



# ANNUAL REPORT 2020-21



**Ministry of New and Renewable Energy**  
Government of India



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*Solar Pump installed in Rajasthan*



CHAPTER

1

OVERVIEW

1



## OVERVIEW

### 1.1 TARGETS, COMMITMENTS AND INDIA'S ACHIEVEMENTS

India's Nationally Determined Contributions (NDC) under the Paris Agreement for the Period 2021-2030 include:

To reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level; and

To achieve about 40 percent cumulative electric power installed capacity from Non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance.

India is well on its way to achieve these targets.

India has achieved a cumulative installed renewable energy capacity (excluding large hydro) of **92.54 GW** out of which **5.47 GW** was added in the period April 2020 till January, 2021. During the period from April 2014 to January 2021, the installed RE capacity of India has increased by two-and-half times, and in the same period, the installed solar energy capacity has increased 15 times. Globally, today India stands 4<sup>th</sup> in RE power capacity, 4<sup>th</sup> in Wind power, and 5<sup>th</sup> in Solar Power capacity.

India has one of the highest rates of growth for renewable energy in the world. As per Global Trends in Renewable Energy Investment 2020 report, during the period 2014-2019, renewable energy programmes and projects in India attracted an investment of US\$ 64.2 billion (Rs 4.7 lakh crore).

**Table 1.1: India's RE Sector at a Glance**

Year	Installed RE Capacity (in GW)	% Share of RE in total Installed Capacity	Generation from Renewable Sources (in BU)	Total Generation from all sources (in BU)	% Share of RE in Generation
2014-15	39.55	14.36	61.78	1110.18	5.56
2015-16	46.58	15.23	65.78	1172.98	5.60
2016-17	57.90	17.68	81.54	1241.38	6.56
2017-18	69.77	20.24	101.83	1303.37	7.81
2018-19	78.31	21.95	126.76	1375.96	9.21
2019-20	87.07	23.52	138.32	1390.93	9.95
2020-21	<b>92.54</b>	<b>24.53</b>	111.92	1017.81	<b>11.00</b>
	(Up to Jan, 2021)	(Up to Jan, 2021)	(Up to Dec, 2020)	(Up to Dec, 2020)	(Up to Dec, 2020)



The last six years, since April, 2014 have also witnessed a steep decline in Solar tariffs from Rs. 6.47/ Kwh in 2013-14 to Rs. 1.99/Kwh in December, 2020, similar decrease was noticed in wind power when procurement model changed from Feed in Tariffs to bidding in 2017.

Decreasing Trend of Tariff



## 1.2 MAJOR ONGOING SCHEMES

### 1.2.1 Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PM KUSUM)

PM-KUSUM scheme is one of the largest initiatives in the world to provide clean energy to more than 3.5 million farmers by solarising their agriculture pumps. PM-KUSUM scheme aims to install grid connected ground mounted solar power plants (up to 2 MW) aggregating to a total capacity of 10 GW under Component A; install 20 Lakh standalone solar pumps under Component B; and solarize 15 Lakh grid connected agricultural pumps under Component C. All components combined would support installation of additional solar capacity of 30.80 GW.

### 1.2.2 Roof Top Solar (RTS) Programme

Rooftop Phase-I of this programme was launched on 30<sup>th</sup> December, 2015 in which incentives and subsidies were provided for residential, institutional and social sectors. For Government sector, achievement linked incentives were also provided. Rooftop Phase-II was launched in February 2019 with a target of achieving cumulative capacity of 40,000 MW by the year 2022. Under rooftop solar scheme, Central Financial Assistance (CFA) of 40% for RTS systems up to 3 kW capacity and 20% for

capacity beyond 3 kW and up to 10 kW is provided. For Group Housing Societies (GHS) and Residents Welfare Associations (RWA), CFA is limited to 20% for RTS plants for supply of power to common facilities. So far over 3.7 GW capacity of RTS capacity has been estimated to have been installed in the country and over 2.6 GW capacity is under installation in the residential segment.



*Fig. 1.1: Roof Top Solar Power Plants increase the efficient utilisation of Power*

### 1.2.3 Solar Parks

The Ministry introduced the Solar Parks programme with the objective of facilitating solar project developers to set up projects in a plug-and-play model. The scheme for development of solar parks has a target capacity of 40 GW. All States and Union Territories are eligible for getting benefit under the scheme. Solar parks are being developed by agencies of Central/State Governments, Joint Ventures between agencies of Central and State Governments and also by private entrepreneurs.



*Fig. 1.2: Aerial view of Pavagada Solar Park*





#### 1.2.4 Green Energy Corridors

To facilitate evacuation of electricity from RE projects, Green Energy Corridor scheme was launched in 2015 for setting up of transmission and evacuation infrastructure. The Inter-State Transmission System (ISTS) component consisting of 3200 ckm transmission lines and 17,000 MVA substations has been completed in March 2020. The Intra-State Transmission System (InSTS) component has been sanctioned to eight RE rich states of Tamil Nadu, Rajasthan, Karnataka, Andhra Pradesh, Maharashtra, Gujarat, Himachal Pradesh and Madhya Pradesh for evacuation of over 20,000 MW of renewable power. The InSTS component is under implementation and is anticipated to be completed by year 2021. Out of the target of approx. 9700 ckm transmission lines and approx. 22,600 MVA capacity substations under the InSTS component, approx. 7362 ckm lines have been constructed and 9656 MVA substations have been charged.

#### 1.2.5 Greening of Islands

The Government intends to fully convert Andaman and Nicobar, Lakshadweep islands to Green Energy where energy needs will be met using RE sources. The Greening of Islands programme aims to deploy 52 MW of distributed grid-connected solar PV power projects by March 2021.

The Ministry provides 40% capital subsidy for projects under the scheme. Projects of 20 MW SPV with 16 MW/8MWH BESS in Port Blair, South Andaman; and a project of 1.95 MW with 2.15 MWH BESS in 4 Islands of Lakshadweep, are expected to be commissioned by January 2022.

### 1.3 SPECIAL MEASURES TO PROMOTE GROWTH OF RENEWABLE ENERGY

#### 1.3.1 Ensuring Round-the-Clock-Power (RTC) from the RE Power Projects

In order to overcome the issues of intermittency and low capacity utilization of transmission infrastructure, the mechanism of 'bundling' has been brought out by the Ministry. To ensure uninterrupted firm power round-the-clock, RE is bundled with power from other sources or combined storage. Such bundled power is supplied to the distribution company (DISCOM) thereby obviating the need for DISCOMs to balance power.

#### 1.3.2 Renewable Energy Hybrid Projects

Solar and Wind power being variable in nature pose challenges to provide a stable supply. However, in India solar and wind resources are complementary to each other as wind is stronger during evening and night, when there is limited input from solar power. Hybridization of these two technologies reduces the variability and optimizes the utilization of land and transmission systems. Capacities of 1,440 MW of wind-solar hybrid projects are under implementation in the states of Rajasthan and Tamil Nadu.

#### 1.3.3 Solar Cities

At least one city, (either the state capital city or a well-known tourist destination) in each of the states of India is being developed as a solar city. All electricity needs of the city will be fully met from RE sources, primarily from solar energy. All houses in the solar city will have roof-top solar energy plants. Every Solar city will also have solar street lights and waste to energy plants among others. The balance of energy needs will be met by ground mounted Solar Plants.



### 1.3.4 Renewable Purchase Obligations (RPO)

Uniform Renewable Purchase Obligations (RPO) have been introduced wherein all electricity distribution licensees have to purchase or produce a specified minimum quantity of their total requirements from Renewable Energy Sources.

### 1.3.5 Waiver of Inter State Transmission System Charges

Inter State Transmission System charges and losses for inter-state sale of power from solar and wind power projects have been waived for all projects to be commissioned up to 30.06.2023.

## 1.4 ENHANCING DOMESTIC MANUFACTURING CAPACITY

In compliance of the Aatmanirbhar call given by the Hon'ble Prime Minister and the call "To be Vocal for Local" several steps were taken to enhance domestic manufacture of RE machinery, components and equipments. While sufficient manufacturing capacity in wind power exists in the country, the present installed capacity for manufacturing of solar cells in the country is around 2.5 GW, while the functional capacity of solar modules is around 9-10 GW, whereas the annual requirement for the next 10 years is around 30 GW, necessitating imports. In order to enhance the domestic manufacturing capacity, the Ministry has been consistently bringing out policies to support domestic PV manufacturing. Some of the initiatives are:

- » The Ministry has created a captive market of more than 36 GW over the next 2 to 3 years for domestic producers by making deployment of domestic cells and modules mandatory in schemes such as PM-KUSUM, Solar Rooftops and CPSU schemes.
- » Further the procurement of RE sector-related goods by Public Sector Enterprises has to be from domestic sources only.
- » A Performance Linked Incentive (PLI) scheme has been approved by the Government for encouraging the production of high efficiency solar modules.
- » In order to protect domestic manufacturers from cheap imports, a Safeguard Duty has been imposed on import of solar cells and modules.
- » To hand-hold and facilitate investors for setting up manufacturing plants in India, a Project Development Cell (PDC) has been set up in the Ministry.
- » In order to give a long term visibility to investors, Government has announced an advance trajectory of Basic Customs Duty (BCD) on solar cells & modules. Further, the BCD rates on solar inverters and solar lanterns/lamps have been increased.

## 1.5 EASE OF DOING BUSINESS

**1.5.1** Standard Bidding Guidelines were issued in 2017 for the Procurement of Solar & Wind Power through Competitive Bidding to ensure:

- » Transparency
- » Standardization & uniformity of procurement process



- » Providing a risk-sharing framework between various stakeholders

These measures have resulted in encouraging investments, enhancing bankability of projects, progressive lowering of tariffs and improved profitability.

- 1.5.2** In order to enhance ease of doing business and to assist the states in procurement of RE power, this mechanism of Intermediary Procurer in the form of Central Agencies like SECI/NTPC was introduced. Under this dispensation, the Intermediary Procurer buys power from private power developers and sells it to distribution companies. Intermediary procurer also facilitate, setting up of RE projects in one or more states and selling of power to different states.

This mechanism has helped in attracting foreign investors looking for opportunities for bulk investment.

- 1.5.3** To overcome the problems of delay and defaults by DISCOMS, a robust Payment Security Mechanism involving Letters of Credit and Government Guarantees has been introduced.

- 1.5.4** To redress disputes during the implementation of contractual agreements, a Dispute Resolution Mechanism has been instituted. Under this mechanism, a Dispute Resolution Committee (DRC) has been constituted with outside members.

The DRC acts in a transparent manner to deal with issues which are beyond the scope of Contractual Agreements between solar power developers/ wind power developers and SECI / NTPC/ NHPC, and thus augments ease of doing business.

- 1.5.5** In order to enhance liquidity in the RE sector, directions for reduction in performance security have been issued in line with Department of Expenditure directives.

Directions have been given to implementing agencies for acceptance of Letter of Undertaking/ Payment on Order Instrument, issued by IREDA, PFC & REC in lieu of Performance Bank Guarantee (PBG)/ Earnest Money Deposit (EMD).

## 1.6 MEASURES TAKEN BY THE MINISTRY TO ADDRESS COVID-19 PANDEMIC

To mitigate the economic and financial impact of the Covid-19 Pandemic, the Ministry took several proactive measures during 2020-21 to support the RE Sector and businesses.

These include:

- » The Ministry requested States and UTs to ensure uninterrupted essential operation of Renewable Energy Generating Stations (REGS) and permit & facilitate movement of equipment and machinery needed during the nation-wide lockdown due to COVID-19 outbreak.
- » Blanket Time-Extension of Five Months' due to Lock-down.
- » The Ministry issued clarifications that Renewable Energy (RE) Generating Stations have been granted 'Must-Run' status and this status of 'Must-Run' remains unchanged during the period of lockdown and also directed DISCOMS for the payments to RE generators be done on regular basis as was being done prior to lockdown as per established procedures.



## 1.7 NEW AREAS

### 1.7.1 One Sun One World One Grid

“We have a dream called One World, One Sun One Grid. We can generate round the clock electricity from the sun as it sets in one part of the world but rises in another part. The sun never sets for the entire earth.”

Hon'ble Prime Minister has envisioned the concept of One Sun One World One Grid (OSOWOG), a transnational electricity grid supplying solar power across the globe in order to make use of availability of sunshine in different neighbouring countries at different times.

The Ministry is engaged and participating in implementing Hon'ble Prime Minister's vision of One-Sun-One-World-One-Grid. The concept is to interconnect generators and loads across continents with an international power transmission grid. A tripartite Memorandum of Understanding (MoU) between the International Solar Alliance (ISA), the Government of India, and the World Bank was signed on September 8<sup>th</sup>, 2020 to implement the OSOWOG initiative. Currently, a long-term vision, implementation plan, road map and institutional framework is being developed by the ISA, which will implement this project. A consultant has been selected to undertake a study for evaluating the feasibility and implementation of the global OSOWOG project.

