महापारेषण

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LIMITED
(CIN NO U40109MH2005SGC153646)

Name of Office: Office of the Chief Engineer (STU)		To, **The Secretary,** Maharashtra State Electricity Regulatory Commission, World Trade Centre, 13th Floor, Cuffe Parade, Mumbai
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NO/MSETCL/CO/STU/ No 00084 **Date:** 2 JAN 2018

Sub: – Submission of State Transmission Utility Five Year (2017-18 to 2022-23) Transmission Plan for State of Maharashtra

REF: 1) Electricity Act, 2003
2) MERC (State Grid Code) Regulations, 2006

Respected Sir,

As per Clause 39, of the Act and Regulation 8, of MERC (State Grid Code) Regulations, 2006 State Transmission Utility has prepared Five Year Transmission Plan for the State of Maharashtra after considering all the aspects as per the Act, Regulations and comments / suggestions from the utilities has been incorporated in the Plan.

A copy of Five Year Transmission Plan is submitted to the Hon'ble Commission for information and further needful please.

The STU Five Year Transmission Plan is also made available on website of MAHATRANSCO for reference of all stakeholders.

Thanking you.

Shriram N. Bhopale
Chief Engineer (STU)

Encl: A/A

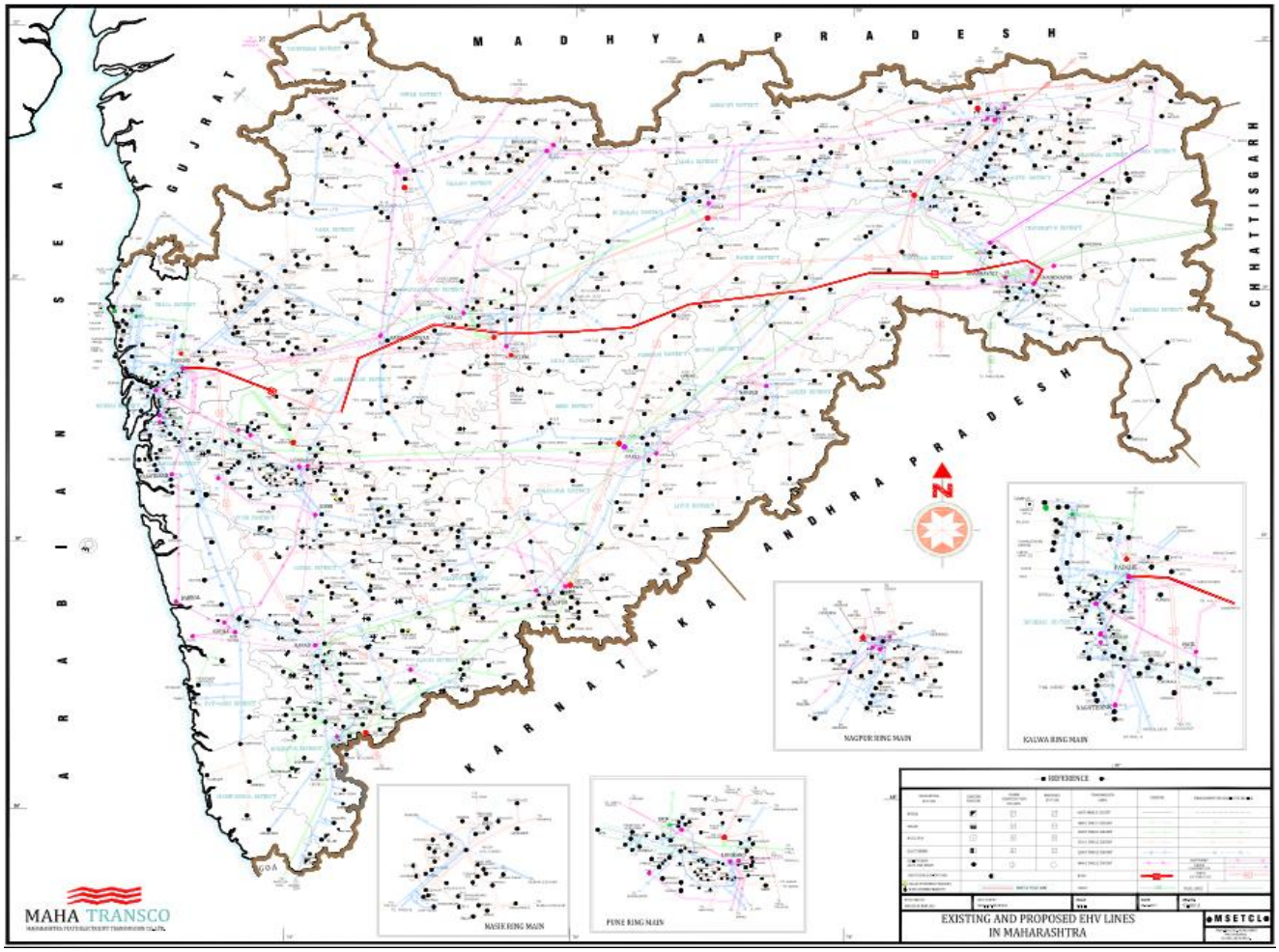
Copy S. w. rs. to:

1) Chairman & Managing Director, MSETCL
2) Director (Projects), MSETCL
3) Director (Operations), MSETCL
4) Director (Finance), MSETCL

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.
maharashtrastu

STU FIVE YEAR TRANSMISSION PLAN

(2017-18 TO 2022-23)



List of Abbreviation and Acronyms

Legend	Particulars
*1	To meet additional Load Requirement of MSEDCL for (a) MIDC (b) Urban (c) Rural / Agriculture
*2	To evacuate generation / PG network
*3	To Strengthen System / Overcome constraint of a) High Voltage b) Low Voltage c) Loading
*4	To have Reliability/Redundancy
*5	To complete missing elements

ABBREVATIONS

Legend	Particulars
CTU	Central Transmission Utility
DMIC	Delhi Mumbai Industrial Corridor
EMTP	Electro Magnetic Transient Program
FACTS	Flexible AC Transmission Systems
GEC	Green Energy Corridor
HTLS	High Temperature Low Sagging
IPP	Independent Power Producers
InSTS	Intra State Transmission System
SEZ	Special Economic Zone
MIDC	Maharashtra Industrial Development Corporation

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Introduction

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Introduction to MSETCL

Maharashtra State Electricity Transmission Company Limited (hereinafter referred as "MSETCL") is the largest transmission company in State and wholly owned corporate entity under the Maharashtra Government. It is incorporated under the Companies Act, in June, 2005 after restructuring the erstwhile Maharashtra State Electricity Board (MSEB) to transmit electricity from point of Generation to point of Distribution.There are total 9 (nine) existing transmission companies in the State of Maharashtra are shown in Figure 0-1.

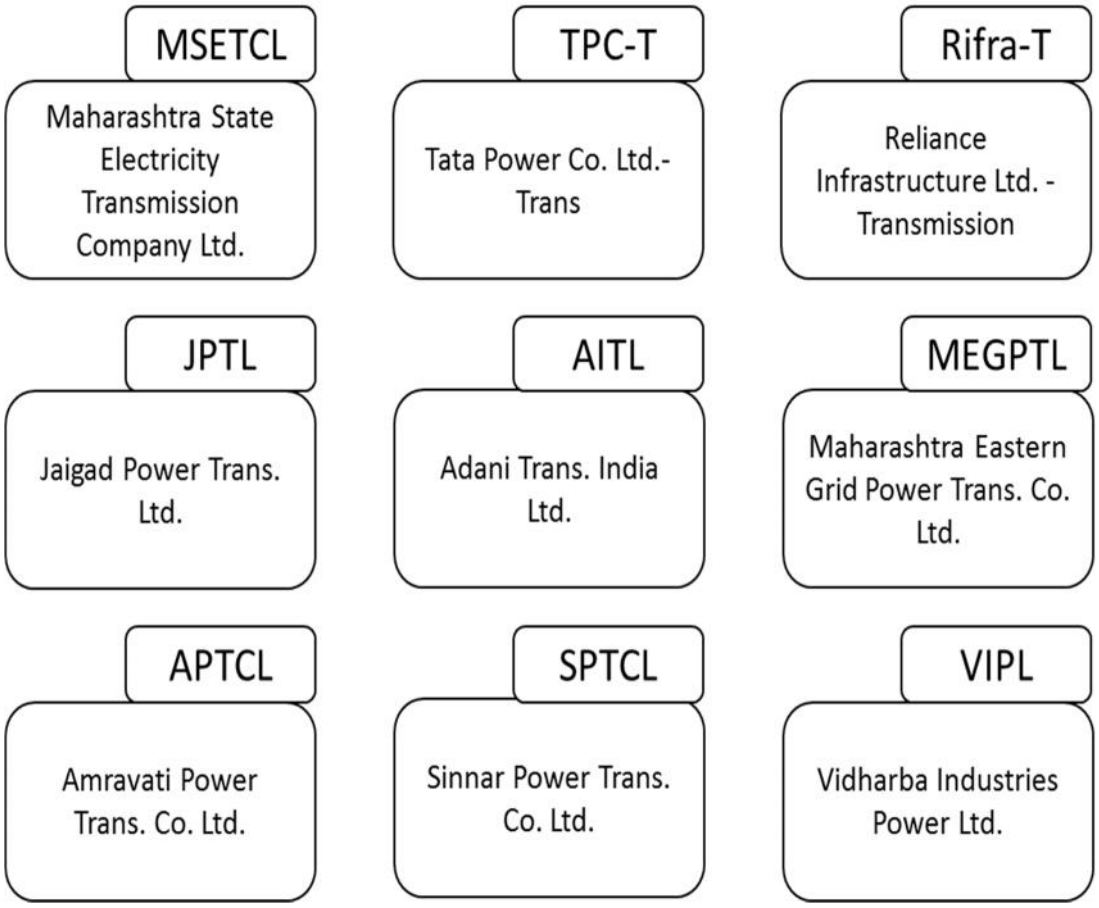

Figure 0-1. Transmission Companies in Maharashtra.

The MSETCL also functions as a State Transmission Utility (STU) and bears responsibilities to plan, develop, operate and maintain the Transmission System to facilitate transmission of electricity from its source to load centers in a secure, reliable and economic manner. **As on March 2017, MSETCL owns and operates most of Maharashtra's Electric Power Transmission System. MSETCL operates 648 Extra High Voltage (EHV) Substations, transmission network of 44,615 ckm and transformation capacity of 1,18,487 MVA at various voltage levels.** Today, MSETCL is the largest STU in India.

EXISTING MAHARASHTRA NETWORK AS ON 31-03-2017

Voltage Level	EHV Substation (No's)					Transformation Capacity (MVA)					EHV LINES (CKT KM.)								
	MSETCL	R-INFRA	TPC-T	MEGPTCL	STU	MSETCL	R-INFRA	TPC-T	MEGPTCL	STU	MSETCL	R-INFRA	TPC-T	JPTL	APML-T	APTCL	SPTCL	MEGPTCL	STU
765kV	1			2	3	3000			3000	6000	0							360	360
500 KV HVDC	2				2	3582				3582	1504								1504
400 KV	30				30	27210				27210	8415			334	438	14	57	62	9320
220 KV	219	8	8		235	51610	3000	6563		61173	16729	539	416						17684
132KV	315				315	27855				27855	14913								14913
110 KV	36				36	2305				2305	1759								1759
100 KV	38		13		51	2798		2368		5166	701		769						1470
66 KV	7				7	127				127	594								594
Total	648	8	21	2	679	118487	3000	8930	3000	133417	44615	539	1186	334	438	14	57	422	47604

Power Scenario in Maharashtra

Maharashtra State is targeted to continual improvement in Generation, Transmission and Distribution sectors, the gap between demand and generation is continuously narrowing down. The tables below shows, power scenarios in the State for previous three financial years.

Table 1: Power Scenario in Maharashtra

Year	MSEDCL		MUMBAI	STATE		Month
	Max Dem (MW)	LS (MW)	Max Dem (MW)	Max Dem (MW)	LS (MW)	
FY 2012-13	15261	1166	3077	18268	1166	Apr
FY 2013-14	17158	1655	2812	19635	1655	Feb
FY 2014-15	17694	973	3352	20795	973	Oct
FY 2015-16	18054	350	3416	21414	350	Oct
FY 2016-17	19745	538	3581	23055	538	March

(Source: MSLDC)

1.1.1 Installed Generation Capacity in MW for Maharashtra including central shares as on 31-03-2017

Table 2: Installed Generation Capacity in MW for Maharashtra including central shares as on 31.03.2016

Ownership	Hydro	Coal	Gas	Nuclear	Total	RES	Total
State	2884.84	10580	672	0	14136.84	208.13	14345
Private	447	11496	568	0	12511	7439.47	19950
Central (firm allocation)	0	3911.4	2513	690	7114.40	0	7114
Total	**3332**	**25987.4**	**3753**	**690**	**33762**	**7647.60**	**41410**

(Source: WRLDC Annual report for FY 2016-17)

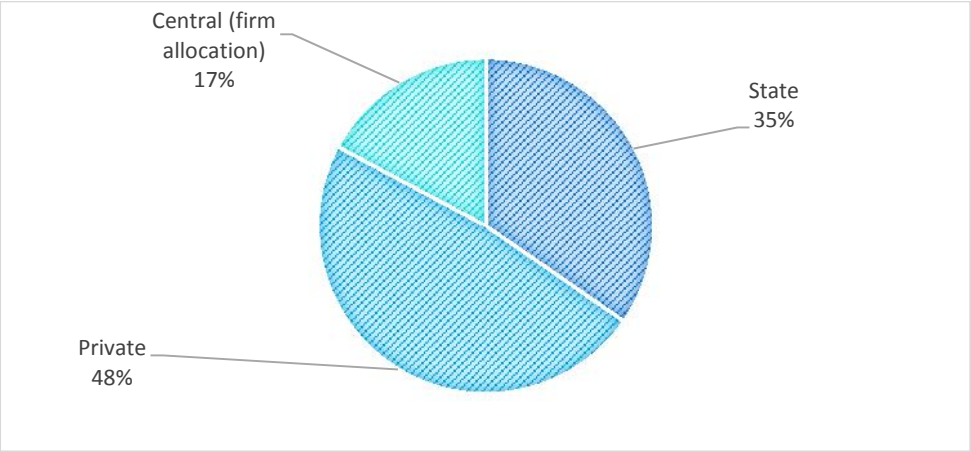

Figure 0-2: Installed Generation Capacity of the Maharashtra.

MAHAGENCO				
A. Present Generation Installed capacity (Thermal and Gas)				
Sr. No.	Station	Unit No.	Units Capacity (MW)	MW
1	Koradi	6 to 7	(210x2)	420
		8 to 10	660 x 3	1980
		Stn		**2400**
2	Nashik	3 to 5	630 (210 x3)	**630**
		2&3	210x 2	420
3	BTPS	4 & 5	500x 2	1000
		Stn		**1420**
4	Paras	3&4	(250x2)	500
5	Parali	4 to 5	(210x2)	420
		6 to 8	(250x3)	750
		Stn		**1170**
6	Khaperkheda	1 to 4	(210 X 4)	840
		5	500x1	500
		Stn		**1340**
7	CSTPS	3 to 4	210 X 2	420
		5 to 9	500 X 5	2500
		Stn	500	500
MAHAGENCO THERMAL (TOTAL)				**10380**
B. GAS TURBINE POWER STATION				
8	URAN G.T.		4x108	432
9	W.H.R. 1&2		2x120	240
MAHAGENCO GAS (TOTAL)				**672**

(Source: MAHAGENCO WEBSITE)

MAHAGENCO HYDRO POWER			
Sr. No.	**Power Stations**	**Unit**	**Capacity (MW)**
	HYDRO		
1	Koyna I&II (PP)	4X70+4X80	600
(Stg.I & II Cap. is Uprated from 560 MW to 600 MW)			
	Koyna IV (PP)	4X250	1000
	Koyna III (PP)	4X80	320
	K.D.P.H. (IP)	2X18	36
	Koyna Total		1956
2	Bhatghar (IP)	1X16	16
3	Bhatsa (DW)	1X15	15
4	Bhira Tail Race (PP)	2X40	80
5	Dhom (IP)	2X1	2
6	Dimbhe(IP)	1X5	5
7	Dhudhganga(IP)	2X12	24
8	Eldari (IP)	3X7.5	22.5
9	Ghatghar PSS	2X125	250
10	Kanher (IP)	1X4	4
11	Manikdoh(IP)	1X6	6
12	Paithan PSS (DW)	1X12	12
13	Panshet (DW)	1X8	8
14	Pawna (IP)	1X10	10
15	Radhanagari (IP)	4X1.2	4.8
16	Surya(DW&IP)	1X6	6
17	Terwanmedhe(IP)	1X0.2	0.2
18	Tillari (PP)	1X66	66
19	Ujani PSS (DW&IP)	1X12	12
20	Vaitarna (DW & PP)	1X60	60
21	Vaitarna Dam Toe (DW)	1X1.5	1.5
22	Varasgaon (DW)	1X8	8
23	Warna(IP)	2X8	16
24	Small Hydro (Sr.No.2 to 23)		629
	MAHAGENCO HYDRO TOTAL		**2585**
25	Solar		180
	MAHAGENCO (TOTAL)		**13187**

(Source: MAHAGENCO WEBSITE)

Maharashtra Share in Central Sector Stations in WR			
Central Stations / ISGS	**Installed Capacity (MW)**	**Maharashtra share (MW)**	**% Share**
KSTPS	2100	626	29.79
VSTPS-STG-I	1260	421	33.42
VSTPS-STG-II	1000	338	33.83
VSTPS-STG-III	1000	281	28.08
KAWAS	656	199	30.36
GANDHAR	657	195	29.72
SIPAT-II	1000	279	27.9
KAPS	440	144	32.64
TAPS 1&2	320	160	50
TAPS 3&4	1080	400	37.06
Korba – III	425	128	30.11
SIPAT I	1980	584	29.47
RGPPL	1426	1329	67.59
Allocation to Railways from RGPPL	540	230	
VSTPS-STG-IV	1000	307	30.69
Mauda	1000	401	40.11
VSTPS-STG-V	500	166	33.21
Mauda (MSTPS - II)	660	270	40.91
Mundra UMPP	4000	760	19
SSP	1450	392	27
EMCO Energy Limited	600	200	33.33
Kahalgaon		140	-
NVVN, rajasthan solar		10	-
SECI,MP solar		15	-
DSPP, Rajasthan solar		40	-
Total		**8013**	

(Source: WRLDC Annual report for FY 2016-17)

Trombay TPC Thermal Generation

Thermal Station	Installed Capacity(MW)	Declared capacity	Fuel
# Unit 4	150	0	Oil
* Unit 5	500	500	Coal + Oil
Unit 6	500	500	Oil+ Gas
Unit 7 A	120	120	Gas
Unit 7 B	60	60	Gas
Unit 8	250	250	Coal
Total	1580	1430	

#Unit 4 is Out due to Non avaibility of permission from Maharashtra Pollution Control Board.
*Unit 5 is under Economic Shutdown

TPC HYDRO DETAILS

Hydro Station	Installed Capacity(MW)	Declared capacity
Khopoli	24*3	72
Bhivpuri New(9,10, 11) Old (1,4) 7,8	24*3 12*1 1.5*2	75
Bhira Old-1 Old 2 to 6	24*1 =24 24*5=120	150
BPSU	150	150
Total		447

Dahanu Rinfra Thermal Generation

Thermal Station	Installed Capacity (MW)	Declared capacity	Fuel
Unit 1	250	250	Coal
Unit 2	250	250	Coal
Total	500	500	

Mumbai System Total Generation

Generating Stn	OLC(MW)
Tata Hydro	447
Tata Thermal	930
Rinfra Thermal	500
Mumbai System Total Avaiable Generation	1877

1.2 Regulatory Framework for Transmission Planning

MSETCL being STU, is responsible to formulate 5 year transmission plan as per Regulation 8 of Maharashtra Electricity Regulatory Commission (State Grid Code) Regulations 2006. The rolling plan needs to be updated every year. The State Transmission Utility shall also consider the following for the purpose of preparing the transmission system plan.

1.3 Philosophy of Transmission Planning

The transmission system forms a vital link in the electricity supply chain. Transmission system provides 'service' of inter-connection between the source (generator) and consumption (load centers) of electricity such that, system parameters and loading of system elements shall remain within prescribed limits.

The transmission system is generally augmented to cater to the long term requirements of eligible entities. The long term applicants seeking transmission service are expected to pose their end-to-end requirements well in advance to the STU so as to make-available the requisite transmission capacity, and minimize situations of congestion and stranded assets.

Critical loads such asrailways, metro rail, airports, refineries, underground mines, steel plants, smelter plants, etc. shall plan their interconnection with the grid, with 100% redundancy and as far as possible from two different sources of supply.

The system shall be planned to operate within permissible limits both under normal as well as after more probable credible contingency. However, the system may experience extreme contingencies which are rare, and the system may not be planned for such rare contingencies. The credible contingenecy should be identified from time to time in order to ensure security of the grid, the extreme/rare and suitable defense mechanism, such as – load shedding, generation rescheduling, islanding, system protection schemes, etc. may be worked out to mitigate their adverse impact. Major criteria used for transmission planning of Maharashtra state are derived / adopted from Central Electricity Authority (Manual on Transmission Planning Criteria) 2013.

1.4 Transmission Planning Methodology

The UHV & EHV network of 765 KV, 400 KV, 220 KV, 132 KV, 110/100 KV& HVDC networks are modelled in detailed along with their respective transformer capacities considering Western regional Network.

The load flow & Short Circuit studies are carried out on International Software by critical analysis of the network in terms of voltage profile and network loading. The simulation is carried out by matching the power flows at all UHV/EHV voltage levels along with voltage profile at various buses.

The STU Five year transmission plan is formulated taking in to account previous years load growth of distribution and upcoming load centers SEZ's, MIDC, New Industrial corridors, agriculture & commercial complex etc. Load Growth is considered as per the District wise Load forecasting by distribution licensees.

The following guidelines given by CEA and State Grid Code have been incorporated while conducting the simulation studies which are reproduced below.

1.4.1 Criteria for Transmission Planning

- ***Criteria for Contingency***

In normal operation ('N-0') of the grid, with all elements *in service* in the time horizon of study, it is required that all the system parameters like voltages, loadings, frequency should remain within permissible normal limits. The grid may however be subjected to disturbances and it is required that after a more probable disturbance i.e., loss of an element ('N-1' or single contingency condition), all the system parameters like voltages, loadings, frequency shall be within permissible normal limits. Further, after suffering one contingency, grid is still vulnerable to experience second contingency, though less probable ('N-1-1'), wherein some of the equipments may be loaded up to their emergency limits. To bring the system parameters back within their normal limits, load shedding/re-scheduling of generation may have to be applied either manually or through automatic System Protection Schemes (SPS). Such measures shall generally be applied within one and a half hour (1½) after the disturbance.

- ***Criteria for Loading Limits***

Normal thermal ratings and normal voltage limits represent equipment limits that can be sustained on continuous basis. Emergency thermal ratings and emergency voltage limits represent equipment limits that can be tolerated for a relatively short time which may be one hour to two hour depending on design of the equipment.

The loading limit for a transmission line shall be its thermal loading limit. The thermal loading limit of a line is determined by design parameters based on ambient temperature, maximum permissible conductor temperature,

wind speed, solar radiation, absorption coefficient, emissivity coefficient etc. Following factors should be considered while transmission line design:

- Design of transmission lines with various types of conductors should be based on conductor temperature limit, right-of-way optimization, losses in the line, cost and reliability considerations etc.
- The loading limit for an inter-connecting transformer (ICT) shall be its name plate rating or MSETCL practices or as per CEA guidelines may be used.
- The emergency thermal limits for the purpose of planning shall be 110% of the normal thermal limits.

➢ ***Criteria for Steady State Voltage limits***

The steady-state voltage limits are given below.

Voltage Level	**Voltages (KV_{rms})**			
	Normal rating		**Emergency rating**	
Nominal	Maximum	Minimum	Maximum	Minimum
765	800	728	800	713
400	420	380	420	372
230	245	207	245	202
220	245	198	245	194
132	145	122	145	119
110	123	99	123	97
66	72.5	60	72.5	59

➢ ***Criteria for Temporary over voltage limits***

i 800 KV system 1.4 p.u. peak phase to neutral (653 KV = 1 p.u.)
ii 420 KV system 1.5 p.u. peak phase to neutral (343 KV = 1 p.u.)
iii 245 KV system 1.8 p.u. peak phase to neutral (200 KV = 1 p.u.)
iv 145 KV system 1.8 p.u. peak phase to neutral (118 KV = 1 p.u.)
v 123 KV system 1.8 p.u. peak phase to neutral (100 KV = 1 p.u.)
vi 72.5 KV system 1.9 p.u. peak phase to neutral (59 KV = 1 p.u.)

Phase to neutral switching over voltage can be maximum up to 2.5 p.u.

➢ ***Reliability criteria***

In normal conditions, the system should operate within safe loading limits. The angular separation between adjacent buses shall not exceed 30 degree to maintain the system stability. The system should be planned to continually functioning with single contingencies as follows,

- ***Steady-state:***

a. All the equipments in the transmission system shall remain within their normal thermal and voltage ratings after a disturbance involving loss of any one of the following elements (called single contingency or 'N-1' condition), but without load shedding / rescheduling of generation:
   - Outage of a 132 KV or 110 KV single circuit,
   - Outage of a 220 KV or 230 KV single circuit,
   - Outage of a 400 KV single circuit,
   - Outage of a 400 KV single circuit with fixed series capacitor(FSC),
   - Outage of an Inter-Connecting Transformer(ICT),
   - Outage of a 765 KV single circuit
   - Outage of one pole of HVDC bipole.

b. The angular separation between adjacent bases under ('N-1') conditions shall not exceed 30 degree.

Transient-state:

Usually, perturbation causes a transient that is oscillatory in nature, but if the system is stable the oscillations will be damped. The system is said to be stable in which synchronous machines, when perturbed, will either return to their original state if there is no change in exchange of power or will acquire new state asymptotically without losing synchronism. The transmission system shall be stable after it is subjected to one of the following disturbances:

(a) The system shall be able to survive a permanent three phase to ground fault on a 765 KV line close to the bus to be cleared in 100 ms.

(b) The system shall be able to survive a permanent single phase to ground fault on a 765 KV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time one second) followed by 3-pole opening (100 ms) of the faulted line shall be considered.

(c) The system shall be able to survive a permanent three phase to ground fault on a 400 KV line close to the bus to be cleared in 100 ms.

(d) The system shall be able to survive a permanent single phase to ground fault on a 400 KV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time one second) followed by 3-pole opening (100 ms) of the faulted line shall be considered.

(e) In case of 220 KV / 132 KV networks, the system shall be able to survive a permanent three phase fault on one circuit, close to a bus, with a fault clearing time of 160 ms (8 cycles) assuming 3-pole opening.

(f) The system shall be able to survive a fault in HVDC convertor station, resulting in permanent outage of one of the poles of HVDC Bipole.

(g) Contingency of loss of generation: The system shall remain stable under the contingency of outage of single largest generating unit or a critical generating unit (choice of candidate critical generating unit is left to the transmission planner).

- ***Criteria for second contingency ('N-1-1')***

  - The system shall be able to survive a temporary single phase to ground fault on a 765 KV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and successful re-closure (dead time 1 second) shall be considered.
  - The system shall be able to survive a permanent single phase to ground fault on a 400 KV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time one second) followed by 3-pole opening (100 ms) of the faulted line shall be considered.
  - In case of 220 KV / 132 KV networks, the system shall be able to survive a permanent three phase fault on one circuit, close to a bus, with a fault clearing time of 160 ms (8 cycles) assuming 3-pole opening.
  - In the 'N-1-1' contingency condition as stated above, if there is a temporary fault, the system shall not loose the second element after clearing of fault but shall successfully survive the disturbance.
  - In case of permanent fault, the system shall loose the second element as a result of fault clearing and thereafter, shall asymptotically reach to a new steady state without losing synchronism. In this new state the system parameters (i.e. voltages and line loadings) shall not exceed emergency limits, however, there may be requirement of load shedding / rescheduling of generation so as to bring system parameters within normal limits.

- ***Criteria for generation radially connected with the grid***

  For the transmission system connecting generators or a group of generators radially with the grid, the following criteria shall apply:

  - The radial system shall meet 'N-1' reliability criteria for both the steady-state as well as transient-state.
  - For subsequent contingency i.e. 'N-1-1' only temporary fault shall be considered for the radial system.

- If the 'N-1-1' contingency is of permanent nature or any disturbance/contingency causes disconnection of such generator/group of generators from the main grid, the remaining main grid shall asymptotically reach to a new steady-state without losing synchronism after loss of generation. In this new state the system parameters shall not exceed emergency limits, however, there may be requirement of load shedding / rescheduling of generation so as to bring system parameters within normal limits.

- ***Criteria for simulation and studies***

The system shall be planned based on one or more of the power system studies viz.,i) Power Flow Studies ii) Short Circuit Studies iii) Stability Studies (including transient stability and voltage stability) iv) EMTP studies (for switching / dynamic over-voltages, insulation coordination, etc.)

For the purpose of planning of the Intra-STS System, the transmission network may be modelled down to 66 KV level or up to the voltage level which is not in the jurisdiction of DISCOM. The STUs may also consider modelling smaller generating units, if required.

1.4.2 Planning margins

In a very large interconnected grid, there can be unpredictable power flows in real time due to imbalance in load-generation balance in different pockets of the grid. This may lead to overloading of transmission elements during operation, which cannot be predicted in advance at the planning stage. This can also happen due to delay in commissioning of a few planned transmission elements, delay/abandoning of planned generation additions or load growth at variance with the estimates. Such uncertainties are unavoidable and hence some margins at the planning stage may help in reducing impact of such uncertainties. However, care needs to be taken to avoid stranded transmission assets. Therefore, at the planning stage following planning margins may be provided:

- Against the requirement of Long Term Access sought, the new transmission lines emanating from a power station to the nearest grid point may be planned considering overload capacity of the generating stations in consultation with generators.
- New transmission additions required for system strengthening may be planned keeping a margin of 10% in the thermal loading limits of lines and transformers.

- At the planning stage, a margin of about ± 2% may be kept in the voltage limits and thus the voltages under load flow studies (for 'N-0' and 'N-1' steady-state conditions only) may be maintained within the limits given below:

Voltage (KV_{rms}) (after planning margins)		
Nominal	Maximum	Minimum
765	785	745
400	412	388
230	240	212
220	240	203
132	142	125
110	119	102
66	70	62

In planning studies all the transformers may be kept at nominal taps and On Load Tap Changer (OLTC) may not be considered. The effect of the taps should be kept as operational margin.

1.4.3 Reactive power compensation

Requirement of reactive power compensation like shunt capacitors, shunt reactors (bus reactors or line reactors), static VAr compensators, fixed series capacitor, variable series capacitor (thyristor controlled) or other FACTS devices shall be assessed through appropriate studies.

Reactive Compensation shall be provided as far as possible in the low voltage systems with a view to meet the reactive power requirements of load close to the load points, thereby avoiding the need for VAr transfer from high voltage system to the low voltage system. In the cases where network below 132 KV/220 KV voltage level is not represented in the system planning studies, the shunt capacitors required for meeting the reactive power requirements of loads shall be provided at the 132 KV/220 KV buses for simulation purpose.

It shall be the responsibility of the respective utility to bring the load power factor as close to unity as possible by providing shunt capacitors at appropriate places in their system. Reactive power flow through 400/220 KV or 400/132 KV or 220/132(or 66) KV ICTs, shall be minimal. Wherever, voltage on HV side of such an ICT is less than 0.975 pu no reactive power shall flow down through the ICT. Similarly, wherever, voltage on HV side of the ICT is more than 1.025 pu no reactive power shall flow up through the ICT. These criteria shall apply under the 'N-0' conditions.

Switchable bus reactors shall be provided at EHV substations for controlling voltages within the limits without resorting to switching-off of lines. The bus reactors may also be provided at generation switchyards to supplement reactive capability of generators. The size of reactors should be such that under steady state condition, switching on and off of the reactors shall not cause a voltage change exceeding 5%. The standard sizes (MVAr) of reactors are:

Voltage Level	Standard sizes of reactors (in MVAr)
400 KV (3-ph units)	50, 63, 80 and 125 (rated at 420 KV)
765 KV (1-ph units)	80 and 110 (rated at 800 KV)

Fixed line reactors may be provided to control power frequency temporary over-voltage(TOV) after all voltage regulation action has taken place.Line reactors (switchable/ controlled/ fixed) may be provided if it is not possible to charge EHV line without exceeding the maximum voltage limits. The possibility of reducing pre-charging voltage of the charging end shall also be considered in the context of establishing the need for reactors. The line reactors may be planned as switchable where ever the voltage limits, without the reactor(s) remain within limits specified for TOV conditions. Static VAr Compensation (SVC) shall be provided where found necessary to damp the power swings and provide the system stability. The dynamic range of static compensators shall not be utilized under steady state operating condition as far as possible.

1.4.4 Substation planning criteria

The requirements in respect of EHV substations in a system such as the total load to be catered by the substation of a particular voltage level, its MVA capacity etc. are important to the planners. This will provide an idea to them about the time for going in for the adoption of next higher voltage level substation and also the number of substations required for meeting a particular quantum of load.

The maximum short-circuit level on any new substation bus should not exceed 80% of the rated short circuit capacity of the substation. The 20% margin is intended to take care of the increase in short-circuit levels as the system grows. The rated breaking current capability of switchgear at different voltage levels may be taken as given below:

Measures such as splitting of bus, series reactor, or any new technology may also be adopted to limit the short circuit levels at existing substations wherever they are likely to cross the designed limits.

Voltage Level	Rated Breaking Capacity
132 KV	25 kA / 31.5 kA
220 KV	31.5 kA / 40 kA
400 KV	50 kA / 63 kA
765 KV	40 kA / 50 kA

Rating of the various substation equipments shall be such that they do not limit the loading limits of connected transmission lines. Effort should be made to explore possibility of planning a new substation instead of adding transformer capacity at an existing substation when the capacity of the existing substation has reached as given in column (B) in the following table. The capacity of any single substation at different voltage levels shall not normally exceed as given in column (C) in the following table:

Voltage Level (A)	Transformer Capacity	
	Existing capacity (B)	Maximum Capacity (C)
765 KV	6000 MVA	9000 MVA
400 KV	1260 MVA	2000 MVA
220 KV	320 MVA	500 MVA
132 KV	150 MVA	250 MVA

While augmenting the transformation capacity at an existing substation or planning a new substation the fault level of the substation shall also be kept in view. If the fault level is low the Voltage stability studies shall be carried out.

Size and number of interconnecting transformers (ICTs) shall be planned in such a way that the outage of any single unit would not over load the remaining ICT(s) or the underlying system.

A stuck breaker condition shall not cause disruption of more than four feeders for the 220 KV system and two feeders for the 400 KV system and 765 KV system.

Transmission planning is targeted for providing congestion free transmission system with maximum reliability to wheel power from generating stations and external resources to load points. The transmission system plays a vital role of being a connecting link between source (generating stations) and sink (distribution companies). Therefore, planning process requires thorough understanding and processing of information received from various distribution companies and generating stations. The planning process aims at providing one or more alternatives to successfully evacuating generating

stations to provide all necessary drawal points to meet requirements of a distribution utility. To summarize, the successful transmission plan results into but not limited to

- evacuation of upcoming generation
- coordinated planning with CTU
- wheeling of power to distribution companies
- congestion free and secure transmission network
- improved availability of transmission elements, and
- Ensuring tweak to previous planning defects if required.

For the purpose of transmission system planning of Maharashtra, the planning process is divided into two parts viz.

- for State of Maharashtra (excluding Mumbai region) and
- Mumbai Region. The demand projection requirements are accordingly identified and processed to make separate plan for Mumbai and Rest of Maharashtra.

This chapter prepares base of transmission planning for Maharashtra excluding Mumbai. Detailed transmission plan for Mumbai is covered in RInfra-T & TPC-T licensee five year plan.

1.5 Generation Growth

Generation growth for Maharashtra can be considered into one or more of the following forms:

- Central Sector share allocated to State by Ministry of Power
- State Generation Plan
- IPP
- Virtual generators in form of power imported over ISTS.
- Renewable Power generators connected to 66 KV and above.

STU has tried to put together all generation evacuation requirements to ensure timely planning of the required transmission network and summarized as below (table is based on estimates).

Particular	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Central Sector	764	25	439	0	0	0
State Generation	0	0	250	0	0	0
IPP	270	810	0	0	0	0
RE Generators	2300	2300	2300	2900	1200	0
Total	**3334**	**3135**	**2989**	**2900**	**1200**	**0**

1.5.1 Central Sector Generation

Proposed Year wise Allocation of power by Central Sector 2017-18 to 2022-23 in given in Table 3

Table 3 : Proposed Year wise Allocation of power by Central Sector

Name of Generating Station	17-18	18-19	19-20	20-21	21-22	22-23
NTPC Vindhychal-V (1 × 500 MW)	-	-			-	-
Mauda II U-3 & 4 (2 × 660 MW)		-			-	-
NTPC Solapur Unit1 Mah.(2 × 660)					-	-
NTPC Lara Unit-I (1 × 800 MW)	114	-			-	-
NTPC Lara Unit-II (1 × 800 MW)	114	-			-	-
NTPC Gadarwara Stage I U-I (2 × 660 MW)	25				-	-
NTPC Solapur Unit-2 Mah.(2 × 660MW)	328				-	-
Subansiri Hydro Arunachal (2000 MW)	183				-	-
NTPC Gadarwara Stage I U-II (2 × 660 MW)	-	25			-	-
NTPC Dhuvaran Gujrat (2 × 660 MW)	-		50		-	-
NTPC Lara Unit- III (3 × 800 MW)	-		114		-	-
NTPC Gadarwara Stage I U-II (2 × 660 MW)			25		-	-
N Karanpura Jharkhad (4X660 MW)			100		-	-
NTPC Khargone (2 × 660 MW)			50		-	-
NTPC Barh			100		-	-
Total allocation I	764	25	439	0	-	-

1.5.2 State Generation Plan

Proposed Year wise Generation addition by MSPGCL is given in Table 4.

Table 4 : Proposed Year wise Generation addition by MSPGCL

Installed Capacity	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Latur (85% of 1500)	1320*	-				
Bhusaval Unit no.6(1 × 660)		660*				
Nashik unit no.6(1 × 660)		660*				
Paras Unit-5			250			
Dondaicha Unit-1(1 × 660)			660*			
Dondaicha Unit-2(1 × 660)			660*			
Dhopave Unit-1(1 × 660)			660*			
Dhopave Unit-2(1 × 660)			660*			
Dondaicha Unit-3(1 × 660)			660*			
Dondaicha Unit-4(1 × 660)			660*			

Installed Capacity	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Dondaicha Unit-5(1 × 660)			660*			
Dhopave Unit-3(1 × 660)				660*		
Total	0	0	250	0		
Considering Planned & Forced outages, Poor Coal Quality & Non-availability of Gas, 65 % of the net generation is considered.	0	0	162.5	0		
Existing MAHAGENCO Generation	7586	7586	7586	7748.5		
Year wise Generation Availability (Cumula tive)	7586	7586	7748.5	7748.5		

* Generators are not considered for STU planning

IPP Generation growth

The IPP generation growth details are given in Table 5

Table 5 : IPP Generation Growth

Particular	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
India Bulls Sinner (5 × 270)	270	810	0	0	0	0
Lanco Wardha (2 × 660) (CTU Connectivity)	0	*660	*660	0	0	0
Total	**270**	**810**	**0**	**0**	**0**	**0**

1.6 Demand Projection

Transmission planning can be considered as a process of matching the requirements of generating stations and load points. It should provide timely opportunities to evacuate existing and upcoming generation and wheeling the same up to load points. This also implies to provide enough interface points to draw power by distribution utilities and EHV consumers. For simplifying the process of estimating load growth following major criteria are taken into account,

MSEDCL Projections:

In FY 2016-17, maximum demad of MSEDCL was 19,745 MW. STU estimates that, from transmission planning point of view, the demand shall increase in the range of 5.0% – 6.5% till FY 2022-23. Transmission system planning is accordingly targeted to cater to increasing demand of MSEDCL as shown in Table 6.

MIDC Projections:

Maharashtra Industrial Development Corporation (MIDC) is a project of the Government of State Maharashtra in India, and is the leading corporation of Maharashtra. It provides businesses with infrastructure like land (open plot or built-up spaces), roads, water supply, drainage facility, street lights. In line with "Make in India" initiative by Hon'ble Prime Minister, the State of Maharashtra encouragesindustries for "Make in Maharashtra" with following key objectives:

- Set up industrial areas for planned and systematic industrial development
- To function as a special planning authority in development of industrial areas
- "Prosperity to all through Industrialization" is the corporate philosophy of MIDC

The growth of new MIDCs are certainly dependent on many other factors apart from the above mentioned missions. However, it is expected that, the new MIDC shall come up from FY 2017-18 onwards. Accordingly, transmission network is to be planned to propel growth of State and Country. STU's estimates of demand projections of MIDC are shown in Table 6.

Mumbai Projections:

Mumbai has been hub of economic transactions. Begin the constrained geographical area, only anticipated growth is expected. Apart from general yearly growth, it is expected that smart city activities escalate consumption by good numbers. Details of the Mumbai demand growth are projected in consultation with stack holders. Accordingly, STU projects demand of Mumbai as shown in Table 6.

Other Demand Projections:

Apart from other mentioned load growth categories, STU estimates load growth in various zones of Maharashtra from DMIC, SEZ, Smart City etc. STU considers demand growth as shown in Table 6 for preparation of transmission plan till FY 2022-23.

Table 6.a Demand Projections for Maharashtra (As per 19th EPS)

Particular	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
MSEDCL Load	20132	21541	23049	24663	26389	28236
Mumbai Load	3861	3969	4080	4195	4312	4433
Total	**23993**	**25511**	**27130**	**28857**	**30701**	**32669**

The demad of the State considering the CAGR of MSEDCL & Mumbai utilities is as shown below in Table 6.b

Table 7.b Demand Projections for Maharashtra (As per CAGR)

Particular	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
A) MSEDCL Load (CAGR-6.4 %)	21009	22353	23784	25306	26926	28649
B) Mumbai Load (CAGR-2.75%)	3433	3527	3624	3724	3826	3931
Mumbai Load (CAGR-3%) Considered for planning	3581	3688	3799	3913	4030	4151
Total (A+B)	**24442**	**25881**	**27408**	**29030**	**30752**	**32580**

1.7 CTU Transmission Planning

The transmission plan for Maharashtra needs to be coordinated with transmission planning of Central Transmission Utility (CTU). This is imperative as responsibility of evacuating power from LV bus of CTU substation is responsibility of the State. Therefore, State needs to ensure timely execution of connectivity CTU network for successful evacuation. Summary of CTU's upcoming plan is summarized below.

