark cost or actual cost whichever is less to all beneficiaries in all states
@ 40% of the bench mark cost or actual cost whichever is less to Non-profit making bodies and institutions in special category states, viz., NE states, Sikkim, J&K, Himachal Pradesh, Uttarakhand and islands.
The benchmark cost of the different CST technologies is given in table below:
<table>
<tr><th>Type of Solar Collector</th><th>Benchmark Cost of Collector Area(Rs/m^2)</th></tr>
<tr><td>Concentrator with manual tracking (dish solar cookers)</td><td>7000</td></tr>
<tr><td>Solar collector systems for direct heating and drying and non-imagine/ Compound Parabolic Concentrators (NIC/CPC)</td><td>12000</td></tr>
<tr><td>CSTs with single axis tracking (including Scheffler dish)</td><td>15000</td></tr>
<tr><td>CSTs with single axis tracking, solar grade mirror, reflector and evacuated tube collectors</td><td>18000</td></tr>
<tr><td>CST based on double axis tracking</td><td>20000</td></tr>
</table></td></tr>
</table>

ANNEXURE –III

Trend of Solar Tariff

Previous bid results							
SI. No		RA Year/Month	Capacity on Offer (MW)	Highest Bid (Rs./KWh)	Lowest (Rs./KWh)	Weighted Avg. Price (Rs./KWh)	Remarks
1	NSM Batch 1	Dec'10	150	12.76	10.95	12.16	
2	NSM Batch2	Dec'11	350	9.39	7.49	8.79	
3	Orissa Phase 1	Mar'12	25	8.98	7.0	8.36	
4	Orissa Phase 2	Dec'12	25	9.50	7.28	8.73	
5	Karnataka	Apr'12	60	8.5	7.94	8.34	
6	Madhya Pradesh	Jun'12	125	12.45	7.9	8.05	
7	Tamil Nadu	Mar'13	150	14.5	5.97	6.48*	
8	Rajasthan	Mar'13	75	8.25	6.45	6.45 (L1)	
9	Andhra Pradesh	Apr'13	226	15.99	6.49	6.49 (L1)	
10	Punjab Phase 1	June'13	270	8.75	7.2	8.41	
11	Uttar Pradesh Phase 1	Aug'13	130	9.33	8.01	8.9	
12	Karnataka Phase 2	Aug'13	130	8.05	5.5	6.87	
13	Madhya Pradesh Phase 2	Jan'14	100	6.97	6.47	6.86	
14	Andhra Pradesh Phase 2	Oct'14	500	5.99** (7.03 Level.)	5.25** (6.17 Level.)	5.75** (6.75 Level.)	
15	Karnataka	Nov'14	500	7.12	6.71	6.94	
16	Telangana	Nov'14	500	6.9	6.46	6.72	
17	Punjab (Capacity 5-24 MW)	Feb'15	100	7.45	6.88	7.17	
18	Punjab (Capacity 25-100 MW)	Feb'15	100	7.56	6.88	7.16	
19	NTPC Anantapur(CPSU scheme)	May'15	250	-	-	6.16*** (L1)	
20	Uttar Pradesh Phase 2	June'15	215	8.6	7.02	8.04	
21	Madhya Pradesh	June'15	300	5.641	5.051	5.36	
22	Telangana Group 1****	August'15	500	5.8727	5.4991	5.73	
23	Telangana Group 2****	August'15	1500	5.8877	5.1729	5.62	
24	Punjab	Sept'15	500	5.98	5.09	5.65	
25	Uttarakhand	Oct' 2015	170	5.99	5.57	5.766	
26	AP-500 MW Bundling scheme	Nov'2015	500	4.63	4.63	4.63	
27	AP-350 MW Bundling scheme	Dec'2015	350	4.63	4.63	4.63	
28	AP-150 MW Bundling scheme(DCR)	Dec'2015	150	5.13	5.12	5.123	
29	Haryana(State scheme)	Dec'2015	150	5.00	5.00	5.00	PPA on hold due to tariff issues