### 1.7.2 Hydrogen Energy Mission

Hydrogen as an energy carrier has a vital role in diversification of renewable energy across key economic sectors, by increasing the share of renewable energy in the electricity mix, enabling clean transportation and decarbonising industries like fertilisers, chemicals, petrochemicals, iron and steel. To identify the prospects, the Hon'ble Prime Minister had announced India's Plans on 26<sup>th</sup> November, 2020 to launch a comprehensive National Hydrogen Energy Mission. The Mission is to enable cost competitive green hydrogen production, storage, distribution and application technologies; developing globally competitive manufacturing expertise; and putting in place regulations, codes, safety, performance and quality standards in consonance with technology and market development stages. The Mission also envisages support for development and deployment of hydrogen energy in niche areas with an aim to commercialise the technologies in mid to long term. The draft Mission document is under final stages of its preparation and will be released for stake holder consultation.

### 1.7.3 Offshore Wind

Offshore wind in India has a potential of approximately 70 GW mainly off Tamil Nadu and Gujarat coasts. Eight zones each off the coasts of Gujarat and Tamil Nadu have been identified as potential offshore zones. Measurement of wind resources through LiDAR at Gulf of Khambat off Gujarat coasts, survey of subsea surface and soil profile, Geo-physical survey of 365 sq kms of area (required for a 1.0 GW project) and geo technical studies at five locations have been carried out off Gujarat Coast. Similar studies and surveys are planned for areas off the coast of Tamil Nadu for which Government of Tamil Nadu has already allocated land to NIWE. The Ministry has constituted a Committee to finalise a suitable strategy for offshore wind energy programme for the country.



#### 1.7.4 Solar Power Development for a Carbon Neutral Ladakh

Ladakh has the highest solar insolation in India and therefore has a vast RE potential. However, evacuation of RE power available at such high altitude Himalayan regions is challenging. An RE Park of 10 GW is planned in order to exploit Ladakh's vast RE potential and optimize the cost of evacuation. Solar Energy Corporation of India (SECI) is also planning to setup a 50 MW plant which will provide 20 MW (AC) and use balance energy for battery storage of 50 MWh at Phyang Leh. In addition, 1 MW Solar-Wind Hybrid plant at Nyoma will also be developed. Power Grid Corporation of India Ltd. (PGCIL) is developing a Detailed Project Report (DPR) for transmission infrastructure required to evacuate the 10 GW RE capacity that is planned to be set up in Ladakh.

A Geothermal Power Project to conduct exploratory drilling and to set up of 1 MWe power project from geothermal energy has been proposed by ONGC Energy Centre (OEC) in Puga Valley in the Union Territory of Ladakh. Depending upon experience generated from this pilot project, prospects for setting up larger capacity geothermal plants will be explored.

### 1.8 WASTE TO ENERGY INITIATIVES

A Waste to Energy Programme for recovery of Energy from Urban, Industrial and Agricultural Wastes/Residues (WTE Programme) in the form of Biogas/BioCNG/Power is under implementation.

The WTE programme through grant of Central Financial Assistance supports the Sustainable Alternative Towards Affordable Transportation (SATAT) initiative of Ministry of Petroleum and Natural Gas wherein it is envisaged to set up 5000 CBG plants by 2023-24 with production target of 15 MMT of BioCNG. It will facilitate the creation of new employment opportunities and enhance farmers income thereby help realising the vision of "Annadaata se Urjadaata" and invigorate the rural economy.

The WTE programme is also aligned with the Swachh Bharat Mission by way of promoting Municipal Solid Waste (MSW) to power projects.

Under the Waste to Energy programme as on 31<sup>st</sup> Jan 2021, a total of five projects with a cumulative capacity of 74.7 MW power from Municipal Solid Waste (MSW) have been given in-principle approval by the Ministry for grant of Central Financial Assistance (CFA). These five projects are estimated to utilize around 6000 Tons/day of MSW towards generation of Electricity.

### 1.9 HUMAN RESOURCES FOR RENEWABLE ENERGY

India's ambitious targets necessitate development of Human Resources in adequate numbers to both install and maintain RE capacities. In the last six years, the Ministry has taken a number of initiatives for this purpose.

#### 1.9.1 Short Term Training and Skill Development Programmes

Under this component, short term training is imparted. This includes training for maintaining solar installations (the trained technicians are called Suryamitra), and solar water pumps (the trained technicians are called Varunmitra).



### **1.9.2 National Renewable Energy Fellowship (NREF) Schemes**

Scholarships/fellowships are provided to students for pursuing higher studies in renewable energy in prestigious academic/R&D institutions. This is intended to meet the demand of highly qualified manpower in the area of Renewable Energy.

### **1.9.3 Support to RE Infrastructure in Educational & Research Institutions**

About 15 no. of R&D/research/engineering/academic institutions have been financially supported to initiate higher studies/research courses in Renewable Energy by strengthening the RE based infrastructure facilities such as laboratory and library facilities.

### **1.9.4 National Renewable Energy Internship Scheme**

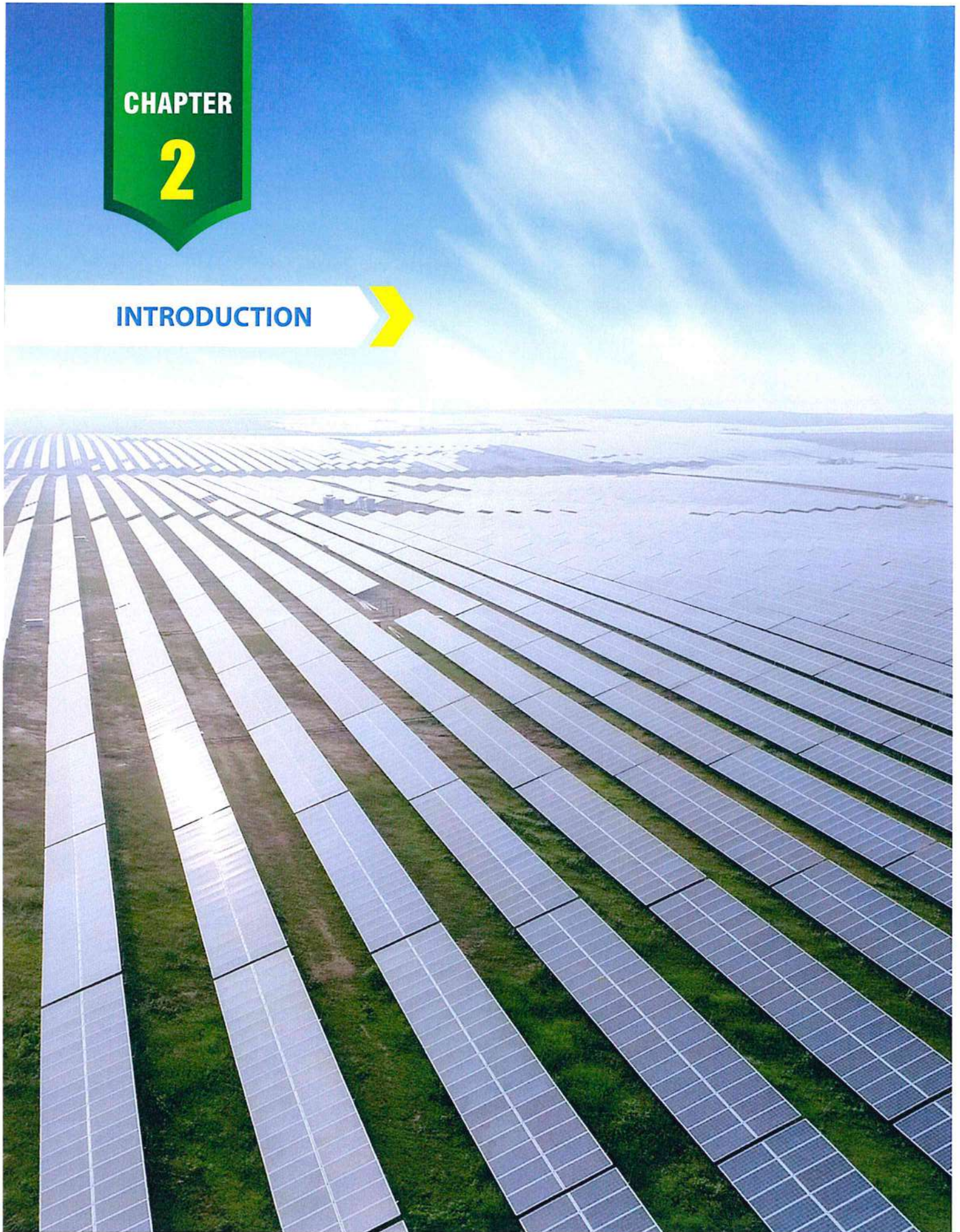
The Ministry provides internship opportunities to students pursuing higher education and professionals working in the Renewable Energy sector. During the current year, 13 no. of internships were provided to M.Tech, B.Tech, M.Sc and M.B.A students under this scheme.



**CHAPTER**

**2**

**INTRODUCTION**



## INTRODUCTION

**2.1** In 1982, a separate Department of Non-Conventional Energy Sources (DNES) was created in the Ministry of Energy to look after all the aspects relating to New and Renewable Energy. The Department was upgraded into a separate Ministry of Non-Conventional Energy Sources (MNES) in 1992 and was re-named as Ministry of New and Renewable Energy (MNRE), in October 2006.

### 2.2 ALLOCATION OF BUSINESS RULES

As per distribution of subjects among the Ministries and Departments under Allocation of Business Rules, following subjects have been Allocated to the Ministry of New and Renewable Energy (*Naveen aur Navikarniya Oorja Mantralaya*).

- » Research and Development (R&D) of Bio-gas and programmes relating to Bio-gas units.
- » Commission for Additional Sources of Energy (CASE).
- » Solar Energy - including Photovoltaic (PV) 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 Ltd. (IREDA).
- » Research and Development of other Non-conventional/Renewable sources of energy and programmes relating thereto.
- » Tidal Energy.
- » Integrated Rural Energy Programme (IREP).
- » Geothermal Energy.

### 2.3 STRUCTURE OF THE MINISTRY

Shri Indu Shekhar Chaturvedi is the Secretary in Ministry of New and Renewable Energy with effect from 11<sup>th</sup> May, 2020. The Ministry has one Additional Secretary, one Financial Adviser, three Joint Secretaries, two Economic Advisers and one Deputy Director General. Various programmes are being implemented by the Ministry through State Nodal Agencies (SNAs) and channel partners.

### 2.4 INSTITUTIONS UNDER THE MINISTRY

To support the Ministry, there are five institutions consisting of three autonomous bodies i.e., National Institute of Solar Energy (NISE), National Institute of Wind Energy (NIWE), and National Institute of Bio Energy (NIBE), and two public sector undertakings i.e., Indian Renewable Energy Development Agency (IREDA) and Solar Energy Corporation of India (SECI).





- » NISE is located at Gurugram, Haryana and serves as the technical focal point for R&D in Solar energy sector.
- » National Institute of Wind Energy (NIWE), is located at Chennai, Tamil Nadu and serves as the technical focal point for Research & Development in Wind energy sector.
- » NIBE is located at Kapurthala, Punjab and is focusing on R&D in Bio energy sector.
- » IREDA, a Non-Banking Financial Institution under the administrative control of this Ministry, provides term-loans for renewable energy and energy efficiency projects.
- » SECI functions as the implementing and executing arm of the Ministry for implementation of the National Solar Mission and Wind energy projects.

In addition, the Department of Hydro and Renewable Energy (DHRE) formerly known as the Alternate Hydro Energy Centre (AHEC), Indian Institute of Technology, Roorkee provides technical support for small hydro power development. However, DHRE is not an institution under the control of the Ministry.

## 2.5 PUBLIC GRIEVANCES REDRESSAL

Grievances are received in the Ministry through President's Secretariat, Prime Minister's Office, Department of Administrative Reforms and Public Grievances (DARPG), other Ministries and Departments and from the individuals concerned with MNRE's portal Centralized Public Grievance Redress And Monitoring System (CPGRAMS) and portal of Department of Administrative Reforms and Public Grievances (DARPG), Ministry of Personnel, Public Grievances and Pensions.

With a view to deliver expeditious redressal of grievances in a responsible and effective manner, the following measures have been put in place in the MNRE.