A) Summary of Existing & Under Construction POWERGRID transmission system in Maharashtra :

	Existing	Under Construction
Substations 400/220 kV	6 nos (4780 MVA) (Wardha, Solapur, Pune-AIS, Boisar, Bhadravati, Aurangabad, Kolhapur-GIS)	1 nos (2130 MVA) (Navi Mumbai, Parli, Boisar)
765/400 KV	4 nos.(13500 MVA) (Wardha, Aurangabad, Solapur, Pune-GIS)	1 nos.(3000 MVA) (Padghe GIS)
Converter Transformer 400/93kV	2808 MVA (12X234MVA) (Bhadravati BTB)	
Total	**10 nos (18280 MVA)+2808MVA Conv Trf**	**3 nos.(5130 MVA)**

B) Summary of Existing & Under Construction transmission system being implemented through TBCB route in Maharashtra:

	Existing	Under Construction
Substations 400/220 kV	-	-
765/400 KV	1 no. (3,000 MVA) (Dhule)	2 no. (6,000 MVA) (Parli (New), Warora PS)
Total	**1 no. (3,000 MVA)**	**2 nos. (6,000 MVA)**

Abstract of Transmission Plan

Abstract of Transmission Plan

Table7: Abstract of Transmission Plan from 2017-18 to 2022-23

Sr. No.	Particulars	Maharashtra State Abstract						Total
		2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	
1	**New substations**							
	400 KV	3	1	2	1	0	1	**8**
	220 KV	8	10	10	4	7	6	**45**
	132 KV	5	3	5	10	5	6	**34**
	110 KV	0	0	0	0	0	1	**1**
	100 KV	0	1	0	0	0	1	**2**
	Sub Total	**16**	**15**	**17**	**15**	**12**	**15**	**90**
2	**EHV Lines**							
i)	**Lines associated with new s/s in ckt -km**							
	400 KV	365	221	48	60	0	100	**794**
	220 KV	409	648.6	1065	343	219	504	**3188.6**
	132 KV	436	422.6	565.5	662	434	382	**2902.1**
	110 KV	0	0	0	0	0	20	**20**
	100 Kv	0	21	1	0	0	50	**72**
	Sub Total	**1210**	**1313.2**	**1679.5**	**1065**	**653**	**1056**	**6976.7**
ii)	**Link Line in ckt -km**							
	765 KV	0	0	0	20	0	0	**20**
	400 KV	307	50	4	0	75	80	**516**
	220 KV	514	312	87	73	260	0	**1246**
	132 KV	399.7	560.4	395	351	636	150	**2492.1**
	110 KV	111	124	105	60	32	0	**432**
	100KV	0	23	8	0	0	0	**31**
	Sub Total	**1331.7**	**1069.4**	**599**	**504**	**1003**	**230**	**4737.1**
iii)	**2nd ckt stringing in ckt -km**							
	400 KV	0	0	0	0	0	0	**0**
	220 KV	46.8	35	13	0	0	0	**94.8**
	132 KV	366.3	412	287	319	248	60	**1692.3**
	110 KV	0	0	0	35	0	0	**35**
	100 KV	0	33	0	0	0	0	**33**
	Sub Total	**413.1**	**480**	**300**	**354**	**248**	**60**	**1855.1**

Sr. No.	Particulars	Maharashtra State Abstract						Total
		2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	
iv)	**Reorientation of existing line in ckt -km**							
	400 KV	1	4	0	0	0	0	**5**
	220 KV	0	2	1.5	0	0	0	**3.5**
	132 KV	18	0	0	0	0	0	**18**
	110 KV	0	0	0	0	0	0	**0**
	100 KV	2	0	0	0	0	0	**2**
	Sub Total	**21**	**6**	**1.5**	**0**	**0**	**0**	**28.5**
v)	*** Replacement of conductor in ckt -km**							
	400 KV	0	100	0	0	0	0	**100**
	220 KV	93.95	127.19	24	0	0	0	**245.14**
	132 KV	85.42	49.5	142	0	0	0	**276.92**
	110 KV	15	0	0	0	0	0	**15**
	100 KV	0	18.5	0	0	0	0	**18.5**
	Sub Total	**194.37**	**295.19**	**166**	**0**	**0**	**0**	**655.56**
	EHV Lines Total (Ckt-kM)	**3170.17**	**3163.79**	**2746**	**1923**	**1904**	**1346**	**14253**
3 i)	**Addition of Transformation capacity in MVA**							
	400 KV	1000	1000	2002	1000	0	1000	**6002**
	220 KV	1650	2700	1675	700	900	1700	**9325**
	132 KV	300	150	300	525	400	300	**1975**
	110 KV	0	0	0	0	0	50	**50**
	100 KV	0	100	0	0	0	50	**150**
	Sub Total	**2950**	**3950**	**3977**	**2225**	**1300**	**3100**	**17502**
ii)	**Creation of new level in existing s/s in MVA**							
	220 KV	1000	650	350	200	100	0	**2300**
	132 KV	250	225	0	0	0	0	**475**
	110 KV	0	0	0	0	0	0	**0**
	100 KV	0	50	200	0	0	0	**250**
	Sub Total	1250	925	550	200	100	0	**3025**
iii)	**Additional ICT in existing s/s in MVA**							
	400 KV	1001	1818	0	0	0	0	**2819**
	220 KV	900	200	200	400	0	0	**1700**
	132 KV	0	0	0	0	0	0	**0**
	110 KV	0	0	0	0	0	0	**0**
	100 KV	0	0	0	0	0	0	**0**

Sr. No.	Particulars	Maharashtra State Abstract						Total
		2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	
	Sub Total	1901	2018	200	400	0	0	**4519**
iv)	**Replacement of ICT in existing s/s in MVA**							
	400 KV	0	0	185	185	0	0	**370**
	220 KV	275	500	100	0	0	0	**875**
	132 KV	0	0	0	0	0	0	**0**
	110 KV	0	0	0	0	0	0	**0**
	100 KV	0	0	0	0	0	0	**0**
	Sub Total	275	500	285	185	0	0	**1245**
v)	**Additional Transformer in existing s/s in MVA**							
	220 KV	625	150	0	0	0	0	**775**
	132 KV	1100	550	0	0	0	0	**1650**
	110 KV	50	0	0	0	0	0	**50**
	100 KV	0	0	0	0	0	0	**0**
	Sub Total	1775	700	0	0	0	0	**2475**
vi)	**Replacement of Transformer in existing s/s in MVA**							
	220 KV	300	100	0	0	0	0	**400**
	132 KV	400	355	50	25	0	0	**830**
	110 KV	**25**	**100**	**0**	**0**	**0**	**0**	**125**
	100 KV	0	75	0	0	0	0	75
	Sub Total	725	630	50	25	0	0	**1430**
	Capacity addition Total (MVA)	8876	8723	5062	3035	1400	3100	**30196**

AMRAVATI ZONE

ANNEXURE - B

Sr. No.	Particulars	Vol level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation(10)	220 kV	220/132/33 kV Warud **(Strengthening) Amravati** **(Back Charged)**	220/132 kV Malkapur **(Strengthening) Buldhana**				220/132/33 kV Lonar **(Strenthening/ MSEDCL) Buldhana**
			220/132/33 kV Anjangaon II **(Strengthening) Amravati** **(Back Charged)**	220/33 kV Ner (Watfali) **(MSEDCL) Yavatmal**				
		132 kV			132/33 kV Ralegaon **(MSEDCL/Tribal) Yavatmal**	132/33 kV Mukutban **(MSEDCL) Yavatmal**	132/33 kV Karajgaon / Asegaon **(MSEDCL) Amravati**	132/33 kV Karanja (Ramzanpur)/Wadai Satwai **(MSEDCL) Akola**
							132/33 kV Babhulgaon **(MSEDCL) Yavatmal**	
B	Link Lines	220 kV	Wardha (PG) - Yavatmal DC	Wani – Pandharkawada D/C		Yavatmal Tap – Ghatodi		
		132 kV	Amravati - Morshi at Nandgaon Peth	Akot – Hiwarkhed line at Warwat Bakal	Bhokardan - Dhad	Deolgaon Raja - Jafrabad		
				Chandur Bazar - Achalpur at Nandgaon Peth	Durgwada TSS - Murtizapur	Yavatmal-Yavatmal MIDC line at Darwha		
					Murtizapur - Karanza	Ner - Dharwa D/C		
C -1	2nd ckt stringing	132 kV	Washim - Jambazar	Durgwada - Anjangaon	Chikali - Dusarbid	Chikali - Khamgaon		Nepanagar - Dharni
			Akot - Hivarkhed	Malegaon - Mehekar				
C-2	Reorientation	132 kV	Paras - Akola ckt-I					
			Paras - Akola ckt- II					
C-3	HTLS/ Replacement	132 kV						
D-1	Creation of New Level	220 kV	Nandgaon Peth (1X100) 220/**132**	Amravati (2X25) 132/33 kV	*Ner 220/**132** (1 X 100 MVA)*			
				Pandharkawda (1 X 100 MVA) 220/132	*220/**33** kV Warud (2 X 25 MVA)*			
		132 kV	Gorakshan Akola (1X25) 132/33 kV					
D-2	ICT - Addition	400 kV		Akola (1 X 500) 400/220				
		220 kV		**Balapur (1X 200) 220/132**				
			Yavatmal (1X100) 220/132 kV Comm on dt. 03.09.2017	Nandgaon Peth (1X100) 220/132		***Ner 220/132 (1 X 100 MVA)***		
D-3	ICT - Replacement	400 kV						
		220 kV						
D-4	Transformers - Addition	220 kV	Yavatmal (1X50) 220/33					
		132 kV		Durgwada (1X25) 132/33				
				Chandur Bazar (1X25) 132/33 kV				
				Dhad (1X25) 132/33				
				Lalkhedi (1 X 25 MVA) 132/33 kV				
				Motala (1X25) 132/33 kV				
				Dharni (1x25) 132/33				
				Digras (1x25) 132/33				
				Risod (1x25) 132/33				
				Buldhana (1x25) 132/33				
				Karanaja (1x25) 132/33				
				Dusarbid (1x25) 132/33				
D- 5	Transformers - Replacement	220 kV	Akola (Apatapa) 1X(50-25) 132/33 kV					
		132 kV		Gunj 1X (50-25) 132/33				
				Pandharkawada 2x(50-25) 132/33 kV				

AMRAVATI ZONE

ANNEXURE - B

Sr. No.	Particulars	Vol level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
E-1	**Reactor - New**	**400 kV**		Akola 1 X125 MVAr				
E-2	**Reactor-Shifting**	**400 kV**						
F	**Capacitor**	**33 kV**	13 N0's S/S - 200 MVAR	16 N0's S/S - 175 MVAR	17 No's S/S - 225 MVAR			
		132 kV			10 N0's S/S - 300 MVAR			
		220 kV				1 N0's S/S - 60 MVAR		

AURANGABAD ZONE

ANNEXURE - B

Sr No	Particulars	Vol. level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation (14)	220 kV	220/33 kV Krishnoor **(MSEDCL) Nanded**	220/33 kV Shendra DMIC Project **(MIDC) Aurangabad**	220/132/33 kV Narangwadi **(Strengthening) Osmanabad**	220/132 kV Georai **(Strengthening) Beed**	220/33 KV Bidkin DMIC project **(MIDC) Aurangabad**	
			220/132/33 kV Jalna (Nagewadi) **(MIDC) Jalna**	220/132/33 kV Jalkot **(Strengthening) Latur**	220/132 kV Kurunda **(Strengthening) Hingoli**			
			220/132/33 kV Partur **(Strengthening) Jalna (Back Charged)**					
		132 kV	132/33 kV Sengaon **(MSEDCL) Parbhani**		132/33 kV Sarola **(RE Evacuation/ (GEC)) Beed**	132/33 kV Utwad (Ramnagar) **(MSEDCL) Jalna**		132/33 kV Mahur **(MSEDCL) Nanded**
						132/33 kV Barashiv (Hanuman Nagar/Aundha) **(MSEDCL) Hingoli**		
B	Link Lines	765 kV			Aurangabad (MS) - Aurngabad (PG)			
		400 kV	Bhusawal-II - A'bad-I at Tapthitanda					
		220 kV	Interlinking of Waluj-Chitegaon with Padegaon Sawangi	Parli - Harangul line at Parli (PG)			Nagewadi Bhokardan	
				Parli - Osmanabad at Parli (PG)				
		132 kV	Beed - Raimoha at Beed	Bhokar- Himayatnagar	Bhokardhan- Sillod	Sawangi - Pishor at Phulambri (**GEC**)	Mukhed - Kundalwadi at Narsi.	
			Bhokar - Tamsa.	Mukhed Kundalwadi at Krishnoor	Jintoor - Yeldari at Partur.	Padegaon - Sillod at Phulambri **(GEC)**	Kharda - Ashti (**GEC**)	Patoda -Raimoha SCDC **(GEC)**
			Garware - Bajaj	Padegaon - Paithan at Chitegaon.	Kagzipura-Kannad at Deogaon Rangari	Naldurg - Ujani at Tuljapur (**GEC**)	Kharda -Ashti at Patoda **(GEC)**	Kinwat Gunj
			Shendra Chikalthana	Ambad – Ghansawangi at Partur.	Majalgaon – Pathri	Shendra - Deolai	Paithan - Mahakal	
C -1	2nd ckt stringing	220 kV	Padegaon - Sawangi					
		132 kV	Gangapur - Canpack	Beed - Georai **(GEC)**	Kurunda- Basmat	Jalna– Jafrabad	Himayatnagar - Umarkhed	
			Tap to LILO Killari on Ujani - Omerga	Partur –Mantha	Narsi-Degloor	Kandhar Mukhed	Hingoli – Akhada Balapur	
			Bhokardhan - Rajur	Ambad – Ghansawangi	Himayat nagar - Kinwat.	Basmat - Purna	Kurunda – Akhada Balapur	
			Parbhani - Pathri	Tap to LILO for Ahmedpur s/s	Talegaon - Majalgaon	Nilanga- Omerga	Umri - Kundalwadi	
				Bhokardan - Jafrabad			Partur-Jalna (Old)	
							Bhairavnath - Kharda **(GEC)**	
C-2	Reorientation	220 kV						
C-3	HTLS/ Replacement	132 kV		Latur - Ujani - Naldurg - Solapur DC line renovation using 0.2 ACSR Conductor **(GEC)**				
D-1	Creation of New Level	400 kV		Thapti Tanda (1x25) 220/33 kV				
		220 kV	Beed (2X25) 220/**33** kV (1 No. of T/F-27.12.16 2nd T/F commi. On dt. 14.10.2017	Krishnoor (1X100) 220/132 kV	Manjarsumba (1X100) 220/**132** kV (**GEC**)	Shendra (2 X100) 220/**132** kV	Phulambri (2 X100) 220/132 kV	
			Parbhani (2X50) 220/**33** kV	Patoda (2X100) 220/**132** kV(GEC)				
		132 kV	Jalkot (2X25) 132/**33** kV					
D-2	ICT - Addition	220 kV	Jalna (1X200) 220/132 kV	Chitegaon (1x200) 220/132 kV	Krishnoor (1X100) 220/132 kV	Manjarsumba (1X100) 220/132 kV (GEC)		
				Hingoli (1x200) 220/132 kV				
				Harangul (1x200) 220/132 kV				
D-3	ICT - Replacement	400 kV		Girvali 1x(500-315) 400/220 kV				
		220 kV	Manjarsumba (1X25) 220/33 kV Commissioned T/F-1-08.03.2016 & T/F 2-27.12.16	Osmanabad (1x50) 220/33 kV				
			Waluj (1X50) 132/33 kV	Harshul (1x50) 132/33 kV				

AURANGABAD ZONE

ANNEXURE - B

Sr No	Particulars	Vol. level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
D-4	Transformers - Addition	132 kV		Purna (1x25) 132/33 kV				
				Ashti (1x50) 132/33 kV				
				Nilanga (1x50) 132/33 kV				
				Ilichpur (1x25) 132/33 kV				
				Kagzipura (1x25) 132/33 kV				
				Jafrabad (1x25) 132/33 kV				
				Killari 1 X 25 MVA, 132/33				
				Umri (1X25) 132/33 kV				
				Deolai (1X25) 132/33 kV				
				Basmath (1X 25) 132/33 kV				
D-5	Transformers - Replacement	**400 kV**	Waluj 2X(100-50) 220/33-33 kV					
		220 kV		Hingoli 1x(50-25) 220/33 kV				
				Jalna 2x(100-50) 220/33-33 kV				
		132 kV		Latur 1x(50-25) 132/33 kV				
				Udgir 1x(50-25) 132/33 kV				
				Killari 1 X (50-25),132/33				
				Ambad 1X(50-25) 132/33 kV				
				Ardhapur 1X(50-25) 132/33 kV				
E- 1	Reactor - New	**400 kV**		1X125 MVAr at Nanded	1X125 MVAr at Waluj	1 X (125-50) MVAR Girawali		
E- 2	Reactor - Shifting	**400 kV**		1 X 50 MVAR Parli to Nanded				
				1 X 50 MVAR Parli to Nanded				
F	Capacitor	**33 kV**	15 N0's S/S - 250 MVAR	20 N0's S/S - 190 MVAR	01 N0's S/S - 10 MVAR			
		132 kV			23 N0's S/S - 515 MVAR			

KARAD ZONE

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation (6)	400 kV	400/220 kV Alkud **(Strenthening) Sangli** **(Downstream Incomplete)**					
		220 kV					220/33 kV Kesurdi MIDC **(MIDC) Satara**	
							220/33 kV Kupwad MIDC **(MIDC) Sangli**	
		132 kV				132/33 kV Pachgani **(Mahableshwar) (MSEDCL) Satara**		132/33 kV Saroli / Akurde **(MSEDCL) Kolhapur**
		110 KV						110/33 kV Shiradwad **(MSEDCL) Kolhapur**
B	Link Lines	220 kV	Karad - Koyna	Vita-Miraj at Alkud **(GEC)**				
				Jath-Mhaisal at Alkud (GEC)				
		132 kV	Kudal - Kankawali	Ambheri - Aundh				
				Lonand - Phaltan at Phaltan MIDC (**GEC**)				
				Sawantwadi - Kudal (**GEC**)				
				LILO of Mayani-Dighanchi at Mhaswad (GEC)				
		110 kV	Conversion Ogalewadi - Mayani	Mudshingi (Kolhapur) - Puikhadi	Wathar - Kale (T) **(GEC)**	Kavathe M'kal - Jath (**GEC**)	Borgaon - Kundal **(GEC)**	
			Kavathe Mahankal - Sawlaj **(GEC)**	Niwaliphata - Ratnagiri	Ogalewadi – Kundal at Kadegaon			
			Tap to LILO at Ashta	Jaysingpur - Kurundwad	Conversion of Miraj - Tasgaon SCSC to DCDC			
			Peth - Borgaon	Kothali - Radhanagri at Bidri				
			Interlink Jath - Jath					
C-1	2nd ckt stringing	220 kV		Miraj - Tilawani (Icchalkaranji) (**GEC**)				
		132 kV		Aundh-Dahiwadi (**GEC**)				
		110 kV				Kale (T) - Warana **(GEC)**		
C-2	Reorientation	220 kV						
C-3	HTLS/ Repl	110 kV	Oglewadi - Atit (ACSS conductor)					
D-1	Creation of New Level	220 kV	**Peth (1X100) 220/110 kV**	Satara MIDC 50 MVA 132/110 kV by 100 MVA 220/110 kV		Sawantwadi (1X100) 220/132 kV		
		132 kV		Bambawade (1X100) 132/110 kV				
D-2	ICT - Addition	400 kV						
				New Koyna (3X105) MVA 400/220 kV				
		220 kV		Satara MIDC (1 X 200 MVA) 220/132 kV			Sawantwadi (1X100) 220/132 kV	
D-3	ICT - Replacement	400 kV		Talandge 3X(167-105) MVA 400/220 kV				
		220 kV	Satara MIDC (50-25) 132/110 kV					
			Miraj 1X (200-100) 220/132 kV Comm. On dt. 27.10.2017					
		220 kV	Five Star MIDC (1X50) 220/33 kV					
			Oni (1X25) 220/33 kV					

KARAD ZONE

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
D-4	Transformers - Addition		Kharepatan (1X25) 220/33 kV					
		132 kV		**132 kV Wai (1X25) 132/33 kV**				
				Shirwal (1X25) 132/22 kV				
				Dahiwadi (1X25) 132/22 kV				
				Satara Road (1X25) 132/22 kV				
		110 kV	Gokulshirgaon (1X50) 132-110/33 kV					
D-5	Transformers - Replacement	220 kV	Ogalewadi 1X(50-25) 132-110/33 kV (Comm)					
		110 kV	Ichalkarnji 1X(50-25) 132-110/33 kV	Kale 2 X (50-25) 132-110/33 kV	Kurundwad 1X(50-25) 132-110/33 kV			
				Kurundwad 1X(50-25) 132-110/33 kV				
				Sankh 2 X (50-25)MVA, 110/33kV				
				Ashta 2X(50-25) 132-110/33 kV				
E	Reactor	400 KV	1X 125 MVAr, Karad					
			1X 125 MVAr, Kolhapur					
F	Capacitor	33 kV		21 No's S/S - 210 MVAR				

NAGPUR ZONE

ANNEXURE - B

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation (16)	400 kV	400 kV Chandrapur II S/s **(Strenthening) Chandrapur(Downstream Incomplete)**					
		220 kV		220/132/33 kV New Pardi **(Ring Main Strengthening) Nagpur**	220/132/33 kV Naghbid **(Tribal/MSEDCL) Chandrapur**	220/132/33 kV Karanja **(Strengthening) Wardha**	220 /132/33 kV Sakoli **(MSEDCL)** Bhandara	220/132/33 kV Mankapur **(Ring Main Strengthening)** Nagpur
				220/132/33 kV Uppalwadi **(Ring Main Strengthening) Nagpur**				220/33 kV Butibori (Addl) ***(MIDC) Nagpur***
		132 kV		132/33 kV Morgaon Arjuni **(MSEDCL/Tribal) Gondia**	132/33 kV Chamorshi **(Tribal/MSEDCL) Gadchiroli**	132/33 kV Bazargaon **(MSEDCL) Nagpur**	132 /33 kV Lendra Park **(MSEDCL) Nagpur**	
				132/33 kV Jat Tirodi **(MSEDCL) Nagpur**	132/66 kV Allapally **(MSEDCL/Tribal) Gadchiroli**	132/33 kV Deori **(MSEDCL/Tribal) Gondia**		
						132/33 kV Sironcha **(MSEDCL/Tribal) Gadchiroli**		
B	Link Lines	400 KV		Bhadravati-Chandrapur D/C at Chandrapur-II.	Koradi I - Akola (IB) LILO at Koradi II		LILO Chandrapur I - Parli 3rd ckt at Warora	
		220 kV	C'pur-II - C'pur MIDC		Interconnection of Khpd-Kaulewada Ckt-I to Kanhan - Bhandara			
				Bhugaon - Warora I at Warora				
		132 KV	Sindewahi - Brahmpuri	Wardha-II to Pulgaon	Sicom to Mul		Saoner - Katol	
			Warud - Bharsingi	Kalmeshwar- Hingna -I -Hingana-II		Warud Bharsinghi LILO at Karanja (Wardha)	Deori - Morgaon Arjuni	
C -1	2nd ckt stringing	132 kV	Wardha - II - Deoli	Mul –Sindewahi	Asgaon –Brahmpuri			
			Wardha-II- Seloo					
C-2	Reorientation	220 kV						
C-3	HTLS/ Replacement	132 kV	Khapri - Besa	Bhandhara-Kharda	Kaulewada -Gondia			
D-1	Creation of New Level	220 kV		Wardha-I (2X50) 220/**33** kV	Sicom (1 X 100 MVA) 220/**132** kV			
				Ambazari (2 X 25 MVA) 220/**33** kV				
				Purti (Co –Gen) (2X25) 220/**33** kV				
		132 kV	**Allapally(1 X 25) 132-66/33**	Hiradamali TSS (2 X 25 MVA) 132 /**33** kV				
D-2	ICT - Addition	220 kV	Wardha-II (1X100) 220/132 kV	Hinganghat (1X100) 220/132 kV				
D-3	ICT - Replacement	400 kV						
		220 kV		Bhandara 1x(200-100) 220/132 kV				
				Kaulewada 1X(200-100) 220/132				
D-4	Transformers - Addition	220 kV	Sicom (1X50) 220/33 kV					
			Hinganghat (1x100) 220/33-33					
			Gadchandur (1X50) 220/33 kV					
		132 kV	Uppalwadi (1X50) 132/33 kV	Seloo (1X25) 132/33 kV				
			Ashti (1X25) 132/33 KV					
		66 kV	**Sironcha (1 X 25) 132-66/33kV**					
D-5	Transformers - Replacement	220 kV	Wardha-II 2X(50-25) 220/33 kV (Commissioned on dt.T/1-28.02.2017 T/F2- 30.03.2017)					
		132 kV	Besa 2X(50-25) 132/33 kV	Khapri 2X(50-25) 132/33 kV				
			Deoli 2X(50-25) 132/33 kV					

NAGPUR ZONE

ANNEXURE - B

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
E-1	Reactor (New)	400 KV		1X125 MVAr, Chandrapur -II				
				1X125 MVAr, Koradi -II				
				1X125 MVAr, Khaparkheda				
E-2	Reactor (Shifting)	400 KV		C'pur-I - C'pur -II ckt -I				
				C'pur-I - C'pur -II ckt -II				
F	Capacitor	33 kV	13 N0's S/S - 100 MVAR					
		132 kV	01 N0's S/S - 30 MVAR					

NASHIK ZONE ***ANNEXURE - B***

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation (21)	400 kV			400/220 kV Karjat (Bhose) **(Strengthening) Ahmednagar**	400/220 kV Nashik **(Strengthening) Nashik**		
					400/220 kV Balsane (Shivajinagar) **(RE Evacuation) Dhule (GEC)**		220/132/33 kV Supa MIDC/ Dhotre **(MIDC) Ahmednagar**	
		220 kV	220/132/33 kV Kalwan **(Strengthening) Nashik (Back Charged)**	220/132/33 kV Jamner (Kekatnimbhora) **(Strengthening/MIDC) Jalgaon**	220/132kV Adwadi (Sinnar) SS **(Strengthening) Nashik**	220/132 kV Amrapur/Shegaon-Pathardi (**Strengthening) Ahmednagar**	220/33 kV Girnare **(MSEDCL) Nashik**	220/132/33 kV Nandurbar **(MSEDCL/Tribal) Nandurbar**
			220/132/33 kV Pimpalgaon **(Strengthening) Nashik (Back Charged)**	220/132 kV Viroda **(Strengthening/Tribal) Jalgaon**				
		132 kV	132/33 kV Ghargaon **(MSEDCL) Ahmednagar**		132/33 kV Sinnar (Shaha) **(Strengthening) Nashik**	132/33 kV Dhadgaon **(MSEDCL/Tribal) Nandurbar**	132/33 kV Gholashi Phata **(MSEDCL) Nashik**	132/33 kV Karkee **(MSEDCL) Jalgaon**
			132/33 KV Vadjeere **(MSEDCL) Ahmednagar**			132/33 kV Kothali (**MSEDCL) Jalgaon**		132/33 kV Lakhmapur / Dindori (**MSEDCL) Nashik**
								132/33 kV Shirdi **(MSEDCL) Ahmednagar**
B	Link Lines	220 kV	Malegaon- Kalwan	Malegaon - Manmad				
			Eklahare - Pimpalgaon	Babhleswar - Kopargaon				
		132 kV	Raymond - Adgaon at Mhasrul (LILO Shift)	Ahmednagar - Ahmednagar MIDC DC line **(GEC)**		Bhabhleshhwar-Rahuri- A'nagar **(GEC)**	Visarwadi - Sakri	
			Tap to LILO for Rahuri	Pimpalgaon - Ranvad		Pimpalgaon - Dindori	Erandol - Parola	
			Shirpur - Dondaicha	Samsherpur - Nandurbar	Ahmednagar - Supa **(GEC)**	Ozhar Chandwad at Pimpalgaon **(GEC)**	Sakri - Shivajinagar	
			Bhose - Karjat				LILO of 132kV Khaprale - Sangamner S/C at 220/132kV Sinnar S/s (GEC)	
C -1	2nd ckt stringing	220 kV	Dondaicha - Shahada		Jamde - Valve **(GEC)**	Bhenda - Vishwind DC **(GEC)**		
		132 kV	Taloda - Shahada	Parola - Amalner	Shevgaon - Ghodegaon **(GEC)**	Bhenda - Newasa		
			Amalner - Chopda		Belwandi- Shrigonda	Pathardi – Shevgaon **(GEC)**	*Eklahare -Sinnar*	
			Sinnar (Old) – Khaprale (**GEC**)	Amalner - Nardane	Benda - Shevgaon **(GEC)**	Manmad - Yeola (**GEC**)		
			Nandurbar - Visarwadi (**GEC**)	Malegaon - Nampur				
C-2	Reorientation	220 kV						
C-3	HTLS/ Replacement	132 kV	Eklahare (OCR) - Takli (ACSS)	Chalisgaon - Dhule (Replacement)				
				GCR-Ambad link line				
D-1	Creation of New Level	220 kV		Manmad (1 X 100) 220/132kV				
				Belwandi (1x50) 220/33 kV				
		132 kV		**Pimpalgaon (1 X 25) 132/33 kV**				
D-2	ICT - Addition	400 kV						
		220 kV	Shahada (1X100) 220/132 kV	***Bhenda 1 X 100 MVA, 220/132kV***	Manmad (1 X 100 MVA) 220/132			
				Chalisgaon (1X200) 220/132 kV				
			Ahmednagar (1X200) 220/132 kV	Kalwan (1 X 200 MVA) 220/132 kV				
D-3	ICT - Replacement	400 kV		Babhleshwar 3x(167-105) 400/220 kV				
				Dhule 3x(167-105) 400/220 kV				
		220 kV	Dondaicha (1X50) 220/33 kV	Malegaon (1x50) 220/33 kV				
			Shahada (1X50) 132/33 kV	Bhenda (1x25) 132/33 kV				
			Sinnar MIDC (1X50) 132/33 kV	Amalner (1X50) 132/33 kV				

NASHIK ZONE ***ANNEXURE - B***

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
D-4	Transformers - Addition	132 kV	Satpur Old (1X50) 132/33 kV	Chalisgaon (1X50) 132/33 kV				
			New MIDC Jalgaon (1X50) 132/33 kV	Chandwad (1x 25) 132/33 kV				
			Pachora (1X50) 132/33 kV	Shrigonda (1X25) 132/33 kV				
			Dhule (1X50) 132/33 kV	Ramache pimplus (1x25) 132/33 kV				
			Nandurbar (1X50) 132/33 kV	Newasa (1x25) 132/33 kV				
				Rashin (1x25) 132/33 kV				
				Ahmednagar (1X50) 132/33 kV				
				Supa (1X50) 132/33 kV				
D-5	Transformers - Replacement	220 kV		Sayne 2x(50-25) 220/33 kV				
		132 kV	Mhasrul 1X(50-25) 132/33 kV	Taloda 1X(50-25) 132/33 kV				
			Pahur 1X(50-25) 132/33 kV	Nardana 1X(50-25) 132/33 kV				
				Nampur 1X(50 – 25) 132/33 kV				
E- 1	Reactor - New	400 kV		1 X 125 MVAr, Bhusawal -II (Deepnagar)				
				1 X 125 MVAr Dhule				
		220 kV			1 X 25 MVAr, Dhule 220 kV (GEC)			
E- 2	Reactor-Shifting	400 kV	1 X 50 MVAr Khadka					
F	Capacitor	33 kV	29 N0's S/S - 500 MVAR	23 N0's S/S - 420 MVAR				
		132 kV		13 No's S/S - 390 MVAR				

PUNE ZONE

ANNEXURE-B

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation (8)	400 kV		400/220/33 kV Hinjewadi **(MIDC) Pune**	220/132/33 kV Khed City **(**Retwadi) **(MSEDCL) Pune**			
		220 kV	220/132/22 kV Chinchwad - II **(Strengthening) Pune**	132/22 kV EON Kharadi **(MSEDCL) Pune**				220/33 kV Marunje / Balewadi**(MSEDCL) Pune**
		132 kV	132/33 kV Kavathe Yamai **(MSEDCL) Pune**				132/22 kV Bhugaon **(MSEDCL) Pune**	
			132/33 kV Nimboni **(MSEDCL) Solapur**					
B	Link Lines	400 KV	765kV Shikrapur(PG) to 400kV Lonikand II	Karad - Lonikand at Jejuri				Solapur PG - Lamboti
		220 kV	Solapur (PG) - Bale DC	Phaltan MIDC -Walchandnagar DC		Jeur-Paranda		
			Urse - Chinchwad	Jejuri-Lonand	Loni Deokar - Tembhurni			
			Chinchwad-Kandalgaon		LILO of Chinchwad-Telco at Chakan II		Pandharpur-Bhalwani at Alkud	
			Chinchwad Apta for Talegaon (PG)					
		132 kV	Parvati - Kothrud	NCL - Rahatani	LILO of Chakan-Mahindra Forge at Pimpalgaon			
			Akkalkot - Karajgi	Chinchwad - Bajaj LILO at Chakan II	Zuari - Chettinad			
			Magarpatta - Rasta Peth	Phursungi - Mundhwa				
			Ganeshkhind -Pawana at Rahatani	Ranjangaon - Kuruli	LILO of Indapur -Ujani at Lonideokar			
				Ranjangaon - Shirur				
			Theur- Sanaswadi & Markal-Kharadi at LNKND-II	Chinchwad - Rahatani				
			Chinchwad-Khopoli (Andralake)	NCL- Kothrud				
			Rahatani - Varasgaon at Flagship	Daund - Shrigonda				
C -1	2nd ckt stringing	220 kV	Tap to LILO Volks Wagon					
		132 kV	Degaon –Mandrup (**GEC**)	Malinagar to Velapur	Jeur - Parewadi	Rahatani –Varasgaon		
			Purandwade Tap on Bawada Nira Bhima-Walchandnagar	Velapur ShankarNagar		Bale -MIDC Solapur	Mohol - Puluj	
C-2	Reorientation	220 kV						
C-3	HTLS/ Conversion/Replacement	220 kV	Lonikand - Theur	Chinchwad - Chakan				
			Pandharpur -Puluj-Degaon	Narayangaon - Mahindra Forging - Chakan				
D-1	Creation of New Level	400 kV	Lonikand II (2X100) 220/**132** kV					
		220 kV	Flagship (1X200) 220/**132** kV					
		132 kV	SPSL (2X50) 132/**22** kV					
D-2	ICT - Addition	400 kV	Jejuri (3X167) 400/220 kV	Chakan (1X315) 400/220 kV				
				Lamboti (Solapur)(3X167) 400/220				
		220 kV						
D-3	ICT - Replacement	400 kV			Chakan 1X(500-315) 400/220 kV	Chakan 1X(500-315) 400/220 kV		
		220 kV		Pandharpur 1X(200-100) 220/132-100 kV				
				Magarpatta 2x(200-100) 220/132 kV				
D-4	Transformers Addition	220 kV	Hinjewadi II (1X100) 220/22-22 kV	Nanded City(1x50) 220/22 kV				
			Jeur (1X50) 220/33 kV	Pandharpur (1x50), 220/33kV				
			Theur (1X50) 220/22 kV					
		132 kV	Kamthadi (1X50) 132/33 kV	Whirlpool (1X25) 132/22 kV				
			Yavat (1X50) 132/33 kV	Kharadi (1x50) 132/22 kV				
				NCL (1X50) 132/22 kV				
				Sanaswadi (1X50) 132/22 kV				
D-5	Transformers Replacement	220 kV	Hinjewadi II 2 X (100-50) 220/22-22 kV					
			Indapur 1 X (50-25) 132/33 kV	Shirur 1 X (50-25) 132/22 kV				
			Bawda 2 X (50-25) 132/33 kV	Rastapeth 2x(50-25) 132/22 kV				

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
	Replacement	132 kV		Markal 2x(50-25) 132/33 kV				
				Purandavade 1 X (50-25) 132/33kV				
				Velapur 2 X (50-25) 132/33 kV				
E-1	New Reactor	400 KV		1X125 MVAr, Lonikand - II				
			1X125 MVAr, Solapur					
E-2	Reactor (Shfting)	400 KV	Lonikand - I to Lonikand -II ckt-I					
			Lonikand-I to Lonikand -II ckt-II					
F	Capacitor	33 kV	26 No's S/S - 300 MVAr					
		132 kV	01 No's S/S - 30 MVAR	06 No's S/S - 180 MVAR				
		220kV			05 No's S/S - 300 MVAR			

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation (15)	400 kV	400/220 kV Padghe - II (Kudus) **(Strengthening) Palghar**					**400/220 kV Aarey (Strengthening) Mumbai**
		220 kV			220/33 kV Khandeshwar **(MSEDCL/NMIA) Raigad**	220/22 kV Mankoli / Bhiwandi (**MSEDCL) Thane**	**220/22 kV Dombivali (W) (MSEDCL) Thane**	
				220/22 kV Virar (West) (Chikhal Dongari) **(MSEDCL) Palghar**	220/22 kV Virar (East) (Kopari) **(MSEDCL)**			
				220/132/33 kV Palghar **(MSEDCL/Tribal) Palghar**	220/100/22 kV Pawane **(MIDC) Thane**			
					220/33 kV Ulwe Node **(MSEDCL/NMIA) Raigad**			
					220/33 kV Panchanand-Taloja(**MSEDCL**) Raigad			220/33-22 kV Goregaon Filmcity **(MSEDCL) Mumbai**
		132 kV				132/33 kV Jawhar **(MSEDCL/Tribal) Palghar**		
		100 kV		100/22 kV Kaman (Vasai)/Kharbahv **(MSEDCL) Palghar**				100/33 kV Dighi **(MIDC) Raigad**
B	Link Lines	220 kV			Kalwa-Taloja at Pal Dombivali by using 100 kV Kalwa Khopoli RoW	220 kV Colourchem- Kolshet		
			Borivali - Boisar (M) M/C line at Boisar PG	Boisar- Ghodbunder at Kudus	Sonkhar - Trombay at Vashi		DC line from 400 KV Boisar (PG) - Wada	
				Tarapur - Borivali at Kudus				
		100 kV		Padghe – Bhiwandi at Bapgaon				
				100 kV Ambernath – Mohone at Jambhul	Padghe – Pisse/Panjrapur at Bapgaon			
C -1	2nd ckt stringing	100 kV	Kandalgaon- Mhasala.					
			100 kV Tap (Jithe – Thal) to Gail					
C-2	Reorientation	400 kV	Babhaleshwar –Padghe DC at 400 KV Padghe	400 kV Kalwa - Padghe Ckt 3				
			Padghe-Kalwa DCat 400 KV Padghe					
		220 kV		Interconnecting 220 kV D/C Kharghar - Kandalgaon & Apta- Kalwa - Taloja line at crossing	Padghe – Jambhul			
		110 kV	Pal - Dombivali Tap on Taloja(Restoration of Kalwa- Khopoli D/C)					
C-3	HTLS/ Reconductoring/ Replacement	400 kV		Padghe –Kalwa CKT- I & II				
		220 kV	Mulund -Bhandup Tap to Mulund	Kalwa- Mulund- II				
			Nerul- Sonkhar	Sonekhar-Trombay				
			Kharghar- Trombay	Kalwa - Trombay				
				Boisar (M) - Boisar PG D/C	Mulund - Trombay			
		132 kV	Boisar-II-Lupin- MIDC					
		100 kV		Padghe -Bhiwandi D/C				
D-1	Creation of New Level	220 kV	Jambhul (2 X 50) 220/**22** kV	Vasai (2 X 50) 220/**22** kV				
		100 kV		Gail (2 X 25) 100/**22** kV	Vashi (1x200 MVA) **220**/100kV			
D-2	ICT - Addition	400 kV	Padghe (3 X 167) 400/220 kV Commissioned on dt. 24.11.2017					
			Kalwa (3 X 167) 400/220 kV			Vashi (1x200 MVA) 220/100		
D-3	ICT - Replacement	400 kV						
		220 kV	Vasai 1 X (200-100) 220/100 kV	Vasai 1 X (200-100) 220/100 kV	Taloja 1 X (200-100) 220/110 kV			
D-4	Transformers - Addition	400 kV		Kharghar (1 X 50) 220/33 kV				
		220 kV		ONGC Panvel (1X50) 220/22 kV				
				Anand nagar (1x50), 220/22				
				Padghe (1 X 50) 220/22 kV				
		132 kV		Boisar MIDC (1X50) 132/33 kV				
		100 kV		Neral (1x25), 110/22kV				

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
D-5	Transformers - Replacement	220 kV		Kamba 1 X (100-50) MVA 220/22-22 kV				
				Temghar 1 X (100-50) 220/22-22 kV				
		100 kV		Roha 1 X (50-25) 100/22 kV				
E	Reactor	400 kV	1 X 125 MVAr at Kudus					
F	Capacitor							

EHV PROJECTS CUM O & M ZONE AMRAVATI

FY 2017-18

I) New EHV Substations

Sr No	Name of S/S	District	Total Scope of Work	Remarks
1	220/132 KV Warud II	Amravati	220kV DC line from 220 kV Kalmeshwar – 60 km	To Strengthen System
			LILO of 132 kV Warud - Morshi S/S at 220 kV Warud - 30 kms **(Commissioned)**	
			2 X 100 MVA, 220/132 kV T/FS with bays **(Commissioned)**	
			132 kV Outlets - 4 No's	
2	220/132/33 kV Anjangaon II	Amravati	220 kV D/C line from 220 kV Akola - 45 kms with bays	To strengthen 132 KV network in Anjangaon, Achalpur area and Akot area of Amravati District and Akot area of Akola District and to meet 33KV load requirement of MSEDCL.
			LILO on 132 kV Akot – Anjangaon line at 220 kV Anjangaon S/s - 14 kms with bays	
			LILO on 132 kV Achalpur – Anjangaon line for 220 kV Anjangaon S/s - 9 kms with bays	
			132 kV SCDC line to Daryapur S/s - 30 kms with bays **(Commissioned)**	
			1 X 100 MVA, 220/132 kV ICT'S with bays **(Commissioned)**	
			2 X 25 MVA, 220/33 kV T/F with bays	
			33 kV Outlets – 12 No's	

II) New EHV Lines

A) Link Line:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 KV Wardha(PG) – Yavatmal D/c line	140	Yavatmal	For evacuation of power from Wardha (PG) to load center and reduce loading of 220 KV Wardha-II-Yavatmal- Pusad lines.
2	132 kV	LILO of 132 kV Amravati – Morshi SC line at 220 kV Nandgaon Peth	2	Amravati	To strengthen 132 kV source for Morshi S/s.

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 kV Akot – Hiverkhed SCDC line	29	Akola	To strengthen 132 kV source for Hiverkhed S/s.
2	132 kV	132 kV Washim-Jambazar	41	Akola	To strengthen existing 132 KV network in Washim District.

C) Reorientation of existing Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	Reorienation of 132 KV Paras Substation to 132 KV Akola substation ckt-I at 220 KV Balapur MIDC substation	9	Akola	Evacuation of power from Paras MSPGCL and dismantling of 132 KV Old Paras Switch Yard.
2	132 kV	Reorienation of 132 KV Paras Substation to 132 KV Akola substation ckt-II at 220 KV Balapur MIDC substation	9	Akola	

D) Replacement of conductor:

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 KV Gorakshan Akola	1X 25 MVA, 132/33 kV TF	Akola	Elimination of 11 KV level.
2	220 kV Nandgaon Peth	1 X 100 MVA, 220/132 kV ICT	Amravati	To establish 220 kV level.

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Yavatmal	1 X 100 MVA, 220/132 kV ICT	Yavatmal	To have redundancy.

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Yavatmal	1 X 50 MVA, 220/33kV TF	Akola	To meet upcoming MSEDCL load.

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Akola (Apatapa)	1 X (50-25) MVA, 132/33kV TF	Akola	To meet upcoming MSEDCL load.

V) Capacitor Bank

Sr. No.	Name of Substation	Description	District	Remarks
1	132kV Achalpur S/S	2 x5 MVAR	Amravati	To control Low voltage Problem & maintain voltage profile
2	132kV Morshi S/S	2 x5 MVAR	Amravati	
3	132kV Anjangaon S/S	2 x5 MVAR *	Amravati	
4	132kV Chandur Bazar S/S	2 x5 MVAR	Amravati	
5	132kV Pandharkawada S/S	2 x5 MVAR	Amravati	
6	132kV Darwah S/S	2 x5 MVAR *	Amravati	
7	132kV Ghatanji S/S	2 x5 MVAR	Amravati	
8	132kV Hiwarkhed S/S	2 x 10 MVAR	Akola	
9	132kV Washim S/S	2 x 10 MVAR *	Akola	
10	132kV Karanja S/S	2 x 10 MVAR *	Akola	
11	132kV Motala S/S	1 x 10 MVAR	Akola	
12	132kV Mehkar S/S	2 x 15 MVAR	Akola	
13	132kV Warwat Bakal S/S	2 x 15 MVAR	Akola	

FY 2018-19

I) New EHV Substations

Sr No	Name of S/S	District	Total Scope of Work	Remarks
1	220/132 kV Malkapur	Buldhana	LILO one one ckt of 220 KV M/C line from 220 kV Paras – Balapur at Malkapur - 80 kms	Strengthening of 132 KV network in Buldana District.
			2 X 100 MVA, 220/132 kV ICT	
			Reorientation of 132 kV lines a) LILO on 132 kV Malkapur – Paras circuit & 132 kV Malkapur – Khamgaon circuit to proposed substation (M/C line on M/C tower) – 10 kM	
			LILO on one circuit of 132 kV Malkapur – Bhusawal (Khadka) circuit to proposed substation (D/C line on D/C tower)– 10 kM	
			132 kV Outlets - 7 No's	
2	220/33 kV Ner (Watfali)	Yavatmal	220 kV SC line on DC towers from 220 kV Badnera - 49 kms	To meet additional Load Requirement of MSEDCL for Rural / Agriculture
			2 X 25 MVA, 220/33 kV ICT	
			33 kV Outlets - 06 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Km	District	Remarks
1	220 kV	Wani -Pandharkawada D/c line	40	Yavatmal	To have additional source to Pandharkawada s/s.
2	132 kV	LILO on 132 kV Akot – Hiwarkhed line at 132 kV Warwat Bakal s/s.	20	Akola/ Buldana	To have additional source for 132 KV Hiwarkhed S/s.
3	132 kV	LILO of 132 kV Chandur Bazar – Achalpur SC line at 220 kV Nandgaon Peth	30	Amravati	To strengthen 132 kV source for Chandur Bazar S/s

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132v kV	2nd circuit stringing of 132 KV Durgwada- Anjangaon SCDC line.	35	Akola	Strengthening of 132 kV network in Akola District.
2	132 kV	2nd circuit stringing of 132 kV Malegaon - Mehekar SCDC line.	44	Washim	Strengthening of 132 kV network in Washim District.

C) Reorientation of existing Lines: NIL

D) Replacement of conductor: NIL

III) Reactors :

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Akola	1 X 125 MVAR	Akola	To control high voltage problem.

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Amravati	2 X 25 MVA 132/33 KV	Amravati	To establish 33 KV level.
2	220/132 KV Pandharkawda	1 X 100 MVA, 220/132 kV ICT	Yawatmal	To establish 220 KV level

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Akola	1 X 500MVA, 400/220 kV ICT	Akola	To have redundancy
2	220 kV Balapur	1 X 200MVA, 220/132 kV ICT	Amravati	To have redundancy
3	220 kV Nandgaon Peth	1 X 100 MVA, 220/132 kV ICT	Amravati	To have redundancy

C) Replacement of ICT in existing substation: NIL

D) *Additional Transformer:*

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Durgwada	1 X 25 MVA, 132/33 kV TF	Amravati	To meet the growing Ag. demand in the area
2	132 kV Chandur-bazar	1 X 25 MVA, 132/33 kV TF	Amravati	To meet the growing Ag. demand in the area
3	132 kV Dhad	1 X 25 MVA, 132/33 kV TF	Amravati	To meet MSEDCL Demand

Sr. No.	Name of Substation	Description	District	Remarks
4	132 kV Lalkhedi	1 X 25 MVA, 132/33 kV TF	Akola	Elimination of 11 KV level.
5	132 kV Motala	1 X 25 MVA, 132/33 kV TF	Amravati	To establish 33 KV level in place of existing 66 KV.
6	132 kV Dharni	1 X 25 MVA, 132/33 kV TF	Amravati	To have redundancy and to meet upcoming load.
7	132 kV Digras	1x25 MVA, 132/33 kV T/F	Amravati	To have redundancy and to meet upcoming load.
8	132 kV Risod	1 X 25 MVA, 132/33 kV TF	Washim	To have redundancy and to meet upcoming load.
9	132 kV Buldhana	1 X 25 MVA, 132/33 kV TF	Buldhana	To have redundancy and to meet upcoming load.
10	132 kV Karanaja	1 X 25 MVA, 132/33 kV TF	Washim	To have redundancy and to meet upcoming load.
11	132 kV Dusarbid	1 X 25 MVA, 132/33 kV TF	Akola	To have redundancy and to meet upcoming load.

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132kV Gunj	1 x (50-25) MVA, 132/33 kV T/F	Yavatmal	To have Reliability/Redundancy
2	132 kV Pandharkawda	2 X (50-25) MVA, 132/33kV TF	Yavatmal	To meet the growing Ag. demand in the area.

V) Capacitors

Sr. No.	Name of Substation	Description	District	Remarks
1	220kv Badnera	2 x 5 MVAR	Amravati	To control Low voltage Problem & maintain voltage profile
2	132kV Tiwasa	2 x 5 MVAR	Amravati	
3	220kV Pusad	2 x 5 MVAR	Amravati	
4	132kV Arni	2 x 5 MVAR	Amravati	
5	132kV Jambazaar	2 x 5 MVAR	Amravati	
6	132kV Digras	2 x 5 MVAR	Amravati	
7	132kV Maglurpir	2 x 5 MVAR		
8	132kv Risod	2 x 5 MVAR		

Sr. No.	Name of Substation	Description	District	Remarks
9	132kV Patur	2 x 5 MVAR		
10	132kV Murtizapur	2 x 5 MVAR		
11	132kV Durgwada	1 x 5 MVAR		
12	132kv DeolgaonMahi	2 x 5 MVAR		
13	132kv Dhad	2 x 5 MVAR		
14	132kv Bhuldana	2 x 5 MVAR		
15	132kV Dusarbid	1 x 10 MVAR		
16	132kV khamgaon	2 x 15 MvAR		

FY 2019-20

I) New EHV Substations

Sr No	Name of S/S	District	Total Scope of Work	Remarks
1	132/33 KV Ralegaon	Yavatmal	LILO on 132 kV Yavatmal - Pandharkawada line at Ralegaon - 40 kms	To improve reliability of power supply and voltage profile.
			2 X 25 MVA, 132/33 kV T/F's with bays	
			33 kV Outlets - 4 No's	

I) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 Bhokardhan - Dhad	35	Buldana	To have additional source to Dhad.
2	132 kV	132 kV Durugwada TSS-Murtizapur	10	Amravati	To strengthening of 132 kV Akola Ring main
3	132 kV	132 kV Mutizapur-Karanja	35	Amravati	To strengthen 132 kV Network

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 kV Chikhali – Dusarbid SCDC line	51	Buldhana	To strengthen 132 kV source for Dusarbid S/s

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

II) Reactors: Nil

III) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Ner s/s	1 X 100 MVA, 220/132 kV ICT	Yavatmal	To have second source 132 kV Babhulgaon s/s
2	220 kV Warud	2 X 25 MVA, 220/33 kV T/F.	Amravati	To have 33 kV outlets for meeting Discom load.

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer:

E) Replacement of Transformer:

IV) Capacitors:

Sr. No.	Name of Substation	Description	District	Remarks
1	220kV Dhamangaon	2 X 5 MVAR	Amravati	To control Low voltage Problem & maintain voltage profile
2	220kV Nandgaon peth	2 X 5 MAVR	Amravati	
3	132kV Daryapur	2 x 10 MVAR	Amravati	
4	132kv Dharni	2 x 10 MVAR	Amravati	
5	132kv Warud	2 x 10 MVAR	Amravati	
6	220kV Yavatmal	2 x 10 MVAR	Amravati	
7	220kV Wani	2 x 10 MVAR	Amravati	
8	132kV Yavatmal MIDC	2 X 15 MVAR	Amravati	
9	132kV Gunj	2 x 15 MVAR	Amravati	
10	132kV Umarkhed	2 x 15 MVAR	Amravati	
11	220kV Balapur	2x5MVAR	Amravati	
12	220kV Chikhali	2x15MVAR	Amravati	
13	132kV Akot	2x5MVAR	Amravati	
14	132kV Malegaon	1x15MVAR	Amravati	
15	132kV Malkapur	2x15MVAR	Amravati	
16	132kV Deulgaon Raja	2x5MVAR	Amravati	
17	132kV Jalgaon Jamod	2x5MVAR	Amravati	
18	132kV Chandur Bazar	2x15 MVAr, 132kV	Amravati	
19	132kV Digras	2x15 MVAr, 132kV	Amravati	
20	132kV Ghatanji S/S	2x15 MVAr, 132kV	Amravati	
21	132 kV Akot	2x15 MVAr, 132kV	Akola	

22	132 kV Risod	2x15 MVAr 132kV	Akola	
23	132 kV Karanja	2x15 MVAr, 132kV	Akola	
24	132 kV Mehkar	2x15 MVAr, 132kV	Akola	
25	132 kV Deulgaon Raja	2x15 MVAr, 132kV	Akola	
26	132 kV Jalgaon Jamod	2x15 MVAr, 132kV	Akola	
27	132 kV Buldhana	2x15 MVAr, 132kV	Akola	

FY 2020-21

I) New EHV Substation

Sr No	Name of S/S	District	Total Scope of Work	Remarks
1	132/33 kV Mukutban	Yavatmal	LILO on one ckt of 132 kV Wani – Pandharkawada line at 132 kV Mukutban - 80 ckt kms	To meet agriculture load and improvement in reliability and voltage profile.
			2 X 25 MVA, 132/33 kV T/F's with bays	
			33 kV Outlets - 4 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV Yavatmal Tap – Ghatodi line.	25	Yavatmal	To strengthen the system in the area.
2	132 kV	132 kV Deulgaon Raja-Jafrabad line	25	Akola	To strengthen the system in the area.
3	132 kV	132 kV Yavatmal-Yavatmal MIDC line at Darwha	40	Yavatmal	To meet MIDC demand.
4	132 kV	132 kV Ner-Darvha D/C	60	Yavatmal	To establish another source to Ner.

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	2nd circuit stringing of 132 kV Chikhali - Khamgaon SCDC line.	60	Buldhana	Strengthening of 132 kV network in Buldhana District.

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: NIL

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Ner	1 X 100 MVA, 220/132 kV ICT	Yavatmal	To have 132 kV source from Ner to Babhulgaon.

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Pusad	60 MVAr, 220 kV	Amravati	To control Low voltage Problem

FY 2021-22

I) New EHV Substation

Sr No	Name of S/S	District	Total Scope of Work	Remarks
1	132/33 kV Karajgaon / Asegaon	Amravati	LILO on 132 kV Chandur Bazar - Achalpur line at Karajgaon - 20 kms 2 X 25 MVA, 132/33 kV T/F's with bays 33 kV Outlets - 6 No's	To meet agriculture load and improvement in reliability and voltage profile.
2	132/33 KV Babhulgaon	Yavatmal	132 kV DC line from 220 kV Ner S/s – 25 kms 2 X 25 MVA, 132/33 kV T/F's with bays 33 kV Outlets - 6 No's	To improve reliability of power supply and voltage profile.

II) New EHV Lines

A) Link Lines:

B) Second circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil
E) Replacement of Transformer: Nil

V) Capacitors: Nil

FY 2022-23

I) New EHV Substation

Sr No	Name of S/S	District	Total Scope Of Work	Remarks
1	220/132/33 kV Lonar	Buldhana	220 kV LILO On Chikali Jalana -60 kM	To meet additional Load Requirement of MSEDCL & sytem strengthening in Buldhana.
			132 kV Lonar Mehekar DCDC - 20 km	
			132 kV DCDC to Risod – 27 kM	
			2 X 100 MVA, 220/132 kV ICT	
			2 X 25 MVA, 132/33 kV	
2	132/33 kV Karanja (Ramzanpur) / Wadai Satwai	Akola	132 kV D/C line from 220 kV Balapur – Karanja - 25 kms	To improve reliability of power supply and voltage profile.
			2 X 25 MVA, 132/33 kV T/F with bays	
			33 kV Outlets - 6 No's	

II) New EHV Lines

A) Link Lines: Nil

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	2nd circuit stringing of 132 kV Nepanagar – Dharni SCDC line.	60	Yavatmal	Providing second source to 132 kV Dharni s/stn..

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors: Nil.