30	Rajasthan-420 MW Bundling	Jan'2016	420	4.36	4.34	4.351	
31	UP-100 MW Bundling	Jan'2016	100	4.78	4.78	4.78	
32	Rajasthan-100 MW Bundling(DCR)	March'16	100	5.07	5.06	5.068	
33	Telangan-50 MW Bundling(DCR)	March'16	50	5.19	5.19	5.19	
34	Jharkhand-200	March'16	102	5.59	5.20	5.464	PPA on hold due to tariff issues
35	Jharkhand-1000	March'16	999	5.48	5.08	5.356	
36	Telangan-350 MW Bundling	May'16	350	4.67	4.66	4.667	
37	Karnataka-500 MW Bundling	May'16	500	4.80	4.78	4.79	
38	KA-100 MW bundling(DCR)	Sept-16	100	4.86	4.84	4.85	
39	MP-750 MW(State scheme)	Feb-17	750	2.979	2.970	2.9743# (3.30 Level tariff)	
40	AP-250 MW(Bundling)	April-17	250	3.15	3.15	3.15	
41	Rajahthan-250 MW(VGF) Bhadla-IV Solar Park	May-17	250	2.63	2.62	2.624	
42	Rajahthan-500 MW(VGF) Bhadla-III Solar Park	May-17	500	2.45	2.44	2.446	Lowest tariff arrived in this bidding
43	Tamil Nadu-1500 MW(State scheme)	July-17	1500	3.97	3.47	3.47##	
44	Gujarat-500 MW	Aug-17	500	2.67	2.65	2.665	
45	NTPC-250 MW(DCR)	Oct-17	250	3.14	3.14	3.14	Tenders cancelled due to WTO issue
46	Rajahthan-250 MW(VGF) Bhadla-IV Solar Park	Dec-17	250	2.49	2.48		
47	Rajahthan-500 MW(VGF) Bhadla-III Solar Park	Dec-17	500	2.48	2.47		
48	Gujarat-500 MW	March-18	500	3.06	2.98		Tender cancelled
48	Karnataka(State Scheme) Solar Park	March-18	550	2.93	2.91	2.916	
49	Maharashtra (State Scheme)	May-18	1000	2.72	2.71	2.71	
50	Assam (State Scheme)	June-2018	85	3.70	3.17	3.37	
51	UP-125(VGF) Solar park	June-2018	125	3.38	3.32	3.344	Tender cancelled
52	AP-750 MW(VGF) Kadapa Solar Park	July-2018	750	2.71	2.70	2.70	
53	UP(State Scheme)	July-2018	1000	3.55	3.48	3.53	Tender cancelled

54	SECI-Anywhere (ISTS based)	July-2018	2000	2.54	2.44	2.502	
55	SECI -Anywhere (ISTS based)	July-2018	3000	2.71	2.44	2.648	Only L1 (600 MW) was allocated
56	Karnataka(State Scheme) Solar park	July-2018	500	2.85	2.85	2.85	
57	Odisha(State Scheme)	July-2018	200	3.20	2.79	3.045	Only 75 MW was allocated
58	NTPC -Anywhere (ISTS based)	August-2018	2000	2.60	2.59	2.593	
59	Gujarat(State Scheme)	Sept-2018	500	2.45	2.44		
59	Karnataka(State Scheme)	Oct-2018	150	2.92	2.92	2.92	
60	UP(State Scheme)	Oct-2018	500	3.23	3.13	3.196	
61	UP(State Scheme)	Dec-2018	550	3.08	3.02	3.06	
62	Gujarat (State Scheme)	Feb-2019	500	2.68	2.55	2.66	
63	Maharashtra (State Scheme)	Feb-2019	1000	2.75	2.74	2.7465	
64	Gujarat (State Scheme)	Feb-2019	700	2.89	2.84	2.872	Tender cancelled
65	SECI (ISTS-III)	Feb-2019	1200	2.61	2.55	2.585	
66	Rajasthan (SECI-Non Solar Park)	March-2019	750	2.49	2.48	2.481	
67	SECI (Dondaicha Solar Park (Phase – I), Maharashtra	May-2019	250	2.91	2.87		
68	Gujarat (State Scheme) Raghanesda Solar Park Ph-IIIR	May-2019	500	2.70	2.65		
69	SECI (ISTS-IV)	June-2019	1200	2.55	2.54		
70	UP(State Scheme)	June-2019	500	3.05	3.02		Only 72 MW awarded
71	SECI(Rajasthan) (Tranche-II)	June-2019	750	2.50	2.50	2.50	Only 680 MW awarded
	*5% escalation for 10 years ** 3% escalation for 10 years. Separate L1 for 9 districts *** EPC Bids with Domestic content requirement. Capital subsidy of Rs. 1 Cr/MW ****Results for the lowest bid for 500 and 1500 MW respectively. # escalation of 5 paisa from 2 nd year to 15th year ## All the bidders showed willing to sign the PPA at Rs.3.47/unit(lowest tariff)						