- » Sh. K Salil Kumar, Deputy Secretary has been designated as Liaison Officer for Schedule Castes (SC), Scheduled Tribes (ST), Other Backward Classes (OBC) for implementation of scheme of reservation for persons of SC, ST and OBC categories.
- » A committee has been constituted to enquire into the complaints of sexual harassment from any of the women working in this Ministry.
- » Grievances, petitions and complaints received are forwarded by Public Grievance Cell, MNRE to the Division Head concerned for redressal, to take necessary action and final disposal, with the request to send a final reply to the petitioner, as per time schedule provided.
- » These petitions are monitored on regular basis to keep track of their disposal by reminders etc. The position regarding final disposal of petitions is also intimated to the authority from which the grievance was received, by post or through CPGRAMS and the individuals concerned.
- » Time Frame for Redressal of the Grievance/petition:



Sl. No.	Subject	Time Frame
1	Issue of acknowledgement to the petitioner	03 days
2	Forwarding of the grievances or petition to the concerned authority	07 days
3	Issue of interim reply to the petitioner or to send communication seeking additional information from petitioner	15 days
4	Final disposal of petition or grievance and time limit for informing the position of the outcome	60 days

## 2.6 CITIZENS'/CLIENTS' CHARTER OF MNRE

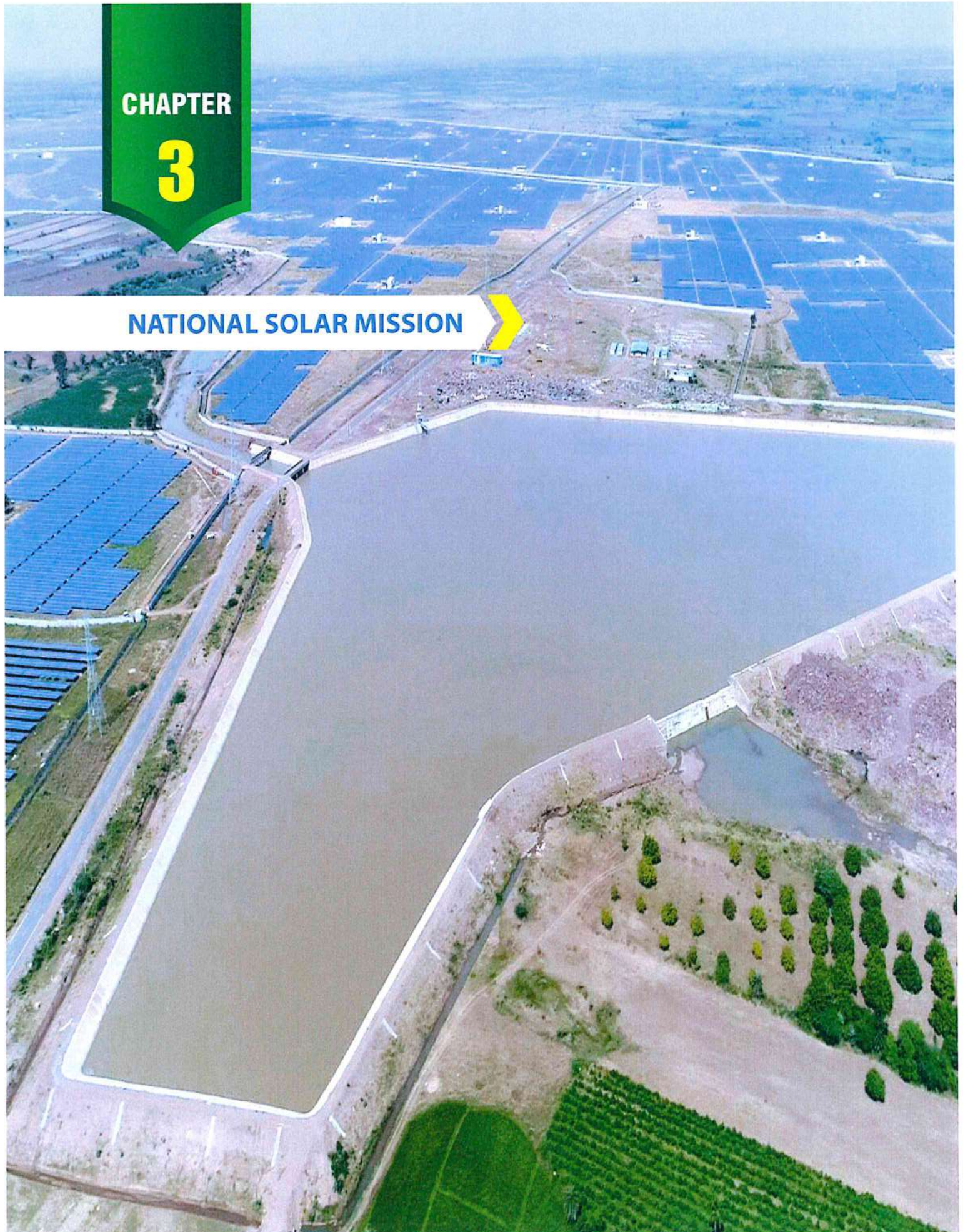
In order to ensure timely delivery of services to its Citizens'/Clients' and redressal of their grievances in a time-bound manner, the Ministry has made available on its website a Citizens'/Clients' Charter (CCC), incorporating its Mission, main Services and Transactions and commitment to its clients and the people of India in general. It aims at providing a mechanism for redressal of Citizens'/Clients' grievances. It also aims at addressing problems of interface between the Ministry and its Clients' and Citizens'. The Ministry has endeavoured to continuously improving the quality of public services for the people at large to make them responsive to their needs and wishes.



CHAPTER

3

NATIONAL SOLAR MISSION



## NATIONAL SOLAR MISSION

### 3.1 INTRODUCTION

The National Solar Mission (NSM), launched on 11<sup>th</sup> January, 2010, had set a target for development and deployment of 20 GW Solar Power by the year 2022. The Cabinet in its meeting held on 17.6.2015 had approved revision of the target from 20 GW to 100 GW.

### 3.2 1000 MW CAPACITY GRID-CONNECTED SOLAR POWER PROJECTS IMPLEMENTED THROUGH NTPC VIDYUT VYAPAR NIGAM LIMITED (NVVN) UNDER NATIONAL SOLAR MISSION (NSM) PHASE-I

This scheme covered large solar power plants of total 1,000 MW capacity connected to grid at 33 kV and above - 500 MW capacity each based on Solar Thermal (ST) and Solar Photovoltaic (SPV) technologies. It included three stages: (i) Migration Scheme (ii) NSM Phase-I, Batch-I and (iii) NSM Phase-I, Batch-II.

### 3.3 MIGRATION SCHEME

With a view to facilitate quick start-up to NSM and also speedier implementation of the then on-going projects under advanced stage of implementation in different States, this scheme was introduced in Feb 2010 to allow the migration of such projects to NSM. A total of 16 projects of 84 MW capacity (54 MW SPV and 30 MW ST) were approved under this scheme for long-term procurement of power by NVVN at Central Electricity Regulatory Commission (CERC) notified tariff for 2010-11 viz. Rs.17.91/unit for SPV and Rs.15.31/unit for ST. Eleven SPV projects of 48 MW capacity were commissioned under this scheme.

### 3.4 NSM PHASE-I, BATCH-I & BATCH-II

- (i) Under NSM Batch-I and Batch-II of NSM, solar power projects were allotted through a process of reverse bidding. Bids for same were invited in two batches: Batch-I of 150 MW SPV and 470 MW ST in Aug 2010 and Batch-II of 350 MW SPV in Aug 2011.
- (ii) In Batch-I the eligible project capacities were 5 MW for SPV and upto 100 MW for ST. 28 SPV Projects with an aggregate capacity of 140 MW and 7 ST Projects with an aggregate capacity of 470 MW were allotted. The bid tariffs for SPV projects were in the range of ₹10.95-12.76 per unit, with average of ₹12.12 per unit and for ST projects in the range of Rs.10.49-12.24 per unit, with average of ₹11.48 per unit. 28 SPV projects of aggregate 140 MW capacity and 3 ST projects of aggregate 200 MW capacity have been commissioned under NSM Phase-I, Batch-I.
- (iii) In Batch-II for SPV, the project capacity fixed was 5-20 MW. 27 SPV projects with an aggregate capacity of 340 MW were allotted at tariff ranging between ₹7.49-9.44 per unit, with average of ₹8.77 per unit. 26 SPV projects of aggregate 330 MW capacity have been commissioned under NSM Phase-I, Batch-II.
- (iv) A 5 MW SPV project by Delhi Mumbai Industrial Corridor Development Corporation Limited (DMICDC) and a 10 MW SPV project by Solar Energy Corporation of India (SECI) has also been set up under the MNRE bundling scheme of NSM Phase-I.



- (v) Thus, under NSM Phase-I, 533 MW solar PV projects and 200 MW solar thermal power projects have been commissioned under the bundling scheme.
- (vi) Power generated from the commissioned plants is being purchased by the NVVN and being sold to State Utilities and DISCOMs under a mechanism of bundling with power from unallocated quota of power from coal-based stations of NTPC on equal capacity basis to effectively reduce the average per unit cost of bundled solar power to the purchasing Utilities. A Payment Security Mechanism involving a revolving fund of Rs.486 crore has been put in place to ensure timely payments to developers in the event of delays/ defaults in payments by the purchasing State Utilities to NVVN.

### 3.5 FOCUS AREA UNDER PHASE-II OF NSM

#### 3.5.1 Grid Connected Projects

The Government has set the Mission target of 100 GW by 2022 for solar power in the country. NSM Phase-II aims for achieving significantly higher scales of targets of 100 GW. Hence, Ministry has contemplated all possible options for implementation of the Mission. Selection of capacity for Phase-II, grid connected projects are done via different schemes such as Bundling, Generation Based Incentive (GBI), Viability Gap Funding (VGF) and Solar Park Scheme.

#### 3.5.2 Achievements

As on 31.12.2020, a total solar power capacity installed is 37.46 GW. In addition, tenders of around 36.69 GW are in pipeline for which Letter of Intent (LoI) has been issued but not commissioned and for around 18.47 GW tenders have been issued but LoI are yet to be issued. Thus, it is expected to fully achieve the target of 100 GW by 2022. It is expected that the solar power projects of around 40 GW cumulative capacity will be commissioned by March, 2021.

Based upon availability of land and solar radiation, the potential Solar power in the country has been assessed to be around 750 GWp. State-wise details of estimated Solar Energy potential in the country and the cumulative installed capacity (as on 31.12.2020) are given in **Table 3.1** and **Table 3.2** respectively.

**Table 3.1: State-wise estimated Solar Energy Potential in the Country**

Sl. No.	State/UT	Solar Potential (GWp) #
1.	Andhra Pradesh	38.44
2.	Arunachal Pradesh	8.65
3.	Assam	13.76
4.	Bihar	11.20
5.	Chhattisgarh	18.27
6.	Delhi	2.05
7.	Goa	0.88
8.	Gujarat	35.77
9.	Haryana	4.56
10.	Himachal Pradesh	33.84



Sl. No.	State/UT	Solar Potential (GWp) #
11.	Jammu & Kashmir	111.05
12.	Jharkhand	18.18
13.	Karnataka	24.70
14.	Kerala	6.11
15.	Madhya Pradesh	61.66
16.	Maharashtra	64.32
17.	Manipur	10.63
18.	Meghalaya	5.86
19.	Mizoram	9.09
20.	Nagaland	7.29
21.	Odisha	25.78
22.	Punjab	2.81
23.	Rajasthan	142.31
24.	Sikkim	4.94
25.	Tamil Nadu	17.67
26.	Telangana	20.41
27.	Tripura	2.08
28.	Uttar Pradesh	22.83
29.	Uttarakhand	16.80
30.	West Bengal	6.26
31.	UTs	0.79
<b>TOTAL</b>		<b>748.98</b>

# Assessed by National Institute of Solar Energy

**Table 3.2: Commissioning Status of Grid Connected Solar Projects as on 31-12-2020**

Sl. No.	State/UT	Cumulative Capacity till 31-03-2020 (MW)	Capacity added in 2020-21 till 31-12-2020 (MW)	Cumulative Capacity till 31-12-2020 (MW)
1	Andaman & Nicobar	12.19	17.03	29.22
2	Andhra Pradesh	3610.02	234.15	3844.17
3	Arunachal Pradesh	5.61	0.00	5.61
4	Assam	41.23	1.76	42.99
5	Bihar	151.57	5.84	157.41
6	Chandigarh	40.55	4.61	45.16
7	Chhattisgarh	231.35	8.65	240.00
8	Dadar & Nagar	5.46	0.00	5.46
9	Daman & Diu	19.86	20.10	39.97
10	Delhi	165.16	11.30	176.46

Sl. No.	State/UT	Cumulative Capacity till 31-03-2020 (MW)	Capacity added in 2020-21 till 31-12 -2020 (MW)	Cumulative Capacity till 31-12-2020 (MW)
11	Goa	4.78	0.00	4.78
12	Gujarat	2948.37	970.11	3918.48
13	Haryana	252.14	10.28	262.42
14	Himachal Pradesh	32.93	9.80	42.73
15	Jammu & Kashmir	19.30	1.43	20.73
16	Jharkhand	38.40	0.66	39.06
17	Karnataka	7277.92	50.94	7328.86
18	Kerala	142.23	4.69	146.92
19	Lakshadweep	0.75	0.00	0.75
20	Madhya Pradesh	2258.45	181.69	2440.14
21	Maharashtra	1801.80	94.02	1895.82
22	Manipur	5.16	1.20	6.36
23	Meghalaya	0.12	0.00	0.12
24	Mizoram	1.52	0.01	1.53
25	Nagaland	1.00	0.00	1.00
26	Odisha	397.84	1.76	399.60
27	Pondicherry	5.51	2.03	7.54
28	Punjab	947.10	0.00	947.10
29	Rajasthan	5137.91	251.57	5389.48
30	Sikkim	0.07	0.00	0.07
31	Tamil Nadu	3915.88	399.90	4315.78
32	Telangana	3620.75	315.61	3936.36
33	Tripura	9.41	0.00	9.41
34	Uttar Pradesh	1095.10	197.75	1292.85
35	Uttarakhand	315.90	4.54	320.44
36	West Bengal	114.46	35.38	149.84
	<b>Total</b>	<b>34627.79</b>	<b>2836.81</b>	<b>37464.60</b>