EHV PROJECTS CUM O & M ZONE AURANGABAD

FY 2017-18

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Partur	Jalna	220 kV D/C line from 220 kV Jalna MIDC (Nagewadi) - 220 kV Partur s/s – 100 ckt kms	To improve reliability and voltage profile. (*4, *3(c))
			LILO on 132 kV Parbhani - Partur line at 220 kV Partur s/s – 10 ckt kms.	
			LILO on 132 kV Partur - Mantha line at 220 kV Partur s/s – 10 ckt kms **(Commissioned)**	
			2 X 100 MVA, 220/132 kV ICT's **(Commissioned)**	
			2 X 50 MVA 220/33 kV T/f **(Commissioned)**	
			33 kV Outlets - 6 no's	
2	220/132/33 kV Jalna MIDC (Nagewadi)	Jalna	220 kV D/C line from 400 kV Aurangabad - II (Thaptitanda) to Jalna MIDC (Nagewadi) – 90 ckt kms	To improve reliability and voltage profile. (*4, *3(c))
			LILO on one circuit of 220 kV D/C Waluj - Jalna line at 220 kV Jalna MIDC (Nagewadi) – 30 ckt kms	
			132kV LILO on existing 132kV Jalna (old)-Jafrabad line at 220 kV Jalna (Nagewadi) s/s – 15 km	
			132 kV LILO on 132kV Jalna (MIDC) to 220kV Jalna s/s at 220kV Jalna (Nagewadi) s/s– 0.5 km	
			2 x 200MVA 220/132 kV ICTs with bay	
			2 x 50 MVA 220/33 kV T/Fs with bay	
			33 kV Outlet – 12 nos.	
3	220/33 kV Krishnoor	Nanded	220 kVD/C line (partly on M/C) from 400 kV Nanded - Krishnoor – 17 ckt kms	To meet load in Nanded district and improvement in reliability and voltage profile. (*1(b), *4)
			2 x 50 MVA, 220/33 kVT/fs	
			33 kV bays - 12 no's	
4	132/33kV Sengaon	Hingoli	132 kV Hingoli - Shengaon D/C line from 220 kV Hingoli s/s – 60 ckt kms	To meet the load growth in Hingoli District. (*1(c))
			2 x 25 MVA, 132/33 kV T/F with bay	
			33 kV bays - 8 nos.	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	LILO of another ckt of 400 kV Bhusawal-II To Aurangabad-I at 400 kV Tapthi Tanda	177	Aurangabad	Strengthening of 400 kV network nearby Aurangabad. (*3(c))
2	220kV	Interlinking of Waluj-Chitegaon with Padegaon- Sawangi	15	Aurangabad	Same will create the 3rd circuit between 220kV Waluj & 220kV Padegaon Substation which will ultimately reduce the load on existing 220kV Waluj – Padegaon DCDC Line.
3	132 kV	132 kV LILO on Beed Raimoha for 220 kV Beed S/s.	14.7	Beed	To reduce overloading of 132 KV Beed Raimoha line (*3(c))
4	132 kV	132 kV SCDC line from 220 kV Bhokar-132 kV Tamsa.	23	Nanded	To strengthen 132 kV network for 132 kV Tamsa and Himayatnagar Substations (**3(c), *4)
5	132 kV	132 kV D/C line from Garware (EHV Consumer) to Bajaj (EHV consumer)	6	Aurangabad	To strengthen 132 kV network between 220 kV Padegaon and 132 kV Waluj S/s. (**3(c), *4)
6	132 kV	132kV Shendra -Chikaltahna line	12	Aurangabad	To strengthen 132 kV network

B) Second Circuit stringing:

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	Second ckt stringing of 220 kV Padegaon - Sawangi SCDC line.	17.4	Aurangabad	To reduce overloading of 220 kV DC line from 400 kV Aurangabad-I (Waluj) - Padegaon. (*3(c))
2	132 kV	2nd circuit stringing of 132 kV Gangapur - Canpack SCDC line.	30	Aurangabad	To strengthen 132 kV network. (*4)
3	132 kV	Tap to LILO Killari on Ujani - Omerga	4	Latur	

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
4	132 kV	2nd circuit stringing of 132 kV SCDC line from 220 kV Parbhani - Pathri.	48	Parbhani	To strengthen 132 kV network. (*4)
5	132 kV	2nd circuit stringing of 132 kV SCDC line from 220 kV Bhokardan - Rajur.	26	Jalna	

C) Reorientation of existing Lines: Nil

D) *Replacement of conductor: Nil*

III) Reactor:

A) New: *Nil*

B) Shifting : Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Parbhani	2 X 50 MVA, 220/33 kV	Parbhani	To reduce loading of 132 kV Parbhani S/s (*3 (c))
2	220 kV Jalkot	2x 25 MVA, 132/33 kV	Latur	To have Reliability/Redundancy

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Jalna	1 X 200 MVA, 220/132 kV ICT	Jalna	Up gradation of 33 kV Consumers to 132 kV level. (*1) To increase reliability (*4)

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Waluj	1 X 50 MVA, 132/33 kV TF	Aurangabad	To increase reliability (*4)

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Waluj	2 X (100-50) MVA, 220/33-33 kV	Aurangabad	To meet upcoming industrial load & for redundancy. (*1 (a) & *3(c))

V) Capacitor :

Sr. No.	Name of Substation	Description	District	Remarks
1	132kV Pishor	1 X 5 MVAR	Aurangabad	To control Low Voltage Problem (*3 (b))
2	132kV Kannad	1 X 5 MVAR	Aurangabad	
3	132kV Gangapur	1 X 5 MVAR	Aurangabad	
4	132kV Vaijapur	2 X 5 MVAR	Aurangabad	
5	132kV Ambad	2 X 5 MVAR	Aurangabad	
6	132kV Partur	2 X 5 MVAR	Aurangabad	
7	132kV Akhada Balapur	2 X 5 MVAR	Aurangabad	
8	132kV Pathri	2 X 5 MVAR	Aurangabad	
9	132kV Purna	2 X 5 MVAR	Aurangabad	
10	132kV Ashti	1X5MVAR on 33kV	Aurangabad	
11	132kV Omerga	1X5MVAR on 33kV	Aurangabad	
12	132kV Nilanga	2X5MVAR on 33kV	Aurangabad	
13	132kV Chakur	1X5MVAR on 33kV	Aurangabad	
14	132kV Udgir	1X5MVAR on 33kV	Aurangabad	
15	132kV Himayatnagar	2X5MVAR on 33kV	Aurangabad	

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I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/33 kV Shendra (DMIC) GIS	Aurangabad	LILO on one circuit of 220 kV DC line from 400 kV Aurangabad (PG) – Shendra at 220kV Shendra (AURIC) (DMIC Project) – 8 Km 2 X 50 MVA, 220/33 kV T/F 33 kV Outlets - 8 No's	To meet upcoming demand of Shendra (DMIC Project). (*1(a))
2	220/132/33 kV Jalkot	Latur	220 kV D/C line from 400 kV Nanded to Jalkot - 120 ckt kms. LILO on 132 kV Chakur - Ahmedpur SCDC line at 220 kV Jalkot – 50 ckt kms 132 kV SCDC from 220 kV Jalkot - 132 kV Udgir- 25 km 2 x 100 MVA 220/132 kV ICT with Bay 2 x 25 MVA 220/33 kV T/f 33 kV bays - 6 nos.	To improve reliability and voltage profile. (*4, *3(c))

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	LILO on both circuits of 220 kV Parli - Harangul line at Parli (PG)	20	Beed	To reduce loading of 400 kV Girawali S/s and evacuation of power from Parli PG S/s (*2, 3(c)).
2	220 kV	LILO on 220 kV Parli - Osmanabad S/C line at Parli (PG)	10	Beed	
3	132 kV	132 kV SCDC line from 220 kV Bhokar - 132 kV Himayatnagar.	32	Nanded	To strengthen 132 kV network for 132 kV Tamsa and Himayatnagar Substations (*4)
4	132 kV	LILO of 132kV Mukhed-Kundalwadi at Krishnoor	25	Nanded	To strengthen 132 kV source (*3 b).
5	132kV	LILO on one ckt of 132 kV Ambad – Ghansawangi D/c line at 220 kV Partur.	60	Jalna	To strengthen 132 kV source (*3 b).
6	220 kV	LILO on one ckt of Padegaon – Paithan DC line at 220 kV Chitegaon.	5	Aurangabad	To reduce loading of 220 kV Padegaon s/s. (*3c)

B) Second Circuit stringing:

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 kV Beed - Georai line 2nd ckt stringing	36	Beed	Strengthening of 132 kV network (*3(c), *4)
2	132 kV	2nd ckt stringing of 132 kV Partur –Mantha SCDC Line	24	Jalna	
3	132 kV	2nd ckt stringing of 132 kV Ambad – Ghansawangi SCDC Line	25	Jalna	
4	132 kV	2nd ckt stringing of Latur – Renapur Tap for Ahmedpur s/s (Conversion Tap to LILO)	45	Latur	
5	132 kV	2nd ckt stringing of 132 kV SCDC Line from 220 KV Bhokardan - Jafrabad	29	Jalna	

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 kV Latur – Ujani-Naldurg-Solapur DC line renovation using 0.2 ACSR conductor (GEC)	115	Beed	Strengthening of 132 kV network (*3(c), *4)

III) Reactors:

A) New :

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Nanded	1 X 125 MVAR	Nanded	To control high voltage problem. (*3(a))

B) Shifiting

Sr. No.	Particulars	Capacity of Reactor	Remarks
1	Shifting of line Reactor from 400 kV Parli to 400 kV Nanded s/s on Chandrapur -Nanded line.	1 X 50 MVAR	To reduce reactive power and improve voltage profile. (*3(b))
2	Shifting of line Reactor from 400 kV Parli to 400 kV Nanded s/s on Chandrapur -Nanded line.	1 X 50 MVAR	

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Thapti Tanda	(1X25) 220/33 kV	Aurangabad	To meet additional load demand of MSEDCL
2	220 kV Krishnoor	1 X 100 MVA 220/132 kV	Nanded	To strengthen 132 kV network in Narsi, Degloor and Kundalwadi in Nanded District. (*4)
3	220kV Patoda	2x100 MVA 220/132 kV	Beed	To create 132 kV level for 132 kV N/W strengthening

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Chitegaon	1 X 200 MVA, 220/132 kV ICT	Aurangabad	To have Reliability/Redundancy & to be reviewed after Shendra 132 kV Level creation
2	220 kV Hingoli	1 X 200 MVA, 220/132 kV ICT	Hingoli	To have Reliability/Redundancy
3	220 kV Harangul	1 X 200 MVA, 220/132 kV ICT	Latur	To have Reliability/Redundancy

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Girawali	1 X (500-315) MV, 400/220 kV ICT	Aurangabad	To have Reliability/Redundancy

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Osmanabad	1 X 50 MVA 220/33 kV TF	Osmanabad	To meet upcoming MSEDCL load.(* 1(c))
2	132kV Harsul	1 X 50 MVA 132/33 kV TF	Aurangabad	To meet upcoming MSEDCL load.(* 1(c))
3	132kV Purna	1 X 25 MVA 132/33 kV TF	Parbhani	To meet upcoming MSEDCL load.(* 1(c))
4	132kV Ashti	1 X 50 MVA 132/33 kV TF	Beed	To meet upcoming MSEDCL load.(* 1(c))

Sr. No.	Name of Substation	Description	District	Remarks
5	132kV Nilanga	1 X 50 MVA 132/33 kV TF	Latur	To meet upcoming MSEDCL load.(* 1(c))
6	132kV Ilichpur	1 X 25 MVA 132/33 kV TF	Nanded	To meet upcoming MSEDCL load.(* 1(c))
7	132kV Kagzipura	1 X 25 MVA 132/33 kV TF	Aurangabad	To meet upcoming MSEDCL load.(* 1(c))
8	132kV Jafrabad	1 X 25 MVA 132/33 kV TF	Jalna	To meet upcoming MSEDCL load.(* 1(c))
9	132 kV Killari	1 X 25 MVA, 132/33 kV TF	Latur	To meet upcoming MSEDCL load.(* 1(c))
10	132 kV Umri	1 X 25 MVA 132/33 kV T/f	Nanded	To increase reliability (*4)
11	132 kV Deolai	1 X 25 MVA, 132/33 kV T/F	Aurangabad	To meet upcoming MSEDCL load.(* 1(c))
12	132 kV Basmath	1x 25 MVA 132/33 kV T/f	Hingoli	To meet upcoming MSEDCL load.(* 1(c))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220kV Hingoli	1 X (50-25) MVA, 220/33 kV T/F	Hingoli	To increase reliability (* 4)
2	220kV Jalna	2 X (100-50) MVA, 220/33-33 kV T/F	Jalna	To increase reliability (* 4)
3	132kV Latur (K)	1 X (50-25) MVA, 132/33 kV T/F	Latur	To increase reliability (* 4)
4	132kV Udgir	1 X (50-25) MVA, 132/33 kV T/F	Latur	To increase reliability (* 4)
5	132 kV Killari	1 X (50-25) MVA 132/33 kV T/f	Latur	To increase reliability (*4)
6	132 kV Ambad	1 X (50-25) MVA 132/33 kV T/f	Jalna	To increase reliability (* 4)
7	132 kV Ardhapur	1 X (50-25) MVA 132/33 kV T/f	Jalna	To increase reliability (* 4)

V) *Capacitors:*

Sr. No.	Name of Substation	Description	District	Remarks
1	220KV BHOKARDAN	2 X 5 MVAR	Jalna	To control Low voltage Problem & maintain voltage profile
2	132KV JAFRABAD	2 X 5 MVAR	Jalna	
3	132KV RAJUR	2 X 5 MVAR	Jalna	
4	132KV MANTHA	2 X 5 MVAR	Jalna	
5	220KV PHULAMBRI	2 X 5 MVAR	Aurangabad	
6	132KV GHANSAWANGI	2 X 5 MVAR	Jalna	
7	220KV HINGOLI	2 X 5 MVAR	Hingoli	

8	132KV BASMAT	2 X 5 MVAR	Hingoli	
9	132KV KAIJ	2 X 5 MVAR	Beed	
10	132KV RAIMOHA	2 X 5 MVAR	Beed	
11	132KV BHOOM	2 X 5 MVAR	Osmanabad	
12	132KV MAJALGAON	2 X 5 MVAR	Beed	
13	220KV TULJAPUR	2 X 5 MVAR	Osmanabad	
14	220KV OSMANABAD	2 X 5 MVAR	Osmanabad	
15	132KV GEVRAI	1 X 5 MVAR	Beed	
16	132KV KILLARI	2 X 5 MVAR	Latur	
17	132KV AUSA	2 X 5 MVAR	Latur	
18	132KV MUKHED	1 X 5 MVAR	Nanded	
19	220KV MURUD	2 X 5 MVAR	Latur	
20	132KV DEGLOOR	2 X 5 MVAR	Nanded	

FY 2019-20

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Narangwadi	Osmanabad	220 kV DC line from 400 kV Solapur (PG) – Narangwadi – 140 ckt kms.	Strengthening of 132 kV network in Naldurg, Nilanga, Omerga area & improvement in voltage profile (*3(b),*3 (c))
			LILO on 132 kV Nilanga - Omerga at Narangwadi – 30 ckt kms	
			LILO on 132 kV Killari - Omerga at Narangwadi – 14 ckt kms	
			2 X 100 MVA, 220/132 kV ICT.	
			2 X 50 MVA, 220/33 kV T/f	
2	220/132 kV Kurunda GIS	Hingoli	220 kV DC line from 400 kV Nanded - 60 ckt kms	To evacuate power from 400 kV Nanded & to reduce loading of 220 kV Wardha – Pusad - Hingoli line. (*2)
			LILO on 220 kV Ghatodi - Hingoli line - 25 kms	
			2 X 100 MVA 220/132 KV ICT with bays.	
			132 kV interconnection of LV side (132 kV) of 220/132 kV ICT with existing 132 kV Kurunda AIS bus – 1.5 km.	
			Reorientation of 132 kV lines at 220 kV Kurunda with bays – 30 ckt kms.	
2	132/33 kV Sarola	Beed	132 kV SCDC line from Kaij - 30 ckt kms.	To improve the voltage profile and to meet the upcoming load. (*3(c), *1(c))
			132 kV SCDC line from 220 kV Manjarsumba s/s – 25 ckt kms.	
			2 X 25 MVA, 132/33 kV T/f.	
			33 kV Outlets - 6 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
1	132	Bhokardan - Sillod	40	Jalna	To Strengthen 132 kV System
2	132	LILO on 132 kV Jintoor -Yeldari line at 220 kV Partur .	75	Parbhani	To Strengthen 132 kV System
3	132	LILO on 132 kV Kagzipura- Kannad line at 220 kV Deogaon Rangari.	30	Aurangabad	Remaining scope of 220 kV Deogaon Rangari S/s. (*5)
4	132	132 kV Majalgaon – Pathri SCDC line.	35	Beed/Parbhani	To Strengthen 132 kV System

B) Second Circuit stringing:

Sr. No.	Voltage	Name of Line	Length of Line Ckt Km	District	Remarks
1	132	2nd ckt Stringing of 132 KV Kurunda-Basmat SCDC Line	14	Nanded	To strengthen 132 KV network. (*4)
2	132	2nd ckt stringing of 132 kV Narsi-Degloor SCDC Line	18	Nanded	
3	132	2nd ckt stringing of 132 kV Himayatnagar –Kinwat line	50	Nanded	
4	132	2nd ckt stringing of 132 kV Telgaon-Majalgaon SCDC line	21	Beed	

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors:

A) New :

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Waluj	1 X 125 MVAR	Aurangabad	To control high voltage problem. (*3(a))

B) Shifting : Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Manjarsumba	1 X 100 MVA, 220/132 kV ICT	Beed	Creation of 132 kV level for 132 kV Sarola and Kaij Substations. (*4)

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Krishnoor	1 X 100 MVA, 220/132 kV ICT	Nanded	To increase reliability. (*4)

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: NIL

V) Capacitors:

Sr. No.	Name of Substation	Description	District	Remarks
1	220KV Devgaon Rangari	2 x 5 MVAR	Aurangabad	To control Low Voltage Problem (*3 (b))
2	132KV Paithan	2 x 5 MVAR	Aurangabad	
3	132KV Mahakala	2 x 5 MVAR	Aurangabad	
4	132KV Soygaon	2 x 5 MVAR	Aurangabad	
5	132KV Badnapur	2 x 5 MVAR	Aurangabad	
6	132KV Kagzipura (Khultabad)	2 x 5 MVAR	Aurangabad	
7	132KV Pangri	2 x 5 MVAR	Beed	
8	132KV Telgaon	2 x 5 MVAR	Beed	
9	220KV Beed	2 x 5 MVAR	Beed	
10	220KV Manjersumba	2 x 5 MVAR	Beed	
11	220KV Paranda	2 x 5 MVAR	Osmanabad	
12	132KV Naldurga	2 x 5 MVAR	Osmanabad	
13	132kV Kallamb	2 x 5 MVAR	Osmanabad	
14	220KV Patoda	2 x 5 MVAR	Beed	
15	220KV Harangul	2 x 5 MVAR	Latur	
16	132kV Ahmedpur	2 x 5 MVAR	Latur	
17	132kV Niwali	2 x 5 MVAR	Latur	
18	132kV Ujani	1 x 5 MVAR	Latur	
19	220kV Bhokar	2 x 5 MVAR	Nanded	
20	132kV Kinwat	2 x 5 MVAR	Nanded	
21	132 Kundalwadi	2 x 5 MVAR	Nanded	
22	132kV Ardhapur	2 x 5 MVAR	Nanded	
23	132kV Umri	2 x 5 MVAR	Nanded	
24	132kV Tamsa	2 x 5 MVAR	Nanded	
25	132kV Narsi	2 x 5 MVAR	Nanded	
26	132kV Kandhar	1 x 5 MVAR	Nanded	

FY 2020-21

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132 kV Georai	Beed	220 kV DC line from 400 kV Thapti Tanda s/s with bays – 140 ckt kms.	To evacuate power from 400 KV Thapti Tanda s/s. (*2 & *3 (c))
			2 X 100 MVA, 220/132 kV ICT	
			LILO on one ckt of 132 kV Beed – Georai line at 220 kV Georai with bays -10 ckt kms.	
			132 kV Georai – Majalgaon SCDC line with bays - 50 ckt kms.	
			LILO on 132 kV Georai – Mahakala SC line at 220 kV Georai with bays -10 ckt kms.	
2	132/33 kV Utwad (Ramnagar)	Jalna	LILO on 132 kV Jalna (old) - Partur line -24 ckt kms	To reduce loading of 132 kV Jalna (Kanhiyanagar) s/s. (*3(c))
			2 X 25 MVA 132/33 kV T/F	
			33 kV Outlets - 4 No's	
3	132 kV Barashiv (Hanuman Nagar) / Aundha	Hingoli	132 kV DC line from 220 kV Kurunda (prop) S/S with bays - 60 ckt kms.	To improve voltage profile in Hingoli District (*3 b)
			2 X 25 MVA, 132/33 kV T/F with bays.	
			33 kV Outlets - 6 No's.	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	765 kV	765 kV DC line between 765 kV Aurangabad (MSETCL) to Aurangabad (PG)	20	Aurangabad	To have internal line with National grid at 765 kV level. (*4)
2	132	132 kV Naldurg - Ujani S/C line at 220 kV Tuljapur S/s	30	Osmanabad	To strengthen 132 kV network at Naldurg- Ujani area. (**3(c), *4)
3	132	LILO on 132 kV Sawangi - Pishor S/C at 220/132 kV Phulambri S/s.	20	Aurangabad	To improve the voltage profile and to meet the upcoming load.(*3(c), *4)
4	132	LILO on 132 kV Padegaon - Sillod (Pishor) S/C at 220/132 kV Phulambri S/s.	20		To improve the voltage profile and to meet the upcoming load (*3(c), *4)
5	132	132kV Shendra –Deolai line	25	Aurangabad	To Strengthen System

B) Second Circuit stringing:

Sr. No	Voltage Level	Name of Line	Length of Line CKT Km	District	Remarks
1	132	2nd ckt stringing of 132 kV Jalna– Jafrabad SCDC Line	40	Jalna	To strengthen 132 kV network. (*4)
2	132	2nd ckt stringing of 132 kV Kandhar-Mukhed SCDC Line	32	Nanded	
3	132	2nd ckt stringing of 132 kV Basmat - Purna SCDC Line	22	Parbhani	
4	132	2nd ckt stringing of 132 kV Nilanga- Omerga SCDC Line	35	Latur	

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors:

A) New

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Girwali	1 X (125 – 50)MVAR	Beed	To control high voltage problem. (*3(a))

B) Shifting: NIL

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Shendra	2X 100 MVA 220/132 kV	Beed	To Strengthen System

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Manjarsumba	1 X 100 MVA 220/132 kV	Beed	To have redundancy for 132 kV network. (*4)

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 KV Paithan	2 x 15 MVAR	Aurangabad	To co ntrol Low Voltage Problem (*3 (b))
2	132 KV Ghansawangi	2 x 15 MVAR	Aurangabad	
3	132 KV Purna	2 x 15 MVAR	Aurangabad	
4	132 KV Vaijapur	2 x 15 MVAR	Aurangabad	
5	132 KV Georai	2 x 15 MVAR	Beed	
6	132 KV Telgaon OR 132 KV Majalgaon	2 x 15 MVAR	Beed	
7	132 KV Bhoom	1 x 15 MVAR	Beed	
8	132 KV Ausa	2 x 15 MVAR	Beed	
9	132 KV Kaij	2 x 15 MVAR	Beed	
10	132 KV Ahmedpur	2 x 15 MVAR	Beed	
11	132 KV Naldurga	2 x 15 MVAR	Beed	
12	132kV Pishor	1X15MVAR on 132kV level.	Aurangabad	
13	132kV Kannad	1X15MVAR on 132kV level.	Aurangabad	
14	132kV Gangapur	1X15MVAR on 132kV level.	Aurangabad	
15	132kV Vaijapur	2X5MVAR on 33kV level.	Aurangabad	
16	132kV Ambad	1X15MVAR on 132kV level.	Aurangabad	
17	132kV Akhada Balapur	1X15MVAR on 132kV level.	Aurangabad	
18	132kV Pathri	1X15MVAR on 132kV level.	Aurangabad	
19	132kV Ashti	2X15MVAR on 132kV level.	Beed	
20	132kV Omerga	2X15MVAR on 132kV level.	Beed	
21	132kV Nilanga	1X15MVAR on 132kV level.	Beed	
22	132kV Chakur	1X15MVAR on 132kV level.	Beed	
23	132kV Udgir	2X15MVAR on 132kV level.	Beed	
24	132kV Himayatnagar	1X15MVAR on 132kV level.	Beed	

FY 2021-22

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
3	220/33 kV Bidkin DMIC	Aurangabad	220 kV DC line from 400 kV Aurangabad (PG) – Bidkin – 40 ckt kms 2 X 50 MVA, 220/33 kV T/Fwith bays. 33 kV Outlets - 6 No's.	To meet upcoming load of MIDC (*1(a))

II) New EHV Lines

A) Link Lines:

Sr. No	Voltage Level	Name of Line	Length of Line CKT Km	District	Remarks
1	220 kV	220kV Jalna (Nagewadi)-Bhokardan line.	60	Jalna	To strengthen 132 kV network. (*4)
2	132 kV	LILO on 132 kV Mukhed - Kundalwadi at 132 kV Narsi.	30	Nanded	To have additional source to 132 kV Mukhed- Kundalwadi s/s. (*4)
3	132 kV	132 kV Kharda –Ashti DC line	40	Beed /Ahmednagar	Alternate source to Ashti S/S as well as strengthening for wind power evacuation. (*2, *3(c), *4)
4	132 kV	LILO on 132kV Kharda-Ashti line at 220kV Patoda s/s	60	Beed /Ahmednagar	To strengthen 132 kV network. (*4)
5	132 kV	132 kV Paithan-Mahakal line	50	Parbhani	To strengthen 132 kV network. (*4)

B) Second circuit stringing:

Sr. No	Voltage Level	Name of Line	Length of Line CKT Km	District	Remarks
1	132 kV	2nd ckt stringing of 132 kV Himayatnagar - Umarkhed line	29	Nanded	To strengthen 132 kV network. (*4)
2	132 kV	2nd ckt stringing of 132 KV Partur-Jalna (Old) SCDC Line	49	Latur	
3	132 kV	2nd ckt stringing of 132 kV SCDC Line from 220 kV Hingoli – Akhada Balapur	35	Hingoli	

4	132 kV	2nd ckt stringing of 132 kV Kurunda – Akhada Balapur	39	Hingoli	
5	132 kV	2nd ckt stringing of 132 kV Umri-Kundalwadi.	29	Nanded	
6	132 kV	2nd ckt stringing of 132 kV Bhairavnath - Kharda	20	Osmanabad	

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Phulambiri	2X 100 MVA 220/132 kV	Aurangabad	To be reviewed after 132 kV Level creation at Shendra

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors: Nil

FY 2022-23

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	132/33 kV Mahur	Nanded	132 kV Kinvat - Mahur SCDC line - 45 kms	To meet upcoming load of MSEDCL (*1(a))
			132 kV Gunj - Mahur SCDC line - 25 kms	
			2 X 25 MVA, 132/33 kV T/Fwith bays.	
			33kV Outlets -4 No's.	

II) New EHV Lines

A) Link Lines:

Sr. No	Voltage Level	Name of Line	Length of Line CKT Km	District	Remarks
1	132 kV	LILO on 132 kV Pathardi-Raimoha at 220kV Patoda s/s-OR 132 kV Patoda – Raimoha SCDC	20	Beed	To strengthen 132 kV network
2	132 kV	132 kV Kinwat-Gunj SC DC line	70	Nanded	To strengthen 132 kV network

B) Second circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) *Creation of new level in existing substation: Nil*

B) *Additional ICT in existing substation: Nil*

C) *Replacement of ICT in existing substation: Nil*

D) *Additional Transformer: Nil*

E) *Replacement of Transformer: Nil*

F) Capacitors: Nil

EHV PROJECTS CUM O & M ZONE KARAD

FY 2017-18

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	400/220 kV Alkud **(Commissioned)**	Sangli	LILO of one ckt of 400 kV South Solapur (PG) - Kolhapur DC line at 400 kV Alkud – 30 ckt kms **(Commissioned)**	Strengthening of existing network and evacuation of Wind power in Sangli District (*2, *3(c))
			LILO of one ckt of 220 kV Vita Mhaishal (on Miraj line) DC line – 36 ckt kms	
			LILO of one ckt of 220 kV Mhaishal - Jath line – 46 ckt kms	
			2 X 500 MVA 400/220 kV ICT 1 X 167 MVA , 400/220 kV spare ICT **(1 ICT Commissioned)**	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV Karad - Koyna SCDC line	49	Satara	Evacuation of power from Koyna (Dam foot) power generation.(*2)
2	132 kV	132 kV Kudal - Kankavali SCDC line.	31	Sindhudurg	To strengthen 132 kV network for 132 kV Kudal S/S (*3(c))
3	110 kV	132 kV SCDC line from 220 kV Ogalewadi - Mayani	45	Satara	Up gradation of existing 110 kV line to 132 kV (*4)
4	110 kV	Kavathe Mahakal - Savalaj SCDC line	30	Sangli	To have redundancy to 132 kV Savalaj S/S (*4)
5	110 kV	Conversion of 110 kV SC line to 132 kV DC line using same ROW (Tap to LILO) of 110 kV Ashta s/s.	4	Sangli	To reduce loading of existing 110 kV Ashta S/S (*3(c))
6	110 kV	132 kV SCDC line from 220 kV Peth to 110 kV borgaon.	30	Sangli	To have nearest 132 kV source for Borgaon S/S (*4)
7	110 kV	132 kV interlink from 220 kV Jath to 110 kV Jath	2	Sangli	To have local source to Jath s/s. (*4)

B) Second Circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	110 kV	Replacement of conductor of existing 110 kV Ogalewadi – Atit SC line with ACSS conductor	15	Satara	To overcome overloading problem of Ogalewadi – Atit line. (*3(c))

III) Reactors:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Karad	1 X 125 MVAR	Satara	To control high voltage problem. (*3(a))
2	400 kV Kolhapur	1 X 125 MVAR	Kolhapur	To control high voltage problem. (*3(a))

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Peth	1 X 100 MVA, 220/110 kV Xmer	Sangli	For interlinking 220 kV Peth S/s to 110 kV Borgaon S/s (*3(c))

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Satara MIDC	1 X (50-25) MVA, 132/110 kV ICT	Satara	To meet upcoming load of Urmodi LIS (*1(a))

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Five Star MIDC	1 X 50 MVA, 220/33 kV TF	Kolhapur	To meet upcoming MSEDCL load (*1(a))
2	220 kV Oni	1 X 25 MVA, 220/33 kV TF	Ratnagiri	To meet upcoming MSEDCL load (*1(a))

Sr. No.	Name of Substation	Description	District	Remarks
3	220 kV Kharepatan	1 X 25 MVA, 220/33 kV TF	Sindhudurg	To meet upcoming MSEDCL load (*1(a))
4	110 kV Gokul Shirgaon	1 X 50 MVA, 132-110/33 kV TF	Kolhapur	To meet upcoming MSEDCL load (*1(c))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Ogalewadi	1 X (50-25) MVA, 132-110/33 kV TF	Satara	To reduce loading (*3(c))
2	110 kV Ichalkaranji	1 X (50-25) MVA, 132-110/33 kV TF	Kolhapur	To meet upcoming MSEDCL load (*1(c))

V) Capacitor : NIL

FY 2018-19

I) New EHV Substations: Nil

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 kV Ambheri (Wind) - Aundh SCDC line	60	Satara	To have redundancy for 132 kV Aundh S/S (*4)
2	132 kV	LILO of 132 kV Lonand - Phaltan line at Phaltan MIDC s/s	10	Satara	To have redundancy for 132 kV Phaltan S/S (*4)
3	132 kV	132 kV Sawantwadi - Kudal D/C line	50	Sindhudurg	To have alternate source from 220 kV Sawantwadi S/S (*4)
4	132 kV	LILO on 132kV Mayni - Dighanchi S/C at 132kV Mhaswad S/s.	55	Satara	
5	110 kV	110 kV link line from Jaysingpur - Kurundwad	40	Kolhapur	To have redundancy for 110 kV Kurundwad S/S (*4)
6	110 kV	Conversion of SCSC 110 kV Mudshinghi – Puikhadi line to 132 kV DCDC	16	Kolhapur	To strengthen existing 110 kV network for Puikhadi S/S (*3(c))
7	110 kV	110 kV SCDC line from 220 kV NiwaliPhata to 110 kV Ratnagiri	20	Ratnagiri	To have redundancy for 110 kV Ratnagiri S/S (*4)
8	110 kV	LILO on 110 KV Kothali – Radhanagari line at 220 KV Bidri s/s.	16	Kolhapur	To reduce loading of 220 KV Mudshingi s/s. (*3C))

B) Second Circuit stringing:

Sr. No.	Voltage level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	2nd circuit stringing of 220 kV Miraj – (Tilawani) Ichalkaranji SCDC line.	35	Sangli / Kolhapur	To strengthen 220 kV network for 220 kV Miraj and Ichalkaranji S/s (*3(c), *4)
2	132 kV	2nd ckt stringing of Aundh – Dahiwadi SCDC line	30	Satara	To provide additional source to 132 kV Aundh (*4)

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: NIL

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Satara MIDC	Replacement of 1 X 50 MVA, 132/110 kV ICT by 1 X 100 MVA, 220/110 kV ICT	Satara	For providing another permanent source to 110 kV Atit S/s (*4)
2	132 kV Bambavde	1 X 100 MVA 132/110 kV ICT	Kolhapur	For interlinking 132 kV Bambavde S/s with 110 kV Chambukhadi S/s (*4)

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV New Koyna	3 X 105 MVA, 400/220/33 kV ICT	Ratnagiri	To have reliability & redundancy (*4)
2	220 kV Satara MIDC	1 X 200 MVA, 220/132kV ICT	Satara	To have reliability & redundancy (*4)

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Talandge (Kolhapur)	3 X (167- 105) MVA, 400/220/33 kV ICT	Kolhapur	To have reliability & redundancy (*4)

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Wai	1 X 25 MVA, 132/33 kV TF	Satara	To meet upcoming MSEDCL load (*1(c))
2	132 kV Shirwal	1 X 25 MVA, 132/22 kV TF	Satara	To meet upcoming MSEDCL load (*1(a))
3	132 kV Dahiwadi	1 X 25 MVA, 132/22 kV TF	Satara	To meet upcoming MSEDCL load (*1(ac)
4	132 kV Satara Road	1 X 25 MVA, 132/22 kV TF	Satara	To meet upcoming MSEDCL load (*1(a))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	110 kV Kale	2 X (50 - 25) MVA, 132-110/33 kV TF	Kolhapur	To meet increase in load (*1(c))
2	132 kV Kurundwad	1 X (50 – 25) MVA, 132 – 110/33 kV	Kolhapur	To meet increase in load (*1(c))
3	110 kV Sankh	2 X (50 - 25) MVA, 110/33 kV TF	Sangli	To meet increase in load (*1(c))
4	110 kV Ashta	2 X (50-25) MVA, 132-110/33 kV TF	Sangli	To meet upcoming MSEDCL load (*1(c))

V) Capacitor Bank:

Sr. No.	Name of Substation	Description	District	Remarks
1	132kV Phaltan	5 MVAR	Satara	To reduce reactive power and improve voltage profile. (*3(b))
2	110 kV Kurundwad	1 X 5 MVAR	Kolhapur	
3	110 kV Kale	2 X 5 MVAR	Satara	
4	220 kV Wathar	2 X 10 MVAR	Kolhapur	
5	110 kV Kothali	1 X 10 MVAR	Kolhapur	
6	220 kV Halkarni	2 X 5 MVAR	Kolhapur	
7	132 kV Bambawade	1 X 5 MVAR	Kolhapur	
8	110 kV Jaysingpur	2 X 5 MVAR	Kolhapur	To reduce reactive power and improve voltage profile. (*3(b))
9	220 kV Mumewade	2 X 5 MVAR	Kolhapur	
10	220 kV Vita	2 X 10 MVAr	Sangli	
11	110 kV Tasgaon	2 X 5 MVAr	Sangli	
12	110 kV Jath	2 X 10 MVAr	Sangli	
13	110 kV K'Mahankal	2 X 10 MVAr	Sangli	
14	110 kV Kundal	2 X 5 MVAr	Sangli	
15	220 kV Ogalewadi	2 X 5 MVAr	Satara	
16	110 kV Kale(T)	2 X 5 MVAr	Kolhapur	
17	132 kV Shirwal	1 X 5 MVAr	Satara	
18	132 kV Dahiwadi	1 X 5 MVAr	Satara	
19	110 kV Atit	1 X 5 MVAr	Satara	
20	132 kV Wai	1 X 5 MVAr	Satara	
21	132 kV Wai	1 X 5 MVAr at 22 kV	Satara	

FY 2019-20

I) New EHV Substations: Nil

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	110 kV	Conversion of existing 110 kV Kale (T) - 220 kV Wathar line to DC using same ROW	35	Kolhapur	To strengthen 110 kV for Kale (T) S/S (*3(c), *4)
2	110 kV	LILO of 110 kV Ogalewadi – Kundal (Kirloskarwadi) at 220 kV Kadegaon & then disconnecting the Ogalewadi end &utilize the unused 2nd ckt of 110 kV Ogalewadi – Kale (T)	35	Sangli	To provide 2nd source to 110 kV Kale (T) S/s (*4)
3	110 kV	Conversion of 110 KV SCSC line from 220 KV Miraj –Tasgaon to DCDC	35	Sangli	To have additional source for 110 kV Tasgaon S/s (*3)

B) Second Circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Kurundwad	1 X (50 – 25) MVA, 132 – 110/33 kV	Kolhapur	To meet increase in load (*1(c))

V) Capacitor: Nil

FY 2020-21

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	132/33 kV Panchgani (Mahabaleshwar)	Satara	LILO on 132 kV Lonand - Wai ckt I - 15 kms 2 X 25 MVA, 132/33 kV T/f 33 kV Outlets - 8 No's	To meet the upcoming load of MSEDCL (*1(b))

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	110 kV	Kavthe Mahakal - Jath D/C line (GEC)	35	Sangli	Evacuation of Wind generation(*2)

B) Second Circuit stringing:

Sr. No	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	110 kV	2nd circuit stringing of 132 kV Kale (T) – Warna SCDC line.	35	Satara/ Kolhapur	Strengthening of existing EHV network nearby Warna(*3(c))

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Insuli (Sawantwadi)	1 X 100 MVA, 220/132 kV ICT	Sindhudurg	For system strengthening. Subjected to completion of Sawantwadi – Kudal line before level creation.

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitor: Nil

FY 2021-22

I) New EHV Substations:

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/33 kV Kesurdi MIDC	Satara	LILO on 220 kV Kandalgaon – Lonand S/C line at Kesurdi – 10 ckt kms. 2 X 50 MVA, 220/33 kV T/F 33 kV Outlets - 6 No's.	To meet upcoming demand in Kesurdi MIDC and improve reliability and voltage profile (*1(a), *3(b))
2	220/33 kV Kupwad MIDC	Sangli	LILO on 220 kV Vita - Miraj S/C line at Kupwad – 1 ckt kms. 2 X 50 MVA, 220/33 kV T/F 33 kV Outlets - 6 No's.	To improve reliability and voltage profile (*3(b), *4)

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	110 kV	110 kV Borgaon – Kundal link line **(Instead of 110 kV Kadegaon – Kundal GEC line)**	32	Sangli	To have reliability & redundancy (*4)

B) Second Circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Rectors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Insuli (Sawantwadi)	1 X 100 MVA, 220/132 kV ICT	Sindhudurg	To meet upcoming load of Sea World Project in Malwan (*1(b))

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitor: Nil

FY 2022-23

I) New EHV Substations:

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	132/33 kV Saroli / 132/33 kV Akurde	Kolhapur	132 kV SCDC line from 220 kV Bidri S/s to 132 kV S/s - 16 kms 2 X 25 MVA , 132/33 kV T/f 33 kV Outlets - 8 No's	To meet the upcoming load (*1(b))
2	110/33 kV Shiradwad	Kolhapur	110 kV LILO of Miraj – Kurundwad – 20 ckt kms 2 X 25 MVA , 132-110/33 kV T/f 33 kV Outlets - 8 No's	To reduce loading of 110 kV Ichalkaranji S/S and meet the upcoming load (*1(a), *3(c))

II) New EHV Lines

A) Link Lines: Nil

B) Second Circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitor: Nil

EHV PROJECTS CUM O & M ZONE NAGPUR

FY 2017-18

I) New EHV Substation: Nil

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	400/220 KV Chandrapur -II S/S	Nagpur	2 X 500 MVA 400/220 kV ICT 1 X 167 MVA , 400/220 kV spare ICT	Evacuation of power from Chandrapur-II MSPGCL (*2)
			LILO of 400 kV Chandrapur - Parli DC line at Chandrapur II S/s - 1.8 kms **(Commissioned)**	
			400 kV Chandrapur II - Warora DC line - 20 kms **(Commissioned)**	
			220 kV Chandrapur-II - Tadali S/s - 20 kms	
			220 kV DC line from 400 kV Chandrapur-II to Chandrapur MIDC – 22 kM	

II) New EHV lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV DC line from 400 kV Chandrapur-II to Chandrapur MIDC	22	Chandrapur	Evacuation of power from Chandrapur-II MSPGCL (*2)
	132 kV	132 kV Sindewahi - Brahmpuri SCDC line.	53.3	Chandrapur	To have additional source to 132 kV Brahmpuri S/S.(*4)
2	132 kV	132 kV Warud to Bharsingi SCDC line	32	Amravati/ Nagpur	To strengthen 132 kV network at Bharsingi S/s.(*3 (c))

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	2nd circuit stringing of 132 kV Wardha-II - Deoli SCDC line.	15	Wardha	To have additional source to 132 KV Deoli s/s. (*3(c), *4)
2	132 kV	2nd circuit stringing of 132 kV Wardha-II- Seloo SCDC line.	20	Wardha	To have additional source to 132 kV Seloo s/s.(*4)

C) Reorientation of existing Lines: NIL

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	Replacement of conductor of existing 132 kV Khapri-Besa SC line with HTLS conductor	17	Nagpur	To overcome overloading problem of Khapri- Besa line. (*3(c))

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Allapally	1 X 25 MVA, 132-66/33 kV T/F	Gadchiroli	To meet upcoming load(*1(c))

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Wardha -II	1 X 100 MVA, 220/132 kV	Wardha	To have redundancy (*4)

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV SICOM Chandrapur	1 X 50 MVA, 220/33 kV T/F	Chandrapur	To meet upcoming load(*1(c))
2	220 kV Hinganghat	1 X 100 MVA, 220/33-33 kV T/F	Wardha	To meet upcoming load(*1(c))
3	220 kV Gadchandur	1 X 50 MVA, 220/33 kV TF	Gadchiroli	To meet upcoming of MSEDCL Load. (*1(c))
4	132 kV Uppalwadi	1 X 50 MVA, 132/33 kV T/F	Nagpur	To meet upcoming load. (*1(b))
5	132 kVAshti	1 X 25 MVA, 132/33 kV TF	Gadchiroli	To meet upcoming of MSEDCL Load. (*1(c))
7	132 kV Sironcha	1 X 25 MVA, 132-66/33 kV T/F	Gadchiroli	To meet upcoming load(*1(c))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Besa	2 X (50-25) MVA, 132/33 kV T/F	Nagpur	To meet upcoming Load. (*1 (c))
2	132 kV Deoli	2 X(50-25) MVA, 132/33 kV T/f	Wardha	To meet upcoming Load. (*1(c))

V) Capacitors

Sr. No.	Name of Substation	Description	District	Remarks
1	132/33 kV Arvi s/sn	10 MVAR at 33 kV level	Nagpur	To reduce reactive power and improve voltage profile. (*3(b))
2	66 kV Sironcha s/sn	5 MVAR at 33 kV level	Nagpur	
3	132kV Brahmapuri s/sn	10 MVAR at 33 kV level	Nagpur	
4	220 kV kaulewada	2 X 5 MVAr	Gondia	
5	132 kV Sakoli	2 X 5 MVAr	Bhandara	
6	132 kV Gondia	2 X 5 MVAr	Gondia	
7	132 kV Amgaon	1 X 5 MVAr	Gondia	
8	132 kV Lakhandur	2 X 15 MVAr at 132 kV	Bhandara	
9	220 kV Umred	1 X 5 MVAr	Nagpur	
10	132 kV Katol	1 X 10 MVAr	Nagpur	
11	132 kV Mansar	1 X 5 MVAr	Nagpur	
12	132 kV Saoner	2 X 5 MVAr	Nagpur	
13	132 kV Ambhora	1 X 5 MVAr	Nagpur	
14	132 kV Bharsingi	1 X 5 MVAr	Nagpur	

FY 2018-19

I) New EHV Substation

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Uppalwadi	Nagpur	220 kV Khaparkheda – Uppalwadi DC UG cable 6.8 kms (Route length)	To meet the load growth and to improve the voltage profile in Nagpur circle. (*1(b), 3(c))
			220 kV Khapakheda – Uppalwadi DC OH line 8.6 ckt kms	
			Interconnection between 220 kV and 132 kV Uppalwadi s/s -2 ckt kms	
			2 X 100 MVA, 220/132 kV ICT	
			2 X 50 MVA, 220/33 kV T/F	
2	220/132/33 kV New Pardi	Nagpur	220 kV Uppalwadi - Pardi DC UG cable line 15.5 (Route Km)	
			Interconnection between 220 kV New Pardi and 132 kV Pardis/s -2 ckt KM	
			2 X 100 MVA, 220/132 kV ICT at Pardi	
			2 X 50 MVA, 220/33 kV T/F	
3	132/33 kV Morgaon Arjuni	Gondia	132 kV Lakhandur – Morgaon Arjuni D/C line - 40 ckt kms	Elimination of 66 kV level and to meet upcoming demand. (*1(c))
			2 X 25 MVA, 132/33 kV T/F'S with bays	
			33 kV Outlets – 4 No's	
4	132/33 kV Jat Tirodi GIS	Nagpur	Laying of 132 kV DC underground cable from 132 kV Pardi s/s to 132 kV Jat Tarodi s/ – 10.0 kms	For strengthening of Nagpur ring main and to meet upcoming demand. (*1(b))
			2 X 50 MVA, 132/33 kV T/Fs with Bays	
			33 kV Outlets – 12 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	LILO of two ckts of 400 kV Bhadravati - Chandrapur-I at Chandrapur - II.	5	Chandrapur	To reduce loading of Chandrapur-I –Chandrapur-II lines. (*3 (c))

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
2	220 kV	LILO on 220 kV Bhugaon to Warora–I line for 400 kV Warora S/s	10.3		Evacuation of power generated by MSPGCL at Chandrapur-II and Adani Power at Tiroda and transmit the same to the load center. (*2)
3	132 kV	132 kV Wardha - II to Pulgaon D/C	30	Wardha	To strengthen 132 kV network at Pulgaon S/s. (*4)
4	132 kV	132 kV Kalmeshwar - Hingna – I - Hingana - II SCDC line.	14	Nagpur	To meet upcoming loading of Nagpur City. (*1(b))

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	2nd circuit stringing of 132 kV Mul – Sindewahi SCDC line.	30	Chandrapur	To have additional source to 132 KV Mul & Sindewahi s/s. (*4)

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	Replacement of conductor of existing 132 kV Bhandhara – Kharda Ckt I & II by ACSS Conductor	30	Nagpur	To Strengthen System / Overcome constraint of Loading

III) Reactor

A) *New:*

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Chandrapur - II	1 X 125 MVAR	Chandrapur	To control high voltage problem.(*3(a))
2	400 kV Koradi - II	1 X 125 MVAR	Nagpur	To control high voltage problem.(*3(a))
3	400 kV Khaparkheda	1 X 125 MVAR	Nagpur	To control high voltage problem.(*3(a))

B) *Shifting:*

Sr. No.	Name of Substation	Description	District	Remarks
1	Chandrapur-I	Shifting of 1 X 50 MVAR line Reactor from 400 kV Chandrapur - I to 400 kV Chandrapur - II s/s on Chandrapur -Parli line.	Chandrapur	To control high voltage problem. (*3(a))
2	Chandrapur-I	Shifting of 1 X 50 MVAR line Reactor from 400 kV Chandrapur - I to 400 kV Chandrapur- II s/s on Chandrapur -Parli line.		