ANNEXURE - IV

STANDING COMMITTEE ON ENERGY

MINUTES OF THIRD SITTING OF THE STANDING COMMITTEE ON ENERGY (2019-20) HELD ON 25th OCTOBER, 2019, IN COMMITTEE ROOM 'D', PARLIAMENT HOUSE ANNEXE, NEW DELHI

The Committee met from 1400 hrs to 1600 hrs

LOK SABHA

Shri Rajiv Ranjan Singh alias Lalan Singh - Chairperson

2. Shri Gurjeet Singh Aujla
3. Shri Chandra Shekhar Bellana
4. Shri Thomas Chazhikadan
5. Dr. A. Chellakumar
6. Shri Sanjay Haribhau Jadhav
7. Shri Kishan Kapoor
8. Km. Shobha Karandlaje
9. Shri Ramesh Chander Kaushik
10. Smt. Anupriya Patel
11. Shri N. Uttam Kumar Reddy
12. Shri Naba Kumar Sarania
13. Shri Shivkumar Chanabasappa Udasi

RAJYA SABHA

14. Shri T.K.S. Elangovan
15. Shri B.K. Hariprasad
16. Shri Javed Ali Khan
17. Shri C.P. Thakur
18. Smt Viplove Thakur

SECRETARIAT

1. Shri R.C. Tiwari - Joint Secretary
2. Shri N.K. Pandey - Director
3. Smt. L. Nemjalhing Haokip - Deputy Secretary

WITNESSES

MINISTRY OF NEW AND RENEWABLE ENERGY

1.	Shri Anand Kumar	Secretary
2.	Shri Praveen Kumar	Spl. Secretary & CMD, IREDA
3.	Shri Praveen Garg	Additional Secretary & FA
4.	Shri Amitesh Kumar Sinha	Joint Secretary
5.	Shri Bhanu Pratap Yadav	Joint Secretary
6.	Shri Dinesh Dayanand Jagdale	Joint Secretary
7.	Ms. Sutapa Majumdar	Economic Advisor
8.	Shri Dilip Nigam	Scientist - G
9.	Dr. P.C. Maithani	Scientist - G
10.	Shri G.L. Meena	Scientist - G
11.	Shri Jatindra Nath Swain	MD, SECI
12.	Dr. A.K. Tripathi	DG, NISE
13.	Dr. K. Balaraman	DG, NIWE
14.	Shri A.S. Sandhu	Chief Controller of Accounts

2. At the outset, the Hon'ble Chairperson welcomed the Members of the Committee and the representatives of the Ministry of New and Renewable Energy to the sitting and informed that the sitting had been called to discuss the Demands for Grants of the Ministry for the year 2019-20. The Chairperson also apprised them about the provisions of Directions 55(1) and 58 of the Directions by the Speaker.

3. During the discussion, a power-point presentation was made on the subject "Examination of Demands for Grants of the Ministry of New and Renewable Energy for the year 2019-20" which, *inter-alia,* covered Renewable Energy Capacity Addition in the last decade, Position of India in the World in Renewable Sector, Share of RE Capacity in Total Installed Capacity, Comparative Expansion of Conventional *v/s* Renewal, Generation from various Renewable Energy Sources during the last five years, Financial Progress of the Ministry during the last three years & current year, Head Wise Allocation for

the Schemes of the Ministry for 2019-20, Financial and Physical Targets for 2019-20, Mission 175 GW by 2022, Sector wise Achievement against Target as on 30.09.2019, RPO Requirement and Compliance, Annual Addition to Solar Power Installed Capacity, State-wise Solar Power Potential & Installed Capacity, Year-wise lowest Solar Tariff, Mission 100 GW Solar by 2022, Solar Park Scheme, Viability Gap Funding Scheme, Solar PV Manufacturing, Effect of GST on Solar Sector, Solar Rooftop Phase - II, PM - KUSUM, Solar Off-Grid Distributed and Decentralized Renewal Power, Atal Jyoti Yojana (AJAY), Solar Study Lamps Scheme, Annual Addition to Wind Power Installed Capacity, State-wise Wind Power Installed Capacity, Wind Power Potential, Manufacturing of Wind Turbines, Status of Wind Bids, Off - Shore Wind, Wind - Solar Hybrid Projects, Present Status of Small Hydro, Challenges in Small Hydro Programme, Major Activities proposed to be undertaken during 2019-20 in SHP, Biomass Power, Waste to Energy, New National Biogas and Organic Manure Programme, Green Energy Corridor, PSUs/Institutions of MNRE, etc.