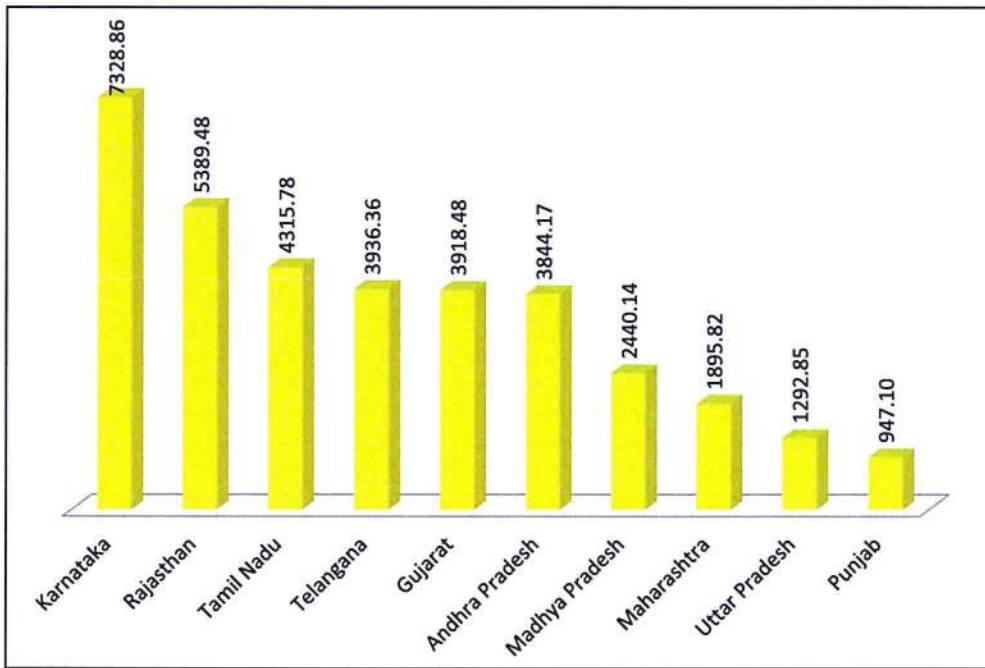


Fig. 3.1: Top Ten States in Solar Installation capacity in MW as on 31-12-2020

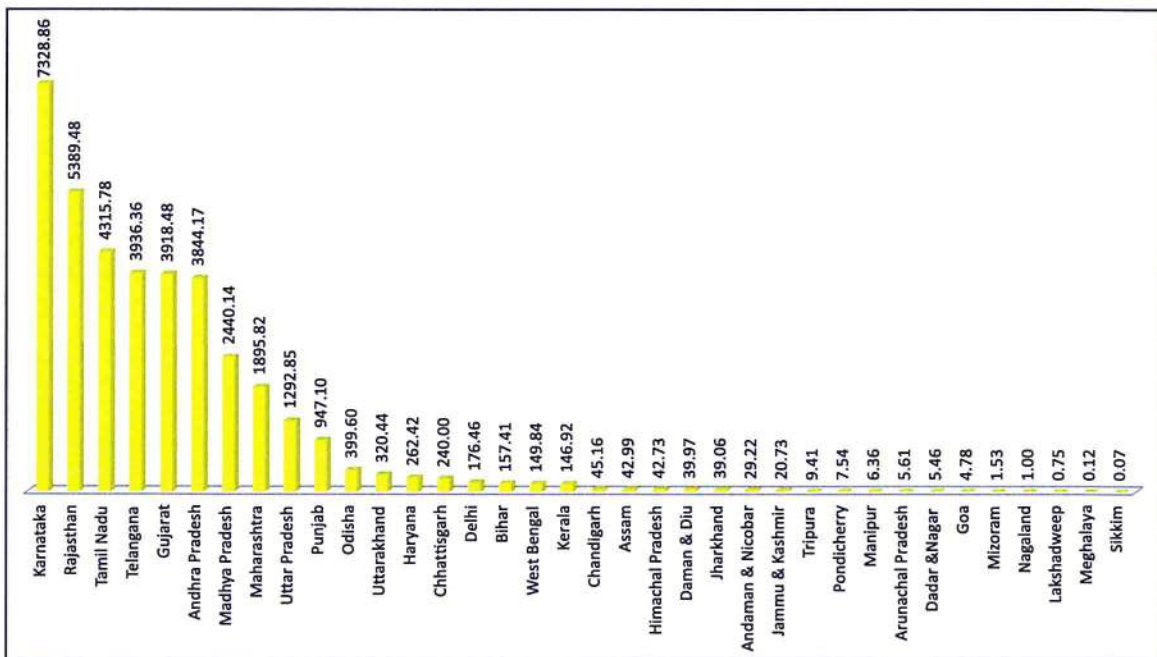


Fig. 3.2: Cumulative Capacity of Solar Power Installed Till 31-12-2020





### 3.5.3 Expected Achievements till 31.03.2021:

It is anticipated that a cumulative capacity of around 40,000 MW will be installed under different Solar Programmes by end of Financial Year 2020-21.

## 3.6 SCHEMES UNDER NATIONAL SOLAR MISSION

The National Solar Mission has multiple components.

### 3.6.1 Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects:

- » The Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects was rolled out on 12-12-2014 with aggregate capacity 20,000 MW. Further, the capacity of the Solar Park Scheme was enhanced from 20,000 MW to 40,000 MW on 21-03-2017 to set up at least 50 Solar Parks by 2021-22.
- » Solar Park is a large chunk of land developed with all necessary infrastructure and clearances for setting up of Solar projects. The capacity of the Solar Parks is generally 500 MW and above. However, smaller parks (up to 20 MW) are also considered in States or UTs where there is shortage of non-agricultural land. Approximately 4 to 5 acres per MW of land is required for setting up Solar Parks. The total Central Grants approved under the Scheme is ₹ 8,100 crore.
- » Under the scheme, the Ministry provides Central Financial Assistance (CFA) of up to ₹ 25 lakh per solar park for preparation of Detailed Project Report (DPR). Beside this, CFA of up to ₹ 20.00 lakh per MW (₹ 12 Lakh/MW for development of internal infrastructure of solar park and ₹ 8 Lakh/MW for development of external power evacuation infrastructure of solar park) or 30% of the project cost, including Grid-connectivity cost, whichever is lower, is also provided on achieving the milestones prescribed in the scheme. The approved grant is released by Solar Energy Corporation of India Ltd. (SECI) as per milestones.

#### Selection of Solar Power Park Developers

The park developers are designated as Solar Power Park Developer (SPPD). Solar parks are being developed in the following modes shown in **Table 3.3**.

**Table 3.3 The Different Modes under which Solar Power Parks are Developed**

Mode	Brief Description
<b>Mode-1</b>	The State designated nodal agency or a State Government Public Sector Undertaking (PSU) or a Special Purpose Vehicle (SPV) of the State Government.
<b>Mode-2</b>	A Joint Venture Company of State designated nodal agency and Solar Energy Corporation of India Ltd (SECI).
<b>Mode-3</b>	The State designates SECI as the nodal agency.
<b>Mode-4</b>	Private entrepreneurs with equity participation from the State Government or its agencies based on open transparent bidding process.
<b>Mode-5</b>	By Central Public Sector Undertakings (CPSUs) like SECI, NTPC etc., in own or lease land



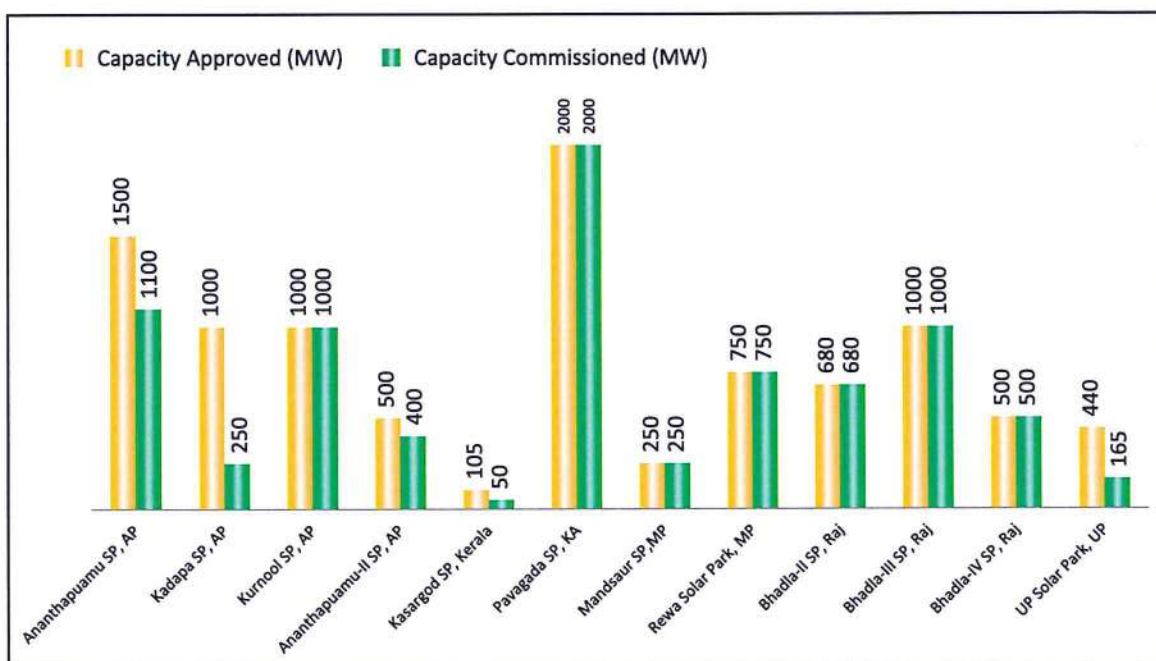
<b>Mode-6</b>	Private entrepreneurs without any Central Financial Assistance from MNRE
<b>Mode-7</b>	SECI acts as the Solar Power Park Developer (SPPD) for Renewable Energy Parks
<b>Mode-8</b>	CPSU, State PSU, Government organisation and their subsidiaries or the JV of above entities can act as SPPD.

**Progress of Solar Park Scheme**

The target of the Solar Park Scheme is to develop 50 Solar Parks with aggregate installed capacity of 40,000 MW of Solar Power by 2021-22. The details of Solar Parks approved as on 31.12.2020 is given in **Table 3.4**.

- » **Capacity approved:** Based on the proposals received from the States, 42 Solar Parks of aggregate capacity 26,801MW has been approved to 15 States up to December, 2020. These solar parks are at different stages of development.
- » **Commissioned capacity inside Solar Parks:** Solar projects of 200 MW have been commissioned inside various solar parks in 2020-21, as on 31.12.2020, while aggregate capacity 8,145MW have been commissioned inside various solar parks as given in **Fig. 3.3**.

**3.6.2 Expected Achievement till 31.03.2021:** It is anticipated that a cumulative capacity of around 10,000 MW will be installed by end of Financial Year 2020-21.



**Fig.3.3: Solar Parks: Capacity Approved and Capacity Commissioned.**



**TABLE 3.4 : LIST OF APPROVED SOLAR PARKS AS ON 31-12-2020**

State	Solar Park	Capacity (MW)	Land identified at
Andhra Pradesh	Ananthapuramu-I Solar Park	1500	NP Kunta of Anantpuramu & Galiveedu of Kadapa Districts
	Kurnool Solar Park	1000	Gani and Sakunala Village of Kurnool District
	Kadapa Solar Park	1000	Vaddirala, Thalamanchi, Pannampalli, Ramachandrayapalli, Konna Ananthapuram and Dhidium villages in Mylavaram Mandal, Kadapa district
	Ananthapuramu-II Solar Park	500	Talaricheruvu & Aluru Villages, Tadipathri Mandal, Anathapuramu District of Andhra Pradesh
	Hybrid Solar Wind Park	160	Kanaganapalli Mandal, Ananthapuramu District
Arunachal Pradesh	Lohit Solar Park	20	Tezu township in Lohit district
Gujarat	Radhnesada Solar Park	700	Radhnesada, Vav, Distt. Banaskantha
	Harsad Solar Park	350	Villages-Harsad, Madhpura, Suigam and Navapara, Taluka-Suigam, District-Banaskatha
	Dholera Solar Park Ph-I	1000	Dholera Special Investment Region (SIR), Taluka- Dholera, District-Ahmedabad, Gujarat
	Dholera Solar Park Ph-II	4000	Dholera Special Investment Region (SIR), Taluka- Dholera, District-Ahmedabad, Gujarat
Himachal Pradesh	Kaza Solar Park	1000	Spiti valley in district Lahaul and Spiti
Jharkhand	Floating Solar Park	150	Getalsud and Dhurwa dam, Jharkhand
Karnataka	Pavagada Solar Park	2000	Villages-Valluru, Rayacharlu, Balasamudra, Kyathaganacharlu, Thirumani of Pavagada Taluk, Tumkur dist.
Kerala	Kasargod Solar Park	105	Paivalike, Meenja, Kinanoor, Kraindalam and Ambalathara villages of Kasargode district
	Floating Solar Park by NHPC	50	West Kallada, Kerala
Madhya Pradesh	Rewa Solar Park	750	Gurh tehsil, District Rewa, MP
	Mandsaur Solar Park	250	Runija and Gujjarkhedi villages in Suwasra Tehsil, Mandsaur district
	Neemuch	500	Badi, Kawai and Bardwada villages of Singoli Tehsil, Neemuch district.
	Agar	550	Agar and Susner Tehsil of Agar district
	Shajapur	450	Shajapur and Moman Badodiya tehsil of Shajapur district.