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Purti (Co –Gen) s/s.	2 X 25 MVA, 220/33 kV TF	Nagpur	To meet upcoming load. (*1 (c))
2	220 kV Wardha-I	2 X 50 MVA, 220/33 kV T/F	Nagpur	To eliminate 66 kV level. (*1(c))
3	220 kV Ambazari	2 X 25 MVA, 220/33 kV T/F	Nagpur	To meet upcoming load. (*1(b))
4	132 kV Hirdamali TSS	2 X 25 MVA, 132/33 kV	Nagpur	To meet upcoming load. (*1(b))

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Hinghanghat s/s.	1 X 100 MVA, 220/132 kV ICT	Wardha	To meet upcoming load. (*1 (c))

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Bhandara	1 X (200-100) 220/132 kV ICT	Bhandara	To have Reliability/Redundancy
2	220 KV Kaulewada	1 X (200-100), 220/132 kV ICT	Gondia	To have Reliability/Redundancy

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Seloo	1 X 25 MVA, 132/33 kV T/F	Nagpur	To meet upcoming MSEDCL load. (*1(b))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Khapri	2 X (50-25) MVA, 132/33 kV T/F	Nagpur	To meet upcoming Load. (*1 (c))

V) **Capacitor:** Nil

FY 2019-20

I) New EHV Substation

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Nagbhid	Chandrapur	220kV DC line from 220kV Umred S/stn-46 Km LILO of one ckt of 132kV Asgaon - Bramhapuri line at 220kV Nagbhid S/stn-21 Km 2 X 100 MVA 220/132 KV ICT 1 X 25 MVA 220/33 KV T/f	To meet load of Tribal area (*1(c))
2	132/33 kV Chamorshi	Gadchiroli	LILO of 132kv Mul Ashti line at Chmaorshi – 15 kM 2 X 25 MVA, 132/33 kV T/F 33 kV Outlets - 12 No's	To reduce loading of 132 kV Mul s/s, quality of power supply and to improve voltage profile in Gadchiroli District. (*3 (c), *3(b))
3	132/66- 33 kV Allapally	Gadchiroli	132 kV D/C line from 132 kV Ashti to Allapally SCDC line - 120 ckt kms. 2 X 25 MVA, 132/66-33 kV T/F'S with bays	To eliminate 66 KV level in Gadchiroli District, improve reliability of supply and voltage profile.(*3 (b))

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	LILO of Koradi I – Akola (IndiaBulls) at Koradi II	4	Nagpur	To Strengthen System / Overcome constraint of Loading
2	220 kV	Termination of 220 KV Koradi-II to Kaulewada ckt II at 220 KV Kanhan & 220KV Bhandara	4	Nagpur	To Strengthen System / Overcome constraint of Loading
3	132 kV	132 kV link line from Sicom – Mul S/s	25	Nagpur	To Strengthen System / Overcome constraint of Loading

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	2nd circuit stringing of 132 kV Asgaon – Brahmpuri SCDC line.	27	Chandrapur	To have additional source to 132 kV Brahmpuri s/s. (*4)

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	Replacement of conductor of existing 132 kV Kaulewada – Gondia Ckt I & II by ACSS conductor	80	Nagpur	To Strengthen System

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Sicom	1 X 100 MVA, 220/132 kV ICT	Nagpur	To establish link line from Sicom – Mul (*4)

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer:

E) Replacement of Transformer: Nil

V) Capacitor: Nil

FY 2020-21

I) New EHV Substation

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Karanja	Wardha	220 kV DC line on MC towers by making LILO on 220 kV Ambazari - Amravati SC line at prop 220 kV Karanja s/s – 02.0 kMs (route length)	To reduce loading of 132 kV Talegaon s/s, quality of power supply and to improve voltage profile. (*3 (c))
			132 kV MC line on MC towers by making LILO on both ckts of 132 kV Amravati - Ambazari DC line at prop. 220 kV Karanja s/s – 02.0 kMs (route length)	
			2 X 100 MVA, 220/132 kV ICT	
			2 X 25 MVA, 132/33 kV with bays	
			33 kV Outlets - 4 No's	
2	132/33 kV Bazargaon	Nagpur	LILO on 132 kV Ambazari - Amravati line - 5 kms	To meet upcoming requirement of Industrial load, improve reliability of supply and voltage profile. (*1(b))
			2 X 25 MVA, 132/33 kV T/F'S with bays	
			33 kV Outlets – 4 No's	
3	132/33 kV Deori	Gondia	132 kV DC line from 132 kV Amgaon S/S - 72 ckt kms	To reduce loading of 132 kV Amgaon s/s, quality of power supply and to improve voltage profile in Gondia District. (*1(c), *3 (b))
			2 X 25 MVA, 132/33 kV T/F with bays	
			33 kV Outlets – 4 No's	
4	132/33 kV Sironcha	Gadchiroli	132 kV SCDC line from Kistampeth (Telangana) - 35 ckt kms	To reduce loading of 132 kV Talegaon s/s, quality of power supply and to improve voltage profile in Gadchiroli District. (*3(c), *3 (b))
			2 X 25 MVA, 132/33 kV with bays	
			33 kV Outlets – 4 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	LILO of 132 kV Warud – Barshinghi at Karanja (Wardha)	30	Nagpur	To Strengthen 132 kV Network

B) Second circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity:

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Replacement of ICT in existing substation: Nil

E) Additional Transformer: Nil

F) Replacement of Transformer: Nil

V) Capacitor: Nil

FY 2021-22

I) New EHV Substation

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Sakoli	Bhandara	220 KV Sakoli Bhandara DC line -40 kM	To meet upcoming load of MSEDCL (*1(b))
			132 kV Sakoli (Old) - Sakoli DCDC- 5 kM	
			132 kVDeori - Sakoli DCDC- 40 kM	
			2 X 100 MVA 220/132 KV ICT.	
			2 X 25 MVA 132/33 KV T/f.	
			33 KV Outlets - 4 Nos.	
2	132/33 kV Lendra Park	Nagpur	132 kV U/G Cable by LILO on Mankapur - Hingana 1- 15 kM	To meet upcoming load of MSEDCL (*1(b))
			2 X 25 MVA 132/33 KV T/f.	
			33 KV Outlets - 8 Nos.	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	LILO on 400 kV Chandrapur I – Parli 3rd ckt line at Warora	50	Chandrapur	Evacuation of 400 kV Warora S/S (*2)
2	132 kV	132 kV Saoner-Katol DC line	85	Nagpur	To have additional source to 132 kV Katol s/s. (*4)
3	132 kV	132 kV link line from Deori – Morgaon Arjuni	40	Nagpur	To Strengthen 132 kV Network

B) Second circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitor: Nil

FY 2022-23

I) New Substation

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/33 kV Additional Butibori MIDC	Nagpur	220 kV DC line from Butibori – III – Addional Butibori - 20 ckt kms	To meet upcoming load requirement of additional Butibori MIDC area. (*1(a))
			2 X 50 MVA, 220/33 kV T/F	
			33 kV Outlets - 8 No's	
2	220/132/33 kV Mankapur	Nagpur	220/132/33 kV S/S with 2 X 100 MVA, 220/132 kV ICT, 2 X 50 MVA, 220/33 kV T/F at Mankapur	To meet the load growth and to improve the voltage profile in Nagpur circle. (*1(b), 3(c))
			220 kV Uppalwadi - Mankapur M/C Line (Using Same Row) O/H - 8 Km & U/G - 2.5 Km	
			33 kV Outlets - 12 No's	
			Reorientation of 132 kV Lines at Mankapur OH line 2 Kms U/G Cable 0.2 Km	
			220 kV Ambazari - Mankapur M/C Line O/H - 13 Km & U/G - 3.5 Km	

II) New EHV Lines

A) Link Lines: Nil

B) Second circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitor: Nil

EHV PROJECTS CUM O & M ZONE NASHIK

FY 2017-18

I) New Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Kalwan (Bhendi)	Nashik	220 kV Malegaon - Kalwan DC line - 25 kms	Upgradation of existing 132 kv Kalwan s/s for the load requirement in Nasik area
			2 X 100 MVA, 220/132 kV ICTS with bays **(1 ICT Commissioned)**	
			2 X 50 MVA, 220/33 KV T/F S with bays **(1 T/f Commissioned)**	
			LILO of 132 kV Kalwan - Satana line at 220 kV Kalwan - 4 kms **(Commissioned)**	
			12 X 33 KV Outlets	
2	220/132 kV Pimpalgaon (Basmat)	Nashik	220 kV Nasik (Eklahre) - Pimpalgaon DC line - 44 kms	To reduce loading of 132 kV Ranwad, Lasalgaon, Chandwad S/S and strengthening of 132 kV network (*3(c), *1(c))
			132 kV SCDC line to 132 kV Ranvad S/s - 17 kms	
			132 kV DC line to Dindori S/s - 17 kms	
			2 X 100 MVA, 220/132 kV ICTS **(Commissioned)**	
3	132 kV Ghargaon	Ahmednagar	132 kV D/C line from 220 kV Alephata - Ghargaon – 68 ckt kms	To reduce loading of 132 kV Rahuri S/S & 220 kV Bhenda S/S and to meet the increased load in the area. (*3(c), *1(c))
			2 X 25 MVA, 132/33 kV T/F with bays	
			33 kV Outlets - 8 No's	
4	132 kV Vadjeere	Ahmednagar	132 kV D/C line Supa – Vadjire - 25 kms	To meet upcoming load of MSEDCL and reduce load of Supa S/S. (*1(c), *3(c))
			2 X 25 MVA, 132/33 kV T/F'S with bays	
			33 kV Outlets - 8 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220	220kV Eklahare-Pimpalgaon DC line	50	Nashik	Source line for 220 kV Pimpalgaon S/s.(Missing element)(*4 & *5)
2	132	LILO of 132 kV line from 220 kV Raymond – 132 kV Adgaon line at Mhasrul (LILO Shift)	20	Nashik	To strengthen source of 132 kv Mhasrul S/S (*3)

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
3	132	Tap to LILO for Rahuri	1.5	A'nagar	To have additional source for 132 kV Rahuri S/s.(*4)
4	132	132 kV Shirpur -Dondaicha SCDC line	50	Dhule	To reduce loading of existing 132 kV network.(*3(c))
5	132	132 kV Bhose-Karjat	50	Ahmednagar	Strengthening of 132 kV network in Karjat area.(*3(c))

B) Second Circuit stringing:

Sr. No	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220	2nd circuit stringing of 220 kV Dondaicha- Shahada SCDC line.	27	Dhule/	To have additional source S/s. (*4)
2	132	2ndCkt Stringing of 132 kV Taloda - Shahada Line	27	Nandurbar	To have additional source S/s. (*4)
3	132	2nd circuit stringing of 132 kV Amalner – Chopda SCDC line.	35.8	Jalgaon	To have additional source to 132 kV Chopda s/s. (*3 (b))
4	132	2nd circuit Stringing of 132 kV Sinnar (Old) – Khaprale	8.5	Nashik / A'nagar	To strengthen 132 kV network (*3(c))
5	132	2nd Ckt stringing of 132 kV Nandurbar- Visarwadi SCDC Line.	44	Nandurbar	To strengthen 132 kV network for Visarwadi S/S (*3(c, *4)

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132	Replacement of conductor of existing 132 kV Eklahare (OCR)-Takli S/C line with HTLS conductor	11.5	Nashik	To overcome overloading problem of source lines for Nashik Ring Main. (*3(c))

III) Reactor

A) New- Nil

B) Shifting:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Khadka	1 X 50 MVAR	Ahmednagar	To control high voltage problem. (*3(a))

IV) Addition of Transformation

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation:

Sr. No	Name of Substation	Description	District	Remark
1	220 kV Shahada	1 X 100 MVA, 220/132 kV ICT	Nandurbar	To have redundancy (*4)
2	220 kV Ahmednagar	1 X 200 MVA, 220/132 kV ICT	Ahmednagar	To have redundancy (*4)

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Dondaicha	1 X 50 MVA, 220/33 kV T/F	Dhule	To meet upcoming MSEDCL load. (*1(c))
2	220 kV Shahada	1 X 50 MVA, 132/33 kV T/F	Nandurbar	To meet upcoming MSEDCL load. (*1(c))
3	132 kV Sinnar MIDC	1 X 50 MVA, 132/33 kV T/F	Nashik	To meet upcoming MSEDCL load. (*1(a))
4	132 kV Satpur Old	1 X 50 MVA, 132/33 kV TF	Nashik	To meet upcoming MSEDCL load. (*1(c))
5	132 kV New MIDC Jalgaon	1 X 50 MVA, 132/33 kV T/F	Jalgaon	To meet upcoming MSEDCL load. (*1(a))
6	132 kV Pachora	1 X 50 MVA, 132/33 kV T/F	Jalgaon	To meet upcoming MSEDCL load. (*1(c))
7	132 kV Dhule	1 X 50 MVA, 132/33 kV T/F	Dhule	To meet upcoming MSEDCL load. *1(c))

Sr. No.	Name of Substation	Description	District	Remarks
8	132 kV Nandurbar	1 X 50 MVA, 132/33 kV T/F	Nandurbar	To meet upcoming MSEDCL load. (*1(c))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 Kv Mhasrul	1 X (50-25) MVA, 132/33 kV T/F	Nashik	To have redundancy (*4)
2	132 kV Pahur	1 X (50-25) MVA, 132/33 kV T/F	Nashik	To have redundancy (*4)

V) Capacitors:

Sr. No.	Name of Substation	MVAR	District	Remarks
1	132kV Karjat	2 X 5 MVAR at 33 kV level	Nashik	To reduce reactive power and improve voltage profile (*3(b))
2	132kV Shevgaon	2 X 5 MVAR at 33 kV level	Nashik	
3	132kV Newasa	2 X 10 MVAR at 33 kV level	Nashik	
4	132kV Akole	2 X 10 MVAR at 33 kV level	Nashik	
5	132kV Rahuri	2 X 10 MVAR at 33 kV level	Nashik	
6	132kV Muktainagar	2 X 5 MVAR at 33 kV level	Nashik	
7	132kV Chopda	2 X 5 MVAR at 33 kV level	Nashik	
8	132kV Visarwadi	2 X 5 MVAR at 33 kV level	Nashik	
9	132kV Shirpur	2 X 10 MVAR at 33 kV level	Nashik	
10	132 KV LASALGAON S/S	2 x 5 MVAR	Nashik	
11	132KV RANWAD S/S	2 x 10 MVAR	Nashik	
12	132KV RAMACHE PIMPLUS S/S	2 x 10 MVAR	Nashik	
13	132KV SATANA S/S	2 x 10 MVAR	Nashik	
14	132KV YEOLA S/S	2 x 10 MVAR	Nashik	
15	132KV MALEGAON S/S	2 X 15 MVAR	Nashik	
16	132 KV KOPARGAON S/S	2 x 5 MVAR	Ahmednagar	
17	132KV PATHARDI S/S	2 x 5 MVAR	Ahmednagar	
18	220KV BHENDA S/S	2 x 10 MVAR	Ahmednagar	

Sr. No.	Name of Substation	MVAR	District	Remarks
19	132KV SANGAMNER S/S	2 x 10 MVAR	Ahmednagar	
20	132KV SHRIGONDA S/S	2 x 10 MVAR	Ahmednagar	
21	220 KV SHAHADA	2 X10 MVAR	Nandurbar	
22	132 KV NANDURBAR	2 X10 MVAR	Nandurbar	
23	132 KV TALODA	2 X10 MVAR	Nandurbar	
24	132KV DHARANGAON	2 X 10 MVAR	Jalgaon	
25	132KV SAVADA	2 X 10 MVAR	Jalgaon	
26	132KV BODWAD	2 X 5 MVAR	Jalgaon	
27	132 KV CHALISGAON	2 X10 MVAR	Jalgaon	
28	132 KV DONDAICHA	2 x 10 MVAR	Dhule	
29	13 KV DHULE	2 x 10 MVAR	Dhule	

FY 2018-19

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Jamner (Kekat-nimbhora)	Jalgaon	LILO on one ckt of 220 kV Bhusawal (Khadka) - Chalisgaon line at 220 kV Jamner S/S – 1 ckt kms	To meet upcoming load of MIDC area and to improve reliability and voltage profile (*1(a), *4)
			2 X 100 MVA, 220/132 kV ICT	
			132 kV DC line from 220 kV Kekatnimbhora to 132 kV Pahur s/s - 20 ckt kms	
			2 X 50 MVA, 220/33 kV T/F	
			33 kV Outlets - 8 No's	
2	220 kV Viroda S/S	Jalgaon	LILO on 220 kV Deepnagar - Amalner ckt II at Viroda – 7 ckt kms.	To meet upcoming load of MSEDCL and to reduce loading of 132 kV Deepnagar S/S. To strengthen 132 kV network in Dindori area and reduce loading of 132 kV Dindori S/S (*1(c), *3(c))
			132 kV Viroda - Yawal D/C Line – 32 ckt kms	
			132 kV Viroda - Sawada DC line - 11 ckt Kms	
			2 X 200 MVA, 220/132 kV ICT	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220	132 kV SCDC line from 220 kV Malegaon to 132 kV Manmad s/s.	34	Nashik	Creation of New 220 kV Level intecoinnection & to strengthen 132 kV network (*3(c))
2	220	220 kV MC line from 400 kV Babhaleshwar - 220 kV Kopargaon LILO point	36	A'nagar	To strengthen source for 220 kV Kopargaon S/S (Missing Element) (*4 & *5)
3	132	Ahmednagar to Ahmednagar (MIDC) DC Line	32	A'nagar	Strengthening of 132 kV network.(*3(c))
4	132	Pimpalgaon - Ranvad	20	Nashik	Strengthening of 132 kV network.(*3(c))
5	132	Samsherpur - Nanurbar	20	Nandurbar	To have additional source to 132 kV Nandurbar S/S

B) Second Circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line CKT Km	District	Remarks
1	132	2nd circuit stringing of 132 kV Amalner-Parola SCDC line.	17	Jalgaon	Strengthening of 132 kV Network for 132 kV Parola S/S (*3(c), *4)
2	132	2nd circuit stringing of 132 kV Amalner -Nardane SCDC line.	35	Jalgaon	To strengthen 132 kV Network (*3(c))
3	132	2nd circuit stringing of 132 kV SCDC line from 220 kV Malegaon – Nampur S/S	30	Nashik	To have additional source for 132 kV Nampur S/s. (*4)

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132	132 kV Eklahare (GCR) - Ambad link line	19.5	Nasik	To overcome overloading problem of source lines

III) Reactors:

A) New:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Bhusawal –II (Deepnagar)	1 X 125 MVAR	Nashik	To control high voltage problem. (*3(a))

Sr. No.	Name of Substation	Description	District	Remarks
2	400 kV Dhule	1 X 125 MVAR	Dhule	To control high voltage problem. (*3(a))

B) Shifting: NIL

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Manmad	1 X 100 MVA, 220/132 kV	Nashik	Will help in improving the voltage profile
2	220 kV Pimpalgaon	1 X 25 MVA, 132/33 kV	Nashik	As per the load demand from MSEDCL.
3	220 kV Belwandi	1 X 50 MVA, 220/33 kV	Nashik	As per the load demand from MSEDCL.

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Bhenda	1 X 100 MVA, 220/132 kV ICT	Jalgaon	To have Redundancy (*4)
2	220 kV Chalisgaon	1 X 200 MVA, 220/132 kV ICT	Jalgaon	To have redundancy (*4)
3	220 kV Kalwan	1 X 200 MVA, 220/132 kV ICT	Nashik	To have redundancy (*4)

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 KV Bableshwar	3 X (167-105) MVA 400/220 KV ICT	Nashik	To be reviewed after 400 kV Nashik GIS
2	400 KV Dhule	3 X (167-105) MVA 400/220 KV ICT	Dhule	To be reviewed after 400 kV Nashik GIS

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Malegaon	1 X 50 MVA, 220/33 kV T/F	Nashik	To meet upcoming MSEDCL load. (*1(c))

Sr. No.	Name of Substation	Description	District	Remarks
2	132 kV Bhenda	1 x 25 MVA, 132/33 kV TF	Ahmednagar	To meet upcoming MSEDCL load. (*1(c))
3	132 kV Amalner	1 X 50 MVA, 132/33 kV T/F	Jalgaon	To have Redundancy (*4)
4	132 kV Chalisgaon	1 X 50 MVA, 132/33 kV TF	Jalgaon	To meet upcoming MSEDCL load. (*1(c))
5	132 kV Chandwad	1 x 25 MVA, 132/33 kV TF	Nashik	To meet upcoming MSEDCL load. (*1(c))
6	132 kV Shrigonda	1 X 25 MVA, 132/33 kV TF	Ahmednagar	To meet upcoming MSEDCL load. (*1(c))
7	132 kV Ramache Pimplas	1 x 25 MVA, 132/33 kV TF	Nashik	To meet upcoming MSEDCL load. (*1(c))
8	132 kV Newasa	1 x 25 MVA, 132/33 kV TF	Ahmednagar	To meet upcoming MSEDCL load. (*1(c))
9	132 kV Rashin	1 x 25 MVA, 132/33 kV TF	Ahmednagar	To meet upcoming MSEDCL load. (*1(c))
10	132 kV Ahmednagar	1 X 50 MVA, 132/33 kV TF	Jalgaon	To meet upcoming MSEDCL load. *1(c))
11	132 kV Supa	1 X 50 MVA, 132/33 kV TF	Jalgaon	To meet upcoming MSEDCL load. *1(c))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220/33 kV Sayne	2 X (50-25) MVA, 220/33 kV T/F	Nashik	To have Redundancy (*4)
2	132 kV Taloda	1 X (50-25) MVA, 132/33 kV T/F	Nandurbar	To have Redundancy (*4)
3	132 kV Nardana	1 X (50-25) MVA, 132/33 kV T/F	Dhule	To have Redundancy (*4)
4	132 kV Nampur	1 X (50–25) MVA, 132/33 kV T/F	Nashik	To have redundancy (*4)

V) Capacitors:

Sr. No.	Name of Substation	Description	District	Remarks
1	132KV PIMPERKHED S/S	2 X 5 MVAR	Nashik	
2	132KV CHANDWAD S/S	2 X 5 MAVR	Nashik	
3	132KV MHARSUL S/S	2 x 10 MVAR	Nashik	
4	132KV DINDORI S/S	2 x 10 MVAR	Nashik	

Sr. No.	Name of Substation	Description	District	Remarks
5	132KV NAMPUR S/S	2 x 10 MVAR	Nashik	To reduce reactive power and improve voltage profile
6	132KV SINNAR (OLD S/S	2 x 10 MVAR	Nashik	
7	220KV SAYNE S/S	2 x 10 MVAR	Dhule	
8	220KV MALEGAON S/S	2 X 15 MVAR	Nashik	
9	220KV BABHALESHWAR S/S	2 x 15 MVAR	Ahmadnagar	
10	132KV SUPA S/S	2 x 15 MVAR	Ahmadnagar	
11	132kV Parola	2 x5 MVAr	Jalgaon	
12	132kV Yawal	2 x5 MVAr	Nashik	
13	132kV Raver	2 x5 MVAr	Jalgaon	
14	132kV New MIDC Jalgaon	2 x10 MVAr	Jalgaon	
15	132kV Nimbhora	2 x10 MVAr	Jalgaon	
16	132kv Amalner	2 x10 MVAr	Jalgaon	
17	132KV Pahur	2 x10 MVAr	Jalgaon	
18	132KV Pachora	2 x5MVAr	Jalgaon	
19	220KV Bambhori	2 x5MVAr	Jalgaon	
20	132kV Sakri	2 x10 MVAr	Dhule	
21	132kV Nardana	2 x10 MVAr	Jalgaon	
22	220kV Dhule	2 x10 MVAr	Dhule	
23	220KV Dondaicha	2 x10 MVAr	Dhule	
24	132kV Pimparkhed S/s	2x15 MVAr,	Nashik	To reduce reactive power and improve voltage profile
25	132kV Chandwad S/s	2x15 MVAr	Nashik	
26	132kV Sinnar (Old) S/s	2x15 MVAr	Nashik	
27	132kV Karjat S/s	2x15 MVAr	Nashik	
28	132kV Supa S/s	2x15 MVAr,	Nashik	
29	132kV Yeola S/S	2x15 MVAr	Nashik	
30	132kV Akole S/s	2x15 MVAr	Nashik	
31	220 KV Kharda S/s	2x15 MVAr	Nashik	
32	132kV Chopda	2x15 MVAR	Nashik- Bhusawal	
33	132kV Muktainagar	2x15 MVAR	Nashik- Bhusawal	
34	132kV Parola	2 x15 MVAR	Nashik- Bhusawal	
35	132kV Dharangaon	2 x 15 MVAR	Nashik- Bhusawal	
36	132kV Visawarwadi	2 x 15 MVAR	Nashik- Bhusawal	

VI) SVC / STATCOM

Sr. No.	Name of Substation	Description	District	Remarks
1	220kV Chalisgaon	± 125 MVAR	Jalgaon	To dynamically control the voltage profile

FY 2019-20

I) New EHV Substations:

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	400/220 kV Balsane (Shivajinagar)	Dhule	LILO of one ckt of 400 kV Dhule – Sardar Sarovar D/C line at 400 kV Balsane Pooling S/s - 36 ckt kms	To evacuate power of Solar power plants in Dhule District (*2)
			220 kV D/C line with Twin conductor to 220 kV Shivajinagar S/s - 36 ckt kms	
			LILO of 220 kV Dondaicha – Dhule S/C line at 400 kV Balsane Pooling S/s - 30 ckt kms	
			2 X 500 MVA, 400/220 kV ICTs with 400 kV & 220 kV Bays.	
			Space for 220 KV spare bays - 6 No's	
2	400/220 kV Karjat (Bhose)	Ahmed nagar	400 kV MC line on MC tower by making LILO on both Ckts of 400 kV Lonikand - II (ckt-I & Ckt-II) - Girawali Line - 6 kms.	This S/S is proposed for Transmission Strengthening of BBLR/ Ahmednagar & Solapur districts and further for evacuating of power (RE) in the area of Osmanabad Districts.
			220 kV DC line from 220 kV Bhose (Belwandi) s/s to prop. 400 kV Karjat s/s - 32 kms.	
			220 kV DC line on DC towers from 220 kV Jeur s/s to prop. 400 kV Karajat s/s- 52 kms.	
			220 kV DC line on MC towers by making LILO on 220 kV Bhigwan-Kurkumb line at prop. 400 kV Karjat S/S-18 kms.	
			3x 167 MVA, 400/220 kV ICT - 2 nos. & 1x 167 MVA, 400/220 kV spare ICT- 1 no.	
			125 MVAR, 400 kV bus reactor - 1 no.	
3	220/132kV Adwadi (Sinnar) SS	Nashik	220 kV Babhaleshwar – Adwadi (D/C) line - 80 Kms	Will help in strengthening 132 kV network in Sinnar area and creation of 220 kV 3rd ckt from Bableshwar to Nashik
			LILO of 220 kV Nashik GCR – Ghatghar (S/C) Line at 220 kV Adwadi, approximately 18 Kms.	
			2x100 MVA, 220/132 kV ICT	
			LILO of 132 kV Akole – Khaparale (S/C) Line at 132 kV Adwad, approximately 2.75 Kms.	
4	132/33 kV Sinnar (Shaha)	Nashik	LILO on 132 kV Babhaleshwar- Kopargaon line at proposed 132 kV Shaha S/s - 31 Kms	Reducing the load of 132 kV Sinnar S/s and 132 kV Kopargaon S/s.
			2 x 50 MVA, 132/33 kV T/Fs	
			33 kV Outlets - 8 Nos	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 kV SCDC line from 220 kV Ahmednagar -132 kV Supa s/s.	25	A'nagar	To strengthen 132 kV network for Ranwad S/S (*3(c), *4)

B) Second Circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	2nd circuit stringing of 220 kV Jamde - Walve SCDC line.	13	Dhule	To strengthen 132 kV Network (*3(c))
2	132 kV	2nd circuit stringing of 132 kV Shevgaon –Ghodegaon SCDC line	40	A'nagar	To strengthen 132 kV network for Ghodegaon S/S *3(c))
3	132 kV	2nd circuit stringing of 132 kV SCDC line from 220 kV Bhenda – Shevgaon s/s.	41	A'nagar	To strengthen 132 kV network for Shevgaon. *3(c))
4	132	132 kV Belwandi - Shrigonda	20	A'nagar	To strengthen 132 kV network for Shevgaon. *3(c))

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	Replacement of conductor of existing 0.15 conductor of 132 kV S/C line from 220 kV Chalisgaon –Dhule with 0.2 Conductor	53	Jalgaon / Dhule	To strengthen 132 kV network *3(c))

III) Reactors

A) New

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Dhule	1 X 25 MVAR	Nashik	To control high voltage problem. (*3(a))

B) Shifting- Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Manmad	1 X 100 MVA, 220/132 kV	Nashik	To have redundancy (*4)

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors: NIL

FY 2020-21

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	400/220 Nashik	Nashik	400 kV Sinnar (IPP) - Nashik D/C Line - 60 ckt kms.	To meet upcoming load of Nashik City and evacuation of power (1 X 660 MW) from Nashik MSPGCL generation. (*1(b), *2)
			220 kV MC line for LILO on existing 220 kV Eklahare (GCR) - Babhaleshwar DC line and 220 kV DC line from Eklahare (OCR) to (prop.) 400kV Nashik (Eklahare) GIS s/s. – 5.0 kms	
			220 kV underground cable between OCR & GCR Nashik – 1.0 kms (route length)	
			OPGW line on 220 kV DC line between proposed 400 kV Nashik (Eklahare) GIS s/s to 220 kV Babhaleshwar s/s – 75 kms	
			Dismantling of 220 kV DCDC line between 220 kV GCR s/s to 400 kV Nashik (Eklahare) GIS s/s - 5.0 kms	
			2 X 500 MVA, 400/220/33 kV ICT's with bays (Comprising of 7 X 167 MVA Units including a Spare Xmer unit with bays)	
2	220/132 kV Amrapur	Ahmednagar	220 kV DC line from 400 kV Taptitanda S/stn– 75 Km	To strengthen 132 kV network in Pathardi area (*3(c))
			LILO on 132 kV Shevgaon – Pathardi DC line at 220 kV Amrapur (Pathardi) S/stn – 5 Km	

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
			2 x 100 MVA, 220/132 kV ICT	
3	132/33 kV Kothali	Jalgaon	LILO of one circuit of 132 kV Chalisgaon – Pachora (D/C) Line at 132 Kothali S/s. approximately 3 Kms	To meet Load demand of MSEDCL
			2x25 MVA, 132/33 kV T/F	
			33 kV Outlets 06 No's	
4	132/33 kV Dhadgaon	Nandurbar	132 kV DC line from 132 kV Taloda S/S to Dhadgaon – 40 kms	To reduce the loading of 220 kV Shahada S/s and to have nearest EHV source (*3(c), *4)
			2 X 25 MVA,132/33 kV T/F	
			33 kV bays - 06 No's.	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	Conversion of 132 kV Babhaleshwar –Rahuri - Ahmednagar MIDC SC line to DC using same ROW.	36	Ahmednagar	Strengthening of 132 kV Network for 132 kV Ahmednagar MIDC (*3(c), *4)
2	132 kV	Pimpalgaon - Dindori	55	Nashik	To strengthen 132 kV network in Dindori area and reduce loading of 132 kV Dindori s/s. (*3)
3	132 kV	Ozhar- Chandwad at Pimpalgaon (GEC)	10	Nashik	To strengthen 132 kV network (*3(c))

B) Second Circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132	Bhenda – Vishwind DC (GEC)		A'nagar	To strengthen the 132 kV Network
2	132	2nd ckt stringing of 132 kV SCDC line from 132 kV Benda –Newasa	24	A'nagar	To strengthen 132 kV network for Newasa S/s.
3	132 kV	2nd ckt stringing of 132 kV SCDC line from 132 kV Pathardi – Shevgaon	23	A'nagar	To strengthen 132 kV network for Pathardi and Evacuation of Wind power. (*3 (c), *2)

4	132 kV	2nd circuit Stringing of 132 kV Manmad – Yeola SCDC line	25	Nashik	To have additional source for 132 kV Manmad from 220 kV Kopargaon Via Yewla S/s. (*4)

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors: *Nil*

FY 2021-22

I) New EHV Substations

Sr. No	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Supa MIDC / Dhotre	A'nagar	LILO of one circuit of 220 kV Ahmednagar - Bhose DC line at Supa - 40 ckt Km	To meet upcoming demand of MIDC area and to improve reliability and voltage profile. (*1(a), *4, *3(c))
			LILO of both circuits of 132 kV Supa –Vadjire (WIP) DC line at Supa – 20 ckt kms	
			2 X 100 MVA, 220/132 kV ICT	
			2 X 50 MVA, 220/33 kV T/F	
			33 kV Outlets - 8 No's.	
2	220/33 kV Girnare	Nashik	LILO on one ckt of 220 kV Eklahare - Navsari D/C line at Girnare – 10 ckt kms	To meet upcoming load of Nashik City and reduce loading on 132 kV Mhasrul, Satpur & Ambad S/s.
			220 kV D/C line from Raymonds to Girnare – 30 ckt kms	
			2 X 50 MVA, 220/33 kV T/F	
3	132/33 kV Gholashi Phata	Nashik	132 kV DC line from 220 kV Dindori (Proposed) S/S to Gholashi Phata – 70 ckt kms	To reduce the loading of 132 kV Mhasrul S/S and to meet upcoming load of MSEDCL (*1(c), *3(c))
			2 X 25 MVA, 132/33 kV T/F	
			33 kV Outlets - 4 No's.	

II) New EHV lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Km	District	Remarks
1	132	Visarwadi - Sakri	45	Nandurbar-Dhule	To form 132 kV Ring main for Dhule & Nandurbar District and providing 2nd source to both S/s in case of outage or tripping as both are radial S/S.
2	132	Erandol - Parola	27	Jalgaon	To form 132 kV Ring main for 132 kV Amalner – Parola – Erandol in between 220 kV Amalner & 220 kV Bambhori Substation.
3	132	Sakri - Shivajinagar	15	Dhule	– To provide 2nd source to 132 kV Sakri S/s.
4	132	LILO of 132kV Khaprale - Sangamner S/C at 220/132kV Sinnar S/S	30	Dhule	To strengthen 132 kV Network

B) Second circuit stringing: Nil

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	2nd circuit Stringing of 132 kV Eklahare-Sinnar	30	Nashik	To strengthen the 132kV network

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: *Nil*

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitor Bank: *Nil*

FY 2022-23

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Nandurbar	Nandurbar	220 kV DC line from 220 kV Dondaicha - Nandurbar – 80 ckt kms	To meet upcoming load of MIDC area and to improve reliability and voltage profile. (*1(a), *4)
			LILO on one ckt of 132 kV Dondaicha - Nandurbar line at 220 kV Nandurbar MIDC - 10 ckt kms	
			LILO on one ckt of 132 kV Nandurbar - Visarwadi line at 220 kV Nandurbar MIDC - 10 ckt kms.	
			2 X 100 MVA, 220/132 kV ICT	
			2 X 50 MVA, 220/33 kV T/F	
			33 kV Outlets - 6 No's.	
2	132/33 kV Karkee	Jalgaon	132 kV DCDC line from Muktainagar S/S to 132 kV Karkee	To meet upcoming load of MSEDCL and To reduce loading of 132 kV Muktainagar S/S (*3(c))
			2 X 25 MVA 132/33 kV T/f	
			33 kV bays - 6 No's.	
3	132/33 kV Lakhmapur / Dindori	Nashik	LILO on 132 kV Kalwan - Dindori at Lakhampur – 20 ckt kms	To cater to the future load growth and voltage improvement in that area
			2 X 50 MVA, 220/33 kV T/F	
			33 kV Outlets - 8 No's	
4	132/33 kV Shirdi	Ahmednagar	LILO on 132 kV Babhaleshwar - Kopargaon line at 132 kV Shirdi S/S –10 ckt kms.	To meet upcoming load of MSEDCL and reduce load of 220 kV Babhaleshwar S/s. (*1(c), *3(c))
			2 X 25 MVA,132/33 kV T/F with Bays	
			33 kV Outlets - 6 No's	

II) New EHV lines

a. *Link Lines:*

b. *Second circuit stringing: Nil*

c. *Reorientation of existing Lines: Nil*

d. *Replacement of conductor: Nil*

III) **Reactor:** *Nil*

IV) Addition of Transformation Capacity

a. Creation of new level in existing substation: Nil

b. Additional ICT in existing substation: Nil

c. Replacement of ICT in existing substation: Nil

d. Additional Transformer: Nil

e. Replacement of Transformer: Nil

*V) **Capacitor Bank:** Nil*

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FY 2017-18

I) New EHV Substations:

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132 kV Chinchwad II	Pune	220 kV D/C line for reorientation of existing line at 220 kV Chinchwad–II -12 ckt kms	To reduce loading of existing 220 kV Chinchwad s/s. (*3(c))
			132 kV D/c line for reorientation at 220 kV Chinchwad–II - 6 ckt kms	
			2 X 200 MVA, 220/132 kV ICT	
2	132/33 kV Kavthe Yamai (Haji Takli)	Pune	LILO on one ckt of 132 kV D/C line from 220 kV Kathapur – Pimpalgaon at Kavthe Yamai – 16 kms	To reduce loading of 132 kV Narayangaon S/s (*3(c))
			2 X 25 MVA, 132/ 33 kV T/F with bays	
			33 kV Outlets - 4 No's	
3	132/33 kV Nimboni	Solapur	LILO of 132 kV Pandharpur – Mangalwedha line at Nimboni - 22 kms	To improve voltage profile (*3(b))
			2 X 25 MVA, 132/33 kV T/F	
			33 kV Outlets - 6 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	400kV DC line from 765kV Shikrapur (PG) Pune to 400kV Lonikand – II s/s	20	Pune	To strengthen 400 kV network for 400 kV Lonikand-II S/s. (*3(c), *4)
2	220 kV	220 kV DC line from 400 kV Solapur (PG) - 220 kV Bale	40	Solapur	Evacuation of power from Solapur PG S/S and strengthening of 220 kV network for Bale S/s. (*2, *3(c))
3	220 kV	Conversion of existing 220 kV S/C Urse - Chinchwad line to M/C line for portion between Chinchwad substation to prop 220 kV PGCIL Talegaon line LILO point (Loc. No. 50)	58.1	Pune	To reduce overloading of existing Urse-Chinchwad 220 kV line and evacuation of power from Pune PG S/s. (*3(c), *2)
4	220 kV	Conversion of existing S/C Chinchwad - Kandalgaon line in to M/C line for portion between Chinchwad S/s to Hinjawadi MIDC Ph –I S/s.	15	Pune	

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
5	220 kV	LILO on 220 kV Chinchwad Apta for 400 kV Talegaon S/S up to point near Urse S/S	21	Pune	
6	132 kV	132 kV SC line on DC Tower from 132 kV Akkalkot to 132 kV Karajgi S/S for Karajgi S/S	35	Solapur	To have redundancy to 132 kV Karajgi S/s. (*4)
7	132 kV	Under ground 132 kV cable feeder (single Circuit) from 220 kV Magarpatta - 132 kV Rasta Peth s/s.	9.3	Pune	To have redundancy to 132 kV Rasta Peth S/s (*4)
8	132 kV	LILO of 132 kV Ganeshkhind Pawane at 132 kV Rahatani	0.1	Pune	To have redundancy to 132 kV Rahatani S/s. (*4)
9	132 kV	132 kV UG DC Cable from 220 kV Parvati -132 kV Kothrud s/s.	22	Pune	To increase reliability (*4)
10	132 kV	LILO on 132 kV Theur- Sanaswadi and Markal-Kharadi line on MC towers at Lonikand -I	5	Pune.	To reduce loading of 220 kV Theur
11	132kV	LILO on Rahatani –Varasgaon SC line at 220 kV Flag Ship.	10	Pune	To increase reliability (*4)
12	132 kV	Upgradation of 100 kV Chinchwad-Khopoli line To 132 kV (Andra Lake) between Talegaon-Chinhwad)	9	Pune	To strengthen the 132 kV network (*3(c))

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	2nd circuit stringing of 220 kV Wolks Wagon (EHV Consumer) SCDC line. (Conversion Tap to LILO)	2.4	Pune	To have redundancy. (*4)
2	132 kV	132 kV Degaon –Mandrup SCDC line.	25	Solapur	To increase reliability for 132 kV Mandrup S/s (*4)
3	132 kV	132kV Purandwade Tap on Bawada Nira Bhima-Walchandnagar	13	Solapur	

C) Reorientation of existing Lines: NIL

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line CKT Km	District	Remarks
1	220 kV	Replacement of conductor of existing 220 kV Lonikand Theur DC line by HTLS.	24.25	Pune	To strengthen the network (*3(c))
2	132 kV	Conversion of 110kV Pandharpur –Puluj –Degaon line to 132kV	50	Solapur	To strengthen the network (*3(c))

III) Reactor

A) New:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Solapur	1 X 125 MVAR	Solapur	To control high voltage problem (*3 (a))

B) Reactor Shifting:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Lonikand - I to Lonikand -II ckt-I	1 X 125 MVAR	Solapur	To control high voltage problem (*3 (a))
2	400 kV Lonikand - I to Lonikand -II ckt-I	1 X 125 MVAR	Solapur	To control high voltage problem (*3 (a))

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Voltage Level	Name of Substation	Description	District	Remarks
1	400 kV	400 kV Lonikand-II	2 X 100 MVA 220/132 kV ICT	Pune	Establishment of 132 kV level. (*4)
2	220 kV	220 kV Flag Ship	1 X 200 MVA 220/132 kV ICT	Pune	Establishment of 132 kV level. (*4)
3	132 kV	132 kV SPSL (EHV Consumer).	2 X 50 MVA 132/22 kV TF	Pune	Establishment of 22 kV level. (*4)

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Jejuri	3 X 167 MVA 400/220 kV ICT	Pune	To have redundancy (*4)

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Hinjewadi-II	1 X 100 MVA 220/22-22 kV	Pune	To meet upcoming MSEDCL load (*1(b))
2	220 kV Jeur	1 X 50 MVA, 220/33 kV TF	Solapur	To meet upcoming MSEDCL load. (*1 (b))
3	220 kV Theur	1 X 50 MVA, 220/22 kV TF	Pune	To meet upcoming MSEDCL load. (*1 (b))
4	132 kV Kamthadi	1 X 50 MVA 132/33 kV T/F	Pune	To meet upcoming MSEDCL load (*1(b))
5	132 kV Yavat	1 X 50 MVA, 132/33 kV TF	Pune	To meet upcoming MSEDCL load. (*1 (c))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Hinjewadi - II	2 X (100-50) MVA, 220/22-22 kV T/F	Pune	To meet upcoming MSEDCL load (*1(b))
2	132 kV Indapur	1 X (50-25) MVA, 132/33 kV T/F	Pune	To meet upcoming MSEDCL load. (*1(b))
3	132 kV Bawda	2 X (50-25) MVA, 132/33 kV T/F	Pune	To meet upcoming MSEDCL load. (*1(b))

V) Capacitor:

Sr. No.	Name of Substation	Description	District	Remarks
1	132kV Purandwade S/s	2 X 15 MVAR at 132 kV level	Solapur	To control Low Voltage Problem (*3 (b))
2	132kV Velapur S/s	2 X 5 MVAR at 33 kV level	Solapur	
3	220kV Kurkumbh S/s	2 X 15 MVAR at 132 kV level	Pune	
4	132kV Yawat S/s	2 X 5 MVAR at 33 kV level	Pune	
5	132kV Janai S/s	2 X 5 MVAR at 33 kV level	Pune	
6	220kV Kathapur S/s	2 X 5 MVAR at 33 kV level	Pune	

Sr. No.	Name of Substation	Description	District	Remarks
7	220kV Alepatha S/s	2 X 15 MVAR at 132 kV level and 2 X 5 MVAR at 33 kV level	Pune	
8	132kV Naranyangaon S/s	2 X 5 MVAR at 33 kV level	Pune	
9	220 kV Bhigwan	2 x5MVAr	Solapur	
10	220 kV Baramati	2 x5MVAr	Solapur	
11	132 kV Someshwarnagar	2 x5MVAr	Solapur	
12	220 kV Bawada	2 x5MVAr	Solapur	
13	132 kV Indapur	2 X 5 MVAr	Solapur	
14	132 kV Kuruli	2 X 5 MVAr	Pune	
15	132 kV Shirur	2 X 5 MVAr	Pune	
16	132 kV Mandrup	2 x 5 MVAR	Solapur	
17	132 kV Mangalwedha	2 x 5 MVAR	Solapur	
18	132 kV Degaon	2 x 5 MVAR	Solapur	
19	132 kV Puluj	2 x 5 MVAR	Solapur	
20	132 kV Parewadi	2 x 5 MVAR	Solapur	
21	132 kV Shankarnagar	2 x 5 MVAR	Solapur	
22	132 kV Karmala	2 x 5 MVAR	Solapur	
23	132 kV Karajagi	2 x 5 MVAR	Solapur	
24	132 kV Manegaon	2 x 5 MVAR	Solapur	
25	132 kV Mohol	2 x 5 MVAR	Solapur	
26	132 kV Kurduwadi	2 x 5 MVAR	Solapur	

FY 2018-19

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	400/220/33kV Hinjewadi GIS	Pune	LILO of one ckt of 400 kV Koyana- Lonikand DC line at 400 kV Hinjewadi GIS- 10.5 kms	To meet additional load and strengthening of 220 kV network (*1 (b), *3(c))
			220 kV D/C Interconnection from 400 kV Hinjewadi – Hinjewadi II - 5 kms **(Commissioned)**	
			2 X 500 MVA, 400/220 kV ICT with bays 1 X 167 MVA, 400/220 kV Spare	
			2 X 100 MVA, 220/33-33 kV T/F	
2	132/22 kV Eon Kharadi	Pune	132 kV LILO on Markal-Kharadi line for Eon Kharadi using U/G Cable– 2 kms	To meet upcoming load of MSEDCL (*1 (b))
			2 X 50 MVA, 132/22 kV T/F	
			22 kV Outlets - 12 No's	

II) New EHV Lines

A) Link Lines

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	LILO of 400 kV Karad – Lonikand line at Jejuri S/s	20	Pune	To strengthen 400 kV source (*3(c), *4)
2	220 kV	Construction of 220 kV D/C line from 220 kV Phaltan s/s to 220 kV Walchandnagar s/s	104	Pune	To strengthen 220 kV Supply for 220 kV Walchandnagar S/s. (*3(c), *4)
3	220 kV	Construction of 220 kV DCDC line from 400 kV Jejuri s/s to loction no. 28 of existing 220 kV Jejuri-Lonand ckt	9	Pune	To provide separate and direct source to 220 kV Lonand and 220 kV Baramati s/s
4	132 kV	132 kV NCL (Pune) – Rahatani SCDC line	6.4	Pune	To strengthen 132 kV Pune Ring Main (*3(c), *4)
5	132 kV	LILO of 132kV Chinchwad-Bajaj at Chakan II s/s	10	Pune	
6	132 kV	Conversion of existing 132 kV Phursungi - Mundhwa SC line to DC line using same ROW with bays	12	Pune	To strengthen 132 kV Pune Ring Main. (*3(c), *4)
7	132 kV	132 kV from 220 kV Ranjangaon – Kuruli SCDC line (Partly on DC at Ranjangaon end)	20	Pune	To strengthen 132 kV network for 132 kV Kuruli S/s. (*3(c), *4)

8	132 kV	132 kV from 220 kV Ranjangaon – Shirur SCDC line (Partly on DC at Ranjangaon end)	26	Pune	To strengthen 132 kV network for 132 kV Ranjangaon S/s. (*3(c), *4)
9	132 kV	Conversion of existing 132 kV Chinchwad – Rahatani SC line to DC using same ROW - 6.0 kms with bays	6	Pune	To strengthen 132 kV Pune Ring Main. (*3(c), *4)
10	132 kV	132 kV NCL (Pune) – Kothrud SCDC line - 6.4 kms with bays	6.4	Pune	To strengthen 132 kV Pune Ring Main. (*3(c), *4)
11	132 kV	132 kV SCDC Daund – Shrigonda SCDC line - 28 kms	28	Pune /Ahmed nagar	To strengthen 132 kV network for 132 kV Daund S/s. (*3(c), *4)

B) Second Circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	2nd Ckt stringing of 132kV Malinagar-Velapur line	20	Solapur	To strengthen 132 kV network
2	132 kV	2nd ckt stringing of 132kV Velapur-Shankarnagar SCDC line	12	Solapur	To strengthen 132 kV network

C) Reorientation of existing Lines: Nil

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	Replacement of conductor of existing Chinchwad - Chakan S/C line by HTLS.	24.25	Pune	To strengthen the network. (*3(c),*4)
2	220 kV	Replacement of conductor of existing Narayangaon - Mahindra Forging - Chakan S/c line by HTLS.	57.9	Pune	To strengthen the network. (*3(c),*4)

III) Reactors:

A) New

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Lonikand -II	1 X 125 MVAR	Pune	To control high voltage problem (*3 (a))

B) Shifting- Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Chakan	1 X 315 MVA, 400/220 kV	Pune	To have redundancy (*4)
2	400 kV Lamboti	3 X 167 MVA 400/220 kV ICT	Soalpur	To have redundancy (*4)

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Pandharpur	1 X (200-100) MVA, 220/110 kV ICT	Pune	To have redundancy (*4)
2	220 kV Magarpatta	2 X (200-100) MVA, 220/132 kV ICT	Pune	To have redundancy (*4)

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Nanded City	1 X 50 MVA, 220/22 kV	Pune	To meet upcoming load of MSEDCL (*1 (b))
	220 kV Phadarpur	1 X 50 MVA, 220/33 kV	Solapur	To meet upcoming load of MSEDCL (*1 (b))
2	132 kV Whirlpool	1 X 25 MVA 132/22 kV T/F	Pune	To meet upcoming load of MSEDCL (*1 (b))
3	132 kV Kharadi	1 X 50 MVA 132/22 kV T/F	Pune	To meet upcoming load of MSEDCL (*1 (b))
4	132 kV NCL	1 X 50 MVA, 132/22 kV TF	Pune	To meet upcoming load of MSEDCL (*1 (b))
5	132 kV Sanaswadi	1 X 50 MVA 132/22 kV T/F	Pune	To meet upcoming load of MSEDCL (*1 (b))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 KV Shirur	1 X (50-25) MVA, 132/22kV TF	Pune	To meet upcoming load of MSEDCL (*1 (b))

Sr. No.	Name of Substation	Description	District	Remarks
2	132 Rasthapeth	2 X (50-25) MVA, 132/22kV TF	Pune	To meet upcoming load of MSEDCL (*1 (b))
3	132 Markal	2 X (50-25) MVA, 132/33 kV TF	Pune	To meet upcoming load of MSEDCL (*1 (b))
4	132 kV Purandwade	1 X (50-25) 132/33 MVA TF	Pune	To meet upcoming load of MSEDCL (*1 (b))
5	132 KV Velapur	2 X (50-25) MVA, 132/33 kV TF	Pune	To meet upcoming load of MSEDCL (*1 (b))

V) Capacitors:

Sr. No.	Name of Substation	Description	District	Remarks
1	132 kV Mangalwedha or Nimboni	2 X 15 MVAR	Solapur	To control Low Voltage Problem (*3 (b))
2	132 kV Purandwade	2 X 15 MVAR	Solapur	
3	132 kV Mandrup	2 X 15 MVAR	Solapur	
4	132 kV Velapur	2 X 15 MVAR	Solapur	
5	220 kV Walchandnagar (At 132 kV level)	2 X 15 MVAR	Solapur	
6	132 kV Karmalala	2 X 15 MVAR	Solapur	

VII) SVC/STATCOM

Sr. No.	Name of Substation	Description	District	Remarks
1	220kV Pandharpur	± 125 MVAR	Solapur	To dynamically control the voltage profile

FY 2019-20

I) New EHV Substations:

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/132/33 kV Khed city (Rethwadi)	Pune	Construction of 220kV line, LILO on one ckt. of 220kV Lonikand-I – Kathapur DC line, for prop. 220kV Retwadi (Khed) s/s – 5 kms	To meet upcoming load of MSEDCL (*1 (b)) (EHV S/S to be designed keeping the future 400 kV switchyard along with strengthening of 132 kV network in Haveli Taluka)
			2 X 50 MVA, 220/33 kV TF with bay	
			33kV Outlets- 06 No	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV Loni Deokar-Tembhurni SCDC line.	40	Solapur	To strengthen the network. (* 3(c), *4)
2	220kV	LILO of 220kV Chinchwad-Telco line at Chakan II s/s	10	Pune	To strengthen the network. (* 3(c), *4)
3	132 kV	LILO of 132kV Chakan-Mahindra Forge at 132 kV Pimpalgaon	10	Pune	To strengthen the network. (* 3(c), *4)
4	132 kV	132kV Zuari - Chettinad	15	Solapur	To strengthen the network. (* 3(c), *4)
5	132 kV	LILO of 132kV Indapur -Ujani at 220kV Loni deokar s/s	15	Solapur	To strengthen the network. (* 3(c), *4)