4. The Secretary, Ministry of New and Renewable Energy, deposed before the Committee that:

- The Ministry has a target to install a capacity of 175 GW through Renewable Sources by the year 2022. Out of 175 GW, the Ministry have already established 82,580 MW, another 31000 MW is under implementation and another 39000 MW is under bidding. The total capacity which is installed, under implementation and under bidding come out to be 152.85 GW. The Ministry is optimistic not only of achieving the target of 175 GW by 2022, but of exceeding the said target.
- In Solar Sector, against the target of 100 GW, 31 GW have been installed. Another 19 GW are under implementation and 35 GW have been tendered. However, against the target of 40,000 MW from Solar Roof-top, the Ministry estimated that only 4000 MW have been installed till date. The Secretary informed that the main reason of slow progress in Solar Roof-top is unwillingness of

DISCOMs to cooperate in effective implementation of Solar Roof-top as well as Net-Metering.

- Around 85 per cent of solar equipments, solar cells and modules, have been imported from China and other countries like Vietnam and Malaysia etc. Quality of these equipments is a major concern. The Ministry have set up standards for the solar cells and modules, and these are being enforced through the BIS standards. The Ministry has been encouraging the domestic manufacturing of solar cells and modules.
- There is no NPA in Solar and Wind Sector, but Hydro and Biomass Sector have NPAs. If the financial situation does not get improved, there is apprehension that many of the Solar and Wind Projects may also turn into NPAs.
- In Small Hydro, the Ministry have achieved 4.60 GW against the total target of 5 GW. A new scheme for this Sector has been devised by the Ministry and sent for approval of the Cabinet.

5. The Committee, *inter-alia,* deliberated upon following points with representatives of the Ministry of New and Renewable Energy:

(i) Need to spread awareness about subsidies offered by the Government is Solar Roof-top Sector and streamline the procedure of Subsidy disbursement.

(ii) Need to ensure proper implementation of RECs/RPOs;

(iii) Need to encourage Ocean Thermal Energy;

(iv) Need to encourage academic institutions, Airports etc. to put up Solar Panels on their roof-tops

(v) Need to ensure active participation of DISCOMs in Solar Roof-top Sector and Net -Metering;

(vi) Need to ensure durability and quality of Solar Lights/Solar Pumps/Solar Heaters;

(vii) Need for Research to increase the efficiency of Solar Cells and battery storage;

(viii) Achievements *vis-à-vis* targets under various programmes during 2018-19;

(ix) Financial requirement and allocation for 2019-20 *vis-à-vis* physical targets;

(x) Various issues relating to Solar, Wind, Small Hydro, Biomass sector;
(xi) Performance of PSUs/Institutions under the Ministry.

6. The Members also sought clarifications on various other issues relating to the subject and the representatives of the Ministry responded to the same. The Committee directed the representatives of Ministry of New and Renewable Energy to furnish written replies to those queries which could not be readily responded to by them.

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ANNEXURE - V

STANDING COMMITTEE ON ENERGY

MINUTES OF SEVENTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2019-20) HELD ON 3RD DECEMBER, 2019 IN COMMITTEE ROOM 'B', PARLIAMENT HOUSE ANNEXE , NEW DELHI

The Committee met from 1730 hrs. to 1745 hrs.

LOK SABHA

Shri Rajiv Ranjan Singh *alias* Lalan Singh- Chairperson

2. Smt. Sajda Ahmed
3. Shri Gurjeet Singh Aujla
4. Shri Chandra Shekhar Bellana
5. Shri Thomas Chazhikadan
6. Dr. A. Chellakumar
7. Shri Harish Dwivedi
8. Shri S. Gnanathiraviam
9. Shri Ramesh Chander Kaushik
10. Shri Ashok Mahadeorao Nete
11. Shri Parbatbhai Savabhai Patel
12. Smt. Anupriya Patel
13. Shri N. Uttam Kumar Reddy
14. Shri Naba Kumar Sarania

RAJYA SABHA

15. Shri T.K.S. Elangovan
16. Shri Javed Ali Khan

SECRETARIAT

1. Shri R.C. Tiwari - Joint Secretary
2. Shri N.K. Pandey - Director
3. Smt. L. Nemjalhing Haokip - Deputy Secretary

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

a) First Draft Report on Demands for Grants of the Ministry of New and Renewable Energy for the year 2019-20.

b) Second Draft Report on Demands for Grants of the Ministry of Power for the year 2019-20.

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

The Committee then adjourned.