State	Solar Park	Capacity (MW)	Land identified at
	Omkareswar Floating Solar Park	600	Omkareswar reservoir, Madhya Pradesh
	Chhattarpur Solar Park	950	Bijawar Tehsil of Chhattarpur district
	Barethi Solar Park	550	Barethi of Chhattarpur district
Maharashtra	Sai Guru Solar Park (Pragat)	500	Taluka-Sakri, Dhule District
	Patoda Solar Park (Paramount)	500	Villages Tambarajuri and Wadzari, Taluka Patoda, Dist. Beed.
	Dondaicha Solar Park	250	Villages- Vikhran & Methi, Taluka-Dondaicha, district Dhule, Maharashtra
Manipur	Bukpi Solar Park	20	Bukpi Village, Pherzawl District in Manipur
Meghalaya	Solar park in Meghalaya	20	Thamar, West Jaintia Hills & Suchen, East Jaintia Hills districts
Mizoram	Vankal Solar Park	20	Vankal, Khawzal RD Block Chmaphai Dist, Mizoram
Odisha	Solar Park by NHPC	40	Village-Landehill, Tehsil Jagannath Prasad, District-Ganjam, Odisha
	Solar Park by NHPC	100	Village-Kadopada, District-Deogarh, Odisha
	Floating Solar Park by NHPC	100	Rengali Reservoir, Angul district
Rajasthan	Bhadla-II Solar Park	680	Village-Bhadla, Jodhpur Dist, Rajasthan
	Bhadla-III Solar Park	1000	Village-Bhadla, Jodhpur Dist, Rajasthan
	Bhadla-IV Solar Park	500	Village-Bhadla, Jodhpur Dist, Rajasthan
	Phalodi-Pokaran Solar Park	750	Villages Ugraas, Nagnechinagar & Dandhu, tehsil Phalodi, dist Jodhpur (450 MW) and villages Lavan & Purohitsar, tehsil Pokaran, dist Jaisalmer (300 MW)
	Fatehgarh Phase-1B Solar Park	421	Fatehgarh & Pokaran, Jaisalmer, Rajasthan
	Nokh Solar Park	925	Village-Nokh, Pokaran, Jaisalmer, Rajasthan
Uttar Pradesh	Solar Park in UP	440	Orai & kalpi Tehsils of Jalaun, Meja tehsil of Allahabad, Chaanbe tehsil of Mirzapur and Akbarpur tehsil in Kanpur Dehat districts
	Jalaun Solar Park	1200	Tehsil Orai, district Jalaun of Uttar Pradesh
	Lalitpur Solar Park	600	Lalitpur district, Uttar Pradesh
	Jhansi Solar Park	600	Jhansi district, Uttar Pradesh



### 3.6.3 Scheme for Setting Up Over 300 MW of Grid-Connected Solar PV Power Projects by Defence Establishments Under Ministry of Defence and Para Military Forces With Viability Gap Funding Under Phase-II And III of NSM

Potential of Solar Energy in cantonments and Military Stations have been estimated to be approximately 5,000 MW and in Ordnance Factory Boards (OFB) are around 950 MW. Ordnance Factory Board (OFB) and other Defence Establishments have agreed to set up Solar Power Projects on the large tracts of land and vacant rooftops which they own. The Cabinet has approved the Scheme in its meeting held on 10<sup>th</sup> December, 2014. The Ministry has issued Administrative Approval on 07<sup>th</sup> January, 2015.

**The broad guidelines of the scheme are as under:**

- » A capacity of 300 MW will be set up in various Establishments of Ministry of Defence i.e. Establishments of Army, Navy, Air Force, Ordnance Factory Board, Defence Laboratories and Defence PSUs among others. Para Military Forces would also be covered under this scheme.
- » Minimum size of the project shall be 1 MW.
- » The projects under this Scheme will mandatorily use solar cells & modules which are made in India.
- » Project Implementation Schedule is 5 years period i.e. from 2014-19 and later extended till 2019-20.
- » The Defence Establishments will be free to own the power projects i.e. get a EPC contractor to build the project for them or get a developer who makes the investment and supplies power at a fixed tariff of ₹ 5.50 per unit for 25 years. Now solar tariff is reduced from ₹ 5.50 per unit to ₹ 4.50 per unit.
- » The solar project developers will be provided VGF based on the bid. The bidders will be selected on the basis of bids for minimum VGF requirement for the project with commitment to supply solar power at fixed tariff for 25 years.
- » Previously upper limit of VGF was ₹ 2.5 Cr/MW. Now VGF limit is revised to ₹ 1.1 Cr/MW.

**Physical Achievement:** In-principle approval of 241 MW has been given to different Defense Organizations. Solar projects of 11 MW have been commissioned under the Scheme in 2019-20, as on 31-12-2020. Out of approved capacity of 241 MW, 139 MW is already commissioned and balance capacities are under implementation.

**Expected Achievements till 31.03.2021:** It is expected that the balance capacity of 102 MW will be installed under the scheme by end of Financial Year 2020-21.

### 3.6.4 Scheme for Installation of Grid-connected Solar Project and various Off-grid Applications for 100% Solarization of Konark Sun Temple and Konark Town

The administrative guidelines of the Scheme for solarisation of Konark sun-temple and Konark city has been issued on 19.05.2020 with support of total CFA of around ₹ 25.00 crores as a high visibility project.



A 10 MW grid connected Solar Project and different Off-grid applications are to be installed in the Konark city. Odisha Renewable Energy Development Agency (OREDA) being the implementing agency is in the process of finalizing the developers through competitive bidding.

### **3.6.5 Solar Power Project of 20 MWac/ 50 MWp at Phyang, Leh and 1 MW Solar-Wind Hybrid Plant at Nyoma under PMDP**

A Scheme for setting up of solar PV capacity of 20 MWac/ 50 MWp with battery storage of 50 MWh at Phyang, Leh and 1 MW solar-wind hybrid plant with battery storage of 1 MWh at Nyoma under J&K Prime Minister Development Package (PMDP) – 2015 was announced vide order No. 322/12/2017-NSM dated 21.12.2020 with a maximum financial support of ₹ 250 crores from Govt. of India.

SECI will be implementing the project on EPC mode and will be maintaining the project for the entire 25 years of its life. The developers will be selected through competitive bidding. The tariff for the project was fixed at ₹2.00/unit. The RfP for these projects has been issued.

### **3.6.6 Pilot-cum-Demonstration Project For Development of Grid-connected Solar PV Power Plants on canal Banks and Canal Tops**

The Scheme is closed for new sanctions. Under this Scheme, based on the allocation requests received from different States, MNRE has sanctioned net capacity of 50 MW canal-bank and 44 MW canal-top solar PV power projects to 7 different States. As on 31.03.2019, full net sanctioned capacity of 50 MW canal-bank solar PV projects and 44 MW canal-top solar PV projects have been commissioned.

### **3.6.7 Scheme for setting up of 1000 mw of Grid-connected Solar PV Power Projects by CPSUs and Govt. Organizations under Various Central, State Schemes, Self-use or Third Party Sale, Merchant Sale with Viability Gap Funding (VGF) under Phase-II of JNNSM**

- » The Ministry launched the above scheme in January 2015, the Scheme is closed for new sanctions. Under this Scheme, MNRE has sanctioned around 882 MW grid-connected solar PV power plant capacity to 9 CPSUs and Govt. Organizations. As of 31.12.2019, all the sanctioned 882 MW capacity solar PV projects have been commissioned.
- » As on 31.12.2020, VGF of around ₹ 795 crores (including SECI's charges) has already been released to SECI for onward disbursement to CPSUs and Govt. Organisations who have set up Solar PV Power Projects under the Scheme.

### **3.6.8 CPSU Scheme Phase-II for setting up 12,000 MW Grid-connected Solar Photovoltaic (PV) Power Projects by Central and State PSUs, Government Organisations, with Viability Gap Funding (VGF) Support for Self-use or Use by Government Entities, either Directly or through Distribution Companies (DISCOMs)**

- » Government of India, through Ministry of New & Renewable Energy (MNRE), on 05.03.2019, has approved Implementation of CPSU Scheme Phase-II for setting up 12,000 MW grid-connected Solar Photovoltaic (PV) Power Projects by Central and State PSUs, Government Organisations, with Viability Gap Funding (VGF) support over 4 years 2019-20 to 2022-23 for self-use or use by



Government/ Government entities, either directly or through Distribution Companies (DISCOMs).

- » The VGF fund requirement over the four years 2019-20 to 2022-23 will be ₹ 8,580 crore, subject to a maximum of ₹ 0.7 crore/MW, to be decided through bidding amongst Government organizations. The VGF content will be reviewed by MNRE, for downward revision if required. The savings thereby achieved is to be used for additional capacity.
- » **Usage Charge:** To be mutually agreed between Government organizations producing and consuming, subject to limit prescribed in Scheme Guidelines.
- » **Domestic Content Requirement (DCR):** Both Solar cells & modules to be domestically manufactured and MNRE can prescribe DCR for upstream components also such as domestically manufactured wafers/ ingots/ polysilicon or for higher efficiency cells.
- » **Total Investment envisaged: Cost of the project:** ₹48,000 crore for 12,000 MW capacity, at ₹4 crore/MW.
- » **Implementation Agency:** (i) For first two tranches bid out till 31.12.2020: Solar Energy Corporation of India Limited (SECI); (ii) For subsequent Tranches: Indian Renewable Energy Development Agency Limited (IREDA).
- » **Role of Implementing Agency (SECI / IREDA):** Implementing Agency will handle the Scheme, on behalf of MNRE, by way of Bidding on VGF among prospective Government Producers; Scrutiny of project proposals for WTO compliance; Project progress monitoring including site inspection; Ensuring compliance of Domestic Content Requirement (DCR) by way of site inspection/ field visits; and handling of funds under the Scheme. For these activities, SECI / IREDA will be given a fee of 1% of VGF disbursed.
- » The Scheme empowers MNRE to (a) increase the scope of DCR to include wafers, ingots & polysilicon or higher efficiency cells and modules; (b) empowers MNRE to reduce VGF if cost difference comes down; (c) to make amendments or relaxation in provisions of the Scheme with no increase in fund requirement and VGF limit.
- » As of 31.03.2020 SECI has issued two tenders under the Scheme. In Tranche-I issued by SECI, against the 2000 MW capacity offered, the final capacity awarded was 922 MW as given in **Table 3.5**, while in Tranche-II issued by SECI, against the 1500 MW capacity offered, the final capacity awarded was 1104 MW as given in **Table 3.6**.
- » Tendering for further Tranches through IREDA has been initiated in FY 2020-21.



**Table 3.5 Capacity awarded under Tranche I of CPSU Scheme Phase II**

Sl. No.	Bidder's Name	VGf per MW, quoted by the bidder/ Govt. Producer (INR)	Allotted Capacity (MW)	Total VGf eligible for the project (INR)	VGf amount released till 31.12.2020
1	NHDC Ltd.	55,00,000	25	13,75,00,000	6,87,50,000
2	The Singareni Collieries Company Limited	60,00,000	90	54,00,00,000	27,00,00,000
3	Assam Power Distribution Company Limited	68,00,000	30	20,40,00,000	10,20,00,000
4	Delhi Metro Rail Corporation Limited	69,75,000	3	2,09,25,000	1,04,62,500
5	Nalanda University	69,95,555	5	3,49,77,775	1,74,88,888
6	NTPC Limited	70,00,000	769	538,30,00,000	269,15,00,000
<b>Total</b>			<b>922</b>	<b>632,04,02,775</b>	<b>316,02,01,388</b>

**Table 3.6 Capacity awarded under Tranche II of CPSU Scheme Phase II**

Sl. No.	Bidder's Name	VGf per MW, quoted by the bidder/ Govt. Producer (INR)	Allotted Capacity (MW)	Total VGf eligible for the project (INR)	VGf amount released till 31.12.2020
1	The Singareni Collieries Company Limited	68,00,000	81	55,08,00,000	0
2	Indore Municipal Corporation	68,80,000	100	68,80,00,000	0
3	NTPC Limited	70,00,000	923	646,10,00,000	323,05,00,000
<b>Total</b>			<b>1104</b>	<b>769,98,00,000</b>	<b>323,05,00,000</b>

### 3.6.9 Solarisation of Sun Temple Town of Modhera in Mehsana District, Gujarat

- » With an objective of solarisation of sun-temple town of Modhera in District – Mehsana, Gujarat, and fulfilling the domestic and agricultural electricity needs of all the households of Modhera with solar energy, MNRE, Government of India has launched a Scheme on 19<sup>th</sup> March, 2020, as a pilot demonstration project for setting up various renewable energy installations like solar PV power plants, rooftop solar PV power plants, Battery Energy Storage System, smart energy meters, solar EV charging stations, smart load monitoring and data centre with weather station, smart street lights near Modhera sun temple, etc. in Modhera, with an investment of around ₹ 65 Crores, with upto 50% central financial assistance (max. ₹ 32.50 Crores) from Government of India through Ministry of New & Renewable Energy (MNRE) and balance 50% coming from Government of Gujarat. The Scheme is being implemented by MNRE and Government of Gujarat, through Gujarat Power Corporation Limited (GPCL).
- » Gujarat Power Corporation Limited (GPCL) has awarded Letter of Intent (LoI)/ Letter of Award (LoA) for this project on 5<sup>th</sup> August, 2020. The project is under implementation and is expected to be completed in first half of year 2021.
- » As on 31.12.2020, MNRE has released ₹ 16.25 Crores as Central Financial Assistance for this Project.