B) Second Circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 kV Jeur - Parewadi	22	Solapur	To strengthen 132 kV source. (*3(c))

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Chakan	1 X (500 – 315) MVA, 400/220 kV ICT	Pune	To reduce loading of 220 KV network S/s. (*3(c), *4)

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 KV Jeur	60 MVAR 220 kV	Solapur	To control Low Voltage Problem (*3 (b))
2	220 KV Bhigwan	60 MVAR 220 kV	Solapur	
3	220 KV Kurkumbh	60 MVAR 220 kV	Solapur	
4	220 KV Tembhurni	60 MVAR 220 kV	Solapur	
5	220 KV Karkamb	60 MVAR 220 kV	Solapur	

FY 2020-21

I) New EHV Substations: NIL

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV SCDC line between 220 kV Jeur to 220 kV Paranda S/s	40	Solapur/ Osmanabad	To strengthen 220 kV Paranda S/S (* 3(c), *4)

B) Second Circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 KV Rahatani –Varasgaon SCDC line.	42.3	Pune	To have redundancy (*4)
2	132 kV	2nd ckt stringing of 132kV Bale –Solapur MIDC SCDC line	16	Solapur	To strengthen 132 kV network (*3(c))

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 KV Chakan	1 X (500 – 315) MVA, 400/220 kV ICT	Pune	To reduce loading of 220 KV network S/s. (*3(c), *4)

D) Additional Transformer: Nil

E) Replacement of Transformer: NIL

V) Capacitors: Nil

FY 2021-22

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	132/22 kV Bhugaon	Pune	132kV DC line, LILO on 132kV Varasgaon-Rahatni line –2 km.	To meet upcoming load of MSEDCL. (*1(b))
			2 X 50 MVA, 132/22 kV T/F with bays	
			22 kV Outlets - 6 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	LILO on Pandharpur- Bhalwani at 400kV Alkud S/s	50	Solapur/	To evacuate power from 400kV Alkud s/s

B) Second circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	132 kV	132 KV Mohol-Puluj SCDC line.	17	Solapur	To have redundancy (*4)

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity:

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitors: Nil

FY 2022-23

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/22 kV Marunje/ Balewadi	Pune	LILO on 220kV Chinchwad-Parvati line - 5 km.	To meet upcoming load of MSEDCL. (*1(b))
			2 X 50 MVA, 220/22 kV T/F with bays	
			22 kV Outlets - 6 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	400 kV Solapur PG to Lamboti	80	Solapur	To strengthen 400 kV source (*3(c), *4)

B) Second circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity:

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

F) Replacement of ICT in existing substation: Nil

G) Additional Transformer: Nil

H) Replacement of Transformer: Nil

V) Capacitors: Nil

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FY 2017-18

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	400 kV PADGHE – II (KUDUS) S/S	Thane	400 kV D/C Babhaleshwar - Kudus line quad AAAC - 200 Km along with end bays at Babhleshwar end	This substation is proposed to reduce loading of existing 400 kV Padghe S/S & to cater up coming load of Wada, Kudus, Bhiwandi and Kolshet area. (*3(c), *4)
			LILO of both ckts of 400 kV Tarapur – Padghe D/C at Padghe – II (Kudus) - 15 kms	
			400 kV DC line from Vapi to Kudus **(BY PGCIL)** – 125 kms	
			400 kV Padghe (PG) – 400 kV Padghe – II (Kudud) MSETCL using D/C Quad Moose Conductor – 10 kms **(BY PGCIL)** (Line ready)	
			220 kV LILO on 220 kV Kolshet – Wada line at 400 kV Kudus S/S – 10 ckt kms	
			220 kV LILO on 220 kV Padghe - Wada line at 400 kV Kudus S/S – 10 ckt kms	
			2 X 500 MVA, 400/220 kV ICT'S with bays 1 X 167 MVA 400/220 kV 1 PHASE ICT SPARE	
			33 kV GIS Outlets – 12 NOS	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	LILO of one ckt of 220 kV Borivali - Boisar (M) M/C line at Boisar PG	5	Thane	Strengthening of Mumbai power supply. (*3(c), *4)

B) Second Circuit stringing:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	100 kV	2nd circuit stringing of 100 kV SCDC line from 220 kV Kandalgaon- Mhasala.	30	Raigad	To have redundancy to 100 kV Mhasala S/s. (*4)
2	100 kV	2nd ckt stringing of 100 kV Tap (Jithe – Thal) to Gail	3	Raigad	To have redundancy for Gail S/s (*4)

C) Reorientation of existing Lines:

Sr. No.	Name of Line	Length of Line Ckt Km	District	Remarks
1	Reorientation of 400 KV Babhaleshwar –Padghe DC line at 400 KV Padghe s/s.	0.5	Thane	For ease of Maintenance & taking outages (*4)
2	Reorientation of 400 KV Padghe-Kalwa DC line at 400 KV Padghe s/s.	0.5	Thane	
3	Reorientation of 100 kV Pal - Dombivali Tap on 220 kV Taloja to 100 kV Taloja at 100 kV Taloja S/s	2	Raigad	

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	Replacement of conductor 220 KV Mulund -Bhandup Tap to Mulund with high Ampacity	17	Thane / Mumbai	To overcome overloading problem of Mumbai strengthening lines (*3(c))
2	220 kV	Conversion of existing conductor of 220 kV Nerul – Sonkhar Line to HTLS.	07	Navi Mumbai/ Mumbai	To overcome overloading problem of Mumbai strengthening lines (*3(c))
3	132 kV	Replacement of conductor 132 kV Boisar-II-Lupin-MIDC Line	5.92	Palghar	To overcome overloading problem

III) Reactors:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Kudus	1 X 125 MVAr	Thane	To control high voltage problem. (*3(a))

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Jambhul	2 X 50 MVA 220/22 kV T/F	Thane	To meet local upcoming demand (*1(b))

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	400 kV Kalwa	(3 x 167) MVA, 400/220 kV ICT	Thane	To have redundancy and to meet upcoming load. (*4)

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Vasai	1 X (200-100) MVA, 220/100 kV	Palghar	To have redundancy. (*4)

D) Additional Transformer:

E) Replacement of Transformer: NIL

V) **Capacitor Bank:** Nil

FY 2018-19

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/22 kV Virar (West) (Chikhal Dongari)	Palghar	D/C on narrow base D/C tower LILO on proposed 220 kV Boisar – Kopri line at 220 kV Chikhal Dongri S/S - 4 kms	To reduce loading of Nalsopara and Vasai S/S and to meet upcoming load. (*1(b), *3(c))
			2 X 50 MVA, 220/22 kV T/F	
			22 kV GIS Outlets - 12 No's	
2	220/100/33 kV Palghar	Palghar	LILO on 220 kV Boisar – Nalasopara line with bays - 10 kms	To improve reliability and voltage profile. (*4, *3(c))
			LILO on both ckts of 132 kV Boisar MIDC – Dahanu DC line – 60 ckt kms	
			2 X 100 MVA, 220/100 kV ICT	
			2 X 50 MVA, 220/33 kV T/F'S with bays	
			33 kV GIS Outlets - 12 No's	
3	100/22 KV Kaman (Vasai) Kharbahv (GIS)	Palghar	LILO on 100 kV Padghe – Vasai line - 21 kms	To meet upcoming load of nearby Vasai area and reduce the loading of 100 kV Vasai S/s (*1(b))
			2 X 50 MVA 100/22 kV T/F	
			22 kV GIS Outlets - 12 No's	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV Boisar- Ghodbunder at Kudus	58	Thane	To strengthen 220 kV network
2	220 kV	220 kV Tarapur - Borivali at Kudus	58	Thane	To strengthen 220 kV network
3	100 kV	100 kV Padghe – Bhiwandi at Bapgaon	4	Thane	To improve reliability (*4)
4	100 kV	LILO of 100 kV Ambernath – Mohone Line at 220 kV Jambhul by U/G cable	3	Thane	To improve reliability (*4)

B) Second Circuit stringing: Nil

C) Reorientation of existing Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	Formation of 400 kV Kalwa - Padghe third Circuit	4	Thane	For redundancy (*4)
2	220 kV	Interconnecting 220 kV D/C Kharghar - Kandalgaon and Apta-Kalwa - Taloja line at crossing	2	Raigad	For redundancy (*4)

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	400 kV	Replacement of conductor of existing 400 kV Padghe – Kalwa CKT I & II with HTLS conductor	100	Thane / Mumbai	To overcome overloading problem of 400 kV Padghe – Kalwa line. (*3(c))
2	220 kV	Replacement of conductor of existing 220 KV Kalwa- Mulund II line with HTLS conductor	6.04	Thane	To reduce overloading of existing network & strengthen Mumbai Network. (*3 c)
3	220 kV	Replacement of conductor of existing 220 KV Sonkhar - Trombay line with HTLS conductor	9.7	Thane/ Mumbai	To overcome overloading problem of Mumbai strengthening lines (*3(c))
4	220 kV	Replacement of conductor of existing 220 KV Kalwa- Trombay line with HTLS conductor	30	Thane	To reduce overloading of existing network & strengthen Mumbai Network. (*3 c)
5	220 kV	Replacement of conductor 220 KV Kharghar - Trombay with HTLS conductor	43	Navi Mumbai/ Mumbai	To overcome overloading problem of Mumbai strengthening lines (*3(c))
6	220 kV	Replacement of conductor 220 kV Boisar (M) - Boisar PG D/C line with High Ampacity	9	Palghar	To reduce overloading of existing network
7	100 kV	Replacement of conductor 100 kV DC Line from 220 kV Padghe to 100 kV Bhiwandi High Ampacity.	18.5	Thane	To reduce overloading of existing network & strengthen Mumbai Network. (*3 c)

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Vasai	2 X 50 MVA 220/22 kV T/F	Palghar	To meet local upcoming demand (*1(b))
2	100 kV GAIL (EHV Consumer) Nera Usar Alibag.	2 X 25 MVA, 100/22 kV T/F	Raigad	To meet local upcoming demand (*1(b))

B) Additional ICT in existing substation:

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Vasai	1 X (200-100) MVA, 220/100 kV ICT	Palghar	To improve reliability and voltage profile. (*4, *3(b))

D) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Kharghar	1 X 50 MVA, 220/33 kV TF	Vashi	To meet upcoming MSEDCL load (*1(b))
2	220 kV ONGC Panvel	1 X 50 MVA, 220/22 kV TF	Raigad	To meet upcoming MSEDCL load (*1(b))
3	220 kV Anandnagar	1 X 50 MVA, 220/22 kV TF	Thane	To meet upcoming MSEDCL load (*1(b))
4	220 kV Padghe	1 X 50 MVA, 220/22 kV TF	Thane	To meet upcoming MSEDCL load (*1(b))
3	132 kV Boisar MIDC	1 X 50 MVA, 132/33 kV TF	Thane	To meet upcoming MSEDCL load (*1(b))
4	110 kV Neral	1 X 25 MVA ,110/22 kV	Thane	To meet upcoming MSEDCL load (*1(b))

E) Replacement of Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Kamba	1 X (100-50) MVA, 220/22-22 kV T/F	Thane	To meet upcoming MSEDCL load (*1(b))
2	220 kV Temghar	1 X(100-50) MVA, 220/22-22 kV T/F	Vashi	To meet upcoming MSEDCL load (*1(b))
3	110 kV Roha	1 X (50-25) MVA, 100/22 kV T/F	Vashi	To meet upcoming MSEDCL load (*1(b))

V) Capacitor Bank: Nil

FY 2019-20

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/33 kV Khandeshwar	Raigad	Establishment of 220/22 kV GIS S/s at Panvel end on one ckt of UG cable section of 220 kV DCMC Kandalgaon – Khargar line with bays.	To meet upcoming load of MSEDCL (*1(b))
			2 X 50 MVA, 220/33 kV T/F'S with bays	
			33 kV Outlets - 6 No's	
2	220/22 kV Virar (East) Kopari	Palghar	220 kV DCDC LILO on narrow base DC towers on 220 kV Boisar – Vasai line up to Loc No A - 7 kms 220 kV MC line on narrow base MC towers from Loc A to proposed 220 kV Kopri (Virar E) S/s - 5 kms	To meet upcoming load of MSEDCL and reduce loading of 220 kV Nalasopara and 100 kV Vasai substations (**1(b), *3(c))
			220 kV DCDC line LILO on narrow base DC towers on 220 kV Boisar – Varsova line up to Loc No A – 2 kms	
			2 X 50 MVA, 220/22 kV T/F's with bays	
			22 kV GIS Outlets - 12 No's	
3	220/100/22 kV Pawane	Thane	LILO on one ckt of 220 kV Kharghar – Kalwa MC line through UG cable - (0.7 Route kms)	To meet upcoming load of MSEDCL and for reliability (*1(b), (*4))
			LILO on 100 kV Kalwa –Vashi line at Pawane - 1.0 ckt KM.	
			2 x 100 MVA, 220/100 kV ICT	
			2 X 50 MVA, 220/22 kV T/F.	
			22 kV Outlets - 12 Nos.	
4	220/33 kV Ulwe Node	Raigad	Establishment of 220/33 kV GIS S/s at Ulwe end on one ckt of UG cable section of 220 kV DCMC Uran – Khargar line with bays.	To meet upcoming load of MSEDCL. (*1(b))
			Establishment of 220 kV GIS switching station at Kharghar end of UG cable section of 220 kV DCMC Uran – Khargar line with bays.	
			2 X 50 MVA, 220/33 kV T/F with Bays	
			33 kV Outlets - 6 No's	
5	220/33 kV Panchanand-Taloja	Raigad	LILO on 220kV Kalwa-Taloja line U/G Cable (ORC for CIDCO) - 0.5 kM	To meet upcoming load of MSEDCL. (*1(b))
			220/33 kV, 2 X 50 MVA T/F	
			8 x 33 KV Outlets	

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	LILO of KalwaTaloja at 220 kV Pal Dombivali by using 100 kV Kalwa Khopoli RoW	10	Thane	To improve reliability (*4)
2	220 kV	LILO on Sonkhar - Trombay at Vashi	8	Navi Mumbai	To improve reliability (*4)
3	100 kV	LILO on 100 kV Padghe – Pisse/Panjrapur at 220 kV Baapgaon	4	Thane	To improve reliability (*4)

B) Second Circuit stringing: Nil

C) Reorientation of existing Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	Reorientation of one ckt of 220 kV Padghe – Jambhul DC line to connect 220 kV Jambhul – Pal line	1.5	Thane	To have redundancy (*4)

D) Replacement of conductor:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	Replacement of conductor 220 KV Mulund - Trombay with high Ampacity	24	Mumbai	To overcome overloading problem of Mumbai strengthening lines (*3(c))

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: NIL

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Vashi	1 x 200 MVA, 220/100 kV ICT	Raigad	To meet local upcoming demand (*3(b))

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Taloja	1 X (200-100) MVA, 220/110 kV ICT	Raigad	To improve reliability and voltage profile. (*4, *3(b))

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

V) Capacitor Bank: Nil

FY 2020-21

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/22 kV Mankoli (Bhiwandi) S/S	Raigad	LILO on 220 kV Colorchem - Temghar line by using U/G cable - 3km 2 x 50 MVA, 220/22 KV T/FS WITH BAYS 8 x 22 KV Outlets	To meet upcoming load of MSEDCL (*1(b))
2	132/33 kV Jawhar	Palghar	Construction of132kV DCDCline from 132 kV Suryanagars/s & 132 kV Kawdas s/s to 132 kV Jawhar s/s– 40.0kms 25 MVA, 132/33kV transformer with bays-2 nos. 132kV line bay– 4 nos. (02 nos. at prop. Jawhar s/s, 01 at Kawdas& 01 at Suryanagar) 33kV outlet –04 nos. (Outlets to be constructed as per requirement)	To improve reliability and voltage profile and to meet upcoming load of MSEDCL. (*4, *1(c), 3(c))

II) New EHV Lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV COLOURCHEM - KOLSHET D/C	8	Thane	To improve reliability (*4)

B) Second Circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactors: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation:

Sr. No.	Name of Substation	Description	District	Remarks
1	220 kV Vashi	1 x 200 MVA, 220/100 kV	Raigad	To have redundancy. (*4)

C) Replacement of ICT in existing substation: Nil

D) *Additional Transformer: Nil*

E) *Replacement of Transformer: Nil*

V) **Capacitor:** Nil

FY 2021-22

I) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	220/22 kV Dombivali (W)	Thane	220 kV UG cable from 220 kV Dombivli (PAL) with bays - 8 km	To improve reliability and voltage profile and to meet upcoming load of MSEDCL (*4, *3(b))
			2 X 50 MVA 220/22 KV T/f.	
			22 KV Outlets -12 Nos.	

II) New EHV lines

A) Link Lines:

Sr. No.	Voltage Level	Name of Line	Length of Line Ckt Km	District	Remarks
1	220 kV	220 kV DC line from 400 kV Boisar (PG) - Wada	50	Palghar	To have redundancy (*4)

B) Second circuit stringing: Nil

C) Reorientation of existing Lines: Nil

D) Replacement of conductor: Nil

III) Reactor: Nil

IV) Addition of Transformation Capacity

A) Creation of new level in existing substation: Nil

B) Additional ICT in existing substation: Nil

C) Replacement of ICT in existing substation: Nil

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

I) Capacitor: Nil

FY 2022-23

V) New EHV Substations

Sr. No.	Name of S/s	District	Total Scope of Work	Remarks
1	400/220 kV Aarey GIS (Mumbai)	Mumbai	400 kV D/C Kudus - Aarey line- 85 km	To meet upcoming demand of Mumbai & strengthen the network
			LILO on 400 kV Kalwa - Vikhroli line at 400 kV Aarey- 15 km	
			220 kV M/C line by using UG cable to connect 220 kV Aarey (R) S/S	
			1 x 80 Mvar Reactor with bay	
			2 X 500 MVA, 400/220kV ICT'S WITH BAYS 1 X 167 MVA 400/220 kV 1 PHASE ICT SPARE	
			33 kV GIS OUTLETS – 12 NOS	
2	220/33/22 kV Goregaon Filmcity	Mumbai	LILO of 220 kV Aarey (R INFRA T) - 220 kV Borivalli (R INFRA T) at Goregaon Filcity - 5 kms by using UG cable	To meet upcoming demand of Film City & Diversion of MSEDCL load from TATA to MSETCL. (*1(b)
			LILO of 220 kV Aaret (R INFRA T) - 220 kV Borivalli line (MSETCL)(Proposed cable) at Goregaon Filmcity- 5 kms by using UG cable	
			2 X 100 MVA, 220/33 -22 kV T/F	
			2 X 100 MVA, 220/33 - 22 kV T/F	
			33 kV Outlets - 40 No's	
3	100/33 kV Dighi (MIDC)	Raigad	100 kV SCDC line from 100 kV Mashala S/S- 45 km	To cater MIDC load
			2 x25 MVA, 100/33 KV T/F with bays	
			8 x 33 KV Outlets	

VI) New EHV lines

E) Link Lines: Nil

F) Second circuit stringing: Nil

G) Reorientation of existing Lines: Nil

H) Replacement of conductor: Nil

VII) Reactor: Nil

VIII) Addition of Transformation Capacity

F) Creation of new level in existing substation: Nil

G) Additional ICT in existing substation: Nil

H) Replacement of ICT in existing substation: Nil

I) Additional Transformer: Nil

J) Replacement of Transformer: Nil

II) Capacitor: Nil

Addressal of Transmission Constraints

Addressal of Transmission Constraints

Transmission Infrastructure is the backbone for operation of a competitive electricity market and Intra State Transmission is one of the integrating backbone of India's vast National Electricity Grid.

State Utilities / DISCOM's plan for procurement of power from out of State and increased load demand and uncertainity of monsoon along with fresh release of Agriculture Pump load by the State has resulted in the congestion in InsSTS network and poor reactive power management (Low voltage pocket & high voltage pocket) in certain region of the InSTS.

Efforts are made in this State Transmission Plan to mitigate the same by planning schemes for addressing transmission constraints under various times frames and proposed measures to relieve the same in short term, medium term and Long term.

In the Short term schemes are being prepared for augmentation / additional enhancement of power transformer / ICT capacity at existing substationand using the Dynamic line rating of line to enhance capability of existing transmission lines. In the medium term for addressing the transmission congestion the regions deficient in transmission capacity the enhancement of exiting transmission system by way of deploying the new technology like relpacement of exicting loaded transmission line conductors by latest High Temperature Low Sagging (HTLS) / AAAC/ AL 59 conductors along with use of new tower structures. Installation of Capacitor bank at deficient reactive power region and shfting of reactors at appropriate locations is planned.

In the Long term re-conductoing of existing important critical corridors, expedition of new transmission elements and creation of new voltage level along with the adoption of new latest technology is being palnned, also Green Energy Corridor for transmission system is planned for anticipated additional renewables energy generation in the State along with the formation of Renewable Energy Management Centre (REMC) for the same.

Transmission planning is targeted for providing congestion free transmission system with maximum reliability to wheel power from generating stations and external resources to load points. The transmission system plays a vital role of being a connecting link between source (generating stations) and sink (distribution companies). Therefore, planning process requires thorough understanding and processing of information received from various distribution companies and generating stations. The planning process aims at providing one or more alternatives to successfully evacuating generating stations to provide all necessary drawal points

to meet requirements of a distribution utility. To summarize, the successful transmission plan results into but not limited to

- evacuation of upcoming generation
- coordinated planning with CTU
- wheeling of power to distribution companies
- congestion free and secure transmission network
- improved availability of transmission elements, and
- Ensuring tweak to previous planning defects if required.

For the purpose of transmission system planning of Maharashtra, the planning process is divided into two parts viz.

- for State of Maharashtra (excluding Mumbai region) and
- Mumbai Region. The demand projection requirements are accordingly identified and processed to make separate plan for Mumbai and Rest of Maharashtra.

- As the transmission system is vital link between the Generation and Distribution System, network planning is done such that the system is operated with reliabilityunder normal & abnormal condition for evacuation of Generation to meet the load demand.
- However, due to gap in implementation/commissioning of various transmission elements in target time due to various problems such as Land availability, ROW & forest approval, the existing transmission network gets congested & problem of transmission element Overloading , load shedding , Low Voltage/Over Voltage pockets are developed..
- While preparing five year transmission planning, the existing Maharashtra Network is studied in detail.
- These transmission constraints addressed with remedial actions are included in five year plan as long term measures for implementation.
- Now , 132/33 kV Level Capacitor banks & 400 kV Reactors are planned as below at various s/s to address low/High voltage issues

Sr. No.	Zone	Existing MVAr as on Nov 2017	Phase-1 MVAr	Phase-2 MVAr	Phase-3 MVAr	Phase-4 (132 kV) MVAr	Phase-4 (220kV) MVAr
a	**B**	**c**	**d**	**e**	**f**	**g**	**h**
1	**Amravati**	300	200	175	215	330	60
2	**Aurangabad**	774.1	340	190	250	330	0
3	**Nashik**	775	130	370	420	390	0
5	**NAGPUR**	25	25	65	40	0	0
6	**Karad**	241.85	5	80	125	0	0
4	**Pune**	584.836	150	50	130	180	300
7	**Vashi**	101.9	20	0	0	0	0
Total		**2802.69**	**870**	**930**	**1180**	**1230**	**360**
Grand Total (Phase-1 to 4)			**4570**				

Sr No	Name of Zone	Name of Substation	Reactors
			MVAr
1	Nagpur	400 kV Chandrapur-II	375
		400 kV Koradi-II	
		400 kV Khaparkheda	
2	Amravati	400 kV Akola	125
3	Pune	400 kV Solapur	250
		400 kV Lonikand-II	
4	Karad	400 kV Karad	250
		400 kV Kolhapur	
5	Vashi	-	-
6	Aurangabad	400 kV Nanded	125
7	Nashik	400 kV Bhusawal-II (Deepnagar)	250
		220 kV Dhule	
	Total		**1375**

ABSTRACT SHOWING ZONEWISE CONSTRAINTS OBSERVED AND REMIDIAL MEASURES CONSIDERED IN UPCOMING STU PLAN 2017-18 TO 2022-23									
Sr. No.	**Particulars**	**Zone**							**Total**
		Amravati	**Aurangabad**	**Karad**	**Nagpur**	**Nashik**	**Pune**	**Vashi**	
Type of Constraints									
1)	**Critically loaded lines**								
	Observed	1	8	2	5	8	11	2	37
	Solution Identified	1	8	2	5	8	11	2	37
	Solution to be Identified	0	0	0	0	0	0	0	0
2)	**No. of critically loaded ICTs/Tf**								
	Observed	10	5	6	6	11	15	5	58
	Solution Identified	10	5	6	6	11	15	5	58
	Solution to be Identified	0	0	0	0	0	0	0	0
3)	**Low Voltage Pocket**								
	Observed	10	23	2	5	9	29	0	79
	Solution Identified	10	23	2	5	9	29	0	79
	Solution to be Identified	0	0	0	0	0	0	0	0
4)	**Single source s/s**								
	Observed	5	11	13	11	10	12	1	63
	Solution Identified	5	11	13	11	10	12	1	63
	Solution to be Identified	0	0	0	0	0	0	0	0

- The zone wise transmission constraints such as problem of element overload, low voltage & Single Source are addressed as below

I) Amravati Zone

A) *Critically Loaded Lines*

Sr. No	District	Name of Line	Line Configuration	STU Remarks
1	Yavatmal	220 kV Wardha - Yavatmal Line	SCDC	Wardha (PG)-Yavatmal DC

B) *Critically loaded ICT's and Transformers*

Sr. No	District	Name of Substation	STU Remarks.
1	Yavatmal	132 kV Darwha	(1 X 25) 132/33 kV ready for commissioning
2	Yavatmal	132 kV Pandharkawada	1 X (50-25) 132/33 kV TF considered in STU plan
3	Yavatmal	132 kV Gunj	1 X (50-25) 132/33 kV TF considered in STU plan
4	Yavatmal	220 kV Yavatmal	(1 X 50) 220/33 kV WIP TF considered in STU plan
5	Yavatmal	220 kV Yavatmal	(1 X 100) 220/132 kV Commissioned
6	Akola	220 kV Akola	2 X (50-25) 132/33 kV, 1 transformer replaced another WIP
7	Washim	132 kV Risod	(1 X 25) 132/33 kV TF considered in STU plan
8	Buldhana	132 kV Motala	(1 X 25) 132/33 kV TF considered in STU plan
9	Buldhana	132 kV Buldhana	(1 X 25) 132/33 kV TF considered in STU plan
10	Buldhana	132 kV Dusarbid	(1 X 25) 132/33 kV TF considered in STU plan

C) *Low Voltage Pockets*

Sr. No.	District	Name of Substation	STU Remarks
1	Yavatmal	220 kV Pusad	220 kV Wardha –Yavatmal D/C & Yavatmal Tap -Ghatodi
2	Yavatmal	220 kV Ghatodi	220 kV Wardha –Yavatmal D/C & Yavatmal Tap -Ghatodi
3	Yavatmal	132 kV Arni (Jawla)	132 kV Ghatodi- Digras line commissioned / 132kV Ner – Darwha D/C
4	Akola	132 Akot	220 kV Anjangaon S/S WIP
5	Akola	132 kV Hiwarkhed	2nd ckt stringing of Akot- Hiwerkhed & LILO at Warvat-Bakal
6	Buldhana	132 kV Warwat Bakal	2nd ckt stringing of Akot- Hiwerkhed & LILO at Warvat-Bakal
7	Washim	132 Karanja	i) 220 kV Malegaon ii) 132 kV Murtizapur – Karanja link line (2019-20)

8	Washim	132 Washim	i)220 kV Malegaon ii) Washin –Jambazar 2nd circuit stringing
9	Washim	132 kV Mangrulpir	i) 220 kV Malegaon ii) 132 kV Murtizapur – Karanja link line (2019-20)
10	Washim	132 kV Risod	i)220 kV Malegaon

D) *Single source Substation*

Sr. No.	District	Name of Substation	Source Line	Line Configuration	STU Remarks
1	Amravati	132 kV Dharni	132kV Nepa Nagar - Dharni	SCDC	Dharni-Nepanagar 2nd ckt stringing included in STU Plan
2	Amravati	132 kV Morshi	132 kV Amravati - Morshi Line	SCSC	i)220 kV Warud s/s ii) 132 kV Warud – Barsinghi (in Nagpur Plan)
3	Amravati	132 kV Warud	132 kV Morshi - Warud Line	SCSC	132 kV Warud – Barsinghi (in Nagpur Plan)
4	Akola	132 kV Hiwarkhed	132 kV Akot - Hiwarkhed	SCDC	132 kV Akot- Hiwarkhed 2nd ckt stringing & LILO at Warvat- Bakal included in STU –plan
5	Buldhana	132 kV Dhad	132 kV Chikhali - Dhad	SCDC	132 kV Dhad- Bhokardan line

II) Aurangabad Zone

A) *Critically Loaded Lines*

Sr. No.	District	Name of Line	Line Configuration	STU Remarks
1	Aurangabad	220 kV Waluj - Padegaon Ckt - I	M/C & D/C	Second ckt stringing of 220 kV Padegaon - Sawangi SCDC line and making it LILO to one ckt of 220 kV Waluj -Chitegaon DCDC line.
2	Aurangabad	220 kV Waluj - Padegaon Ckt - II	M/C & D/C	
3	A'bad	132 kV Padegaon - Canpack – Gangapur	SCSC	132 kV Deogaon Rangari – Gangapur Line Commissioned
4	Jalna	132 kV (220kV Jalna) – Jalna MIDC	SCSC	132 kV Jalna-Rajur ckt 1 Tap to 132 kV jalna MIDC
5	Jalna	132 kV (220 Jalna) - 132kV Jalna old	SCDC	2nd Ckt stringing of 132 kV Partur to Jalna Old & 2nd Ckt stringing of 132 kV Jalna –Jafrabad-Bhokardan Ckt.
6	Parbhani	220 kV Parbhani - Unit 8 Parli	SCDC	400 kV Kumbhargaon Commissioned & Restoration of 220 kV DC Parli – Waghala line in progress.

7	Parbhani	132 kV Parbhani - Jintur	SCSC	LILO on 132 kV Jintoor - Yeldari S/C line at 220 kV Partur.
8	Hingoli	220 kV Pusad-Hingoli	SCDC	220 kV Ghatodi –Hingoli line already commissioned and upgradation of kurunda to 220 kV is in plan year along with LILO of this 220 kV Ghatodi-Hingoli to Kurunda.

B) Critically loaded ICT's and Transformers

Sr. No.	District	Name of Substation	STU Remarks
1	A'bad	132 kV Waluj	(1 X 50) 132/33 kV TF considered in STU plan
2	Aurangabad	400 kV RS Waluj	220 kV load diversion on 400 kV Aurangabad (PG) is completed. LILO on 220 KV Waluj –Jalna at 400 kV (Thapti Tanda) Aurangabad - II is also completed.
			500 MVA, 400/220 kV 2nd ICT work under way at Thapti tanda.
3	Jalna	220 kV Jalna	33 kV HT consumers are being upgraded on 132 kV level. As such 200 MVA 220/132 KV ICT is sanctioned .Augmentation by replacement of 2X50 MVA 220/33 kV TF to 100 MVA 220/33 kV TF is considered
4	Hingoli	220 kV Hingoli	132 kV Sengaon is planned to shift its own load and upgradation of Kurunda to 220 kV will shift the load of Ahadabalapur, Elichpur and Kurunda on 220 kV Kuruda.
5	Beed	400 kV Girwali	LILO of 220 kV Parli -Harangul &.Osmanabad to Parli PG.

C) Low Voltage Pockets

Sr. No.	District	Name of Substation	STU Remarks
1	A'bad	132 kV Vaijapur	On Commissioning of 132 KV Deogaon Rangari-Gangapur problem resolved.
2	A'bad	132 kV Gangapur	132 kV Gangapur is now fed from 220 kV Deogaon Rangari S/s
3	Jalna	132 kV Partur	220 kV Partur s/s considered in STU Plan &. LILO of 132 kV second ckt of Ambad Ghansawangi at 220 kV Partur.
		132 kV Ghanswangi	
		132 kV Ambad	
4	Jalna	220 kV Bhokardan	220 kV Sawangi – Bhokardan line commissioned. Also 132 kV Dhad- Bhokardan line is sanctioned.
5	Parbhani	132 kV Pathri	132 kV Majalgaon – Pathri SCDC line considered in 2019-20
6	Parbhani	132 kV Jintur	220 kV Malegaon (Washim) commissioned & Load of 132 KV Risod (Washim) will be shifted to 220 KV Malegaon (Washim).
7	Hingoli	220 kV Hingoli	

Sr. No.	District	Name of Substation	STU Remarks
8	Hingoli	132 kV Hingoli	400 kV Kumbhargaon direct source planned for this region by upgradation of Kurunda to 220 kV) will shift the load of Ahadabalapur, Elichpur and Kurunda on 220 kV Kurunda.
9	Hingoli	132 kV Akhada - Balapur	
10	Hingoli	132 kV Basmat	
11	Hingoli	132 kV Kurunda	
12	Nanded	132 kV H'nagar	132 kV SCDC line from 220 kV Bhokar - 132 kV Tamsa and 220 kV Bhokar to 132 kV Himayatnagar considered in STU Plan
13	Nanded	132 kV Kinwat	
14	Beed	132 kV Ashti	Creation of 132 kV Level at 220 kV Patoda and interconnection with Ashti is already sanctioned and considered in STU Plan & 220 kV Beed –Raimoha line is charged already.
15	Beed	132 kV Georai	
16	Beed	132 kV Raimoha	
17	Obad	220 kV Osmanabad	LILO of 220 kV Parli- Osmanabad lines to 400 kV Parli (PG) s/s is considered in STU
18	Obad	220 kV Paranda	220 KV Jeur –Paranda SCDC line considered in STU Plan
19	Obad	132 kV Bhoom	LILO of 132 kV Kharda-Ashti at 220 kV Patoda and 132 kV Manjarsumba to Kaij line is considered in STU Plan.
20	Osmanabad	220 kV Tuljapur	220 kV DC line from 400 kV Lamboti s/s
21	Osmanabad	132 kV Omerga	220 kV Narangwadi S/s consideredin 2019-20
22	Latur	132 kV Chakur	220 kV Jalkot S/s consideredin 2018-19
23	Latur	132 kV Udgir	

D) *Single source Substation*

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
1	Jalna	132 kV Mahakala	SCDC	132 kV Georai-Mahakala LILO to proposed 220 kV Georai S/s
2	Jalna	132 kV Ghansawangi	SCDC	LILO on one ckt of 132 kV Ambad – Ghansawangi D/c line at 220 kV Partur considered
3	Parbhani	132 kV Pathri	SCDC	132 kV Majalgaon – Pathri SCDC line considered
4	Beed	132 kV Ashti	SCSC	132 kV Kharda –Ashti DC line considered
5	Beed	132 kV Majalgaon	SCDC	132 kV Majalgaon – Pathri SCDC line considered
6	Nanded	132 kV Narsi (Dhuppa)	SCSC	LILO of 132 kV Mukhed –Kundalwadi at Krishnoor and Narsi considered in STU Plan.
7	Nanded	132 kV Degloor	SCDC	2nd ckt stringing of 132 kV Narsi - Degloor SCDC Line considered
8	Nanded	132 kV Himaytnagar	SCDC	132 kV SCDC line from 220 kV Bhokar - 132 kV Himayatnagar considered
9	Nanded	132 kV Kinwat	SCDC	132 kV Goonj –Kinwat line and 2nd circuit stringing of 132 kV Himayatnagar –Kinwat SCDC line considered in STU Plan.
10	Latur	132 kV Killari	SCDC	220 kV Narangwadi Substation consideredin 2019-20

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
11	Latur	132 kV Udgir	SCSC	220 kV Jalkot S/s consideredin 2018-19

III) Karad Zone

A) *Critically Loaded Lines*

Sr. No.	District	Name of Line	Line Configuration	STU Remarks
1	Satara	110 kV Ogalewadi - Atit	SCSC	Replacement of 0.1 ACSR conductor by HTLS conductor for 110 kV Ogalewadi - Atit line
2	Satara	110 kV Ogalewadi - Vishrambag	SCDC	110 kV Peth - Borgaon line

B) *Critically loaded ICT's and Transformers*

Sr. No.	District	Name of Substation	STU Remarks
1	Sangli	110 kV Ashta	2 X (50-25) 132-110/33 kV in STU Plan
2	Kolhapur	110 kV Kale	2 X (50-25) 132-110/33 kV in STU Plan
3	Kolhapur	110 kV Gokul Shirgaon	(1 X 50) 110/33 kV in STU Plan
4	Kolhapur	110 kV Kurundwad	1 X (50-25) 132-110/33 kV in STU Plan
5	Kolhapur	220 kV Five Star MIDC	(1 X 50) 220/33 kV in STU Plan
6	Kolhapur	400 kV Talandge	(3X167) 400/220 kV in STU Plan

C) *Low Voltage Pockets :*

Sr. No.	District	Name of Substation	STU Remarks
1	Sangli	110 kV Ashta	Tap to LLO for Ashta in STU Plan-
2	Sangli	110 kV Borgaon	110 kV Peth - Borgaon line in STU Plan-

D) *Single source Substation*

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
1	Satara	132 kV Aundh	SCSC	132 kV Ambheri – Aundh SCDC line
2	Satara	132 kV Dahiwadi	SCSC	132 kV Ambheri – Aundh SCDC line & 2nd circuit Stringing of 132 kV Aundh - Dahiwadi SCDC line
3	Satara	110 kV Kale (T)	SCDC	Conversion of existing 132 kV Kale (T) - 220 kV Wathar line to DC using same ROW
4	Sangli	110 kV Ashta	SCDC	Tap to LILO at Ashta (Borgaon - Vishrambag)
5	Sangli	110 kV Savlaj	SCSC	132 kV K'Mahankal – Savlaj line
6	Sangli	110 kV Tasgaon	SCSC	

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
7	Sangli	110 kV Kundal	SCSC	Ogalewadi – Kundal (Kirloskarwadi) at Kadegaon
8	Sangli	110 KV Jath	SCSC	132 kV interconnection between 220 kV Jath & 110 kV Jath & Kavthemahakal – Jath
9	Kolhapur	110 kV Gokul Shirgaon	Partly SCDC & partly DCDC	Link line arrangement to be made between 110 kV Gokul shirgaon to 110 kV Dudhganga & 110 kV Shahu co-gen. line to 220/110 kV Mudshingi s/s. Can be done at zonal level
10	Kolhapur	110 kV Kurundwad	SCDC	Conversion Jaysingpur - Kurundwad SCSC to DCDC
11	Kolhapur	132 kV Bambawde	DCDC	Shirala - Bambwade 2nd Ckt line stringing work is in progress
12	Ratnagiri	110 kV Ratnagiri	SCDC	Niwaliphata – Ratnagiri
13	Sindhudurg	132 kV Kudal	SCSC	132 kV Kudal – Kankavali

IV) Nagpur Zone

A) Critically Loaded Lines

Sr. No.	District	Name of Line	Line Configuration	STU Remarks
1	Nagpur	132 kV Khapri - Besa	SCDC	Replacement of 132 KV Besa-Khapri line conductor by HTLS conductor is comple5ted
2	Bhandara	132 KV Bhandara – Kardha ckt 1 & 2	DC	Replacement of 132 KV Bhandara – Kardha line conductor by HTLS conductor is included in STU plan
3	Bhandara	132KV Kardha- Sakoli	SC	220/132/33 kv Sakoli s/s is included in STU plan
4	Bhandara	132KV Kardha -Asgaon	SC	132 KV Asgaon –Bramhapuri 2nd Ckt stringing included in STU plan
5	Wardha	220 kV Wardha –Yeotmal	SCDC	220 kV Wardha- Yavatmal & Yavatmal Tap-Ghatodi line is included in STU plan

B) Critically loaded ICT's and Transformers

Sr. No.	District	Name of Substation	STU Remarks
1	Nagpur	132 kV Besa	Replacement of T/Fs 2x(50-25),132/33 kv included in STU plan
2	Bhandara	132 kV Sakoli	220/132/33 kv Sakoli s/s is included in STU plan
3	Gondia	220 kV Kaulewada	Replacement of ICT 1X(200-100),220/132 kv is to be included in STU plan
4	Wardha	220 kV Bhugaon	ICT addition at 220 kv Bhugaon s/s (1x100),220/132 kv included in STU plan

Sr. No.	District	Name of Substation	STU Remarks
5	Wardha	132 KV Deoli	Rep of T/F 2X(50-25),132/33 kv at 132 kv Deoli s/s is included in STU plan
6	Wardha	132 KV Seloo	T/F addition 1x25, 132/33 kv included in STU plan

C) *Low Voltage Pockets*

Sr. No.	District	Name of Substation	STU Remarks
1	Bhandara	132 kV Asgaon	2nd Circuit stringing of 132 kV Asgaon- Brahmapuri , 132 kV Brahmapuri- Sindewahi link & LILO at 220 kV Nagbhid New s/s
2	Bhandara	132 kV Lakhandur	2nd Circuit stringing of 132 kV Asgaon- Brahmapuri , 132 kV Brahmapuri- Sindewahi link & LILO at 220 kV Nagbhid New s/s
3	Bhandara	132 kV Sakoli	220 kV Sakoli s/s considered in STU Plan 2021-22
4	Bhandara	132 kV Gosekhurd	2nd Circuit stringing of 132 kV Asgaon- Brahmapuri , 132 kV Brahmapuri- Sindewahi link & LILO at 220 kV Nagbhid New s/s-- 2019-20
5	Chandrapur	132 kV Bramhapuri	2nd Circuit stringing of 132 kV Asgaon- Brahmapuri , 132 kV Brahmapuri- Sindewahi link & LILO at 220 kV Nagbhid New s/s-- 2019-20

D) *Single source Substation*

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
1	Nagpur	132 kV Katol	SCSC	132 KV Bharsingi-Warud line & 132 kV Saoner-katol line is included in STU plan
2	Nagpur	132 kV Bharsingi	SCDC	132 KV Bharsingi-Warud line is included in STU plan
3	Wardha	132 kV Deoli	SCDC	2nd ckt stringing Bhugaon-Deoli included in STU plan
4	Wardha	132 kV Seloo	SCDC	2nd ckt stringing Bhugaon-seloo included in STU plan
5	Chandrapur	132 kV Sindewahi	SCDC	132kV Bramhapuri- Sindewahi line is included in STU plan
6	Chandrapur	132 kV Bramhapuri	SCDC	132kV Bramhapuri- Sindewahi line is included in STU plan
7	Chandrapur	220 kV Ghuggus Mhatardevi	SCDC	Second source line is utilized for 66 kV Supply to M/s. WCL (Elimination of 66 kV pending due to M/s. WCL & MSEDCL issues)
8	Gadchiroli	66 kV Sironcha	DP	1) 132 kv Allapalli s/s included in STU plan 2) 132 kv Sironcha s/s included in STU plan
9	Gadchiroli	66 kV Etapalli	SCDC	
10	Gadchiroli	66 kV Jimalgatta	DP	
11	Gadchiroli	66 kV Allapalli	DP	

V) Nashik Zone

A) Critically Loaded Lines

Sr. No.	District	Name of Line	Line Configuration	STU Remarks
1	Nashik	Ozar - Dindori	SCSC & DCDC	220 kV Pimpalgaon S/s & 220 kV Kalwan s/s will reduce the loading.
2	Nashik	132 kV GCR - Ranwad	SCDC	132 kV Ranwad – Pimpalgaon line is included in STU plan in
3	Nashik	220 kV GCR (Ekhlare) – BBLR – 1 & II	DCDC	220 kV Sinnar Adwadi S/ proposed in
4	Ahmednagar	132 kV Babhaleshwar - Sangamner line	SCSC	220 kV Sinnar Adwadi S/ proposed in
5	Ahmednagar	132 kV Bhenda - Shevgaon	SCDC	2nd ckt stringing of 132 kV Bhenda – Shevgaon & 220 kV Amrapur S/S proposed
6	Jalgaon	132 kV Amalner-Chopda Line	SCDC	2nd circuit stringing of 132 kV Amalner – Chopda SCDC line considered
7	Dhule	132 kV Nardane - Shirpur Line	SCSC	132 kV Shirpur – Dondaicha line
8	Nandurbar	132kV Dondaicha - Nandurbar	SCSC	132 kV SCDC line between 132 kV Samsherpur – Nandurbar s/s & 220 kV Nandurbar S/s.