### 3.6.10 Grid-connected Rooftop and Small Solar Power Plants Programme

#### Phase II:

Phase II of the Grid connected rooftop solar programme was approved for with a target for achieving a cumulative capacity of 40,000 MW from Rooftop Solar (RTS) Projects by the year 2022 in February 2019. Operational guidelines were issued on 20<sup>th</sup> August, 2019.

Under the Phase II of the Grid connected rooftop solar programme Central Financial Assistance (CFA) up-to 40% of the benchmark cost is provided for RTS projects up to 3 kW capacity and 20% for RTS system capacity beyond 3 kW and up to 10 kW in residential sectors. For Group Housing Societies/ Residential Welfare Associations (GHS/RWA), CFA is limited to 20% for RTS plants for supply of power to common facilities maximum upto 500 kW capacity. The programme is being implemented through power distribution companies (DISCOMs)/Electricity Department of States and UTs.

- » During the year 2020-21, a total of 2096.3 MW (**Table 3.7**) capacity has been allocated to 36 Electricity Departments /DISCOMs of various States and UTs, thereby leading to overall allocated capacity of 2607.2 MW to 65 DISCOMs of 31 States and UTs as on 31.12.2020 under the Phase-II programme.
- » An amount of ₹ 35.60 crore has been released to 16 DISCOMs to various States and UTs in FY 2020-21 (as on 31.12.2020).
- » Online portal has been developed in 19 States and UTs (as on 31.12.2020).
- » Rates has been discovered in 20 States and UTs.

The Phase II of the programme has provision of incentives to DISCOMs. As per scheme, DISCOMs will get the incentive for addition of capacity achieving in the financial year above the baseline capacity as on 31<sup>st</sup> March of the previous year. No incentives for capacity addition up to 10% of base capacity 5% incentives for addition beyond 10% and up to 15% of base capacity and 10% incentives for addition beyond 15% of base capacity.

**Table 3.7 : Capacity Allocated under Phase-II**

S. No.	States & UTs	DISCOM or Electricity Department	Allocation in FY 19-20 (MW)	Allocation in FY 20-21 (MW)
1	<b>Andaman &amp; Nicobar Island</b>	Electricity Department of Andaman & Nicobar	1	nil
2	<b>Andhra Pradesh</b>	Eastern Power Distribution Co. of Andhra Pradesh Ltd.	8	nil
		Andhra Pradesh Southern Power Distribution Co. Ltd.	nil	17
3	<b>Assam</b>	Assam Power Distribution Co Ltd	nil	2
4	<b>Bihar</b>	North Bihar Power Distribution Co Ltd	2	10
		South Bihar Power Distribution Co Ltd	3	10



S. No.	States & UTs	DISCOM or Electricity Department	Allocation in FY 19-20 (MW)	Allocation in FY 20-21 (MW)
5	<b>Chandigarh</b>	Chandigarh Electricity Department	15	70
6	<b>Chhattisgarh</b>	Chhattisgarh State Power Distributing Co Ltd	5	nil
7	<b>Goa</b>	Electricity Department Goa	5	75
8	<b>Gujarat</b>	Dakshin Gujarat Vij Co Ltd.	12	112
		Madhya Gujarat Vij Co. Ltd.	12	102
		Paschim Gujarat Vij Co. Ltd	12	159
		Uttar Gujarat Vij Co. Ltd.	12	89
		Torrent Power Ltd Ahmedabad	5	20
		Torrent Power Ltd Surat	2	10
9	<b>Haryana</b>	Uttar Haryana Bijli Vitran Nigam Ltd	5	10
		Dakshin Haryana Bijli Vitran Nigam Ltd	10	15
10	<b>Himachal Pradesh</b>	Himachal Pradesh State Electricity Board	15	nil
11	<b>Jharkhand</b>	Tata steel licensee. Jamshedpur	0.6	nil
		JUSCO Licensee, Saraikela Kharasawan	0.1	nil
		Jharkhand Bijli Vitran Nigam Limited	10	50
12	<b>Karnataka</b>	Bangalore Electricity Supply Co Ltd	30	300
		Hubli Electricity Supply Co Ltd	20	nil
		Chamundeshwari Electricity Supply Corp Ltd	nil	10
		Gulbarga Electricity Supply Co Ltd	10	nil
		Mangalore Electricity Supply Co Ltd	nil	2
13	<b>Kerala</b>	Kerala State Electricity Board	50	200
14	<b>Lakshadweep</b>	Lakshadweep Electricity Department	nil	10
15	<b>Madhya Pradesh</b>	Madhya Pradesh Madhya Kshetra Vidyut Vitaran Co. Ltd	20	nil
		Madhya Pradesh Paschim Kshetra Vidyut Vitaran Co. Ltd	15	nil
		Madhya Pradesh Poorva Kshetra Vidyut Vitaran Co. Ltd	10	nil
16	<b>Maharashtra</b>	Tata Power Co. Ltd	0.4	2
		Brihanmumbai Electric Supply & Transport Undertaking	0.58	nil
		Adani Electricity Mumbai Ltd	3.5	nil
		Maharashtra State Electricity Distribution Co Ltd	25	500
17	<b>Manipur</b>	Electricity Deptt. of Manipur	nil	1
18	<b>Meghalaya</b>	Meghalaya Power Distribution Corp. Ltd	nil	70
19	<b>Mizoram</b>	Electricity Department	0.5	1



S. No.	States & UTs	DISCOM or Electricity Department	Allocation in FY 19-20 (MW)	Allocation in FY 20-21 (MW)
20	<b>Nagaland</b>	Electricity Department	1	3.8
21	<b>NCT of Delhi</b>	Tata Power Delhi Distribution Ltd	2	8
		BSES Rajdhani Power Ltd	10	nil
		New Delhi Municipal Council	nil	1.5
		BSES Yamuna Power Ltd	10	10
22	<b>Odisha</b>	CESU (now TPCODL)	1	nil
		TP Central Odisha Distribution Ltd		
		Southern Electricity Supply Co Of Odisha Ltd	1	
		Western Electricity Supply Co of Odisha Ltd	1	
		North Eastern Electricity Supply Co of Odisha Ltd	1	
23	<b>Puduchery</b>	Electricity Department	5	25
24	<b>Punjab</b>	Punjab State Power Corp. Ltd	30	50
25	<b>Rajasthan</b>	Jaipur Vidyut Vitran Nigam Ltd	25	nil
		Ajmer Vidyut Vitran Nigam Ltd	5	nil
		Jodhpur Vidyut Vitran Nigam Ltd	15	nil
26	<b>Sikkim</b>	Energy And Power Department	5	nil
27	<b>Tamil Nadu</b>	Tamil Nadu Generation and Distribution Corp. Ltd	5	50
28	<b>Telangana</b>	Southern Power Distribution Co of Telangana Ltd	10.78	20
		Northern Power Distribution Co of Telangana Ltd	1.5	5
29	<b>Uttarakhand</b>	Uttarakhand Power Corp. Ltd	2	26
30	<b>Uttar Pradesh</b>	Madhyanchal Vidyut Vitran Nigam,	19	nil
		Pooravanchal Vidyut Vitran Nigam	10	nil
		Paschimanchal Anchal Vidyut Vitran Nigam	12	nil
		Dakshinanachal Vidyut Vitran Nigam	11	nil
		Kanpur Electricity Supply Co Ltd.	4	nil
		Noida Power Co Ltd	2	nil
		Torrent Power	2	nil
31	<b>West Bengal</b>	West Bengal State Electricity Distribution Co Ltd	0	50
	<b>31 STATES/UTs</b>	<b>65 DISCOMs</b>	<b>510.96</b>	<b>2096.3</b>

### 3.6.11 Grid-connected Rooftop and Small Solar Power Plants Programme Phase-I

Earlier, Ministry has been implementing Grid Connected Rooftop and Small Solar Power Plants Programme which was 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 the sanctioned projects under phase-I. For Government sector achievement linked incentives upto 25% of the benchmark cost in general category States and UTs and 60% of the

benchmark cost for special category States and UTs has been provided for the sanctioned projects under Phase-I.

An amount of ₹ 261.62 crore has been released to various agencies towards full or / partial settlement of projects in FY 2020-21.

As reported by DISCOMs, overall 3737 MW capacity of grid connected rooftop solar plant has been installed in the country as on 31.12.2020 (Table 3.8).

**Table 3.8 : Overall installed capacity (with or without CFA) as on 31.12.2020**

S. No.	States and UTs	DISCOM/Electricity Department	Capacity installed as on 31.12.2020 (in MW)
1	Andaman & Nicobar Island	Electricity Department of Andaman & Nicobar	4.177
2	Andhra Pradesh	Eastern Power Distribution Co. of Andhra Pradesh Ltd. Andhra Pradesh Southern Power Distribution Co. Ltd.	138.258
3	Arunachal Pradesh*	Department of Power	0.215
4	Assam	Assam Power Distribution Co. Ltd.	8.275
5	Bihar	North Bihar Power Distribution Co. Ltd. South Bihar Power Distribution Co. Ltd.	38.815
6	Chandigarh	Chandigarh Electricity Department	38.815
7	Chhattisgarh	Chhattisgarh State Power Distributing Co. Ltd.	27.282
8	Goa	Electricity Department Goa	6.488
9	Gujarat	Dakshin Gujarat Vij Co. Ltd. Madhya Gujarat Vij Co. Ltd. Paschim Gujarat Vij Co. Ltd. Uttar Gujarat Vij Co. Ltd. Torrent Power Ltd, Ahmedabad Torrent Power Ltd, Surat	894.150
10	Haryana	Uttar Haryana Bijali Vitran Nigam Ltd. Dakshin Haryana Bijli Vitran Nigam Ltd.	277.0298
11	Himachal Pradesh	Himachal Pradesh State Electricity Board	14.165
12	Jammu and Kashmir*	Power Development Department of J & K	12.149
13	Jharkhand	Tata Steel Licensee, Jamshedpur JUSCO Licensee Jharkhand Bijli Vitran Nigam Ltd.	29.581

S. No.	States and UTs	DISCOM/Electricity Department	Capacity installed as on 31.12.2020 (in MW)
14	<b>Karnataka</b>	Bangalore Electricity Supply Co. Ltd.	225.902
		Hubli electricity supply Co. Ltd.	
		Chamundeshwari Electricity Supply Corp. Ltd.	
		Gulbarga Electricity Supply Co. Ltd.	
		Mangalore Electricity Supply Co. Ltd.	
15	<b>Kerala</b>	Kerala State Electricity Board	89.75
16	<b>Ladakh*</b>	Power Development Department	0
17	<b>Lakshadweep*</b>	Electricity Development of Lakshadweep	0
18	<b>Madhya Pradesh</b>	Madhya Pradesh Madhya kshetra Vidyut Vitaran Co. Ltd.	76.91
		Madhya Pradesh Paschim Kshetra Vidyut Vitaran Co. Ltd.	
		Madhya Pradesh Poorva Kshetra Vidyut Vitaran Co. Ltd.	
19	<b>Maharashtra</b>	Tata power Co. Ltd.	647.7252
		Brihanmumbai Electric Supply & Transport Undertaking	
		Adani Electricity Mumbai Limited	
		Maharashtra State Electricity Distribution Co. Ltd.	
20	<b>Manipur</b>	Electricity Department of Manipur	4.5
21	<b>Meghalaya*</b>	Meghalaya Power Distribution Corp. Ltd.	0.123
22	<b>Mizoram</b>	Electricity Department	1.365
23	<b>Nagaland*</b>	Department of Power, Nagaland	0.08
24	<b>NCT of Delhi</b>	Tata Power Delhi Distribution Ltd.	139.4
		BSES Rajdhani Power Ltd.	
		BSES Yamuna Power Ltd.	
25	<b>Odisha</b>	CESU (now TPCODL) TP Central Odisha Distribution Ltd.	18.15254
		Southern Electricity Supply Co. of Odisha Ltd.	
		Western Electricity Supply Co. of Odisha	
		North Eastern Electricity Supply Co. of Odisha Ltd.	
26	<b>Puducherry</b>	Electricity Department	9.3
27	<b>Punjab</b>	Punjab State Power Corp. Ltd.	63.047
28	<b>Rajasthan</b>	Jaipur Vidyut Vitran Nigam Ltd.	374.21
		Ajmer Vidyut Vitran Nigam Ltd.	
		Jodhpur Vidyut Vitran Nigam Ltd.	
29	<b>Sikkim*</b>	Energy And Power Department	0.071
30	<b>Tamil Nadu</b>	Tamil Nadu Generation and Distribution Corp. Ltd.	84.36
31	<b>Telangana</b>	Southern Power Distribution Co. of Telangana Ltd.	149.587
		Northern Power Distribution Co. of Telangana Ltd.	

S. No.	States and UTs	DISCOM/Electricity Department	Capacity installed as on 31.12.2020 (in MW)
32	The Dadra and Nagar Haveli And Daman and Diu*	Electricity Department	0
33	Tripura*	Tripura State Electricity Corp. Ltd.	3.127
34	Uttarakhand	Uttarakhand Power Corp. Ltd.	257.25
35	Uttar Pradesh	Madhyanchal Vidyut Vitran Nigam	113.6259
		Puravanchal Vidyut Vitran Nigam	
		Paschimanchal Vidyut Vitran Nigam	
		Dakshinanachal Vidyut Vitran Nigam	
		Kanpur Electricity Supply Co. Ltd.	
		Noida Power Co. Ltd.	
36	West Bengal	State Electricity Distribution Co. Ltd.	7.9
<b>Total</b>			<b>3737.64 MW</b>

\*Data submitted by State nodal agency (SNA)/Project developer in SPIN portal

### 3.6.12 Off Grid and Decentralised Solar PV Applications Programme

Under Off-Grid and Decentralised Solar PV Applications Programme, Ministry has been providing Central Financial Assistance (CFA) for deployment of Solar Street lights, Solar Study Lamps and Solar Power Packs to meet out the electricity and lighting needs of the local communities/institutions/individuals in the rural areas. Programme is being implemented mainly through State Nodal Agencies (SNAs). Further, installation of standalone solar pumps, solarization of existing agricultural pumps and installation of grid-connected solar power plants up to 2 MW is being done under PM-KUSUM Scheme.

Over 216 MW capacity solar PV off-grid power packs / power plants have been installed till 31.12.2020.

Some major Off Grid Solar PV projects under implementation during 2020-21 are as follows. The combined status is given in **Table 3.9**.

- » Over 3 lakh Solar Study Lamps have been distributed to school going children, in North Eastern States and LWE affected districts.
- » About 1 lakh Solar Street Lights have been installed, particularly in North Eastern and Hill States and UTs.
- » Under Atal Jyoti Yojana: Phase-II, cumulatively 90,901 nos. of Solar Street Lights have been installed till 31.12.2020.



- » Solar Off-grid power plants of capacity 710 kWp have been installed at Public Service Institutions in the State of Mizoram.
- » Solar Off-grid power plants of capacity 870 kWp have been installed at Public Service Institutions in the State of Odisha.

**Table 3.9: Cumulative Systems Installed up to 31.12.2020**

SPV Systems System	Cumulative up to 31.12.2020
Lanterns and Study lamps (No.)	78,30,685
Home Lights (No.)	17,23,479
Street Lights (No.)	8,13,132
Solar Pumps (No.)	2,72,700
SPV Plants (MWp)	216.4

Cumulative numbers and capacity of the off-grid solar applications installed in various States as on 31.12.2020 is as given in **Table 3.10**.

**Table 3.10 : State-wise Cumulative Capacity installed under Off-grid SPV Programme**

S. No.	Agencies	Solar Home Light (Nos)	Solar lamp (Nos)	Solar Street Light (Nos)	Solar Pump (Nos)	Solar Power Plant (kW)
1	Andhra Pradesh	22972	77803	15468	34045	3815.595
2	Arunachal Pradesh	35065	76401	13741	22	963.2
3	Assam	46879	647761	16338	45	1605
4	Bihar	12303	1735227	46032	2813	6800
5	Chhattisgarh	42232	3311	2792	61970	31372.9
6	Delhi	0	4807	301	90	1269
7	Goa	393	1093	707	15	32.72
8	Gujarat	9253	31603	5004	11522	13576.6
9	Haryana	56727	93853	34625	5014	2321.25
10	Himachal Pradesh	22592	33909	92500	15	1905.5
11	Jammu & Kashmir	144316	51224	22900	39	8129.85
12	Jharkhand	9450	790515	13572	4800	3769.9
13	Karnataka	52638	7781	5069	7435	7854.01
14	Kerala	41912	54367	1735	818	16048.39
15	Madhya Pradesh	7920	529101	13611	23156	3654
16	Maharashtra	3497	239297	10420	11315	3857.7
17	Manipur	24583	9058	22217	40	1580.5
18	Meghalaya	14874	40750	5800	19	2004
19	Mizoram	12060	91201	10117	37	3885.6
20	Nagaland	1045	6766	11107	3	1506
21	Odisha	5274	99843	17815	9599	2191.515



S. No.	Agencies	Solar Home Light (Nos)	Solar lamp (Nos)	Solar Street Light (Nos)	Solar Pump (Nos)	Solar Power Plant (kW)
22	Punjab	8626	17495	43448	4663	2066
23	Rajasthan	187968	225851	7114	53423	30449
24	Sikkim	15059	23300	504	0	850
25	Tamil Nadu	298641	16818	39908	6289	13052.6
26	Telangana	0	0	1958	424	7450
27	Tripura	32723	253443	6284	151	867
28	Uttar Pradesh	235909	2346365	289355	29600	10638.31
29	Uttarakhand	91595	163386	31535	26	4059.53
30	West Bengal	145332	17662	15302	653	1730
31	Andaman & Nicobar	468	6296	920	5	167
32	Chandigarh	275	1675	901	12	730
33	Lakshadweep	600	5289	4465	0	2190
34	Puducherry	25	1637	417	21	121
35	Others	24047	125797	9150	609	23885
36	NABARD (2015 onwards)	116226	0	0	4012	0
	<b>Total</b>	<b>1723479</b>	<b>7830685</b>	<b>813132</b>	<b>272700</b>	<b>216398.7</b>

Capacity installed in various States during 2020-21 (as on 31.12.2020) is as given in **Table 3.11**.

**Table 3.11 : Capacity installed under Off-grid SPV Programme during 2020-21**

S. No.	Agencies	Solar Home Light (Nos)	Solar lamp (Nos)	Solar Street Light (Nos)	Solar Pump (Nos)	Solar Power Plant (kW)
1	Andhra Pradesh	0	0	4981	0	0
2	Arunachal Pradesh	0	39707	8331	0	0
3	Assam	0	0	5782	0	0
4	Bihar	0	0	7600	0	30
5	Chhattisgarh	0	0	750	0	0
6	Gujarat	0	0	250	2	0
7	Haryana	0	0	0	3721	0
8	Himachal Pradesh	0	0	14400	9	0
9	Jammu & Kashmir	0	0	7513	0	0
10	Jharkhand	0	0	839	130	0
11	Karnataka	0	0	1859	15	0
12	Kerala	0	0	0	0	223
13	Madhya Pradesh	0	0	1928	5343	0
14	Manipur	0	0	10250	0	0
15	Mizoram	0	56689	4492	0	710
16	Nagaland	0	0	4872	0	0
17	Odisha	0	0	218	48	870





S. No.	Agencies	Solar Home Light (Nos)	Solar lamp (Nos)	Solar Street Light (Nos)	Solar Pump (Nos)	Solar Power Plant (kW)
18	Punjab	0	0	690	250	0
19	Rajasthan	0	0	0	5248	0
20	Tamil Nadu	2136	0	489	830	0
21	Tripura	0	188642	4294	0	0
22	Uttar Pradesh	0	16282	10450	950	0
23	Uttarakhand	0	0	3796	0	0
24	West Bengal	0	0	3489	0	0
25	Andaman & Nicobar	0	0	530	0	0
26	Chandigarh	0	0	3	0	0
27	Lakshadweep	0	0	297	0	0
	<b>Total</b>	<b>2136</b>	<b>301320</b>	<b>98103</b>	<b>16546</b>	<b>1833</b>

### 3.6.13 Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyaan (PM-KUSUM) Scheme

- (i) The Cabinet Committee on Economic Affairs approved PM-KUSUM scheme in its meeting held on 19.2.2019. Subsequently, expansion of Scheme was announced in the Budget for 2020-21, which was later approved by Ministry of Finance. The Scheme consists of three components:
- » **Component-A:** 10,000 MW of Decentralized Ground Mounted Grid Connected Solar Power Plants.
  - » **Component-B:** Installation of 20 lakh standalone Solar Powered Agriculture Pumps.
  - » **Component-C:** Solarisation of 15 Lakh existing Grid-connected Agriculture Pumps.
- (ii) The Scheme has been expanded during FY 2020-21 to add a solar capacity of 30.8 GW by 2022. The total central financial support provided under the scheme would be ₹ 34,035 crore including service charges of 2% on eligible CFA to implementing agencies. Revised physical and financial targets are given in **Table 3.12**.

**Table 3.12 : PM KUSUM Programme Components**

Component	Approved capacity	Creation of RE Capacity targeted (GW)	CFA including service charges (₹ Cr)
Component-A	10 GW	10	3,325
Component-B	20 lakh pumps	9.6	15,912
Component-C	15 lakh pumps	11.2	14,798
<b>Total</b>		<b>30.8</b>	<b>34,035</b>

- (iii) Under Component A, renewable power plants of capacity 500 KW to 2 MW will be setup by individual farmers/ cooperatives/panchayats /farmer producer organisations (FPO) on their barren or cultivable lands. The power generated will be purchased by the DISCOMs at Feed in Tariffs (FIT) determined by respective SERC. The scheme will open a stable and continuous source of income to the rural land owners. Procurement Based Incentives @ ₹ 0.40 per unit for five years will be provided to DISCOMs.
- (iv) Under Component B, individual farmers will be supported to install standalone solar pumps of capacity up to 7.5 HP. This will help in replacement of diesel pumps in areas where grid power for agriculture is not available/reliable.



- (v) Under Component C of the scheme, individual farmers will be supported to solarise pumps of capacity up to 7.5 HP. Solar PV capacity up to two times of pump capacity in kW is allowed under the scheme. The farmer will be able to use the generated energy to meet the irrigation needs and the excess available energy will be sold to DISCOM. This will help to create an avenue for extra income to the farmers, and for the States to meet their RPO targets. States can also opt for Feeder level solarisation, where single solar plant can be installed through RESCO/CAPEX mode for feeding power to single or multiple agriculture feeders.
- (vi) For both Component-B and Component-C, Central Financial Assistance (CFA) of 30% of the benchmark cost or the tender cost, whichever is lower, will be provided. The State Government will give a subsidy of 30%; and the remaining 40% will be provided by the farmer. Bank finance may be made available for meeting 30% of the cost. The remaining 10% will be provided by the farmer. Higher CFA of 50% will be provided for North Eastern States, Sikkim, Jammu & Kashmir, Ladakh, Himachal Pradesh, Uttarakhand, Lakshadweep and A&N Islands.
- (vii) The Scheme will have substantial environmental impact in terms of savings of CO<sub>2</sub> emissions. All three components of the Scheme combined together are likely to result in saving of about 32 million tonnes of CO<sub>2</sub> emission per annum. Further, Component-B of the Scheme on standalone solar pumps may result in saving of 1.4 billion litres of diesel per annum and associated savings in the foreign exchange due to reduction of import of crude oil.
- (viii) Under Component-B and Component-C it is mandatory to use indigenously manufactured solar modules with indigenously manufactured solar cell and therefore, the scheme will open-up opportunities for local manufacturing of solar cells and modules to the tune of 20.8 GW.
- (ix) Implementation Status: The MNRE issued implementation guidelines/modalities on 22.7.2019. Based on the demand received from the States, capacities were sanctioned to them under the three components during 2019-20 and 2020-21. The cumulative capacity sanctioned to the States under the three components of the Scheme are given in **Table 3.13**.

**Table 3.13 State-wise and Component-wise Implementation of PM KUSUM Scheme**

S. No.	State	Component-A (MW)	Component-B (Numbers)	Component-C (Numbers)	
				Individual Pumps Solarization	Feeder Level Solarization
1	Andaman & Nicobar	0	0	0	0
2	Andhra Pradesh	0	0	0	0
3	Arunachal Pradesh	0	50	0	0
4	Assam	0	0	0	0
5	Bihar	0	0	0	0
6	Chandigarh	0	0	0	0
7	Chhattisgarh	0	20,000	0	0
8	Dadra & Nagar Haveli	0	0	0	0
9	Daman & Diu	0	0	0	0
10	Delhi	62	0	0	0

S. No.	State	Component-A (MW)	Component-B (Numbers)	Component-C (Numbers)	
				Individual Pumps Solarization	Feeder Level Solarization
11	Gujarat	500	2,199	7,000	0
12	Goa	10	200	7,000	0
13	Haryana	65	37,000	468	0
14	Himachal Pradesh	20	1,550	0	0
15	Jammu & Kashmir	5	5,000	0	0
16	Jharkhand	50	11,000	500	0
17	Karnataka	500	10,500	1,000	50000
18	Kerala	40	100	100	0
19	Ladakh	0	600	0	0
20	Lakshadweep	0	0	0	0
21	Madhya Pradesh	300	60,000	0	25,000
22	Maharashtra	500	1,00,000	0	50,000
23	Manipur	0	150	0	0
24	Meghalaya	5	700	0	0
25	Mizoram	0	0	0	0
26	Nagaland	0	50	0	0
27	Odisha	500	6,000	0	0
28	Puducherry	7	0	0	0
29	Punjab	220	9,500	0	12,500
30	Rajasthan	1,200	75,000	37,500	0
31	Sikkim	0	0	0	0
32	Tamil Nadu	75	6,500	20,000	0
33	Telangana	500	0	0	30,000
34	Tripura	5	3,900	2,600	0
35	Uttar Pradesh	225	23,000	0	0
36	Uttarakhand	0	0	200	0
37	West Bengal	0	0	700	0
<b>Total</b>		<b>4,789</b>	<b>3,72,999</b>	<b>77,068</b>	<b>1,67,500</b>



- (x) Out of the sanctioned capacities shown above, under Component-B, 16,546 standalone solar pumps have been installed in various States. Under Component-C, a pilot project of 24 nos. of solarizations has been completed by Distribution Companies in the State of Rajasthan. Under Component-A, capacities have been allocated by the states of Haryana, Himachal Pradesh and Rajasthan.
- (xi) Recently, Feeder level solarization Guidelines have been issued which allow the distribution companies to solarize agriculture feeders. This is in addition to existing provision of solarization of individual grid-connected agricultural pumps. This provision will allow the State Governments to carry out solarization of agriculture feeders in CAPEX or RESCO mode and provide power to farmers free or at nominal rates.