B) Critically loaded ICT's and Transformers

Sr. No.	District	Name of Substation	STU Remarks
1	Nashik	132 kV MIDC Sinnar	(1 X 50) 132/33 kV in STU Plan
2	Nashik	132 kV R-Pimplas	(1 X 25) 132/33 kV in STU Plan
3	A'Nagar	220 kV Babhaleshwar	132 kV Shirdi S/s in STU Plan
4	A'Nagar	220 kV Ahmednagar	(1 X 200) 220/132 kV in STU Plan
5	A'Nagar	132 kV Ahmednagar MIDC	(1 X 50) 132/33 kV in STU Plan
6	A'Nagar	132 kV Akole	132 kV Rajur S/s Commissioned
7	A'Nagar	132 kV Shrigonda	400 kV Karjat in STU Plan
8	A'Nagar	220 kV Bhenda	(1 X 100) 220/132 kV in STU Plan
9	Jalgaon	132 kV New MIDC Jalgaon	(1 X 50) 132/33 kV in STU Plan
10	Nandurbar	220 kV Shahada	(1 X 100) 220/132 kV in STU Plan
11	Nandurbar	220 kV Shahada	(1 X 50) 132/33 kV in STU Plan

C) Low Voltage Pockets

Sr. No.	District	Name of Substation	STU Remarks
1	Nashik	132 kV Ranwad	132 kV Ranwad – Pimpalgaon line is included in STU plan
2	Nashik	132 kV Lasalgaon	Creation of 220 kV level at 132 kV Manmad S/stn is taken in STU Plan
3	Nashik	132 kV Manmad	Creation of 220 kV level at 132 kV Manmad S/stn is taken in STU Plan
4	A'nagar	132 kV Akole	220 kV Sinnar Adwadi S/ proposed

Sr. No.	District	Name of Substation	STU Remarks
5	Jalgaon	132 kV Chopda	2nd circuit stringing of 132 kV Amalner – Chopda SCDC line considered 220 kV Viroda S/S (WIP) proposed
6	Jalgaon	132 kV Pahur	220 kV Kekatnimbhora S/s is Included in STU plan
7	Dhule	132 kV Shirpur	132 kV Shirpur – Dondaicha line considered in STU plan
9	Nandurbar	132kV Visarwadi	2nd ckt stringing of 132 kV Nandurbar – Visarwadi Included in STU plan

D) Single source Substation

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
1	Nashik	132 KV Nampur	SCDC	2nd ckt stringing of 132 kV SCDC line from 220 kV Malegaon - Nampur considered in STU Plan
2	Ahmednagar	132KV Ghodegaon	SCDC	2nd ckt stringing of 132KV Shevgaon – Ghodegaon considered in STU Plan
3	Ahmednagar	220KV Kopargaon	SCDC	MC line from Babhaleshwar to Kopargaon Included in STU plan
4	Jalgaon	132 kV Amalner	SCSC	2nd Ckt stringing of Amalner-Chopda Line Included in STU plan
5	Jalgaon	132 kV Parola	SCDC	2nd Ckt stringing of Amalner-Parola Line Included in STU plan
6	Dhule	132 kV Shirpur	SCSC	Shirpur - Dondaicha Line Included in STU plan
7	Dhule	132 kV Sakri	SCSC	Visarwadi - Sakri link line included
8	Nandurbar	132 kV Nandurbar	SCSC	220 kV Nandurbar S/s. & 132 kV Samsherpur – Nandurbar link line included in STU Plan
9	Nandurbar	132 kV Visarwadi	SCDC	2nd Ckt stringing of 132 kV Nandurbar- Visarwadi SCDC Line considered in STU Plan
10	Nandurbar	132 kV Taloda	SCDC	2nd Ckt stringing on 132 kV Shahada - Taloda line considered in STU Plan

VI) Pune

A) Critically Loaded Lines

Sr. No.	District	Name of Line	Line Configuration	STU Remarks
1	Pune	Lonikand – Theur Ckt I	DC	HTLS considered in STU Plan

Sr. No.	District	Name of Line	Line Configuration	STU Remarks
2	Pune	Lonikand – Theur Ckt II	DC	HTLS considered in STU Plan
3	Pune	220 kV Urse - Chinchwad	SC	Conversion of existing 220 kV S/C Urse - Chinchwad line to M/C line for portion between Chinchwad substation to prop 220 kV PGCIL Talegaon line LILO point (Loc. No. 50) STU Plan
4	Pune	132 kV Theur Kharadi	DCDC	Creation of level at 400 kV Lonikand - II & LILO on 132 kV Theur - Sanaswadi and Theur - Markal line at 400 kV Lonikand - II is considered in
5	Solapur	220 kV Bale Lamboti I	DC	Solapur (PG) - Bale DC considered
6	Solapur	220 kV Bale Lamboti II	DC	Solapur (PG) - Bale DC considered
7	Solapur	132 kV Bale Mohol	DC	Pandjarpur – Puluj - Degaon conversion from 110 kV to 132 kV is proosed
8	Solapur	132 kV Bale - Chincholikati	DC	Pandjarpur – Puluj - Degaon conversion from 110 kV to 132 kV is proosed
9	Solapur	220 kV Lamboti Khanapur - Karkamb Tap	SCDC	Tap removed & Lamboti- Karkambh & Vita-Pandharpur link established & 400 kV Karjat s/s
10	Pune	132 kV Malingar – Bawada	SCSC	132 kV Walchandnagar- Bawada link
11	Pune	220 kV Jejuri - Baramati	SCDC	Jejuri- Lonand D/C & Jejuri – Baramati D/C is considered

B) Critically loaded ICT's and Transformers

Sr. No.	District	Name of Substation	STU Remarks
1	Pune	400 kV Jejuri	(3 X 167) 400/220 kV ICT proposed in STU plan
2	Pune	220 kV Theur	(1X50) 220/22 kV TF proposed in STU plan
3	Pune	132 kV Kharadi	(1X50) 132/33 TF proposed in STU plan
4	Pune	132 KV Sanaswadi	(1X50) 132/22 TF proposed in STU plan
5	Pune	132 kV Whirlpool	(1 X 25) 132/22 kV TF proposed in STU plan
6	Pune	132 kV Indapur	1 X (50-25) 132/33 STU Plan TF proposed in STU plan
7	Pune	132 kV Walchandnagar	Scheme yet to be proposed by Zonal Office
8	Pune	132 kV Bawada	2 X (50-25) 132/33 kV TF proposed in STU plan
9	Solapur	400 kV Lamboti	3X167 MVA ICT proposed in STU plan
10	Solapur	132 kV Mangalwedha	132/33 kV Nimboni S/S (WIP) proposed in STU plan
11	Solapur	132kV Purandawade	1 X (50-25) 132/22 TF proposed in STU plan
12	Solapur	132 kV Velapur	2 X (50-25) 132/33 kV TF proposed in STU plan
13	Solapur	220 kV Jeur	Load of Karjat to be diverted on 220 kV Bhose
14	Solapur	220 kV Pandharpur	(1X50) 220/33 kV TF proposed in STU plan

15	Solapur	110 kV Pandharpur	110 kV Level to be removed & Load to be shifted to 220 kV Bhalawani & 220 kV Pandharpur

C) *Low Voltage Pockets*

Sr. No.	District	Name of Substation	STU Remarks
1	Pune	220 kV Alephata	220 kV D/C interconnections betwwwn Lonikand & BBLR disconnected & Bunched to form BBLR- Al;ephata D/C & Lonikand-Ranjangaon-Kathapur D/C & 400 kV D/C between 765 kV Shikrapur-PG & Lonikand
2	Pune	220 kV Kathapur	
3	Pune	132 kV Narayangaon	132 kV Chinchwad – Bajaj LILO at Chakan II & Chakan- Mahindra Forge LILO at Pimpalgaon & HTLS
4	Pune	132 kV Shirur	132 Kv Ranjangaon- Shirur link
5	Pune	132 kV Indapur	132 kV Indapur- Ujani at 220 kV Loni - Deokar
6	Pune	132 kV Walchandnagar	220 kV Walchandnagar s/s
7	Pune	132 kV Yawat	220 kV Theur-Yavat - HTLS & 400 kV Karjat S/S
9	Pune	132 kV Janai	
10	Pune	132 kV Alegaon	
8	Pune	132 kV Bawada	132 kV Walchandnagar- Bawada link
16	Solapur	220 kV Barshi	220 kV Jeur – Paranda included in 2020-21
11	Solapur	400 Lamboti	i) 400 kV link from 400 kV Solapur (PG) –Lamboti ii) 220 kV Pandharpur- Bhalawani LILO at Alkud & 220 kV Parli-Osmanabad LILO at Parali (PG) iii) 220 kV DC line from 400 kV Solapur (PG) - 220 kV Bale iv) 400 kV karjat s/s v) 220 Kv Tap removed & Lamboti- Karkambh & Vita-Pandharpur link established vi) SVC/ Statcom proposed at Pandharpur & Solapur(PG) vii) At Present 220 kV Link between Solapur(PG) & Jeur is established as Interim arrangement
12	Solapur	220 kV Pandharpur (Hiwarewadi Section)	
13	Solapur	220 kV Pandharpur (Lamboti Section)	
14	Solapur	220 kV Jeur	
15	Solapur	220 kV Tembhurni	
17	Solapur	220 kV Bhalwani	
18	Solapur	220 kV Karkamb	
19	Solapur	220 KV Malinagar	
20	Solapur	110 kV Pandharpur	
21	Solapur	132 kV Velapur	
22	Solapur	132 KV Karmala	

Sr. No.	District	Name of Substation	STU Remarks
23	Solapur	132 kV Parewadi	
24	Solapur	132 kV Mangalwedha	
25	Solapur	132 kV Sangola	
26	Solapur	132 kV Manegaon	
27	Solapur	220 kV Kurkumbh	
28	Solapur	220 kV Bhigwan	
29	Solapur	220 kV Walchandnagar	

D) Single Source s/s

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
1	Pune	132 kV Varasgaon	SCDC	LILO on Rahatani –Varasgaon SC line at 220 kV Flag Ship & 2nd ckt stringing of 132 kV Rahatani- Varasgaon line considered
2	Pune	132 kV GIS Rastapeth	U/G Cable	Under ground 132 kV cable feeder (single Circuit) from 220 kV Magarpatta - 132 kV Rasta Peth considered
3	Solapur	132 kV Akkalkot	SCSC	132 kV SC line on DC Tower from 132 kV Akkalkot to 132 kV Karajgi considered in STU Plan
4	Solapur	132 kV Karajgi	SCDC	132 kV SC line on DC Tower from 132 kV Akkalkot to 132 kV Karajgi considered in STU Plan
5	Solapur	132 kV Mandrup	SCDC	132 kV Degaon – Mandrup 2nd ckt stringing & 132 kV Akkalkot- karajagi link line considered
6	Pune	132 kV Indapur	SCSC	LILO of 132 kV Indapur Ujani at 220 kV Loni Deokar S/s
7	Solapur	132 kV MIDC Solapur	SCDC	2nd ckt stringing of Bale – MIDC Solapur considered
8	Solapur	132 kV Parewadi	SCDC	2nd ckt stringing of 132 kV Jeur – Parewadi
9	Solapur	132 kV Puluj	SCSC	Pandharpur – Puluj - Degaon replacement to 132 kV considered
10	Solapur	132 kV Shankarnagar	SCDC	2nd ckt stringing of Malinagar- Velapur & Velapur – Shankarnagar considered
11	Solapur	132 kV Purandawade	SCDC	2nd ckt stringing of Purandwade Tap on Bawada Nira Bhima-Walchandnagar considered
12	Solapur	132 kV Velapur	SCDC	2nd ckt stringing of Malinagar- Velapur & Velapur – Shankarnagar considered

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a. *Critically Loaded Lines*

Sr. No.	District	Name of Line	Line Configuration	STU Remarks
1	Kalwa	400 KV Padghe – BBLR I & II	0.5 ACSR Twin Moose	Commissioning of 400 kV Kudus as per scope
2	Kalwa	400 KV Kalwa Padgha I & II	0.5 ACSR Twin Moose	HTLS proposed in 2018-19 for both ckts.

b. Critically loaded ICT's and Transformers

Sr. No.	District	Name of Substation	STU Remarks
1	THANE	132/33kV Palghar	220/132/33 kV Palghar proposed 2018-19
2	THANE	132/33kV Boisar(MIDC)	Additional proposed Boisar MIDC (1X50) 132/33 kV
3	THANE	100/22kV Roha	Replacement proposed Roha 2 X (50-25) 100/22 kV
4	THANE	100/22kV Patalganga	Scheme yet to be proposed by Zonal Office
5	THANE	400/220kV Kalwa	Additional proposed Kalwa (3 X 167) 400/220 kV

c. *Low Voltage Pockets : Nil*

d. Single source Substation

Sr. No.	District	Name of Substation	Line Configuration	STU Remarks
1	Raigad	100 kV Mhasala SS	SC SC	2nd circuit stringing of 100 kV SCDC line from 220 kV Kandalgaon- Mhasala considered in 2017-18

RENEWABLES AND GREEN ENERGY CORRIDOR

RENEWABLES AND GREEN ENERGY CORRIDOR

Importance of RE Generation:

Conventional generators are polluting atmosphere with carbon dioxide and other global warming emissions, which trap heat, steadily drive up the planet's temperature, and create significant and harmful impacts on our health, our environment and our climate. Conventional fuels such as Coal, Gas, Crude oil etc. are limited. Exhaustive use of such energy sources are resulting in to shortage in future considering the power requirements with the time.

Considering the environmental and social impact, it has become necessary to identify alternatives for the use of conventional generations through Renewable Energy sources. RE sources, such as Wind, Solar, Agricultural waste, Industrial waste etc. can be used for generation. Even-though the generation from RE projects mainly Wind & Solar, is infirm in nature, with proper integration and planning, can be benefit the system.

RE Policy:

Policies of Government of Maharashtra and achievements:

Maharashtra being the most progressive and RE rich State, has aggressively promoted establishment of RE Power Projects through various State policies and subsidies. With the initiative of GoM in around 1994, the installed capacity of Wind Generation before FY-2004 was around 407MW. In the year 2004, GoM declared Wind Energy Policy for the State and targeted to establish wind generation of 750MW in five years. In response to the same, Maharashtra achieved to a capacity addition of 1078MW against the target of 750MW with total installed capacity of 1485MW.

In 2008, GoM declared Renewable Energy Policy for the State. In this policy, GoM included RE generations through RE sources other than Wind such as Bagasse, Agricultural Waste, Small Hydro, Industrial Waste etc. In this policy, it was targeted to achieve capacity addition of 3500MW (Wind: 2000MW; Bagasse: 1000MW; Agricultural Waste: 400MW; Small hydro: 100MW). Against the target of 2000MW Wind Generation, State succeeded to achieve capacity addition of 3311MW (including surplus generation of 328MW. Thus, as on September2015, the total installed capacity of Wind generation in the State is 4468MW.

Further, Govt. of Maharashtra, on dtd. 20.07.2015, has declared Renewable Energy Policy – 2015. Under this RE policy, it is targeted to establish around 14,400MW RE Generation in the State. The details RE source-wise capacities are given in Table 8.

Table 8: RE source wise proposed capacities

RE Generator	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Wind Generators	200	500	500	500	500	300
Solar Generators	300	1500	1500	1500	2000	700
Others (Biomass, Bagasse, small hydro etc.)	100	300	300	300	400	200
Total	**600**	**2300**	**2300**	**2300**	**2900**	**1200**

In Maharashtra around 4716MW Wind and 841.5MW Solar Generation has been already commissioned as on 30/11/2017. The total existing RE capacity installed in the State is around 16723MW against the conventional generation of approximately 24567MW (MSPGCL, TPC, R-Infra & IPPs).

Table 9: RE Generation Potential & Actual Achievement for the State

Sr. No.	RE Source for Generation	Potential in the State (MW) *	Achievement (MW)
1	Wind Power Project	9400	4716
2	Bagasse co generation power	2200	1748.36
3	Biomass Power Project	781	228
4	Small Hydro Power Project	732	85.2
5	MSW & Liquid Waste	287	3.00
6	Industrial Waste Power Project	350	33.55
7	Solar Power Project	49 / Sq. km. 35 / Sq. km.	841.5
Total (MW)		**13750**	**7710.61**

As on SEP -16 ***Source: MEDA***

Jawaharlal Nehru National Solar Mission (JNNSM) of Govt. of India:

Govt. of India, has proposed an ambitious plan of establishment of solar generation of 100GW capacity by 2022 in the Country under the scheme Jawaharlal Nehru National Solar Mission (JNNSM). The said mission is implemented in phased manner.

Under this mission, projects of capacity 432MW has been already commissioned in Maharashtra. In addition, under JNNSM, Phase – II, Batch – III, Solar Energy Corporation of India (SECI) a wholly subsidiary company of MNRE has called RfS bids for establishment of 500MW Solar Power Projects in Maharashtra. Further, LoI for 450MW capacity is issued by SECI for Phase-II, Batch-IV. The list of project under JNNSM, Phase-II, Batch-III, Tranche-I & Phase-II, Batch-IV, Tranche-II of GoI is given in the below Table:

Table: List of selected Projects under JNNSM, Phase-II, Batch-III, Tranche-I of GoI

Sr. No.	Name of Developer	Project Location	Capacity (MW)	MSETCL's S/s.	Voltage Level (kV)
1	Bhageria Industries Ltd.	Kombhalne, Akole, Ahmednagar	30	132kV Akole	33
2	Talettutayi Solar Projects Four Pvt. Ltd.	Chatgaon, Telgaon, Beed	50	132kV Telgaon	132
3	Orange Renewable Power Pvt. Ltd.	Mhasale, Sakri, Dhule	50	220kV Shivajinagar	132
4	Orange Renewable Power Pvt. Ltd.	Mhasale, Sakri, Dhule	50	220kV Shivajinagar	132
5	Sepset Constructions Ltd.	Katol MIDC, Katol, Nagpur	20	132kV Katol	33
6	Sepset Constructions Ltd.	Katol MIDC, Katol, Nagpur	20	132kV Katol	33
7	Krishna Wind Farm Developers Pvt. Ltd.	Yewata, Kaij, Beed	10	132kV Kharda	33
8	M/s. NVR Mahasolar Pvt. Ltd. (AMPL Cleantech Pvt. Ltd.)	Telgaon, Dharur, Beed	50	LILO on MSETCL 132kV Phaltan Dahiwadi line	
9	Welspun Renewables Energy Pvt. Ltd.	Londri, Pahur, Jalgaon	100	LILO on MSETCL 220kV Vita- Pandharpur S/C line	
10	Gale Solar farms Pvt. Ltd (Suzlon)	Saltek & Bhamer, Sakri, Dhule	50	220kV Jamde	33
11	Tornado Solar farms Pvt. Ltd. (Suzlon)	Saltek & Bhamer, Sakri, Dhule	20	220kV Jamde	33
12	The Tata Power Renewable Energy Ltd.	Palaswadi, Man, Satara	30	132kV Palaswadi	132
13	M/s. Parampujya Solar Energy Private Limited	Village: Kilaj, Tal. Tuljapur, Dist. Osmanabad	20	132kV Naldurg	33
Total (MW)			**500**		

Table: List of selected Projects under JNNSM, Phase-II, Batch-IV, Tranche-II of GoI

Sr. No	Name of Developer	Project Location	Capacity (MW)	MSETCL's S/s.	Voltage Level (kV)
1	M/s. Solar Edge Power and Energy Pvt. Ltd.	Mhatargaon, Parli, Beed	30	132kV Pangri	132
2	M/s. Solar Edge Power and Energy Pvt. Ltd.	Mhatargaon, Parli, Beed	50		
3	M/s. Solar Edge Power and Energy Pvt. Ltd.	Wadhave, Muktainagar, Jalgaon	50	132kV Muktainagar	132
4	M/s. Lightsource Renewable Energy Holdings Ltd.	Wagdari, Akkalkot, Solapur	50	132/33kV Wagdari	33
5	M/s. Neel Metal Products Ltd. (M/s. JBM Solar Energy Pvt. Ltd.)	Chalisgaon, Jalgaon	40	LILO on 132kV Chalisgaon-Kannad S/C line	
6	M/s. Neel Metal Products Ltd. (M/s. JBM Solar Power Pvt. Ltd.)	Chalisgaon, Jalgaon	60		
7	M/s. Sukhbir Agro Energy Ltd.	Wagdari, Akkalkot, Solapur	10	132kV Waghdari	132
8	M/s. Sukhbir Agro Energy Ltd.	Wagdari, Akkalkot, Solapur	10		
9	M/s. Vijay Printing Press Pvt. Ltd.	Wagdari, Akkalkot, Solapur	10		
10	M/s. Flexirural Urja Pvt. Ltd. (M/s. Essel Green Energy Pvt. Ltd.)	Gangakhed, Parbhani	20	132kV Gangakhed	132
11	M/s. MH Parbhani Power Pvt. Ltd. (M/s. Essel Green Energy Pvt. Ltd.)	Gangakhed, Parbhani	40		
12	M/s. Canadian Solar Energy Holding Singapore 2 PTE. Ltd.	Shirur, Nanded	20	220kV Dhamangaon	
13	M/s. Canadian Solar Energy Holding Singapore 2 PTE. Ltd.	Shirur, Nanded	20	132kV Umri	
14	M/s. Canadian Solar Energy Holding Singapore 2 PTE. Ltd.	Andora, Kallamb, Osmanabad	20	132kV Kallamb	
15	M/s. Canadian Solar Energy Holding Singapore 2 PTE. Ltd.	Mulaj, Omerga, Osmanabad	20	132kV Omerga	
Total (MW)			**450**		

Ultra Mega Solar Parks in Maharashtra:

Further, Govt. of Maharashtra, on dtd. 20.07.2015, has declared Renewable Energy Policy – 2015. Under this RE policy, it is targeted to establish around 14,400MW RE Generation in the State.

MSPGCL, a government generation company has targeted to establish solar generation of 2500MW under Public Private Partnership PPP model to fulfil Renewable Generation Obligation (RGO). The said power is being purchased by State

owned Distribution licensee, MSEDCL, for fulfilling Renewable Purchase Obligation (RPO).

There are three Mega Solar Parks sanctioned by MNRE in Maharashtra. Details of the same are as follows:

Table 10: Upcoming Solar Parks in the State

Sr. No.	Name of Solar Project Developer	Village, Tahsil, District	Total Capacity (MW)	MSETCL's Station Name	Evacuation Arrangement
1	M/s. Pragat Akshay Urja Ltd.	Jaitani, Sakri, Dhule	500	300MW at 220kV Shivajinagar and 200MW at 220kV Dondaicha	220kV level of MSETCL's Substation
2	M/s. Paramount Solar Pvt. Ltd.	Tambarajuri, Patoda, Beed	500	220kV Patoda	220kV level of MSETCL's Substation
3	MSPGCL	Vikharan & Methi, Dondaicha, Dhule	500	400/220kV Pooling Substation at Balsane (Proposed)	220kV level of MSETCL's Substation

Further, applications from M/s. Bafna Solar and Infra Pvt. Ltd to setup 500MW Solar Power Park at Village: Tembhe, Tal.: Sakri, Dist.: Dhule and from M/s. HBG Finance & Energy Leasing Pvt. Ltd. to setup 500MW Solar Power Park at Village – Mhasale, Tal-Sakri, Dist –Dhule have ben received. Both the Grid Connectivity proposals are under process.

The capacity factor for the purpose of maximum injection to plan the evacuation system should be taken from CEA (Manual on Transmission Planning Criteria) 2013.

The 'N-1' criteria may not be applied to the immediate connectivity of wind/solar farms with the ISTS/Intra-STS grid i.e. the line connecting the farm to the grid and the step-up transformers at the grid station.

As the generation of energy at a wind farm is possible only with the prevalence of wind, the thermal line loading limit of the lines connecting the wind machine(s)/farm to the nearest grid point may be assessed considering 12 km/hour wind speed.

The wind and solar farms shall maintain a power factor of 0.98 (absorbing) at their grid inter-connection point for all dispatch scenarios by providing adequate reactive compensation.

High RE potential areas in the State:

Based on the geographic area of the State, Western region comprising of districts: Satara, Sangli & Kolhapur and Northern Region of Maharashtra comprising of districts: Dhule, Nashik, Nandurbar are high Wind Prone areas.

Due to high solar radiations, Vidarbha, Marathwada and North Regions of the State are more suitable for Solar Generation. Major Solar Prone areas in the State are Dhule, Osmanabad, Beed, Solapur, Ahmednagar, Buldhana, Aurangabad, Nagpur, Latur, Parbhani, Hingoli and Amravati.

After 2013, with advanced research and developments the technology has changed thereby improving the efficiency of Wind Turbines. Most of the Wind Turbine Generator (WTG) manufacturers have succeeded to develop WTGs that can generate even at low Wind Power Density below 200 W/m^2. Further, due to modifications in the designs, the hub height of the WTGs has raised from 80 mtrs. to 100 mtrs. Thus, considering the efficiency of WTGs, more availability of barren land, plain terrain and high solar radiations, in Osmanabad, Beed, Ahmednagar and Dhule wind as well as solar projects are been expected. Most of the developers (wind and solar) have applied for Grid Connectivity in these districts.

In RE policy – 2015, repowering of WTGs is also expected. Thus, the WTGs of smaller capacities ranging in kW at hub height of 25 mtrs in the high WPD areas will be replaced with WTGs having higher capacity (around 2MW), higher efficiency with hub height of 50 to 80 mtrs.

1.8 Evacuation plan for RE Generation:

While preparing five year transmission plan for the State, all the inputs such as under progress/proposed conventional/RE generators are taken in to account. Based on the tentative RE rich locations, the proposed and expected quantum of RE generations has been modelled in the Load Flow Software PSS®E. With the simulation results, the impact of such large RE injection has been checked. Accordingly, the transmission system has been proposed so that it would facilitate the evacuation of RE generation as well as benefit the system in the absence of RE generation.

The following Substations are being planned in the State for RE generation evacuation the list of which is given in Table 10.a

Table 10.a: List of Substations for RE Evacuation in Plan

Sr. No.	Name of Sub station	Zone	Year	Remarks / District
1	132/33kV Sarola	Aurangabad	2019-20	(RE Evacuation/ (GEC)) Beed
2	400/220kV Alkud	Karad	2016-17	(RE Evacuation) Sangli
3	400/220kV Balsane (Shivajinagar)	Nashik	2019-20	(RE Evacuation) Dhule

For facilitating evacuation of RE generation, under Green Energy Corridor Scheme of MNRE, MSETCL has proposed 27 no. of InSTS schemes costing around Rs.367.00 Crores. With the implementation of these 27 No. of schemes given in table 11, additional margin for evacuation of RE energy will be created in the existing transmission network.

Table 11: List of schemes Approved under Green Energy Corridor Schemes –I (GEC-I)

Sr. No.	Name of Scheme	Year	Observations & Justifications from Load Flow Studies
1	2nd circuit Stringing of 132kV Shevgaon - Bhenda SCDC line	2019-20	In the absence of this scheme, the existing 132kV Shevgaon - Bhenda SCDC line is critically loaded to 137MW. With this scheme, the loading has been reduced to 78MW per ckt.
2	2nd circuit Stringing of 132kV Shevgaon - Pathardi SCDC line	2020-21	In the absence of this scheme, the existing 132kV Shevgaon - Pathardi SCDC line is loaded to 99MW. With this scheme, the loading has been reduced to 56MW per ckt.
3	2nd circuit Stringing of 132kV Shevgaon - Ghodegaon SCDC line	2019-20	132kV Ghodegaon S/s. is fed from 132kV Shevgaon S/s. through SCDC line. The existing SCDC ilne is loaded to 77MW. Thus, to reduce loading and to provide alternate source to 132kV Ghodegaon S/s., this line has been proposed.
4	2nd circuit Stringing of 220kV Valve - Jamde SCDC line	2019-20	Existing 220kV Valve - Jamde SCDC line is critically loaded to 295MW. With this line, the loading has been reduced to 148MW per ckt.
5	132kV Ahmednagar - Ahmednagar MIDC D/C line	2018-19	The loading on existing 132kV Ahmednagar - Ahmednagar MIDC S/C line is reaching to 151MW. With this scheme, the loading is reduced to 61MW per ckt.
6	132kV Kavthemahankal - Jath D/C line	2020-21	In the absence of this scheme, the existing 132kV Kavthemahankal - Jath S/C line is loaded to 62MW. With this scheme, the loading has been reduced to 37MW per ckt. As Jath complex is wind and solar prone area, this line will provide additional margin for evacuation of future RE generations.

Sr. No.	Name of Scheme	Year	Observations & Justifications from Load Flow Studies
7	2nd circuit Stringing of 132kV Aundh - Dahiwadi SCDC line	2018-19	132kV Aundh S/s. is presently fed from 132kV Dahiwadi S/s. through SCDC line. Aundh area is wind as well as solar prone area. This line will provide additional source to 132kV Aundh S/s. as well as additional margin for the future wind and solar power projects in Aundh area.
8	LILO on 132kV Mayni - Dighanchi S/C at 132kV Mhaswad S/s.	2018-19	132kV Mhaswad S/s. has been planned to cater additional demand of MSEDCL. With this scheme, around 20MW of power can be evacuated. Further, this area is wind and solar prone area. Hence, this scheme can provide additional network for interconnection of RE projects. (Mhasawad S/s. does not exist and not included in STU plan also)
9	2nd circuit Stringing of 132kV Kale - Warna SCDC line	2020-21	132kV Warna S/s. is presently fed from 132kV Kale S/s. through SCDC line. With this scheme, additional source to 132kV Warna S/s. and additional margin for evacuation of future wind power projects can be provided.
10	132kV Kadegaon / Borgaon - Kirloskarwadi SCDC line	2021-22	In the present scenario, on this line no substantial loading is observed. However, the said area is wind prone area. Hence, in future this line will be beneficial to provide evacuation of future wind generations.
11	2nd circuit Stringing of 220kV Miraj - Ichalkaranji (Tilawani) SCDC line	2018-19	In the present scenario, on this line no substantial loading is observed. However, the said area is wind prone area. Hence, in future this line will be beneficial to provide evacuation of future wind generations.
12	132kV Ahmednagar - Supa D/C line using same RoW	2019-20	132kV Supa S/s. is fed from 220/132kV Ahmednagar S/s. through S/C line. The loading on this line is around 87MW. Thus, with this scheme, the loading is reduced to 43MW per ckt and additional source to 132kV Supa S/s. can be provided.
13	132kV Kavthemahankal - Savlaj SCDC line	2017-18	In the absence of this line, the existing 2 Nos. of 132kV Kavthemahankal - Miraj S/C lines are loaded to 85MW & 75MW resp. With this line, the line loading has been reduced to 67MW & 60MW resp. Further, additional margin for evacuation of future wind & solar power projects can be available.
14	LILO of 132kV Lonand - Phaltan S/C at 220/132kV Phaltan MIDC	2018-19	In the present scenario, on this line no substantial loading is observed. However, the said area is wind & Solar prone area. Hence, in future this line will be beneficial to provide evacuation of future wind & solar generations.

Sr. No.	Name of Scheme	Year	Observations & Justifications from Load Flow Studies
15	2nd circuit Stringing of 132kV Beed - Georai SCDC line	2018-19	132kV Georai S/s. is fed from 220/132kV Beed S/s. through SCDC line. With this line, additional source to 132kV Georai S/s. can be provided. Further, this area is wind & solar prone area. Hence, this line will provide additional margin for future RE projects.
16	LILO of one circuit of 220kV Beed - Patoda D/C at 220kV Manjarsumba S/s.	2019-20	Manjarsumba, Patoda area in Beed district is wind as well as solar prone area. Many wind/solar projects are proposed in this area. This scheme will provide additional margin and point of inter-connection for future RE projects.
17	2nd circuit Stringing of 132kV Manmad - Yeola SCDC line	2020-21	In the present scenario, no substantial loading on the lines is observed. However, Manmad, area is wind prone area. Hence, this scheme will provide additional margin for future wind power projects. Further, with this scheme, additional source to 132kV Yeola S/s. can be provided.
18	1 x 25 MVAR, 220kV Bus reactor at 220kV Dhule S/s.	2019-20	This scheme has been proposed based on the studies carried out by PGCIL in the Green Energy Corridor Report. In the present scenario, no substantial voltage improvement is observed. However, this scheme may be beneficial in future.
19	132kV Babhaleshwar - Rahuri - Ahmednagar MIDC S/C line	2020-21	At 132kV Rahuri S/s., industrial load growth has been observed. Further, in the absence of this scheme, the existing line is loaded to 83MW, hence to reduce loading to provide additional power for the future industrial load growth in this area, this scheme has been proposed.
20	2nd circuit Stringing of 132kV Nandurbar - Visarwadi SCDC line	2017-18	132kV Visarwadi S/s. is fed from 132kV Nandurbar S/s. through SCDC line. Visarwadi area is wind and solar prone area. Hence this scheme will provide additional source to the 132kV Visarwadi S/s. and additional margin for future wind and solar power projects.
21	220kV Vish Wind - Bhenda D/C line	2020-21	In the present scenario, on this line no substantial loading is observed. However, the said area is wind as well as solar prone area. Hence, in future this line will be beneficial to provide evacuation of future wind & solar generations.
22	132kV Sawantwadi - Kudal D/C line	2018-19	132kV Kudal S/s. is presently fed from 132kV kankavli S/s. through S/C line. With this scheme, additional source from 220kV S/s. can be provided in the Konkan reagion. Further, around 60MW power cen be evacuated through this scheme.
23	LILO on 132kV Sawangi - Pishor S/C at 220/132kV Phulambri S/s.	2020-21	In the present scenario, no substantial loading on the lines is observed. However, Phulambri, Pishor, Sillod area are wind and solar prone areas. Hence, this scheme will provide additional margin and

Sr. No.	Name of Scheme	Year	Observations & Justifications from Load Flow Studies
			interconnection point for future wind and solar power projects.
24	LILO on 132kV Padegaon - Sillod (Pishor) S/C at 220/132kV Phulambri S/s.	2020-21	In the present scenario, no substantial loading on the lines is observed. However, Phulambri, Pishor, Sillod area are wind and solar prone areas. Hence, this scheme will provide additional margin and interconnection point for future wind and solar power projects.
25	LILO on 132kV Ozar - Chandwad S/C at 220/132kV Pimpalgaon S/s.	2020-21	In the present scenario, no substantial loading on the lines is observed. However, Dindori, Pimpalgaon, area are wind and solar prone areas. Hence, this scheme will provide additional margin and interconnection point for future wind and solar power projects.
26	132kV Kharda - Ashti D/C line partly on M/C towers	2021-22	132kV Ashti S/s. is fed from 220/132kV Ahmednagar S/s. through S/C line. One ckt of this line has been propsoed to be made LILO at 220/132kV Patoda S/s. Thus, in the absence of this line, the 132kV Kharda - Paranda S/C line is critically loaded to 124MW. With this scheme, the line loading is reduce to 79MW.
27	LILO of 132kV Khaprale - Sangamner S/C at 220/132kV Sinnar S/s.	2021-22	With this scheme, wind power of around 60MW is injected in the 220kV network. Further, this area is wind as well as solar prone area. Hence, this scheme will provide additional margin for future RE projects.

In addition to above mentioned Schemes, MSETCL has proposed 14 No. of InSTS schemes under Green Energy Corridor, Tranche-II costing around Rs. 614.4 Crores. With implementation of these 14 No. of schemes given in Table 12, additional margin will be created in the transmission network.

Table 12: List of schemes Approved under Green Energy Corridor Schemes –II (GEC-II)

Sr. No.	Name of line proposed for strengthening	District	Technical Justification for the Scheme
1	132kV Degaon - Mandrup SCDC Line (2nd ckt stringing) (2017-18)	Solapur	132kV Mandrup S/s. is fed from 132kV Degaon S/s. through SCDC line. To provide redundency (N - 1), this line has been proposed in STU Plan. With this line, the loading on existing line is reduced by 43MW.

Sr. No.	Name of line proposed for strengthening	District	Technical Justification for the Scheme
2	Renovation of 132kV Latur - Ujani - Naldurg - Solapur (Bale) D/C line using 0.2 ACSR Panther Conductor	Osmanabad / Solapur	132kV Ujani, 132kV Naldurg, 132kV Latur, substations are fed through 220/132kV Harangul and 220kV Solapur S/s. The length of this line is around 115 kms. Thus to provide alternate and strong source and to reduce overloading this LILO has been proposed. Around 105MW Power is injected in the 220kV grid through this line. This scheme reduces the overloading of 132kV Bale - Ujani S/C and 132kV Bale - Naldurg line by 27MW & 30MW resp.
3	LILO of 132kV Ujani - Naldurg S/C at 220/132kV Tuljapur S/S (2020-21)	Osmanabad	132kV Ujani, 132kV Naldurg, 132kV Latur, substations are fed through 220/132kV Harangul and 220kV Solapur S/s. The length of this line is around 115 kms. Thus to provide alternate and strong source and to reduce overloading this LILO has been proposed. Around 105MW Power is injected in the 220kV grid through this line. This scheme reduces the overloading of 132kV Bale - Ujani S/C and 132kV Bale - Naldurg line by 27MW & 30MW resp.
4	2 X 100 MVA, 220/132kV ICTs at 220/132kV Manjarsumbha S/S (2019-20) & (2020-21)	Beed	132kV Sarola S/s. has been proposed by MSEDCL to cater upcoming demanss in the area. For providing source, creation of 132kV level at 220kV Manjarsumba is required. Further, with 132kV Sarola - Kaij SCDC line, alternate source to 132kV Kaij S/s. can be provided. 132kV Kaij S/s. is presently fed through 132kV Parli S/s. The wind generation can be evacuated through the load being connected to 132kV Sarola S/s.
5	2nd ckt stringing from 132kV Bhairavnath - Kharda SCDC with GIS bay at 132kV Kharda (2nd ckt stringing of 132kV Kharda - Paranda SCDC.) (2021-22)	Beed	This line is proposed to reduce overloading on the existing 132kV Kharda - Paranda SCDC line. With this line, the loading is reduced from 123MW to 90MW i.e. reduction by 33MW.
6	Conversion of existing 132kV Kale(T) - Wathar S/C line to D/C line using same RoW (2019-20)	Kolhapur	110/33kV Kale (T) S/s. is connected to the system through TAP on 110kV Oglewadi - Wathar S/C line. To provide redundency and alternate source, this line has been proposed on STU Plan
7	2 x 100 MVA, 220/132kV ICTs at 220/132kV Patoda S/S (2018-19)	Beed	For creation of 132kV level and to provide alternate source to 132kV Kharda & 132kV Ashti S/s. scheme has been proposed.

Sr. No.	Name of line proposed for strengthening	District	Technical Justification for the Scheme
8	LILO of 132kV Ashti - Kharda SCDC at 220/132kV Patoda S/S (2021-22)	Beed	To provide alternate source to 132kV Kharda, 132kV Ashti, 132kV Bhoom S/s. this scheme has been proposed in STU plan. With this scheme, the loading on the 132kV Kharda - Paranda SCDC is reduced.
9	132kV Patoda - Raimoha SCDC (2022-23)	Beed	For strengthening of the existing network and to evacuate wind power generated in Patoda area, this line has been proposed.
10	132kV Manjarsumbha - Sarola D/C line (2019-20)	Beed	132kV Sarola S/s. has been proposed by MSEDCL to cater upcoming demanss in the area. For providing source, creation of 132kV level at 220kV Manjarsumba is required. Further, with 132kV Sarola - Kaij SCDC line, alternate source to 132kV Kaij S/s. can be provided. 132kV Kaij S/s. is presently fed through 132kV Parli S/s. The wind generation can be evacuated through the load being connected to 132kV Sarola S/s.
11	132/33kV Sarola S/S (2019-20) 2 x 25 MVA, 132/33kV T/F 132kV Sarola - Kaij SCDC line	Beed	132kV Sarola S/s. has been proposed by MSEDCL to cater upcoming demanss in the area. For providing source, creation of 132kV level at 220kV Manjarsumba is required. Further, with 132kV Sarola - Kaij SCDC line, alternate source to 132kV Kaij S/s. can be provided. 132kV Kaij S/s. is presently fed through 132kV Parli S/s. The wind generation can be evacuated through the load being connected to 132kV Sarola S/s.
12	LILO of one ckt. of 220kV Jath - Mhaisal D/C line at 400/220kV Alkud S/S (2017-18)	Karad	
13	LILO on 220kV Vita-Mhaisal line at 400kV Alkud s/s (Route Length-20.0 km) (2017-18)	Sangli	To provide source to 220kV Jath, 220kV Miraj, 220kV Mhaisal and other inter-connected 132kV substations, 400/220kV Alkud S/s. has been proposed. With this scheme wind power can be evacuated to the 400kV grid. Thus, this line can be used for conveyance to ISTS.
14	Establishment of 400/220kV GIS Pooling SS at Shivajinagar (Balsane), Dist. Dhule (2019-20)	Nasik	To facilate evacuation of power from 2Nos. of 500MW Mega Solar Park in Dhule Dist. Further, the proposals for grid connectiovity for additional 2 Nos. of 500MW Mega Solar Park in Dhule Dist. are under process.

All the schemes proposed in Green Energy Corridor will support the existing transmission network for evacuation of existing as well as proposed wind generations and solar generations in the State.

Benefits to the State:

With the huge quantum of RE generation in the State, environmental impact will be reduced. Conventional resources for generation will be minimally used. As the RE generation will be evacuated outside the State for fulfilment of RPO of RE deficit States, MSETCL, would get additional revenue against the transmission of surplus power.

Challenges to be addressed:

In view of capacity addition through RE generations, certain points are required to be addressed on priority such as RE Integration and Reactive Management, Forecasting & scheduling of infirm RE generations, maintaining limits set under Deviation Settlement Mechanism (DSM). Backing down of conventional as well as RE generations during Off-peak loading seasons will be a great challenge which needs automation in regulations of the existing generators. As per CERC notification dtd. 13.08.2015, ancillary services are to be established to handle the situation.

- Development of RE Projects are governed by the Renewable Energy Policy of Govt. of Maharashtra. As per RE policy - 2008 of GoM, it was targeted to achieve capacity addition of Wind: 2000MW; Bagasse: 1000MW; Agricultural Waste: 400MW; Small hydro: 100MW). The capacity addition of RE generations has been successfully achieved and the RE policy - 2008 was exhausted.
- As on Nov. 2017, the existing RE generation in the State is Wind (4716MW), Solar (841.5MW), Bagasse (1748.36MW); Biomass (228MW) and Small Hydro (85.2MW).
- On dtd. 20.07.2015, GoM has declared RE policy – 2015 for the State and on dtd. 09.09.2015, GoM has declared procedure for establishment of RE projects under RE Policy – 2015. As per the procedure laid down under RE Policy, all the proposals of Grid Connectivity to Wind and Solar Power Projects are being scrutinized in the Committee formed by MSETCL.

1.9 Capacity Additions through Solar Projects:

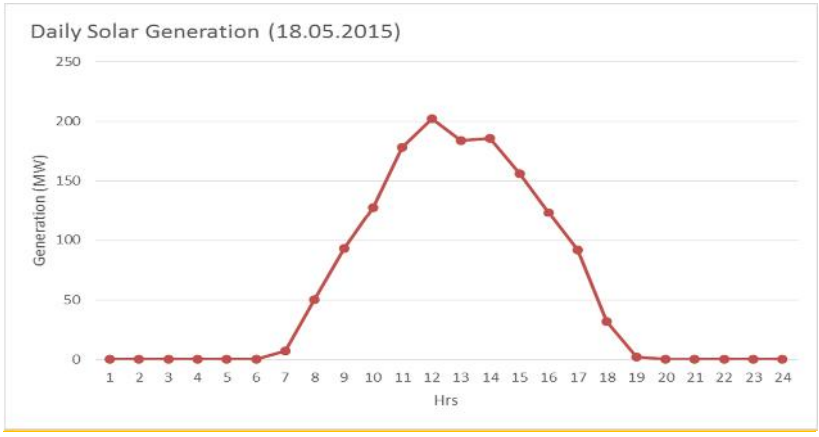
MSPGCL, a government generation company has targeted to establish solar generation of 2500MW under Public Private Partnership (PPP) model to fulfil Renewable Generation Obligation (RGO). The said power is being purchased by State owned Distribution licensee, MSEDCL, for fulfilling Renewable Purchase Obligation (RPO).

For promotion of Solar Energy in the Nation, MNRE has formulated a Jawaharlal Nehru National Solar Mission (JNNSM). Under this scheme, solar power projects will be established in India. It is targeted to establish solar

generation in phased manner to the tune of 20000MW Solar Generation by 2022 which has substantially been scaled up to 100 GW by 2022.

For facilitating and processing the mission, MNRE has formed a government organization "Solar Energy Corporation of India (SECI)" which will purchase the power generated through Solar Projects and sale the power to various Distribution Utilities in the Nation.

Thus, a huge quantum of Solar Generation is expected in the Country as well as in Maharashtra. Based on the injection generation data from existing solar projects, it was observed that during 11:00 Hrs. to 14:00 Hrs. the PLF is more than 70 % of the installed capacity. Thus against the existing installed capacity of 233.5MW, the graph indicating Injection v/s Hrs. is plotted below:



From the above, it is observed that solar generation is mostly available during peak loading conditions i.e. from 07:00 Hrs. to 18:00 Hrs. Thus, MSETCL has proposed a concept for inter-connection of solar generation and evacuation in the grid.

Normally, loads are connected at 33kV level of MSETCL's EHV sub-Stations. Thus, if the solar generations are connected at 33kV level and below, the loads will be locally met. With this arrangement, the system losses will be reduced as the power flow from EHV network through power transformers will be reduced. Thus, more solar power can be evacuated without additional transmission network. The major benefits of the interconnection of solar generation at 33kV level are:

- Reduction in the Transmission & Distribution losses.
- Improvement in the voltage profiles of MSEDCL's distribution Sub-stations.
- Reduction in capex in transmission as well as distribution network.

- Strengthening of the distribution network due to such distributed generations.

Based on the maximum coincident demand catered by the Maharashtra system on dtd. 14.10.2014, MSETCL has identified EHV Sub-Station wise solar capacity that can be connected to the grid. It was observed that around 12000MW load is connected at MSETCL's Sub-stations at 33kV level. Even if 20 – 30 % of the solar generation is considered based on land availability, around 4000MW of solar generation can be evacuated through the existing transmission network, if connected at 33kV level.

The abstract of Existing & Sanctioned RE Power Projects in MSETCL as on 30/11/2017 are as below:

Sr. No.	Type of RE Power Project	Existing (Connected)		Sanctioned (Work in Progress)	
		No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)
1	Wind	53	4716	34	3274
2	Solar	32	841.5	43	2915
3	Bagasse/Co- Generation	89	1748.36	43	834.15
4	Biomass	12	228	16	187.7
5	Small Hydro	9	85.2	3	8.4

Transmission Ring Main System (Nagpur, Pune, Nasik & Aurangabad)

Transmission Ring Main System (Nagpr, Pune, Nasik& Aurangabad)

MSETCLbeing a regulated entity strives to maintain the critical technical parameters of the system so as to provide quality transmission services as per the Standard of Performance. MERC has also decided the Multi Year Tariff (MYT) framework set the performance parameter for transmission license the transmission system availability of 98 % and above.

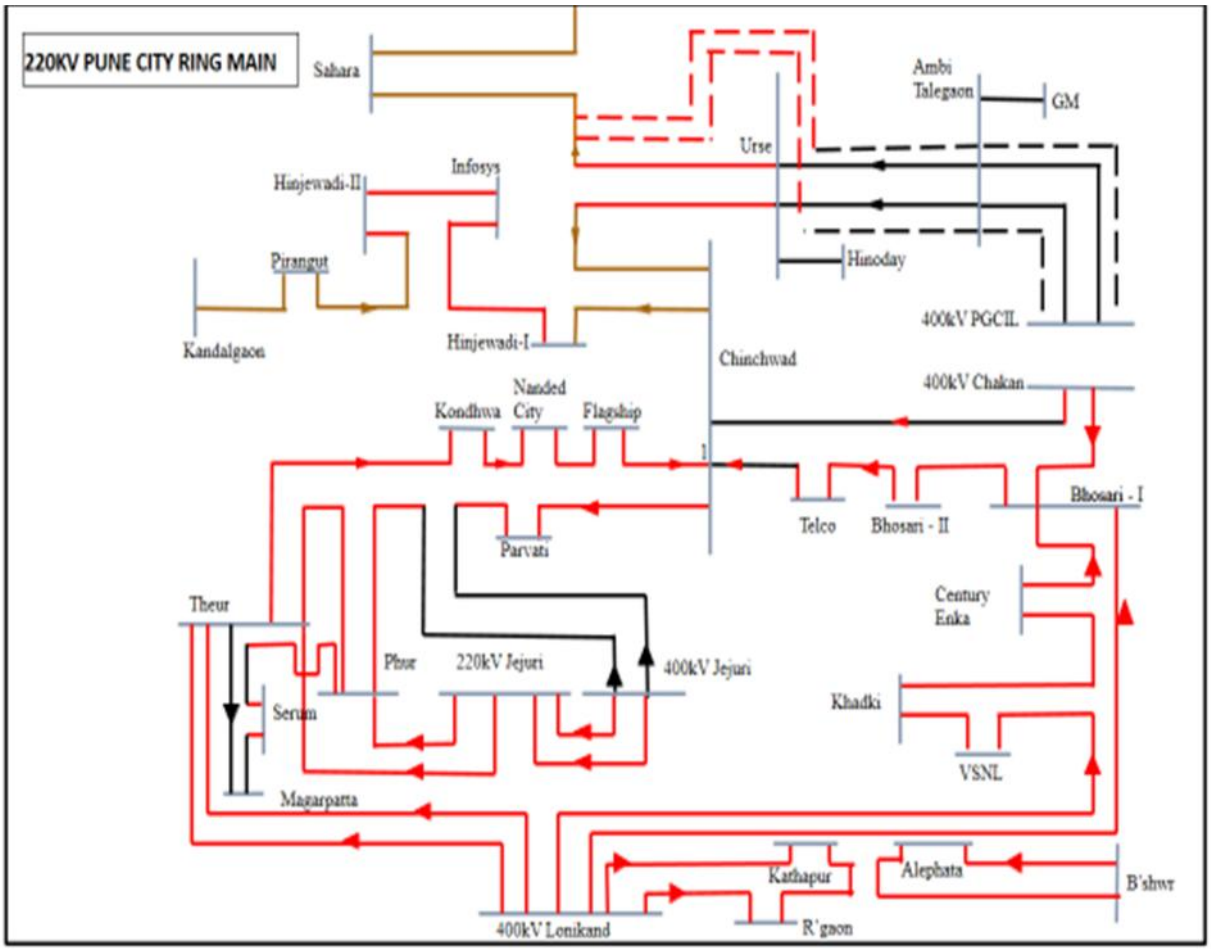
MSETCL Grid substations are presently feeding the distributuion system which are radially feeding the loads to the end consumers any disturbance / outage of transmission elements in the grid affects the supply to the end cosnumers some times critical loads and also such disturbances may create partial blackout in the urban areas of Nagpur, Pune & Nasik such distruption in transmission services may affect the state of affairs & economy in this area.

To prevent drawback of radial transmission system it is necessary to strengthen the existing transmission network by interconnecting them which not only increases the availability of transmission system but also improves reliability. In ring main transmission network is fed by more than one transmission feeder. In this case if one transmission feeder is under fault or maintenance, the ring main system is still energized by other transmission feeders connected to it. In this way the supply to the consumers is not affected even when any transmission feeder becomes out of service. In addition to that the ring main system is also provided with different section isolates at different suitable points. If any fault occurs on any section, of the ring, this section can easily be isolated by protection relays thus opening the associated section on both sides of the faulty zone.

STU has planned the Transmission Ring Main in Nagpur, Pune & Nasik areas the details of which are given below,

PUNE RING MAIN

The load of Pune city is around **2050 MW** with 400 kV Lonikan-I S/S, 400 kV Lonikan-II S/S, 400 kV Jejuri S/S, 400 kV Chakan S/S & 400 kV Pune (PG) S/S as the main of Pune Ring Main System.



To further strengthen the Pune Ring Main the following schemes are planed in phase wise manner,

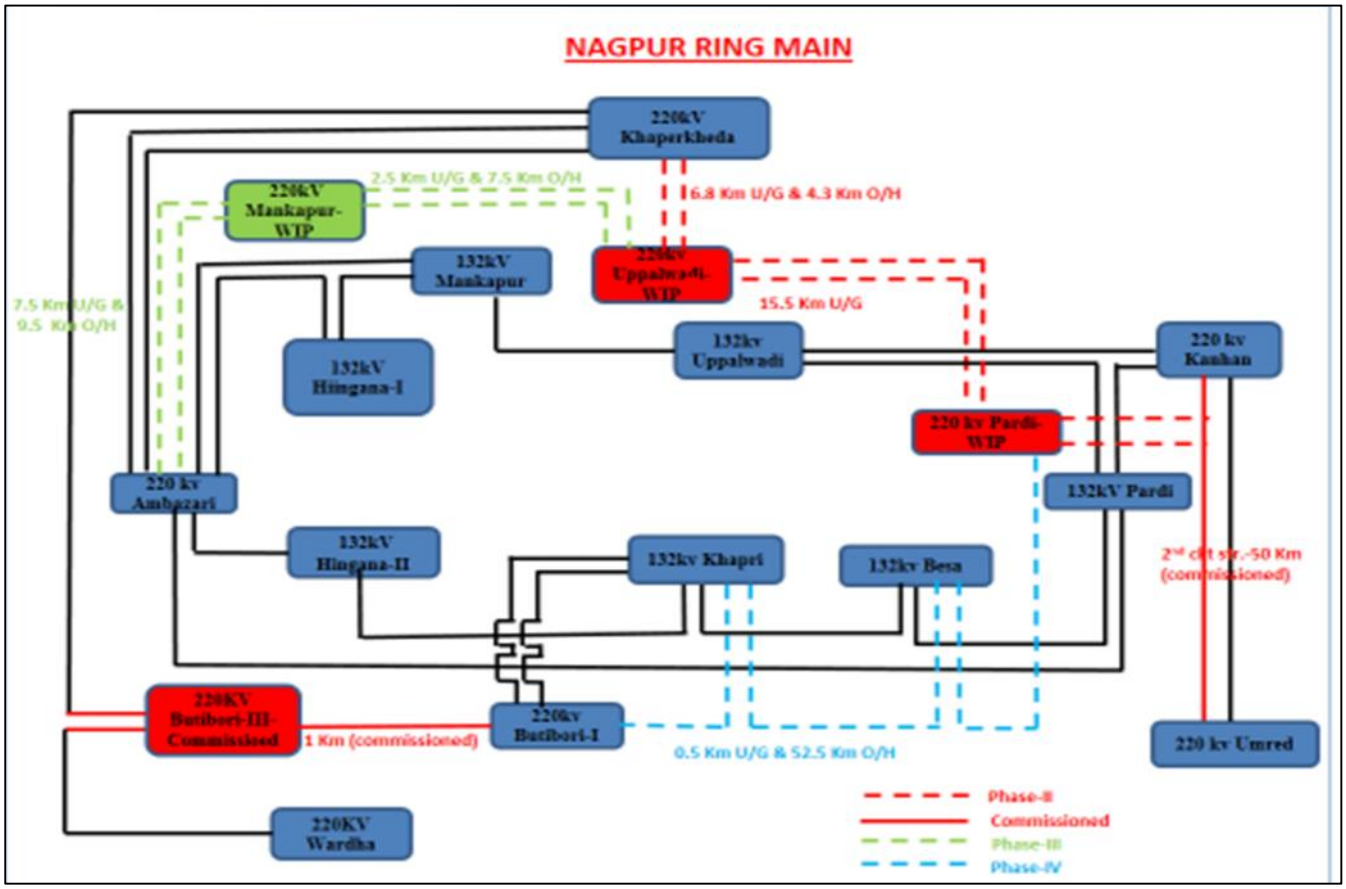
Pune Ring Main					
PRIORITY	**Sr. No.**	**PHASE-I**	**PHASE-II**	**PHASE-III**	**REMARKS**
	1	220 kV Urse-Chinchwad-Hinjawadi Second Circuit	132 kV Parvati-Kothrud Cable	132 kV Chinhwad-Rahatani-NCL	
	2	132 kV Magarpatta-Rastapeth Cable			

Pune Ring Main					
PRIORITY	**Sr. No.**	**PHASE-I**	**PHASE-II**	**PHASE-III**	**REMARKS**
	3	Upgradation of 100 kV Chinhwad-Khopoli line to 132 kV	Chinchwad-Bajaj-Markal - 220/132 kV ICT at Loniknd-II	Chinchwad-Bajaj-Markal - Reorientation of lines	
	4		LILO of 220 kV Chinchwad-Telco at Chakan-II	Part -I 132 kV Theur-Sanaswadi LILO	
	5			Part-II 132 kV Sanaswadi-Shirur	
Low priority	6	132 kV Phursungi-Mundhwa-Magarpatta work balance work	132 kV Rahatani-Varasgaon SC to DC		
	7	LILO of 220 kV Volkswagon (EHV Consumer)	LILO of 132 kV Chakan – Mahindra Forge at Pimpalgaon		
	8		HTLS of 132 kV Chinchwad-Narayangaon		Feasibility to be checked by field office

	High Priority schemes progress of the same to be submitted to STU monthly by field office

The detailed scope of work of above schemes is considered in Pune Zone plan.

NAGPUR RING MAIN



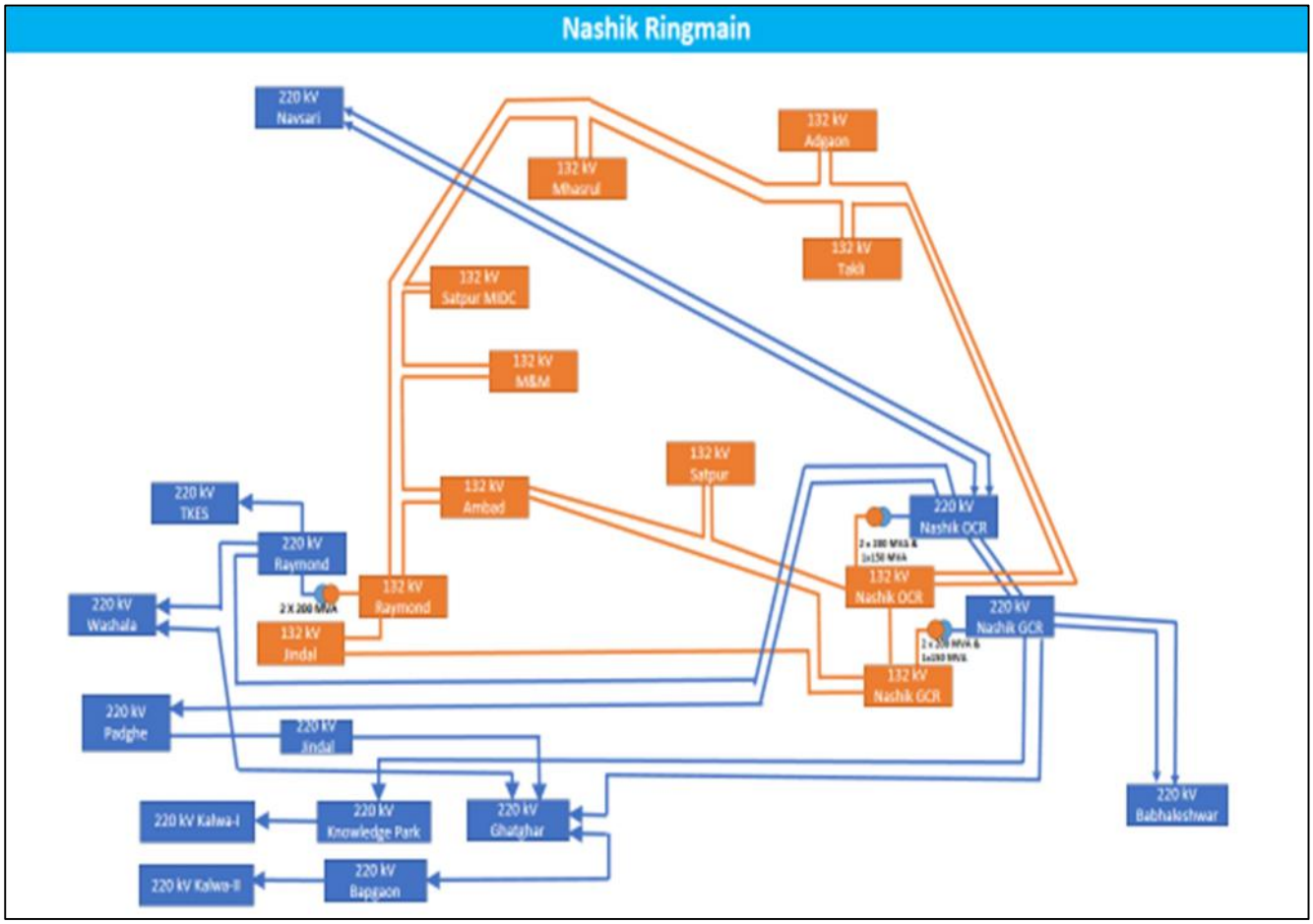
Existing 132 kV ring main Substations

132KV Sub-Stations of Existing Nagpur Ringmain
132KV Pardi S/Stn
132KV Besa S/Stn
132KV Mankapur S/Stn
132KV Uppalwadi S/Stn
132KV Hingna-I S/Stn
132KV Hingna-II S/Stn
132KV Khapri S/Stn
Existing 220KV Sources to 132KV Nagpur Ringmain
220KV Ambazari S/Stn.
220KV Kanhan S/Stn.
220KV Butibori S/Stn.
220KV Kalmeshwar S/Stn.
The present load of 132 kV Nagpur Ring main is near about **495 MW** and the following 220 kV substations schemes have been proposed for Nagpur 132 kV ring main

PHASE-I	**PHASE-II**
1) 220 kV New Pardi (2018-19) 2) 220 kV Uppalwadi (2018-19)	1) 220 kV Mankapur (2022-23)

The detailed scope of work of above schemes is considered in Nagpur Zone plan.

NASIK RING MAIN



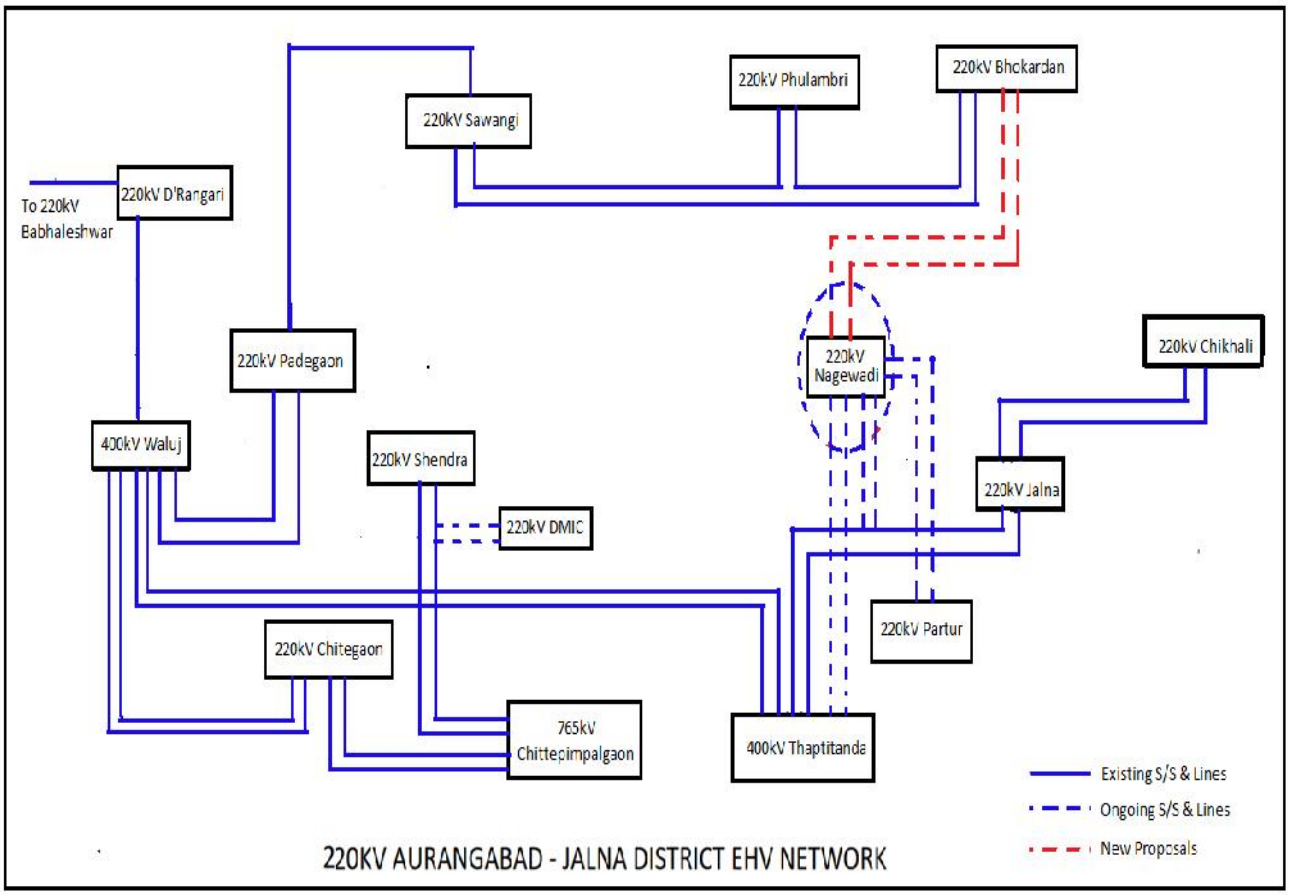
The present load of Nasik city is around **2500 MW** and the 400 kV Sinnar S/S, 220 kV Eklaahre S/S, 220 kV Nashik Bableswar & 220 kV Nashik – Navsari are the main source of Nasik Ring Main.

To strengthen existing 132 kV Nasik Ring Main reconductoring of following lines is proposed,

1) Replacement of conductor of existing 132 kV Eklahare (OCR)-Takli S/C line with HTLS conductor (2017-18)
2) Replacement of conductor of existing 132 kV S/C line from 220 kV Nasik (GCR) - Ambad s/s link line with HTLS conductor (2018-19)
3) LILO of 132 kV Raymond – Adgaon at Mhasrul S/S (2017-18)

The detailed scope of work of above schemes is considered in Nashik Zone plan.

Aurangabad Ring Main



The present load of Aurangabad city is near about **2,200 MW** with 765 kV Etuni S/S, 400 kV Tapti Tanda S/S, 400 kV Aurangabad (PG) S/S & 220 kV Bableshwar S/S are the main source for the 220 kV Aurangabad Ring Main.

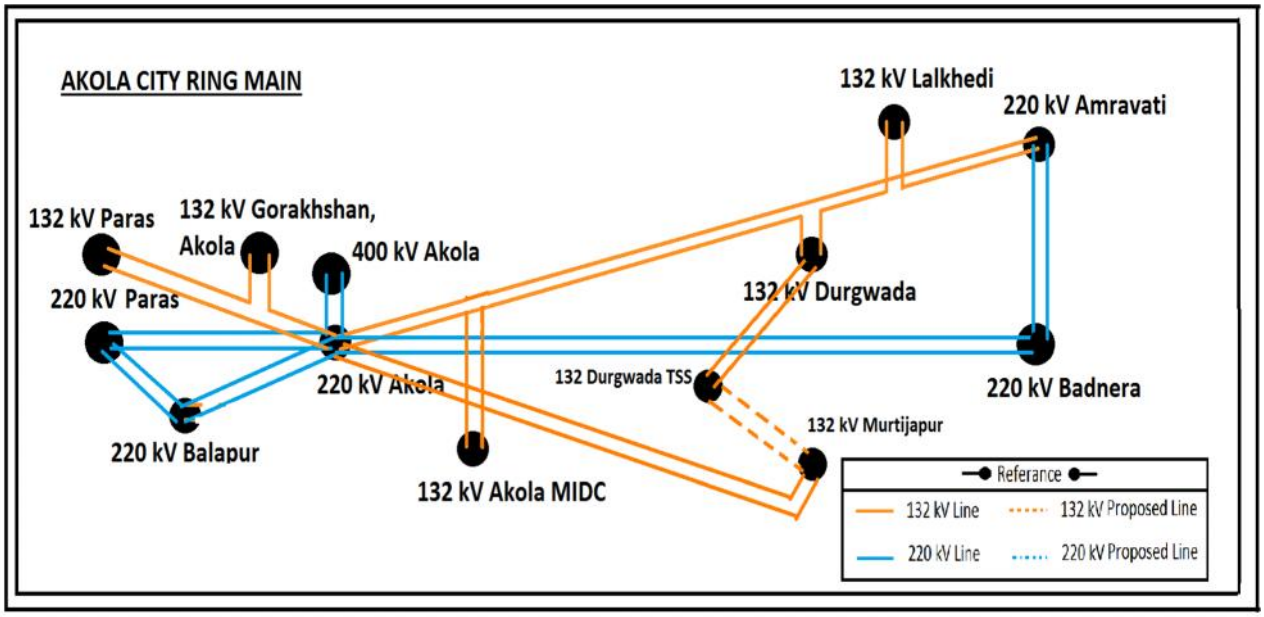
To further strengthen the Aurangabad Ring Main the following schemes are proposed,

1. Establishment of 220 kV Nagewadi S/S (2017-18) & 220 kV Partur S/S (2017-18)
2. 220 kV Waluj Sawangi line
3. 220 kV Padegaon Sawangi (2017-18)
4. 220 kV Nagewadi Partur (WIP)
5. 220 kV Nagewadi Tapti Tanda (WIP)
6. 220 kV Nagewadi – Bhokardhan (2021-22)
7. 132 kV Padegaon - Paithan at Chitegaon (2018-19)
8. 132 kV Garware - Bajaj (2017-18)
9. 132 kV Kagzipura-Kannad at Deogaon Rangari (2019-20)
10. 132 kV Shendra Chikalthana (2017-18)
11. 132 kV Shendra Deolai (2020-21)

The detailed scope of work of above schemes is considered in Aurangabad Zone plan.

Akola City Ring Main

The present load of Akola city is around **130 MW** and the 220 kV Akola S/S & 220 kV Balapur are the main source of Akola City Ring Main.



To further strengthen the Akola City Ring Main the following schemes are planned in phase wise manner,

Sr. No.	Phase – I	Phase -II	Remark
1	Shifting of 132 Kv Akola MIDC S/S on other circuit of 220 kV Apatapa – Amravati line	Link line from 132 kV Durgwada TSS to 132 kV Murtizapur S/S	

Existing 132 kV Ring Main Substations:

Sub-Stations of Akola City Ring Main

1) 132 kV MIDC, Akola
2) 132 kV Gorakhshan, Akola
3) 220 kV Akola

Existing 220 kV Sources to Akola City Ring Main

1) 220 kV Akola
2) 220 kV Balapur

Establishment of Transmission System in Unnetwork area

Tranmsission system in Unnetwork Area

There are certain pockets of the State where the region lacks transmission network or weak transmission network and there is an urgent need for penetrating / strengthening the transmission network.

MSETCL plans following substations for Unnetwork area of Maharashtra. The aim of substation schemes is to improve the quality of electricity and increase the reliability of system in Unnetwork area below is the list of Substations planned to address the unnetwork area,

Sr. No.	Area and District	Nearby existing EHV s/s	Place of proposed EHV s/s	Approximate distance from existing EHV s/s in KM.
1)	North Palghar	220 KV Wada	132 KV Jawhar	29
		132 KV Dahanu		53
2)	Western Nashik	132 KV Ambad	220 KV Girnare	14
		132 KV Satpur		14
		132 KV Mhasrul	132 KV Golashi Phata	30
3)	North Nandurbar	132 KV Taloda	132 KV Dhadgaon	40
4)	South Gondia	132 KVSakoli	132 KV Morgaon Arjuni & 220/132 kV Sakoli	30
		132 KV Amgaon		50
5)	North East Chandrapur	132 KV Sindewahi	220 KV Naghbid	38
6)	North Gadchiroli	220 KV Gadchiroli	132 KV Chamorshi	52
		132 KV Brahmpuri		35

In the 35 Districts of the State theres are total 352 Talukas out of which 274 No's of Talukas are having EHV Sub stations and further in 13 Nos of talukas new EHV Sub stations are considered in the present plan.

Further for the remaining Talukas, EHV Sub stations will be planned after receipt of requirement of EHV sub stations from MSEDCL.

Strengthening of existing EHV network

PROPOSALS FOR SYSTEM STRENGTHENING 132 kV NETWORK

Sr. No.	Particulars of area	District	Zone	Proposal
1	Gondia Bhandara/ Kardha-Asgaon	Gondia/ Bhandara	Nagpur	i) 220 KV Naghbid s/s ii) 220 kV Sakoli s/s iii) 132 kV Deori iv) 132 kV morgaon-arjuni
2	Tiwasa -Telgaon-Arvi	Amravati/ Wardha	Amravati/ Nagpur	220/132 KV Karanja s/s
3	Virur-Ashti-Mul Sindewahi	Chandrapur/ Gadchiroli	Nagpur	132 KV Chamorshi s/s with source line LILO on 132 KV Virur-Mul line considered in this Plan & 132 kV Link line from 132 kV Sicom – Mul & Sindewahi Brahmapuri proposed.
4	Amravati -Morshi-Warud	Amravati	Amravati	i)LILO on 132 KV line from 220 KV Amravati -132 KV Morshi s/s at Nandgaon Peth ii)132 kV Warud-Barshingi Link Line & LILO at 220 kV Karanja iii) 220 kV Warud s/s
5	Amravati-Chandur Bazar-Achalpur-Anjangaon			LILO on 132 KV Chandur Bazar -Achalpur at 220 KV Nandgaon Peth considered in this Plan 2017-18 & establishment of 220 kV Anjangaon S/S is in WIP.
6	Yavatmal-Ghatanji-Pandharkawada			220 kV Level at Pandharkawada with source from 220 KV Wani s/s is considered.
7	Akola -Akot-Hivarkhed			Establishment of 220 kV Anjangaon S/S is in WIP & 2nd ckt stringing of 132 KV Akot-Hiwarkhed SCDC line and LILO on one ckt of 132 KV Akot-Hiwarkhed line at 132 KV Warwat Bakal s/s.
8	Amravati - Lalkhedi-Durgwada- Akola			220 KV source is available at Amravati & Akola. This will support each other. Link line from 132 kV Durgwada TSS to Murtijapur is proposed.
9	Parbhani-Jintoor-Yeldari-Risod	Parbhani/ Washim	Aurangabad/ Amravati	LILO on 132 KV Jijtoor- Yeldari at 220 KV Partur is considered.
10	Parbhani- Purna-Basmat-Kurunda-Hingoli	Parbhani/ Hingoli	Aurangabad	220 KV Kurunda s/s with 220 KV source line from 400 KV Nanded s/s is considered.
11	Harangul-Chakur-Udgir	Latur	Aurangabad	220 KV Jalkot with 220 KV source line from 400 KV Nanded & 132 KV interconnection with Chakur, Udgir is considered.

Sr. No.	Particulars of area	District	Zone	Proposal
12	Ausa-Ujni-Killari-Nilanga-Omerga			220 KV Narangwadi s/s with 220 KV source line from 400 KV Solapur (PG) s/s & LILO on 132 KV Omerga-Nilanga, Omerga-Killari-Ujani is considered.
13	Paranda-Bhoom-Kallamb-Kaij-Parli	Osmanabad/ Beed	Aurangabad	400 kV Karjat with interconnection to Jeur Paranda / Kharda proposed. 220/132 KV ICT at 220 KV Manjarsumba s/s and 132 KV Manjarsumba-Sarola, Sarola-Kaij is considered.
14	Purandar-Daund-Alegaon-Shrigonda	Pune/ Ahmednagar	Pune/Nashik	132 KV Daund s/s is connected to 220 Kurkumbh s/s. LILO Of Kurkumbh to Bhigwan at 400 KV Karjat is considered.
15	Bhenda-Shevgaon-Pathardi-Raimoha	Ahmednagar	Nashik	220 KV Shevgaon/Pathardi s/s with 220 KV source line from 400 KV Thapti Tanda s/s & LILO on 132 KV Shevgaon -Pathardi line is proposed. (2021-22)
16	Bhose-Karjat-Rashin-Karmala-Jeur	Ahmednagar/ Solapur	Nashik/Pune	400 kV Karjat with 220 kV Link to Bhose, & Jeur is proposed.
17	Ahmednagar-Supa-Shirur-Kuruli-Ranjangaon	Ahmednagar/ Pune	Nashik/Pune	220 KV Supa MIDC with LILO on 220 KV Ahmednagar -Bhose at Supa MIDC & 132 KV DC line to 132 KV Supa s/s is considered. 132 KV SCDC line from 220 KV Ahmednagar 132 KV Supa is considered in GEC.
18	Ogalewadi-Borgaon-Ashta-Vishrambag	Satara/Sangli	Karad	Conversion of 110 KV Tap to LILO line for Ashta s/s on SC towers to 132 kV DC line using same ROW is considered. 132 KV SCDC line from 220 KV Peth -110 KV Borgaon is considered. & 132 kV link line from Sawantwadi to Kudal is considered.
19	Kothali-Radhanagari-Kankavali	Kolhapur/ Sindhudurg		LILO on 110 KV Kothali-Radhanagari line at 220 KV Bidri is considered.
20	Babhaleshwar-Sangamner-Akole	Ahmednagar	Nashik	220/132 kV Adwadi (Sinnar) with LILO of 132 kV Akole – Khaparale (S/C) Line at 132 kV Adwadi s/s
21	Sinnar- Kahprale-Akole	Nashik/ Ahmednagar		220/132 kV Adwadi (Sinnar) proposed 2nd circuit stringing of 132 KV Sinnar (Old) - Khaprale SCDC line is proposed.

Sr. No.	Particulars of area	District	Zone	Proposal
22	Ranwad-Lasalgaon-Chandwad-Manmad	Nashik		220 kV Level creation at Manmad & 220 kV Pimpalgaon s/s
				132 KV SCDC line from 220 KV Pimpalgaon (Baswant)-132 KV Ranwad is considered.
23	Chopda -Yawal-Deepnagar	Jalgaon		220 KV Viroda s/s with 220 KV source LILO on 220 KV Deepnagar- Amalner & 132 KV line for Sawada, Yaval is proposed.
24	Sawda-Raver-Nimbhora			
25	Visarwadi-Nandurbar-Dondaicha	Nandurbar/ Dhule		220 KV Nandurbar with 220 KV source line from 220 KV Dondaicha with LILO on 132 KV Dondaicha -Nandurbar, Nandurbar - Visrawadi & Nandurbar - Samsherpur (Proposed) is considered.

Creation of New Voltage Level in Existing Substation

Creation of New Voltage Level in Existing Substation

MSETCL is having a vintage of assets in transmission sytem voltage level from 765 kV, 400 kV, 220 kV, 132 kV, 110 kV, 100 kV, 100 kV and 66 kV. MSETCL Substations are presently feeding Distribution feeder level at 11 kV, 22 kV & 33 kV as per the distribution of voltage level in the various zones of distribution.

However, the existing system loading condition, voltage and constraints are clearly showsthat the network plan to (technically) justifyaddition or strengthening of existing system, sub-stations and lines along with impact of suchaddition / strengthening of the existing network.

MSETCL to setout the lacuna/ drawbacks in the present transmission system which the plan proposes to address by addressing the issues like elimination of 66 kV level sub transmission system and strengthening the particular voltage level by providing the alternate voltage source thus improving reliability and to improve voltage profile has planned to establish the creation of new voltage level in the present existing substation which is as below,

YEARWISE STATE ABSTRACT

Sr. No.	Particulars	ZONE						Total
		2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	
Creation of new level in existing s/s.								
	400/220 KV							
	220/132 KV	600	500	300	200	100	0	**1700**
	220/100 KV		0	200	0	0	0	**200**
	220/33 KV	300	150	50	0	0	0	**500**
	220/22 KV	100	0	0	0	0	0	**100**
	132/110 KV	0	150	0	0	0	0	**150**
	132/33 KV	150	75	0	0	0	0	**225**
	132/22 KV	100	50	0	0	0	0	**150**
	Sub Total	**1250**	**925**	**550**	**200**	**100**	**0**	**3025**

Detailed scope of work of above schemes is considered in respective zonal plan.

DETAILS OF ZONEWISE CREATION OF LEVEL IN EXISTING SUBSTATION.

Sr. No.	Name of substation	District	Scope of work	Year of Commissioning
AMRAVATI ZONE				
1	220 kV Nandgaon Peth	Amravati	1 X 100 MVA, 220/132 kV ICT	2017-18
2	132kV Gorkshan Road Akola(WIP)	Akola	2 x 25 MVA, 132 / 33 KV	2017-18
3	220 KV Amravati	Amravati	2 X 25 MVA 132/33 KV	2018-19
4	220kV level at 132kV Pandharkawda	Yawatmal	1 x 100 MVA, 220 / 132 KV	2018-19
5	220 kV Ner	Yawatmal	1 x 100 MVA, 220 / 132 KV	2019-20
6	220 kV Warud	Amravati	2 x 25 MVA, 220 / 33 KV	2019-20
AURANGABAD ZONE				
1	220 kV Parbhani	Parbhani	2 X 50 MVA, 220/33 kV	2017-18
2	220kV Jalkot	Latur	2x25MVA, 132/33 kV	2017-18
3	220 kV Tapthi Tanda	Aurangabad	1 X 25 MVA, 220/33 kV	2018-19
4	220 kV Krishnoor	Nanded	1 X 100 MVA 220/132 kV	2018-19
5	220 kV Patoda	Nanded	2 X 100 MVA 220/132 kV	2018-19
6	220 kV Manjarsumba	Beed	1 X 100 MVA, 220/132 kV ICT	2019-20
7	220kV Shendra	Aurangabad	1 X 100 MVA, 220/132 kV ICT	2020-21
8	220kV Phulambri	Aurangabad	1 X 100 MVA, 220/132 kV ICT	2021-22
KARAD ZONE				
1	220 kV Peth	Sangli	220/132-110 kV, 100 MVA ICT	2017-18
2	220 kV Satara MIDC	Sangli	1 X 50 MVA, 132/110 kV ICT	2018-19
3	132 kV Bamabwade	Sangli	1 X 100 MVA, 132/110 kV ICT	2018-19
4	220 kV Insuli (Sawantwadi)	Sindhudurg	1 X 100 MVA, 220/132 kV ICT	2020-21

Sr. No.	Name of substation	District	Scope of work	Year of Commissioning
NAGPUR ZONE				
1	132 kV Allapaly	Gadchiroli	1 X 25 MVA, 132-66/33 kV TF	2017-18
2	220 KV Purti (Co – Gen) s/s.	Nagpur	2 X 25 MVA, 220/33 kV TF	2018-19
3	220 KV Wardha -I	Nagpur	2 X 50 MVA, 220/33 kV TF	2018-19
4	220 KV Ambazari	Nagpur	2 X 25 MVA, 220/33 kV TF	2018-19
5	132 kV Hiradmal TSS	Nagpur	2 X 25 MVA, 132/33 kV TF	2018-19
6	132 kV SICOM	Nagpur	1 X 100 MVA, 220/132 kV	2019-20
NASHIK ZONE				
1	220 kV Manmad	Nasik	1 X 100 MVA, 220/132 kV	2018-19
2	220 kV Belwandi	Nasik	1 X 50 MVA, 220/33 kV	2018-19
3	220 kV Pimpalgaon	Nasik	1 X 25 MVA, 132/33 kV	2018-19
PUNE ZONE				
1	400 KV Lonikand-II	Pune	2 X 100 MVA 220/132 KV ICT	2017-18
2	220 KV Flag Ship		1 X 200 MVA 220/132 KV ICT	2017-18
3	132 KV SPSL (EHV Consumer)		2 X 50 MVA 132/22 KV T/f	2017-18
VASHI ZONE				
1	220 kV Jambhul	Thane	2 X 50 MVA 220/22 KV T/f	2017-18
2	220 KV Vasai	Palghar	2 X 50 MVA 220/22 KV T/f	2018-19
3	100 KV GAIL (EHV Consumer) Near Usar Alibag	Raigad	2 X 25 MVA, 100/22 kV T/f	2018-19
4	220 kV Vashi	Raigad	1 X 200 MVA, 220/100 kV ICT	2019-20

Stringing of second circuit of existing 220 kV & 132 kV SCDC lines of MSETCL

2ND CIRCUIT STRINGING							
Particulars	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**
AMRAVATI ZONE							
132 KV	70	79	51	60	0	60	**320**
110 KV							**0**
Sub Total	**70**	**79**	**51**	**60**	**0**	**60**	**320**
AURANGABAD ZONE							
220 KV	17.4						**17.4**
132 KV	108	159	103	129	171	0	**700**
Sub Total	**17.4**	**101**	**160**	**77**	**201**	**0**	**717.4**
KARAD ZONE							
220 KV		35					**35**
132 KV		30					**30**
100 kV				35			**35**
Sub Total	**0**	**65**	**0**	**35**	**0**	**0**	**100**
NAGPUR ZONE							
132 KV	35	30	27	0			**92**
Sub Total	**35**	**30**	**27**	**0**	**0**	**0**	**92**
NASHIK ZONE							
220 KV	27		13				**40**
132 KV	115.3	82	84	72	30		**383.3**
Sub Total	**142.3**	**82**	**97**	**72**	**30**	**0**	**423.3**
PUNE ZONE							
220 KV	2.4						**2.4**
132 KV	38	32	22	58	17		**167**
Sub Total	**40.4**	**32**	**22**	**58**	**42.3**	**0**	**169.4**
VASHI ZONE							
100 KV		33					**33**
Sub Total	**0**	**33**	**0**	**0**	**0**	**0**	**33**

Detailed scope of work of above schemes is considered in respective zonal plan.

Reactive Power Management

REACTIVE POWER MANAGEMENT

Reactive power has been recognized as a significant factor in the design and operation of Power transmission system for a long time. There is a fundamental and important interrelation between active and reactive power transmission. The transmission of active power requires a phase displacement of voltages, but the magnitudes of these voltages are equally important, not only they are necessary for power transmission, but also they must be high enough to support the loads and low enough to avoid equipment breakdown. Thus, we have to control, and if necessary to support or constrain, the voltages at all the key points of the network. This control may be accomplished in large part by the supply or consumption of reactive power at these points.

Although the aspects of reactive power have been long recognized, they have recently acquired increased importance for at-least two reasons: first, the increasing pressures to utilize the transmission capacity as much as possible: and second, the development of newer static types of controllable reactive-power compensators.

The consumption of reactive power in the network is network series element themselves, for example in transmission lines and transformer leakages reactances. Thus, a direct way of increasing power transfer capacity in transmission systems, and of reducing voltage drop in distribution systems is to compensate part of the series inductive reactances by series capacitors.

Further, the issue of Reactive power Management is a critical issue when dealing with planning and operation of power networks with high wind energy penetration. Reactive Power Management entails the requested operation and planning actions to be implemented in order to improve the voltage profile and voltage stability in the power networks. An efficient reactive power planning could be obtained by choosing an optimum location of var sources during the planning stage.

The production and absorption of the reactive power can be achieved with the help of a number of devices including synchronous generators, overhead lines, underground cables, transformers, loads, shunt reactors and synchronous condensers.

Recently, MSETCL transmission system some pockets are experiencing low voltage and high voltage situation due to heavy agriculture and lightly loaded distribution system and is leading to severe stress on the transmission as well as distribution system equipment and may endanger the system security.

The existing shunt capacitors and shunt reactive in the Intra State Transmission system is as given below,

STATUS OF REACTORS						
SR. NO.	400 KV S/S	EXISTING NO. OF REACTORS (MVAR)				
		400 KV LINES		400 KV BUS		
		MSETCL	PGCIL	MSETCL	PGCIL	APML
1)	KORADI	2 X 50 (FIXED)	2 X 50 (FIXED)	1 X 50		
2)	CHANDRAPUR	3 X 50 (FIXED)				
3)	PARLI (GIRAVALI)	6 X 50 (FIXED)				
4)	BHUSAWAL	2 X 50 (FIXED)				
5)	DHULE	2 X 50 (CSR)	2 X 50 (FIXED)		1 X 80	
6)	BABHALESHWAR			2 X 80		
7)	NAGOTHANE			1 X 80		
8)	KOLHAPUR				1 X 80	
9)	PADGHE		1 X 50 (FIXED)	1 X 80		
10)	KARAD	1 X 50 (FIXED) 1 X 80 (CSR)				
11)	LONIKAND	2 X 50 (FIXED)				
12)	KHARGHAR			1 X 80		
13)	TIRODA					2 X 80
	TOTAL	**980**	**250**	**450**	**160**	**160**

Abstract Of EHV/HV Capacitor Banks capacity Installed at EHV S/s as on Nov 2017

Zone	Total Installed Capacitor Bank capacity (MVAR)	HV Capacitor Bank capacity (MVAR)			EHV Capacitor Bank capacity (MVAR)		
		Total Installed capacity	In service	Out of service	Total Installed capacity	In service	Out of service
Amarvati	300	200	200	0	100	100	0
Aurangabad	774.1	154.1	142.15	11.95	620	560	60
Nashik	775	100	34	66	675	645	30
Nagpur	25	25	25		0		
Karad	241.85	46.85	20.371	26.479	195	150	45
Pune	584.836	169.836	161.336	8.5	415	390	25
Vashi	101.9	101.9	75.3	26.6	0	0	0
Total	**2802.686**	**797.686**	**658.157**	**139.529**	**2005**	**1845**	**160**

To tackle the issue of reactive power in the MSETCL transmission system a Standing Committee for MVAR (Reactive) Compensation studies is formed as per the Directives from Hon' Energy Minister and as approved by Hon' CMD dated 11-02-2016 for MVAR (Reactive) Compensation studies in Maharashtra of MSETCL & MSEDCL officials.

A series of meeting have been convened by the Standing Committee for MVAR (Reactive) Compensation studies for analyzing the data as below,

1) Discussion on District wise, Substation wise, Discom Feeder wise, Transformer wise & ICT wise MVAR data and corresponding data as per circulated format.
2) Submission of information of existing Capacitor bank available at EHV Substation.
3) Submission of fresh proposal for additional capacitor bank at EHV Substation.

After various deliberations of the committee the following plans for tackling the reactive power management problem in the transmission network is formulated as short term, medium term and long term.

In the Short term to tackle the low voltage problem the operation of tapchanger of On Load Tap Changer (OTLC) of Power Transformer and ICT's were identified, in the medium term the shifting of reactors to high voltage locations from exiting substations were identified and in the long term reactive power management the following shunt capacitors and reactors at various locations is identified the summary of which is as given below,

Sr. No.	Zone	Existing MVAr as on Nov 2017	Phase-1 MVAr	Phase-2 MVAr	Phase-3 MVAr	Phase-4 (132 kV) MVAr	Phase-4 (220kV) MVAr
a	b	c	d	e	f	g	h
1	Amravati	300	200	175	215	330	60
2	Aurangabad	774.1	340	190	250	330	0
3	Nashik	775	130	370	420	390	0
5	NAGPUR	25	25	65	40	0	0
6	Karad	241.85	5	80	125	0	0
4	Pune	584.836	150	50	130	180	300
7	Vashi	101.9	20	0	0	0	0
Total		2802.69	870	930	1180	1230	360
Grand Total (Phase-1 to 4)			4570				

Detailed scope of work of above schemes is considered in respective zonal plan.

- Projected effect scenario after incorporation of the above Capacitor Banks in Phase-wise manner shows improvement in PU Voltage level in MSETCL substations.
- The Systems MVAr requirement will be mitigated and surplus MVAr will be available in the network. Hence the drawl of reactive power will be reduced from the Generation.
- The requirement of Reactive Power will be met near the load side, hence improving the Power Transfer Capability, hence decreasing the current requirement.
- Due to decrease in the current requirement the Transmission equipment's will also be released.

Sr No	Name of Zone	Name of Substation	Reactors MVAr
1	Nagpur	400 kV Chandrapur-II	375
		400 kV Koradi-II	
		400 kV Khaparkheda	
2	Amravati	400 kV Akola	125
3	Pune	400 kV Solapur	250
		400 kV Lonikand-II	
4	Karad	400 kV Karad	250
		400 kV Kolhapur	
5	Vashi	-	-
6	Aurangabad	400 kV Nanded	125
7	Nashik	400 kV Bhusawal-II (Deepnagar)	250
		220 kV Dhule	
	Total		**1375**

Detailed scope of work of above schemes is considered in respective zonal plan.

Due to rapidly growing demand of electricity, their is need of strengthening the power transmission capability by improving power transfer capacity of existing network or by installing new transmission networks. Building of new transmission networks is time consuming process and requires bulky investment.

Reactive power requirements over and above those which occur naturally are provided by an appropriate combination of reactive source/devices which are normally classified as static and dynamic devices.

I. Static Sources
II. Dynamic Sources

Sources of Reactive Power	Sinks of Reactive Power
Static: Shunt Capacitors Filter banks Underground cables Transmission lines (lightly loaded) Fuel cells PV systems **Dynamic:** Synchronous Generators Synchronous Condensers FACTS (e.g.,SVC,STATCOM)	Transmission lines (Heavily loaded) Transformers Shunt Reactors Synchronous machines FACTS (e.g.,SVC,STATCOM) Induction generators (wind plants) Loads Induction motors (Pumps, Fans etc) Inductive loads (Arc furnace etc)

FACTS AND VOLTAGE CONTROL

The demands of lower power losses, faster response to system parameter change, and higher stability of system have stimulated the development of the Flexible AC Transmission systems (FACTS). FACTS has become the technology of choice in voltage control, reactive/active power flow control, transient and steady-state stabilization that improves the operation and functionality of existing power transmission and distribution system.

I. Static Var Compensator (SVC)
II. STATCOM

The main difference between a STATCOM and an SVC is the way they operate: a STATCOM works as a controllable voltage source while an SVC works as a dynamically controllable reactance connected in parallel.

SVCs and STATCOMs are high-cost devices, as well, although their operating costs are lower than those for synchronous condensers and generators. Hence, depending upon the requirement these devices can be utilized.

MSETCL has planned SVC/STATCOM at 220kV Pandharpur substation & 220kV Chalisgaon substation.

Industrial Development

INDUSTRIAL DEVELOPMENT

Introduction

In line with **"Make in India"** initiative by Hon'ble Prime Minister, the State of Maharashtra encourages industries for **"Make in Maharashtra"** with following key objectives:

Set up industrial areas for planned and systematic industrial development.

To function as a special planning authority in development of industrial areas"Prosperity to all through Industrialization" is the corporate philosophy of MIDC

Maharashtra Industrial Development Corporation (MIDC) is a project of the Government of State Maharashtra in India, and is the leading corporation of Maharashtra. It provides businesses with infrastructure like land (open plot or built-up spaces), roads, water supply, drainage facility, street lights.

1.10 Maharashtra Industrial Development Corporation (MIDC)

The Government of Maharashtra constituted a "Board of Industrial Development" (BID) on October 1, 1960. The BID framed the legislation and it was introduced before the state legislation and passed in the form of "Maharashtra Industrial Act" which gave birth to MIDC, as a separate corporation on August 1, 1962.

The important policy decision of setting up "independent filtered /potable water supply system of adequate capacity" as essential infrastructure for industrial development was the most intelligent step taken by MIDC right in the beginning. It stabilized the population base near the industrial areas. The strategically wise decision taken simultaneously to provide water supply to nearby domestic population from the capabilities created by MIDC of their own water supply system resulted in a phenomenal urban growth in the nearby small towns and villages. The growth of Kalyan complex and Pimpri-Chinchwad are results of this key policy decision taken by MIDC.

1.10.1 Current MIDC Scenario

Maharashtra is the premier state in India because of its investor-friendly environment. It has consistently been ranked the best among major Indian states in various Investment Climate Assessment surveys, especially in terms of having better infrastructure and a relatively deregulated business environment.

The Industrial Policy of the State has classified all Talukas in the State into A,B,C,D& D+ groups. Further some districts are classified as No Industry Districts (NIDs). As such all industrial areas which come under a particular talukas will be assigned the classification/group of that Taluka. The classification indicates the level of development are given in table below,

Table: Industrial Policy of the State into A,B,C,D& D+ groups

Group A	Comprising the developed areas, viz. Mumbai Metropolitan Region (MMR) and Pune Metropolitan Region (PMR).
Group B	Comprising the areas where some development has taken place
Group C	Comprising the areas, which are less developed than those at Group B
Group D	Comprising the lesser-developed areas of the State not covered under Group A/ Group B/ Group C.
Group D+	Comprising the lesser-developed areas of the State not covered under Group A/ Group B/ Group C/ Group D.

Source: http://www.midcindia.org/Pages/Group.aspx

1.10.2 Functions carried out by the MIDC

- Provision of Infrastructure Facilities.
- Maintenance of Industrial Areas.
- Providing Services.
- Assured Water Supply.
- Drainage (effluent disposal) and CETP Schemes.

1.10.3 Zone Wise Existing EHV Substations of MSETCL Feeding to MIDC Area

List of Zone wise existing EHV Substations with Installed Capacity and maximum Load, which are mainly feeding MIDC area are given in Table 83.

Table 83: MIDC Existing EHV Substations

Sr. No.	Name of substation	District	zone	Installed Capacity in MVA	Max. load during 2014-15 in MW	Remarks
1	220 KV Butibori-I	Nagpur	Nagpur	150	79	
2	220 KV Butibori-III			100	19.58	
3	220 KV MIDC Chandrapur	Chandrapur		100	34	
4	220 KV SICOM Chandrapur			130	95.98	
5	220 KV Tadali			100	0	No load

Sr. No.	Name of substation	District	zone	Installed Capacity in MVA	Max. load during 2014-15 in MW	Remarks
6	220 KV Balapur MIDC	Buldana	Amravati	50	1.64	
7	132 KV Akola MIDC	Akola		141	45.98	
8	132 KV Chikalthana	Aurangabad	Aurangabad	175	76.3	
9	132 KV Waluj			141	84.2	
10	220 KV Jalna	Jalna		150	128	
11	132 KV Jalna MIDC			150	83.6	
12	132 KV Latur MIDC	Latur		75	38.9	
13	132 KV Ahmednagar MIDC	Ahmednagar	Nashik	150	64.3	
14	132 KV Ambad	Nashik		200	98.94	
15	132 KV Satpur MIDC			150	38.8	
16	132 KV Sinnar (Malegaon) MIDC			150	55.38	
17	220 KV Kalwa		Vashi	100	55.77	
18	220 KV Knowledge Park Airoli			100	78.57	
19	220 KV Kudus –II (Bhaveghar)	Thane		200	0	Recently Commissioned
20	132 KV Boisar MIDC	Palghar		200	134	
21	220 KV Tambati	Raigad		300	78.8	
22	220 KV Taloja			100	43	
23	220 KV Hinjewadi-I	Pune	Pune	150	90.1	
24	220 KV Hinjewadi-II			100	46.7	
25	220 KV Ranjangaon			100	74.8	
26	132 KV Solapur MIDC	Solapur		141	90	
27	132 KV Chincholi Kati			75	78.8	
28	220 KV Phaltan MIDC	Satara	Karad	50	15.6	
29	220 KV Satara MIDC			100	71.8	
30	220 KV Five Star MIDC	Kolhapur		100	66.5	
31	110 KV Shiroli			107	71.6	
32	110 KV Gokul Shirgaon			100	82.06	
TOTAL				4135	2022.7	

1.11 MIDC Projections

Maharashtra Industrial Development Corporation (MIDC) is a project of the Government of State Maharashtra in India, and is the leading corporation of Maharashtra. It provides businesses with infrastructure like land (open plot or built-up spaces), roads, water supply, drainage facility, street lights.

The growth of new MIDCs are certainly dependent on many other factors apart from the above mentioned missions. However, it is expected that, the new MIDC shall come up from FY 2017-18 onwards. Accordingly, transmission network is to be planned to propel growth of State and Country. STU's estimates of demand projections of MIDC are shown inTable 4.

Table 14. Demand Projections for MaharashtraIndustrial Development Corporation – MIDC

Particular	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
MIDC Load	50	100	300	300	300	-

1.11.1 STU Key role in developing and fulfilment of the MIDC requirements

Maharashtra's industries located in the MIDC areas are supplied through various EHV substations. To meet out the upcoming demand growth of MIDC, STU proposes various substations at their required growth location and the same list are given in Table 9.

In view of above a meeting with officials of MIDC was arranged on dated 27/10/2015 at Prakashganga, Corporate Office, MSETCL, Mumbai to have detailed discussions on requirement of power by MIDC.

Further, a meeting was called by Principal Secretary (Industires) on 12/07/2016 to discuss the matter of establishment of EHV Sub stations in MIDC area. In the meeting the land requirement for EHV Sub station for MSETCL by MIDC, issue of various commercial taxes levy by MIDC, Right of Way for Sub station land & transmission lines and Establishment of GIS/ AIS substation by MSETCL depending upon land availability by MIDC etc. various other issues regarding the establishment of EHV S/S in MIDC were discussed.

After detailed interactions with MIDC, MSETCL field officers, MSEDCL & MSLDC, it was decided to establish 14 no's of EHV Substations as per requirement of MIDC at various places in Maharashtra.

Table 95: MIDC Upcoming EHV Substations

Sr.No.	Name of proposed EHV substation	District	MSETCL Zone	MSEDCL zone	Proposed year of commissioning
1	220KV Butibori (Addl.) MIDC	Nagpur	Nagpur	Nagpur Urban	2022-23
2	220 kV Krishnoor	Nanded	Aurangabad	Aurangabad	2017-18
3	220 kV Jalna (Nagewadi)	Jalna	Aurangabad	Aurangabad	2017-18
4	2220 kV Shendra DMIC	Aurangabad	Aurangabad	Aurangabad	2018-19
5	220KV Bidkin (DMIC)	Aurangabad	Aurangabad	Aurangabad	2021-22
6	220KV Supa MIDC	Ahmednagar	Nashik	Nashik	2021-22
7	220 kV Pawane	Thane	Vashi	Kalyan	2019-20
8	100 KV Dighi {Agardanda (Murud)}	Raigad	Vashi	Kalyan	2022-23
9	400 kV Hinjewadi	Pune	Pune	Pune	2018-19
10	220 kV Kesurdi	Satara	Karad	Baramati	2021-22
11	220KV Kupwad MIDC	Sangli	Karad	Kolhapur	2021-22

Transmission Planning for Tribal Area

Transmission Planning for Tribal Area

New EHV Substations for Tribal Area

There are 35 Districts in the State and the tribal population is largely concentrated in the western hilly Districts of Dhule, Nandurbar, Jalgaon, Nashik and Thane (Sahyadri Region) and the eastern fores Districts of Chandrapur, Gadchiroli, Bhandara, Gondiya, Nagpur, Amravati and Yavatmal (Gondwana Region).

The Scheduled Tribes are one of the most marginalised communities in India. As a consequence of historical injustices, displacement due to development projects, deprivation of land assets through fraud and exploitation of their already distressed situation, and denial of access to natural resources they suffer from a severe development deficit vis-à-vis other communities.

The area under the Tribal Sub Plan in Maharashtra is 50,757 sq. Kms. as against the total Geographical area of 3,07,313 sq.Kms. of the State. This works out to about 16.5 percent of the geographical area of the State.

The Tribal Sub-Plan (TSP) strategy was evolved by the Government of Maharashtra for the rapid socio-economic development of tribal people and the important aspect of this strategy was to ensure allocation of funds for TSP areas at least in proportion to the ST population of each State/UT. The Tribal sub-Plan (TSP) strategy is central to the approach of planning for tribal welfare as a special component of overall planning.

MSETCL plans following substations for tribal area of Maharashtra. The aim of substation schemes is to improve the quality of electricity and increase the reliability of system in tribal area.

List of Substation,

1. *Existing Substations in Tribal areas*

Sr No	Voltage Level	Name of Sub station	District
1	220 kV	Shahada	Nandurbar
2	132 kV	Taloda	Nandurbar
3	132 kV	Visarwadi	Nandurbar
4	220 kV	Kalwan	Nashik
5	132 kV	Kalwan	Nashik
6	132 kV	Dindori	Nashik
7	132 kV	Igatpuri	Nashik

Sr No	Voltage Level	Name of Sub station	District
8	132 kV	Dahanu	Palghar
9	132 kV	Kinwat	Nanded
10	132 kV	Pandharkawada	Yavatmal
11	220 kV	Gadchiroli	Gadchiroli
12	66 kV	Allapali	Gadchiroli
13	66 kV	Yellapai	Gadchiroli
14	66 kV	Sironcha	Gadchiroli
15	132 kV	Dharni	Amravati
16	132 kV	Rajur	Ahmednagar
17	132 kV	Shamsherpur	Nandurbar

2. *Considered in upcoming STU Plan*

Table 10: Tribal area substation

Sr No	Name of substation	Taluka	District	Zone
1	132 kV Ralegaon	Ralegaon	Yavatmal	Amravati
2	132 KV Morgaon Arjuni	Morgaon Arjuni	Bhandara	Nagpur
3	132 KV Allapally	Allapally	Gadchiroli	Nagpur
4	132 kV Chamorshi	Chamorshi	Gadchiroli	Nagpur
5	132 kV Sironcha	Sironcha	Gadchiroli	Nagpur
6	132 kV Deori	Deori	Gondia	Nagpur
7	220 kV Naghbhid	Chandrapur	Chandrapur	Nagpur
8	220 KV Nandurbar MIDC	Nandurbar	Nandurbar	Nashik
9	132 KV Dhadgaon	Dhadgaon	Nandurbar	Nashik
10	220 kV Palghar	Palghar	Palghar	Vashi
11	132 KV Jawhar	Jawhar	Palghar	Vashi
12	132 kV Mahur	Kinwat	Nanded	A'bad

Justification note for Tribal Substation

MSETCL focuses on tribal area of Maharashtra for uninterrupted power supply during five year STU plan preparation with aim of solving issues like poor voltage, less reliability and poor quality of supply etc.