### 3.6.14 Off-Grid & Decentralised Solar PV Applications Scheme: Phase-III

- (i) Phase-III of Off-grid and Decentralised Solar PV Applications Programme was launched in August, 2018 with target of 3,00,000 solar street lights, 25,00,000 solar study lamps and 100 MW capacity of off-grid solar power plants. Scheme is available till 31.03.2021.
- (ii) Under the scheme for Solar Street lights and off-grid Solar Power Plants, CFA of 30% of the benchmark cost or tender cost, whichever is lower, of the system is available for General category States and 90% of the benchmark cost or tender cost, whichever is lower, of the system is available for NE States, Hilly States/UTs and Island UTs. Solar study lamps for students are being provided in North-eastern States and Left Wing Extremism (LWE) affected areas with 85% financial support from the Central Government.
- (iii) Status of sanctions and installations as on 31.12.2020 are given in **Table 3.14**.

**Table 3.14 : Status of Off-Grid & Decentralised Solar PV Applications Programme**

S. No.	States/Union Territories	Solar Street Lights (Nos.)		Solar Study Lamps (Nos.)		Solar Power Packs (kWp)	
		Sanctioned Quantity	Installed Quantity	Sanctioned Quantity	Installed Quantity	Sanctioned Quantity	Installed Quantity
1	Andhra Pradesh	12,000	1,968	-	-	-	-
2	Andaman & Nicobar	1100	530	-	-	-	-
3	Arunachal Pradesh	20,000	8,733	2,00,000	57,850	-	-
4	Assam	20,000	3,116	2,32,342	-	-	-
5	Bihar	-	-	-	-	240	30
6	Himachal Pradesh	20,000	14,000	-	-	-	-
7	Jammu & Kashmir	20,000	5,000	-	-	-	-
8	Kerala	-	-	-	-	2,000	180
9	Manipur	20,000	10,250	75,000	-	25	25
10	Meghalaya	-	-	1,02,000	-	-	-
11	Mizoram	20,000	4,792	1,50,000	80,689	939	710
12	Nagaland	9,810	4,872	24,000	-	-	-
13	Odisha	-	-	-	-	1,000	870
14	Sikkim	-	-	43,034	-	-	-
15	Telangana	-	-	2,00,000	-	-	-
16	Tripura	12,000	3,570	3,00,000	1,89,431	-	-
17	Uttarakhand	19,665	2097	-	-	-	-
18	Uttar Pradesh	-	-	21,122	16,282	-	-
	<b>Total</b>	<b>1,74,575</b>	<b>58,928</b>	<b>13,47,498</b>	<b>3,44,252</b>	<b>4,204</b>	<b>1,815</b>

Note: No demand was received from States not shown above, in any of the three components.

- (iv) Projects are being implemented by State Nodal Agencies. Centralised tendering was done through Energy Efficiency Services Ltd. (EESL), for procurement of solar streetlights and solar study lamps.

### 3.6.15 Atal Jyoti Yojana (AJAY): Phase-II

- (i) Considering the success of the AJAY Phase-I scheme, coverage of the scheme in Phase-II launched in December, 2018 was expanded for implementation in North Eastern States including Sikkim and hilly States/UTs of Jammu & Kashmir, Ladakh, Himachal Pradesh and Uttarakhand and Island UTs and also in the aspirational districts of other States. A total of 3,04,500 Solar Street Lights (SSLs) were proposed to be installed.
- (ii) Under Phase-II, 2000 numbers of SSLs are provided in the Parliamentary Constituencies of NE States, Hilly States/UTs and Island UTs. In the five States covered under AJAY Phase-I, 1000 numbers of SSLs will be provided in each of the Parliamentary Constituencies, which are irrespective of number of SSLs already installed in Phase-I of AJAY scheme. Further, out of total 115 aspirational districts, 67 districts are lying in the states/UTs mentioned above and hence are automatically covered. Parliamentary constituencies lying in uncovered balance 48 aspirational districts not covered in above mentioned States/UTs, are provided with up to 2000 numbers of SSLs based on the extent the Parliamentary Constituency lies in the aspirational district.
- (iii) Due to stoppage of funds under MPLADS for two years on account of challenges due to COVID-19 pandemic, the Scheme was closed for new sanctions w.e.f. 01.04.2020. However, already sanctioned lights are being installed subject to availability of funds from MPLADS.
- (iv) Till 31.03.2020, sanctions were issued by District Administrations for 1.48 lakh solar street lights. Out of this, 90,901 nos. of solar street lights have been installed till 31.12.2020.

### 3.6.16 Off-Grid and Decentralized Concentrated Solar Thermal (CST) Technologies for Community Cooking, Process Heat and Space Heating and Cooling Applications in Industrial, Institutional and Commercial Establishments' Scheme

Ministry has been implementing the 'Off-Grid and Decentralized Concentrated Solar Thermal (CST) Technologies for Community Cooking, Process Heat and Space Heating and Cooling Applications in Industrial, Institutional and Commercial Establishments' Scheme for the promotion of renewable energy for thermal applications till 31.03.2020. No new sanctions were issued in the F.Y. 2020-21. The details of the project which are commissioned in this F.Y. 2020-21 are as follows:

#### i. M/s. Kasturi Estates Pvt. Ltd., Chennai, Tamil Nadu

A CST based solar project having a reflector area of 600m<sup>2</sup> was implemented in the premises of M/s. Kasturi Estates Pvt. Ltd., Chennai, Tamil Nadu for process heating application (**Fig. 3.4**). The project was implemented with a total cost of ₹ 156 lakhs and CFA support of ₹ 36 lakhs for Govt. of India. As per the reports, the system is delivering hot water with a saving of about 116g of LPG per day with a saving of about ₹ 8,236 per day (Approx.).





**Fig. 3.4: CST-based Solar Project at M/s. Kasturi Estates Pvt. Ltd., Chennai, Tamil Nadu**

ii. **M/s. Mondelez India Foods Pvt. Ltd. (AP)**

Mondelez India Foods Pvt. Ltd. is one of India's popular food processing companies (**Fig.3.5**). They were utilizing LPG/High Speed Diesel (HSD) in centralized heating system for process requirements. In order to reduce the usage of fossil fuels a Paraboloid dish with fully two axes tracking based CST system was installed for process heating application. The system with a total reflector area of 380 M<sup>2</sup> comprising of 4 dual-axis tracking paraboloid dish each of 95 M<sup>2</sup> concentrator area. The CST system was installed at a total cost of ₹ 84.195 lakh with a CFA support of ₹ 22.80 lakh. The system generates around 5.15 lakh kcal/day, saving 51 kg of conventional fuel per day equivalent to ₹ 3,500 per day.



**Fig. 3.5: CST based solar project at M/s. Mondelez India Foods Pvt. Ltd., A.P.**



### 3.6.17 Solar Off-grid Programme in Ladakh

160 nos. of off-grid solar power plants of 5 kWp each have been installed in Kargil under Prime Minister Development Package announced in the year 2015 with financial support by MNRE.

### 3.7 GREEN ENERGY CORRIDOR

- 1) In order to facilitate integration of large scale renewable generation capacity addition, the Cabinet Committee of Economic Affairs (CCEA) in FY 2015-16, approved the creation of Intra-State Transmission System in the Renewable Energy rich states of Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu.
- 2) The scheme includes establishment of grid sub-stations at different voltage levels with aggregate transformation capacity of approx. 22600 Mega Volt Ampere (MVA) and installation of approx. 9700 circuit kilo metres (ckm) of transmission lines in these eight states. The creation of the Intra-State Transmission System under the scheme will facilitate the evacuation of over 20 GW of power from renewable energy generation stations to load despatch centres. The project is anticipated to be completed by year 2021.
- 3) The funding of the GEC scheme consists of 40% Central Grant, 40% KfW loan (Euro 500 million) and the remaining 20 percent as State contribution. The scheme had an estimated cost of Rs.10,141.68 crore including grant of Rs.4056.67 crore from Government of India. As on 31.12.2020, a total grant of approx. ₹ 2,064 crore has been disbursed to the States.
- 4) As on 31.12.2020, works related to installation of transmission towers and their stringing for an aggregate approx. 7362 ckm have been completed, and substations of aggregate capacity of approx. 9656 MVA have been charged.
- 5) The following works, mentioned in the States below, have been completed/charged during FY 2020-21:
  - a) **Gujarat:**
    - (i) 320 MVA at 220 kV Moti Gop substation in Jamnagar district,
    - (ii) 620 MVA at 220 kV Babara substation in Amreli district,
    - (iii) Up-gradation of 132 kV Wankaner substation to 220 kV level (district Rajkot),
    - (iv) 1820 MVA at 400/220/66 kV Bhogat GIS substation in Jamnagar district.
  - b) **Karnataka:**
    - (i) 220 kV Double Circuit (DC) line on DC towers from existing 220/66 kV Chitradurga substation to existing 220/66 kV Hiriyur substation,
    - (ii) 200 MVA at 220/110 kV & 10 MVA at 110/11 kV at Mughalkod Substation in Belgaum district,
    - (iii) Line In Line Out (LILO) both circuits of 220 kV Chikkodi –Ghataprabha line
  - c) **Madhya Pradesh:**
    - (i) 132 kV DC Double Strung line from 220 kV Sendhwa substation to 132 kV Pansemal Substation,



- (ii) 220 kV DC line from 220 kV Kanwan substation to 220kV Dhar substation,
  - (iii) 400kV DC line from 400kV Nagda Substation to 400kV Mandsaur Substation,
  - (iv) LILO both circuits of 220kV Nagda - Neemuch line at 400kV Mandsaur Substation,
  - (v) 383 MVA transformer at 220/132kV level at 400kV Ratangarh substation,
  - (vi) Second circuit stringing of DC Single Strung line from 220kV Sabalgarh substation to 132 kV Vijaypur substation,
  - (vii) 40 MVA additional transformer at 132/33kV in existing 132kV Vijaypur substation,
  - (viii) Second circuit stringing of DC Single Strung line from 400kV Astha substation to 132 kV Ichhawar substation,
  - (ix) Second circuit stringing of DC Single Strung line from 132kV Susner (Nalkheda) substation to 132 kV Moman Badodiya substation,
  - (x) Second circuit stringing of DC Single Strung line from 132kV Susner substation to 132 kV Jeerapur substation,
  - (xi) Second circuit stringing of DC Single Strung line from 132kV Tarana substation to 132 kV Makdon substation.
- d) Rajasthan:**
- (i) 132 kV DC line from Chhatargarh substation to Loonkaransar substation,
  - (ii) LILO one circuit of 400kV DC Akal- Jodhpur(new) line at 400kV Jaisalmer-2 substation.
- e) Tamil Nadu:**
- (i) 230 kV line from Cuddalore substation to SP Koil (Veerapuram) substation
- f) Maharashtra:**
- (i) 2nd circuit stringing of 220 kV SCDC line from Miraj substation to Ichalkaranji (Tilawani) substation,
  - (ii) 2nd circuit stringing of 132 kV SCDC line from Aundh substation to Dahiwadi substation,
  - (iii) 2nd circuit stringing of 132 kV DC line from Nandurbar substation to Visarwadi substation,
  - (iv) 2nd circuit stringing of 132 kV DC line from Shevgaon substation to Pathardi substation,
  - (v) 2nd circuit stringing of 132 kV SCDC line from Georai substation to Beed substation,
  - (vi) 132 kV DC line from Kadegaon substation to Kirloskarwadi substation.
- g) Himachal Pradesh:**
- (i) 31.5 MVA additional transformer at 33/132 kV level in the 31.5 MVA 33/132 kV Pandoh substation in Mandi district,
  - (ii) Line In Line Out (LILO) one circuit of 33 KV DC Shahpur - Kangra line at proposed 33/132 KV Chambi substation and LILo of 33kV single circuit Gaj - Shahpur line at 33/132kV Chambi substation.