MSETCL focuses on Vidarbha, Marathawada, West Maharashtra, Kokan area (Palghar District) and North Maharashtra tribal areas and plan the different schemes as listed in Table 11 to achieve the objectives.

Table 11: Tribal Area wise Proposed MSETCL substation

Area	No. of substation	Name of substation
Vidarbha Area	7	Ralegaon, Morgaon Arjuni, Allapally, Chamorshi, Sironcha, Deori, Naghbhid
Marathawada	1	Mahur
Western Maharashtra	0	NIL
Kokan Area (Palghar District)	2	Palghar, Jawhar
North Maharashtra	2	Nandurbar, Dhadgaon

Overview of schemes for tribal area

To strengthen power supply in remote locations like Chimur Dist. Chandrapur, Deori Dist. Gondia, Jawhar, District Palghar, Nandurbar, Dhadgaon of Nandurbar District, new EHV substations are proposed.

Development of substation and related schemes as per STU transmission plan in consecutive year will improve the voltage level and quality of supply with reliable supply in targeted tribal area of Maharashtra state. Reliable electricity supply in targeted tribal area will promote household electrification, industrial development and tourism. Detailed of schemes for tribal area is in Table 12.

Advantages:

On establishment of new EHV substations in Tribal area, nearest EHV source will be available to the existing 33 KV network feeding power supply to tribal area. This will be helpful for maintaining uninterrupted and quality power supply.

Table 12: Detail of schemes for tribal area

Sr No.	Name of substation	Taluka	District	Zone	Purpose	Impact
1	Ralegaon	Ralegaon	Yavatmal	Amravati	will be established to improve quality of supply in this area	To feed the tribal area

Sr No.	Name of substation	Taluka	District	Zone	Purpose	Impact
2	132 KV Morgaon Arjuni	Morgaon Arjuni	Bhandara	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
3	132 KV Allapally	Allapally	Gadchiroli	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
4	132 kV Chamorshi	Chamorshi	Dist. Gadchiroli	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
5	132 kV Sironcha	Sironcha	Gadchiroli	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
6	132 kV Deori	Amgaon	Gondia	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
7	220 kV Naghbhid	Chandrapur	Chandrapur	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
8	220 KV Nandurbar MIDC	Nandurbar	Nandurbar	Nashik	To promote Industrial area in Nandurbar	helpful for strengthening of existing 132 Nandurbar and 132 KV Visarwadi substations

Sr No.	Name of substation	Taluka	District	Zone	Purpose	Impact
9	132 KV Dhadgaon	Dhadgaon	Nandurbar	Nashik	length of existing 33 KV line will be reduced to 56 KMs in place of existing 112 KMs.	System strengthening
10	220 KV Palghar	Palghar	Palghar	Vashi	On establishment of 220 KV Palghar power supply position in Palghar Taluka will be improved	System strengthening
11	132 KV Jawhar	Jawhar	Palghar	Vashi	length of existing 33 KV line will be reduced to 30 KMs from existing 115 KMs	System strengthening
12	132 kV Mahur	Kinwat	Nanded	A'bad	will be established to improve quality of supply in this area	To feed the tribal area

MISCELLANEOUS CIVIL WORKS FOR ADMINSITRATIVE BUILDING

Transmission Planning for Tribal Area

New EHV Substations for Tribal Area

There are 35 Districts in the State and the tribal population is largely concentrated in the western hilly Districts of Dhule, Nandurbar, Jalgaon, Nashik and Thane (Sahyadri Region) and the eastern fores Districts of Chandrapur, Gadchiroli, Bhandara, Gondiya, Nagpur, Amravati and Yavatmal (Gondwana Region).

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The area under the Tribal Sub Plan in Maharashtra is 50,757 sq. Kms. as against the total Geographical area of 3,07,313 sq.Kms. of the State. This works out to about 16.5 percent of the geographical area of the State.

The Tribal Sub-Plan (TSP) strategy was evolved by the Government of Maharashtra for the rapid socio-economic development of tribal people and the important aspect of this strategy was to ensure allocation of funds for TSP areas at least in proportion to the ST population of each State/UT. The Tribal sub-Plan (TSP) strategy is central to the approach of planning for tribal welfare as a special component of overall planning.

MSETCL plans following substations for tribal area of Maharashtra. The aim of substation schemes is to improve the quality of electricity and increase the reliability of system in tribal area.

List of Substation,

1. *Existing Substations in Tribal areas*

Sr No	Voltage Level	Name of Sub station	District
1	220 kV	Shahada	Nandurbar
2	132 kV	Taloda	Nandurbar
3	132 kV	Visarwadi	Nandurbar
4	220 kV	Kalwan	Nashik
5	132 kV	Kalwan	Nashik
6	132 kV	Dindori	Nashik
7	132 kV	Igatpuri	Nashik

Sr No	Voltage Level	Name of Sub station	District
8	132 kV	Dahanu	Palghar
9	132 kV	Kinwat	Nanded
10	132 kV	Pandharkawada	Yavatmal
11	220 kV	Gadchiroli	Gadchiroli
12	66 kV	Allapali	Gadchiroli
13	66 kV	Yellapai	Gadchiroli
14	66 kV	Sironcha	Gadchiroli
15	132 kV	Dharni	Amravati
16	132 kV	Rajur	Ahmednagar
17	132 kV	Shamsherpur	Nandurbar

2. *Considered in upcoming STU Plan*

Table 10: Tribal area substation

Sr No	Name of substation	Taluka	District	Zone
1	132 kV Ralegaon	Ralegaon	Yavatmal	Amravati
2	132 KV Morgaon Arjuni	Morgaon Arjuni	Bhandara	Nagpur
3	132 KV Allapally	Allapally	Gadchiroli	Nagpur
4	132 kV Chamorshi	Chamorshi	Gadchiroli	Nagpur
5	132 kV Sironcha	Sironcha	Gadchiroli	Nagpur
6	132 kV Deori	Deori	Gondia	Nagpur
7	220 kV Naghbhid	Chandrapur	Chandrapur	Nagpur
8	220 KV Nandurbar MIDC	Nandurbar	Nandurbar	Nashik
9	132 KV Dhadgaon	Dhadgaon	Nandurbar	Nashik
10	220 kV Palghar	Palghar	Palghar	Vashi
11	132 KV Jawhar	Jawhar	Palghar	Vashi
12	132 kV Mahur	Kinwat	Nanded	A'bad

Justification note for Tribal Substation

MSETCL focuses on tribal area of Maharashtra for uninterrupted power supply during five year STU plan preparation with aim of solving issues like poor voltage, less reliability and poor quality of supply etc.

MSETCL focuses on Vidarbha, Marathawada, West Maharashtra, Kokan area (Palghar District) and North Maharashtra tribal areas and plan the different schemes as listed in Table 11 to achieve the objectives.

Table 11: Tribal Area wise Proposed MSETCL substation

Area	No. of substation	Name of substation
Vidarbha Area	7	Ralegaon, Morgaon Arjuni, Allapally, Chamorshi, Sironcha, Deori, Naghbhid
Marathawada	1	Mahur
Western Maharashtra	0	NIL
Kokan Area (Palghar District)	2	Palghar, Jawhar
North Maharashtra	2	Nandurbar, Dhadgaon

Overview of schemes for tribal area

To strengthen power supply in remote locations like Chimur Dist. Chandrapur, Deori Dist. Gondia, Jawhar, District Palghar, Nandurbar, Dhadgaon of Nandurbar District, new EHV substations are proposed.

Development of substation and related schemes as per STU transmission plan in consecutive year will improve the voltage level and quality of supply with reliable supply in targeted tribal area of Maharashtra state. Reliable electricity supply in targeted tribal area will promote household electrification, industrial development and tourism. Detailed of schemes for tribal area is in Table 12.

Advantages:

On establishment of new EHV substations in Tribal area, nearest EHV source will be available to the existing 33 KV network feeding power supply to tribal area. This will be helpful for maintaining uninterrupted and quality power supply.

Table 12: Detail of schemes for tribal area

Sr No.	Name of substation	Taluka	District	Zone	Purpose	Impact
1	Ralegaon	Ralegaon	Yavatmal	Amravati	will be established to improve quality of supply in this area	To feed the tribal area

Sr No.	Name of substation	Taluka	District	Zone	Purpose	Impact
2	132 KV Morgaon Arjuni	Morgaon Arjuni	Bhandara	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
3	132 KV Allapally	Allapally	Gadchiroli	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
4	132 kV Chamorshi	Chamorshi	Dist. Gadchiroli	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
5	132 kV Sironcha	Sironcha	Gadchiroli	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
6	132 kV Deori	Amgaon	Gondia	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
7	220 kV Naghbhid	Chandrapur	Chandrapur	Nagpur	will be established to improve quality of supply in this area	To feed the tribal area
8	220 KV Nandurbar MIDC	Nandurbar	Nandurbar	Nashik	To promote Industrial area in Nandurbar	helpful for strengthening of existing 132 Nandurbar and 132 KV Visarwadi substations

Sr No.	Name of substation	Taluka	District	Zone	Purpose	Impact
9	132 KV Dhadgaon	Dhadgaon	Nandurbar	Nashik	length of existing 33 KV line will be reduced to 56 KMs in place of existing 112 KMs.	System strengthening
10	220 KV Palghar	Palghar	Palghar	Vashi	On establishment of 220 KV Palghar power supply position in Palghar Taluka will be improved	System strengthening
11	132 KV Jawhar	Jawhar	Palghar	Vashi	length of existing 33 KV line will be reduced to 30 KMs from existing 115 KMs	System strengthening
12	132 kV Mahur	Kinwat	Nanded	A'bad	will be established to improve quality of supply in this area	To feed the tribal area

MISCELLANEOUS CIVIL WORKS

1.0 Introduction.

After unbundling of the erstwhile MSEB; the company, MSETCL (Maharashtra State Electricity Transmission Company Limited) is established to look after planning, construction and maintenance of EHV network which was in the jurisdiction of MSEB. The total network spread across the State of Maharashtra, comprises of the following assets up to the year 2015-16.

Details of substations /Transmission Line lengths is as follow:-

Sr. No.	Capacity	No. of substations	Transmission line length (CKT Km)
1.	765 KV	1	0
2.	500 KV	2	1504.00
3.	400 KV	28	8225.00
4.	220 KV	211	16326.00
5.	132 KV	306	14554.00
6.	110 KV	36	1737.00
7.	100 KV	38	701.00
8.	66 KV	11	684.00
	Total	**633**	**43731.00**

2.0 Methodology.

The office space required for officer/staff along with space for general amenities are mentioned in erstwhile MSEB Board Resolution No. 7631 dt. 15/11/1971. The total area required for administrative building, Kalwa Complex Airoli is calculated as per the above MSEB Board resolution.

3.0 Background for construction of administrative building at Kalwa complex Airoli, Vashi Zone and Pune Zone

Maharashtra State Electricity Transmission Company Ltd. has been formed on 06.06.2005 after the restructuring of erstwhile Maharashtra State Electricity Board. The Maharashtra State Electricity Transmission Company Ltd. has been entrusted with

the multiple responsibility of being a transmission licensing, state transmission utility & system operator. At present Maharashtra State Electricity Transmission Company Ltd. transmits electricity to the tune of 110815 MVA annually through 43731 CKT kilometres of EHV lines. The operating substations of 765 KV to 66KV capacity are 633 Nos.

After the restructuring of erstwhile Maharashtra State Electricity Board. The MSETCL has established Zones at

1) Aurangabad
2) Amravati
3) Nashik
4) Nagpur
5) Vashi
6) Pune
7) Karad

and **Corporate Office** at Prakashganga, BKC, Bandra (East), Mumbai.

At present Zone office at Vashi along with Testing and Communication Circle, Vashi is situated at fourth floor of administrative building at Vashi along with the MSEDCL offices at first, second, third & fifth floor. However the available space is inadequate to accommodate the staff of Zone office & Testing Circle. Also other circle offices in Vashi Zone viz. EHV Project Circle, Kalwa, EHV O&M Circle, Kalwa & EHV CCCM Circle, Airoli along with some Division & Sub Division offices are scattered in Kalwa complex premises & situated in old shed and residential renovated buildings. Hence it is necessary to accommodate the CE, Vashi office & scattered offices of Kalwa complex premises under one roof for smooth & safety working and overall better administrative control.

The following offices of Maharashtra State Electricity Transmission Company Ltd. Vashi Zone are functioning in common Administrative building with MSEDCL.

1) EHV PC O&M Zone, Vashi.
2) EHV Testing and Telecommunication Circle, Vashi.

Following offices are functioning in old store sheds and old staff quarters building of MSETCL as mentioned below:-

1) EHV CCCM Circle, Airoli in old staff quarter at Kalwa Complex.
2) EHV CCCM Division, Airoli in old shed at Kalwa Complex.
3) EHV CCCM S/Dn. – I Airoli in old shed at Kalwa Complex.
4) EHV CCCM S/Dn. – II Airoli in old shed at Kalwa Complex.
5) EHV CCCM S/Dn. Thane in old shed at Kalwa Complex.
6) EHV O&M Circle, Kalwa in old shed at Kalwa Complex.
7) EHV O&M Division Bhandup, in old staff quarter at Kalwa complex.
8) EHV O&M Division Kalwa in old staff quarter at Kalwa Complex
9) EHV Project Circle Kalwa in old shed at Kalwa Complex.
10) EHV Project Division Kalwa in old shed at Kalwa Complex.
11) EHV Project S/Dn. Kalwa in old shed at Kalwa Complex.
12) EHV T&C Dn. Kalwa in staff quarter at Kalwa Complex.
13) EHV Telecom Dn. Kalwa in old staff quarter at Kalwa Complex.
14) EHV 400 KV line Maint. S/Dn. Kalwa in old shed at Kalwa Complex.
15) 220 KV line Maint.S/Dn- I Kalwa in old staff qtr at Kalwa Complex.
16) Hotline Unit Kalwa in old shed at Kalwa complex.
17) S& I S/Dn. Kalwa in old shed at Kalwa complex.
18) Training and Internal Audit Section C.O, in old SLDC building at Kalwa Complex.

The following offices of Maharashtra State Electricity Transmission Company Ltd. Pune Zone are functioning in common Administrative building of MSEDCL at Rasta Peth, Pune.

1) EHV PC O& M Zone Pune.
2) EHV Project Circle Pune.
3) EHV Civil Circle Pune.
4) EHV O&M Circle Pune.
5) EHV Testing Circle Pune.
6) EHV O&M Division-1 Pune.
7) EHV Telecom division office, Pune.

Following offices are functioning in common Administrative building of MSEDCL at Kasba Peth, Pune.

1) EHV Project division-1 office, Pune
2) EHV Project division-2 office, Pune.
3) EHV Civil Division Pune.
4) EHV lines S/Dn-I office, Pune.
5) EHV Project Construction S/Dn office, Pune.

Following offices are functioning in common administrative building of MSEDCL at Ganeshkhind, Pune

1) EHV lines S/Dn-II office, Pune.

Following offices are functioning in Store shed at 220 kV Pimpari-Chinchwad s/s premise

1) EHV O&M division Pimpri-Chinchwad office, Pune.

As maximum offices of Maharashtra State Electricity Transmission Company Ltd. Vashi Zone and Pune Zone are situated and functioning in old Staff quarter buildings and old store sheds there is inconvenience and unsafe atmosphere among the working staff. So it is very much essential to construct administrative building at Kalwa Complex, Airoli and Pune Zone to accommodate Zonal Office staff and other offices mentioned above for smooth and safety work.

4.0 Design Criteria.

4.1 The total space required for construction of administrative building for Vashi Zone and Pune Zone is considered by adopting following design criteria.

Office space & general amenities space required as per Board Resolution No. 7631 dt. 15/11/1971 and details are as below:-

Sr. No.	Category	Space in Sq. ft.
1.	Sr. Group I officers	160 to 200
2.	Other Group I officers	160
3.	Group II officers as also draftsmen & Tracers.	60 to 120
4.	Group III	40
5.	Records	5% of total office space

Scales of accommodation for **general amenities** etc. in Board's office building, approved under Board Resolution No. 7631 dt. 15/11/1971.

Sr. No.	Purpose	Accommodation as % of total office work area		
		Working up to 10000 Sq. Ft.	Working space more than 10000 Sq. Ft. & up to 20000 Sq. Ft.	Working space more than 20000 Sq. Ft.
1.	Common passages staircase halls	35%	34%	32%
2.	Toilets	7%	7%	7%
3.	Stationary & old records	8%	7%	7%
4.	Club, recreation & reading room	15%	15%	15%
5.	Conference hall &library			
6.	Canteen	9%	7%	5%
7.	Visitors room receptionist & telephone exchange	6%	3%	2%
	Total	80%	73%	68%

4.3 Office wise total area required for Adminsitrative Building at Vashi is as below.

Sr. No.	Name of office	Area required as per Norms is Sq.ft
1	EHV PC O&M Zone office, Vashi	2898
2	EHV CCCM Circle, Airoli	1344
3	EHV CCCM Division, Airoli	1092
4	EHV CCCM Sub Division - I, Airoli	840
5	EHV CCCM Sub Division - II, Airoli	840
6	EHV CCCM Sub Division, Thane	840
7	EHV O&M Circle, Kalwa	1554
8	EHV O&M Division, Bhandup, (Airoli Premises)	1260
9	EHV O&M Division, Kalwa	1260
10	EHV Project Circle, Kalwa	2142
11	EHV Project Division, Kalwa	1554
12	Project Sub Division, Kalwa	714
13	T&C Circle, Vashi	1218
14	T&C Division, Kalwa	735

Sr. No.	Name of office	Area required as per Norms is Sq.ft
15	Telecom Division	798
16	400 kV Lines Maintenance Sub Divison, Kalwa	756
17	220 kV Lines Maintenance Sub Divison-I, Kalwa	756
18	Hot line Unit Kalwa	483
19	S&I Sub Division, Kalwa	861
20	S.E. Training & Internal Audit Sections	2310
	Total	**24255.00**
	Add 34% for common passage, Stair case	8246.70
	Add 7% for toilets	1697.85
	Add 5% for Stationary & old records	1212.75
	Add 15% for Club, Recreation, Reading room, (Conference Hall)	3638.25
	Add 10% for Canteen	2425.50
	Add 5% for Visitor room, receptionist & Telephone exchange	1212.75
	Total area required	42688.80
	Say Total Area in Sqft	**42700.00**

4.3 The Total area required Adminsitrative Building at Pune is as below

Sr. No.	Name of Office	Carpet Area required in Sqft.
1	EHV PC O&M zone Pune	3102
2	EHV Project Circle office,Pune	2596
3	EHV Civil Construction Cum Maintenance Circle,Pune	1716
4	EHV O&M Circle,Pune	2112
5	EHV (T&C) Circle office,Pune	1364
6	EHV Civil division office,Pune	1496
7	EHV O&M division office,Pune	1584
8	EHV O&M division Pimpri-Chinchwad office,Pune	1584
9	EHV Telecom division office,Pune	1144
10	EHV Project division-1 office,Pune	1980
11	EHV Project division-2 office,Pune	1980
12	EHV lines S/Dn-I office,Pune	704
13	EHV Project Construction S/Dn office,Pune	1232
14	EHV lines S/Dn-II office,Pune	1364
	Total Carpet Area required for Office space	23958
	Common passages and staircase halls (34%)	8145.72
	Conference Hall & Library (15%)	3593.7

Sr. No.	Name of Office	Carpet Area required in Sqft.
	Canteen (7%)	1677.06
	Visitors room, Receptionist & Telephone exchange (3%)	718.74
	Parking space	15000
	Watchman cabin	120
	Auditorium	4500
	Total Built up Area (5364 Sq.mtr.)	**57713.22**
	say (5400 Sq.mtr.)	**58125**

5.0 Brief Scope of work

At present Zone office at Vashi along with Testing and Communication Circle, Vashi is situated at fourth floor of administrative building at Vashi along with the MSEDCL offices at first, second, third & fifth floor also the EHV PC O& M Zone Pune, EHV Project Circle Pune, EHV Civil Circle Pune, EHV O&M Circle Pune, EHV Testing Circle Pune are situated in building owned by MSEDCL at Rasta Peth. However the available space is inadequate to accommodate the staff of Zone office & Testing Circle. Also other circle offices in Vashi Zone viz EHV Project Circle, Kalwa, EHV O&M Circle, Kalwa & EHV CCCM Circle, Airoli along with some Division & Sub Division offices are scattered in Kalwa complex premises & situated in old shed and residential renovated buildings. Hence it is necessary to accommodate the CE, Vashi office & scattered offices of Kalwa complex premises under one roof for smooth & safety working and overall better administrative control for achieving targets of MSETCL.

The field office under Vashi Zone has selected suitable open plot in Kalwa Complex, Airoli for construction of administrative building. The said plot is in the possession of MSETCL. Location map of plot in Kalwa Complex is attached herewith as Annexure – B. The Chief Engineer Vashi had prepared estimate of the administrative building by considering area required for accommodation of various offices of MSETCL as per norms & submitted to Corporate Office for administrative approval.

The field office under Pune Zone has selected suitable land given on lease by Pimpri-Chinchwad New Town Development Authority on 4th June 2008, in sector no.

29 / bulk land no. 9, Taluka Haveli, District-Pune admeasuring 6000 square meter. The land is leased for 99 years period on nominal lease of Rs. 1/- per year.

The Board of Directors MSETCL vide B.R. No. 120/13 dtd. 14.09.2017 and B.R. No. 120/14 dated 14/09/2017 have accorded administrative approval for construction of administrative building for Vahsi Zone & Pune Zone through internal funding of MSETCL.

6.0 Objectives

The following are the objectives to construct administrative building, at Kalwa Complex, Airoli for Vashi Zone and at Ravet for Pune Zone.

1) All the administrative offices of Vashi and Pune Zone will come under one roof so that smooth working of MSETCL can be achieved.

2) Interconnectivity between various offices under Vashi and Pune Zone will be improved for achieving targets of the Company.

3) The various administrative functions can be held up in auditorium of proposed administrative building resulting in the convenience of all MSETCL officers/ employees.

7.0 Scope of Work

Component of work for Construction of Administrative building, at Kalwa Complex, Airoli is as below.

Parts	Component of work
A	Civil work including allied work (Landscaping, Driver room, Watchman cabin, Water pump with pump house, Pergola, Dome, Rain water harvesting)
B	Fire fighting arrangement
C	Internal and External Electrification work
D	Air Conditioners & Lift
E	Provision for partition and allied furniture of office, Canteen & Conference Hall

Component of work for Construction of Administrative building, at Ravet, Pune is as below.

Parts	Component of work
A	Civil Work (Main Building including water supply and sanitary work) Block Estimate rate for administrative buildings as per Pune DSR 2016-17.
B	Allied civil work such as I) Water Sump with Pump House, Pergola, Dome II) Aluminum partition & false celling / wall paneling etc.
C	Fire fighting arrangement
	Fire extinguishers
	Fire hydrant system
D	Internal and External Electrification work
E	Construction of Asphalt and concrete Road
F	Land development and site cleaning
G	Compound wall 300Mtr.
H	Furniture for offices

OTHER TRANSMISSION LICENSEES PLAN

OTHER TRANSMISSION LICENSEES PLAN

I) Maharashtra Eastern Grid Power Transmission Company Ltd. (MEGPTCL)

S N	Name of SUBSTATION	Detailed Scope of Work
FY 2022-23		
Augmentation		
1	765 KV Tiroda Switching	3 X 500 MVA 765/400 KV ICT
2	765 Akola-II S/s	3 X 500 MVA 765/400 KV ICT

II) ADANI TRANSMISSION INDIA LIMITED: NIL

III) JAIGAD POWER TRANSCO LIMITED: NIL

IV) VIDHARB INDUSTRIES POWER LIMITED – TRANSMISSION: NIL

V) AMRAVATI POWER TRANSMISSION COMPANY LIMITED: NIL

VI) SINNAR POWER TRANSMISSION COMPANY LIMITED: NIL

RINFRA - TRANSMISSION

RInfra-T STU 5 year Plan FY2018-19-FY2022-23 (Abstract)

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
A	Substation(10)	220 kV			220kV Switching Station at Tower location 257 (Augmentation of Borivali-Ghodbunder-Boisar LILO line)			
							220KV EHV Scheme at Malad /Kandivali (W) with LILO of 220KV DTPS/Boisar/Versova Line – 2KMS 2X125MVA	
						220 kV BKC (Golibar) GIS EHV Station (220KV BKC (Golibar)-Chembur D/C Line – 10.5 KMS , Transformers 2X125MVA,)		
						220kV Dahisar Housing GIS Station. (220 kV Ghodbunder - Dahisar D/C Line – 6.5 KMS . Transformer 2X125MVA,)		
B	Link Lines	220 kV	220 KV D/C Cable Between 220 KV RInfra Saki AND 220 KV TPC Saki EHV S/S.					
					220 KV Cable Connectivity from Aarey – M Borivali -15 KMS			
						Chembur 2nd Feed LILO of 220 KV MSETCL Sonkhar - Trombay Line at R Infra Chembur 220 KV EHV S/S.		
							220KV D/C Connectivity Between Dahisar EHV Station – 220KV RInfra-Borivali EHV Station	
							220 KV D/C cable Between 220 KV RInfra BKC (Golibar) AND 220 KV RInfra Aarey EHV S/S.	
C -1	2nd ckt stringing	220 kV	NIL					
C-2	Reorientation	220 kV	NIL					
C-3	HTLS/ Replacement	220 kV	NIL					
D-1	Creation of New Level	220 kV	NIL					
D-2	ICT - Addition	220 kV	NIL					
D-3	ICT - Replacement	220 kV	NIL					

Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
D-4	Transformers - Addition	220 kV	03rd, 220/33 kV, 125 MVATransformer at Goregaon EHV Station					
					03rd, 220/33 kV, 125 MVATransformer at Borivali EHV Station			
D- 5	Transformers - Replacement	220 kV	NIL					
E-1	Reactor - New	220 kV	NIL					
E-2	Reactor-Shifting	220 kV	NIL					
F	Capacitor	220 kV	NIL					
Sr. No.	Particulars	Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
*G	Additional Schemes	220kV		System Improvement Scheme RInfra Asset SIS-I				
					CAPEX Scheme at RInfra-T Versova EHV Station (TPC Versova-RInfra Versova Connectivity)			
								33kV AIS to GIS conversion at Aarey, Versova & Ghodbunder 220kV EHV SS

RInfra-T 5 year plan FY2018-19 to FY2022 -23

I) New Substations

SR NO	NAME OF S/S	DISTRICT	TOTAL SCOPE OF WORK	REMARKS
1	220/33 kV BKC(Golibar) GIS S/S (2020-21)	Mumbai	1. Construction of 220 kV GIS EHV Station. 2. 220KV BKC (Golibar)-Chembur D/C Line (U/G CABLE) – 10.5 KMS route length. 3. 2X125MVA, 220/33 KV T/F WITH 220 KV GIS BAYS at Chembur and BKC (Golibar), 33 kV GIS bays at BKC (Golibar).	To meet additional load requirement of DISCOM (*1)
2	220/33 kV Dahisar Housing GIS S/S (2020-21)	Mumbai	1. Construction of 220 kV GIS EHV Station. 2. 220 KV Ghodbunder - Dahisar DC Line (U/G CABLE) – 6.5 KMS route length. 3. 2X125MVA, 220/33 KV T/F WITH 220 KV GIS BAYS at Dahisar and Ghodbunder, 33 kV GIS bays at Dahisar Housing.	To meet additional load requirement of DISCOM (*1)
3	220KV EHV Scheme at Malad /Kandivali (W) (2021-22)	Mumbai	1. Construction of 220 kV GIS EHV Station 2. LILO of 220KV DTPS/Boisar/Versova Line – 2KMS route length 3. 2X125MVA, 220/33 KV T/F WITH 220 KV GIS BAYS at Malad/Kandivali (w) & 33 kV GIS bays.	To meet additional load requirement of DISCOM (*1)
5	220kV Switching Station at Tower location 257 (Augmentation of Borivali-Ghodbunder-Boisar LILO line) (2019-20)	Mumbai	1. Construction of 220 kV GIS Switching station at Tower location no. 257 with 220kV GIS bays	To meet requirement of uprating Ghodbunder Borivali cable portion due to MSETCL line upgradation (*4)

II) New EHV Lines

E) Link Lines

Sr. No.	Name of Line	Length of Line CKT Km	District	Remarks
1	220 KV D/C Cable Between 220 KV RInfra Saki AND 220 KV TPC Saki EHV S/S. (2017 – 18)	3	Mumbai	To strengthen the system (*3) (Ongoing scheme under execution) MERC and STU approved
2	220 KV Cable Connectivity from Aarey – M Borivali (2019-20)	30	Mumbai	To strengthen the system (*3) (Ongoing scheme under execution) MERC and STU approved
3	LILO of 220 KV MSETCL Sonkhar - Trombay Line at R Infra Chembur 220 KV EHV S/S. (2020 – 21)	5	Mumbai	To improve reliability (*4) STU approved, MERC approval in process
4	220KV Connectivity Between Dahisar EHV Station – 220KV RInfra-Borivali EHV Station. (2021-22)	12	Mumbai	To improve reliability (*4)
5	220 KV D/C cable Between 220 KV RInfra BKC (Golibar) AND 220 KV RInfra Aarey EHV S/S. (2021 – 22)	30	Mumbai	To improve reliability (*4) Same line will be LILO at Proposed Airport EHV Station

F) Second Circuit stringing: Nil

G) Reorientation of existing Lines: NIL

H) Replacement of conductor: NIL

III) Addition of Transformation Capacity:

F) Creation of new level in existing substation: Nil

G) Additional ICT in existing substation: Nil

H) Replacement of ICT in existing substation: Nil

I) Additional Transformer:

Sr. No.	Name of Substation	Description	District	Remarks
1	03rd, 220/33 kV, 125 MVATransformer at Goregaon EHV Station (2017-18)	1. Installation of 125 MVA transformer & associated 33 kV GIS bay	Mumbai	To meet additional load requirement of DISCOM (*1)
2	03rd, 220/33 kV, 125 MVATransformer at Borivali EHV Station (2019-20)	1. Installation of 125 MVA transformer & associated 33 kV GIS bay	Mumbai	To meet additional load requirement of DISCOM (*1)

J) Replacement of Transformer: Nil

IV) Reactor: Nil

V) Capacitor: Nil

K) RInfra-T Additional Schemes (2018-19 to FY2022-23)

Sr.No.	Name of Substation	Description	District	Remarks
1	System Improvement Scheme RInfra Asset SIS-I (FY2018-19)	1. Refurbishment of old assets. To refurbish and replace old assets in Phased manner, to ensure desirable level of Transmission System availability	**Mumbai**	To improve reliability (*4) WIP, Ongoing scheme, MERC approved scheme
2	CAPEX Scheme at RInfra-T Versova EHV Station (FY2019-20)	1. 220 KV GIS Bays – 06 Nos at RInfra Versova EHV station for TPC-T (RInfra-T Versova to TPC-T Versova Connectivity scheme)	**Mumbai**	To strengthen the system (*3) Scheme approved by STU and MERC
3.	33kV AIS to GIS conversion at Aarey, Versova & Ghodbunder 220kV EHV SS (FY2022-23)	1. Removal of existing 33kV AIS Boards at all the three 220kV EHV Substations. 2. Installation of new proposed 33kV GIS boards at the location of old 33kV AIS Boards.	Mumbai	To handle Fault current level (*4) To improve reliability (*4)

L) New Scheme beyond 5 year plan (2022-23)

Sr.No.	Name of Substation	Description	District	Remarks
1	New 220KV EHV Scheme at Andheri/ Khar (W)/ (Khardanda) (2023-24)	1. 220 kV GIS EHV Station 2. 220kV Cable link with Versova & BKC	**Mumbai**	To meet additional load requirement of DISCOM (*1)
2	220KV Scheme at Tilak Nagar/ Mankhurd Through LILO of Dharvi – Salsett Line at Tilak Nagar S/S Trombay –Mulund Line at Mankhurd EHV station (2023-24)	1. 220 kV GIS EHV Station at Tilak Nagar/Mankhurd 2. LILO of Dharvi – Salsett Line 3. LILO of Trombay – Mulund Line	**Mumbai**	To meet additional load requirement of DISCOM (*1)
3	220/33 kV Airport GIS S/S (2023-24)	1. Construction of 220 kV GIS EHV Station 2. LILO of Aarey-BKC (Golibar) line at Airport EHV Station - 2 KMS route length 3. 2X125 MVA, 220/33kV T/F with 220 kV GIS bays at Airport EHV Station	**Mumbai**	To meet additional load requirement of DISCOM (*1)
4	03rd, 220/33 kV, 125 MVATransformer at Gorai EHV Station (2027-28)	1. Installation of 125 MVA transformer & associated 33 kV GIS bay	**Mumbai**	To meet additional load requirement of DISCOM (*1)
5	400kV GIS Station at Aarey (2024-25)	1) Construction of 400kV GIS EHV Station at Aarey Colony. 2. 400kV MSETCL Kalwa – Aarey D/C line (U/G GIL/Cable – 20Kms route length.	**Mumbai**	To bring Bulk power near the load Centre of Mumbai, to Aarey to meet the future load growth of MMR.

Sr.No.	Name of Substation	Description	District	Remarks
		3. 3X500MVA, 400/220kV T/F with 400kV & 220kV bays at Aarey & MSETCL Kalwa.		

TPC-TRANSMISSION

TATA POWER TRANSMISSION FIVE YEAR TRANSMISSION PLAN 2017-18 TO 2022-23

Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
400 kV					Vikhroli	
220 kV	220 kV Mahalaxmi		Antop Hill	Chunabhatti	Sewree	Parel
				Belapur		Goregaon
				Karanjade		Vileparle
110 kV		Kurla				

					Kharghar-Vikhroli (D/C)	
400 kV					Interconnection of Ghatkopar and Vikhroli Stations	
					LILO of 400 kV Talegaon-Kalwa Line at Vikhroli	
220 kV	LILO of 220 Dharavi Backbay Line at Mahalaxmi R/S	Trombay to Dharavi and Salsette **(Multi-circuit)**	LILO of 220 kV Trombay–Dharavi# 9 Line at Antop Hill	LILO of one ckt of existing 220 kV Bhira-Dharavi D/C line at Chunabhatti	LILO 220 KV Trombay-Carnac 5 & 6 at Sewree	Sewree-Parel (D/C)
			R-Infra Versova S/S to TPC Versova (D/C)	Trombay-Chunabhatti (S/C)	LILO 220 KV Trombay Backbay at Sewree	Mahalaxmi-Parel (S/C)
				MSETCL Kharghar - Tata Belapur (D/C)	Kalwa - Salsette line # 5	Versova-Vile Parle (D/C)
						Tata-Borivali RS - Goregaon RS
						Sahar RS - Goregaon RS
						LILO of 220kV Trombay-Salsette-Backbay line at Carnac
110 kV		Dharavi R/S- Kurla R/S (D/C)		Kurla RS to BKC RS (S/C)		
				ChunabhattiRS - BKC RS (S/C)		

220 kV						
110 kV					Backbay RS to Carnac RS (S/C)	

220 kV						
110 kV						

TATA POWER TRANSMISSION FIVE YEAR TRANSMISSION PLAN 2017-18 TO 2022-23

Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
110 kV					Dharavi-Mahalaxmi	Trombay Parel # 3
					Parel-Mahalaxmi#1	Trombay Chembur # 1 and 2
					Carnac - Backbay#1 and 2	Trombay Carnac # 3
220 kV			*Versova*			
110 kV						
400 kV					2 x 500 MVA, 400/220/33 kV (Vikhroli)	
220 kV						2 X 250 MVA, 220/110/33 kV ICT (Parel)
	2 X 250 MVA, 220/110/33 kV ICTs (Mahalaxmi)		2 X 250 MVA 220 kV /110 kV/ 33 kV ICTs (Versova)	2 Nos. X 250 MVA 220/110/33 kV (Chunabhatti)	2 x 250 MVA, 220/110/33 kV (Vikhroli)	1 X 250 MVA, 220/110/33 kV ICT (Carnac)
400 kV						
220 kV						
220 kV			2 X 125 MVA, 220/33 kV **(Antop Hill)**			2X125 MVA, 220/33 (Goregaon)
						2X125 MVA, 220/33 (Vile Parle)
110 kV		2 X 125 MVA, 110/33 kV **(Kurla)**				
		1x 125 MVA , 110/33-22 kV (BKC)				
220 kV				4x 60 MVA 110/22 KV and 1 x 75 MVA 110/22 kV Transformers by 3 X 125 MVA 220/33-22 kV Transformers **(Dharavi)**		
110 kV	1 x (90-75) MVA (Saki)	1 x (90 – 90) MVA 110/22 kV Transformer # 1 **(Mahalaxmi)**	1 x 90 MVA 110/22 kV Transformer by 125 MVA, 110/33 kV **(Mahalaxmi)**	2 X (125-30) MVA, 110 kV/33/22kV **(Mankhurd)**		
		(90 – 75) MVA, 110 kV / 33-22 kV Transformer#3 **(Mahalaxmi)**				

TATA POWER TRANSMISSION FIVE YEAR TRANSMISSION PLAN 2017-18 TO 2022-23

Voltage level	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
		1 x (90-75) MVA 110/33-22 kV transformer # 2 **(Saki)**				
22 kV						
22 kV						
22 kV						
22 kV						
400 kV						
33 kV			1 No. 15 MVAR (Versova)			
			1 No. 15 MVAR (Mahalaxmi)			
22 kV			1 No. 15 MVAR (Borivli)			

2017-18

I) New Substations:

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	220 kV Mahalaxmi (2017-18)	Mumbai	a) LILO of 220 Dharavi Backbay Line at Mahalaxmi R/S -U/G cable 1600 sq.mm, 2 X 0.5 km = 1 km b) 2 X 250 MVA, 220/110/33 kV ICTs c) 8 Nos. 220 kV GIS bays d) 30 Nos. 33 kV GIS bays e) Construction of GIS Building	To meet additional energy demand of DISCOMs in South Mumbai

II) New EHV Lines

A) Link Lines: NIL

B) Second Circuit stringing: NIL

C) Reorientation of existing Lines: NIL

D) Replacement of conductor: NIL

III) Addition of Transformation Capacity:

A) Creation of new level in existing substation: NIL

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation: NIL

D) Additional Transformer: NIL

E) Replacement of Transformer:

Sr. No.	Name of Substation (Year of completion)	Description	District/ Approx. Cost	Remarks
1	220 kV Saki (2017-18)	1 x (90-75) MVA 110/33-22 kV transformer	Mumbai (10.0 Cr)	Test results indicating deterioration of Existing transformer. Saki, being a critical receiving station in North Mumbai, it is required to replace the transformer with higher capacity to ensure reliability and availability of supply and to meet load growth.

IV) Reactor: NIL

V) Capacitor: NIL

VI) Conversion of Existing AIS by GIS:

SN	Name of S/S (Year of completion)	Scope of Work	District/ Approx. Cost	Remarks
1	110 kV Versova (2017-18)	a) 11 X 110 kV GIS Bays b) 25 X 33 kV GIS bays c) Construction of GIS building	Mumbai (Rs. 37.11 Cr) (Balance to spend)	The transformers at Versova do not have HT breakers. Further existing 33 kV old AIS requires replacement. To cater to these requirements 110 kV GIS and 33 kV GIS is proposed which will also create additional 33 kV outlets for DISCOMs.
2	220 kV Mahalaxmi (2017-18)	41 x 33 kV GIS Bays	Mumbai (24.5 Cr) (Project cost)	Replacement of existing AIS to GIS and creation of additional outlets is required to a. To enhance reliability and b. To meet future load growth c. To create outlets for DISCOMs

2018-19

I) New Substations:

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	110 kV Kurla (2018-19)	Mumbai	a) 110 kV D/C line from Dharavi R/S to proposed Kurla R/S- 2 X 7 km= 14 km [OH (2*0.15 ACSR)- 3 km +UG (1600 sq.mm Cable)- 4 km] b) 2 X 125 MVA, 110/33 kV Transformers c) 10 Nos. X 110 kV GIS bays d) 35 Nos. X 33 kV GIS bays e) Construction of GIS Building	To meet additional energy demand of DISCOMs in area surrounding Kurla

II) New EHV Lines:

A) Link Lines:

Sr. No.	Name of Line (Year of completion)	Length of Line CKT Km	District/ Approx. Cost (Balance to Spend)	Remarks
1	220 kV Multi Circuit line from Trombay to Dharavi and Salsette (2018-19)	4 x24=96 km	Mumbai (Rs. 15 Cr)	To meet energy demand around Dharavi and Salsette Receiving Station area.

B) Second Circuit stringing: NIL

C) Reorientation of existing Lines: NIL

D) Replacement of conductor: NIL

III) Addition of Transformation Capacity:

A) Creation of new level in existing substation: NIL

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation: NIL

D) Additional Transformer:

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	110 kV BKC (2018-19)	Installation of 1 x 125 MVA 110/33-22 kV Transformer # 3	Mumbai	To enhance transformation capacity to meet load growth.

E) Replacement of Transformer:

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	220 kV Mahalaxmi (2018-19)	a) Replacement of 1 x (90 – 90) MVA 110/22 kV Transformer # 1 b) Replacement of 1 x (90 – 75) MVA, 110 kV / 33-22 kV Transformer#3	Mumbai	To enhance transformation capacity to meet load growth.
2	220 kV Saki (2018-19)	1 x (90-75) MVA 110/33-22 kV transformer # 2	Mumbai	To enhance transformation capacity to meet load growth.
3	220 kV Borivali (2018-19)	Replacement of 1 x (90 – 75) MVA 110/33-22 kV Transformer # 7	Mumbai	Transformer # 7 has failed. The replacement with new transformer will meet current and future load requirement.

IV) Reactor: NIL

V) Capacitor: NIL

VI) Conversion of Existing AIS by GIS: NIL

2019-20

I) New Substations:

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	220 kV Antop Hill (2019-20)	Mumbai	a) i)Tapping of 220 kV Trombay–Dharavi# 9 Line to Antop Hill (1 X 1.5=1.5 km) ii) 220 kV S/C line from 220 kV Trombay to Antop Hill (7 km) b) 2 X 125 MVA, 220/33 kV Transformers c) 9 Nos. X 220 kV GIS bays d) 34 Nos. X 33 kV GIS bays e) Construction of GIS Bldg.	To meet additional Load Requirement of DISCOMs

II) New EHV Lines

A) Link Lines: NIL

B) Second Circuit stringing: NIL

C) Reorientation of existing Lines: NIL

D) Replacement of conductor: NIL

III) Addition of Transformation Capacity:

A) Creation of new level in existing substation:

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	220 kV Versova (2019-20)	a) 220 kV D/C line from 220 kV R-Infra Versova S/S to 220 kV TPC Versova – 2 X 8= 16 ckt km (1200 sq. mm cable) b) 2 Nos. X 250 MVA 220 kV /110 kV/ 33 kV ICT c) 9 Nos. X 220 kV GIS bays d) 25 Nos. X 33 kV GIS Bays	Mumbai	To interconnect 220 kV R-infra Versova R/S to 220 kV Tata Power-Versova to increase reliability & to meet load growth.

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation: NIL

D) Additional Transformer: NIL

E) Replacement of Transformer:

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	220 kV Mahalaxmi R/S (2019-20)	Replacement of existing 1 No. 90 MVA 110/22 kV Transformer by 125 MVA, 110/33 kV Transformer	Mumbai	Test results indicating deterioration of Existing transformer. Mahalaxmi is being critical receiving station in South Mumbai it is required to replace the transformer to ensure reliability and availability of supply.

IV) Reactor : NIL

V) Capacitor:

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	Versova (2019-20)	1 No. x 15 MVAR, 33 kV Capacitor Bank	Mumbai	To maintain voltage within the SoP norms of MERC based on steady state overvoltage study carried out through a consultant.
2	Mahalaxmi (2019-20)	1 No. x 15 MVAR, 33 kV Capacitor Bank	Mumbai	To maintain voltage within the SoP norms of MERC based on steady state overvoltage study carried out through a consultant
3	Borivali (2019-20)	1 No. x 15 MVAR, 22 kV Capacitor Bank	Mumbai	To maintain voltage within the SoP norms of MERC based on steady state overvoltage study carried out through a consultant

VI) Addition of Bays :

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	220 KV Dharavi (2019-20)	Installation of 2 Nos. x 110 kV GIS bays	Mumbai	For power supply to Metro-3
2	220 KV Mahalaxmi (2019-20)	Installation of 2 Nos. x 110 kV GIS bays	Mumbai	For power supply to Metro-3
3	220 KV Versova (2019-20)	Installation of 2 Nos. x 110 kV GIS bays	Mumbai	For power supply to Metro-2A

VII) Replacement of Existing AIS :

SN	Name of S/S (Year of completion)	Detailed Scope of Work	District	Remarks
1	220 kV Saki (2019-20)	13 X 110 kV GIS Bays	Mumbai	The existing outdoor switchyard bays requires replacement. It will be converted into GIS and space thus released will be utilized for installation of 3rd ICT
2	220 kV Carnac (2019-20)	16 X 33 kV AIS Bays	Mumbai	Replacement of existing AIS is required to enhance reliability
3	220 kV Borivali (2019-20)	40 X 22 kV GIS Bays	Mumbai	Replacement of existing AIS to GIS is required to a. To enhance reliability and b. To meet future load growth c. To create space for future switchgear

VIII) Installation of Miscellaneous electrical equipment:

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	Transmission RSS (2019-20)	Mumbai	a) Remote Terminal Units (RTU) for SCADA integration at Chembur RSS b) Safety equipment (such as Man lifter, Scissor lift, Arial working platforms, voltage detectors, portable grounds etc.) at various RSS c) Testing equipment (such as HV tan delta set, LV tan delta set, corona discharge indicator, leakage current monitors, SFRA Test kit, 3-phase relay testing kit and breaker analyzer kit etc.) d) Installation of 110 kV breakers at Kalyan RSS e) Replacement of station batteries at Dharavi, Vikhroli and Kalyan RSS f) Installation of power quality Analyzers (PQA) in RSS	1. To meet operation, maintenance and testing requirements at various RSS 2. To monitor, analyze and provide remedial solutions to improve power quality of power supply to customers

2020-21

I) New Substations:

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	220 kV Chunabhatti (2020-21)	Mumbai	a) LILO of one ckt of existing 220 kV Bhira-Dharavi D/C line - 2 X 2 = 4 km b) 220 kV Trombay Chunabhatti Line- 5 km c) 2 Nos. X 250 MVA 220/110/33 kV ICT d) 9 Nos. X 220 kV GIS bays e) 14 Nos. X 110 KV GIS bays f) 21 Nos. X 33 kV GIS bays g) Construction of GIS Building	Substation required to meet additional Load requirement of DISCOMs and to have second interconnection with BKC and Kurla RSS for enhancing reliability and availability
2	2 X 220 kV GIS Switching stations at Navi Mumbai International Airport (2020-21)	Mumbai	a) 28 X 220 kV GIS bays b) 220 kV Cable laying-10 km c) Construction of 2 Nos. of 220 kV GIS Buildings for Switching Stations at two ends of underground cables.	To facilitate Navi Mumbai International Airport Development. 1. One switching station at Karanjade, Raigad 2. Second switching station at Belapur, Raigad

II) New EHV Lines

A) Link Lines:

Sr. No.	Name of Line (Year of completion)	Length of Line CKT km	District	Remarks
1	110 kV S/C line from Kurla RS to BKC RS (2020-21)	5 km	Mumbai	Installation of 110 kV S/C line from Kurla RS and BKC RS (1600 sq.mm Cable) along with bays at both ends. This line will facilitate additional source to 110 kV BKC RS and Kurla Receiving Stations and it will enhance reliability and availability in emergency.
2	110 kV S/C from Chunabhatti S/S to BKC S/S (2020-21)	8 km	Mumbai	Installation of 110 kV S/C from Chunabhatti RS to BKC RS with bays at both ends. Line Length (1600 sq.mm cable) This line will facilitate additional source to 110 kV BKC Receiving Station

Sr. No.	Name of Line (Year of completion)	Length of Line CKT Km	District	Remarks
3	Double circuit 220 kV lines from Tata Belapur S/S to MSETCL's 220 kV Kharghar S/S (2020-21)	2 X 2.5 = 5 km U/G	Mumbai	To strengthen Transmission Network and to bring additional power to Mumbai. The scope will also include installation of 2 X 2 = 4 Nos. of 220 kV bays at both ends.

B) Second Circuit stringing:

C) Reorientation of existing Lines: NIL

D) Replacement of conductor: NIL

III) Addition of Transformation Capacity:

A) Creation of new level in existing substation: NIL

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation: NIL

D) Additional Transformer: NIL

E) Replacement of Transformer:

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	220 kV Dharavi (2020-21)	Replacement of 4x 60 MVA 110/22 KV and 1 x 75 MVA 110/22 kV Transformers by 3 X 125 MVA 220/33-22 kV Transformers along with installation of 3 Nos. of 220 kV GIS Bays	Mumbai	Dharavi is being critical receiving station it is required to replace the old transformers by higher capacity transformers to ensure reliability and availability of supply.
2	110 KV Mankhurd (2020-21)	2 X 125 MVA, 110 kV/33/22kV Transformers	Mumbai	To enhance reliability of power supply and enhance transformation capacity by replacement of weak transformers to meet future load growth.

IV) Installation of Reactor:

V) Capacitor: NIL

VI) A) Miscellaneous: Receiving Stations

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	All 21 Receiving stations in Tata Power Transmission (2020-21)	Installation of Fire Protection systems in Transmission	Mumbai	To ensure that adequate fire protection systems are available as per current statute.
2	Dharavi, Parel and Borivali Receiving stations in Tata Power Transmission (2020-21)	Installation of on-line thermal scanning & automatic hot-spot detection system for equipment in outdoor switchyard	Mumbai	To prevent forced outages of RSS equipment & lines through automatic detection of hot-spots.
3	16 Receiving stations in Tata Power Transmission (2020-21)	Installation of relay parametrization and disturbance record collection system	Mumbai	To reduce line downtime after tripping through analysis of data from remote center.

B) Miscellaneous : Transmission Lines

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	Transmission Lines (2020-21)	Mumbai	a) Replacement of rusted BMS tower steel b) Strengthening weak foundations of 50 Nos. of transmission towers located in creek for life enhancement of these towers c) Installation of safe climbing arrangement on transmission towers d) Installation of Turbo Bird Repellent (TBR) on transmission towers	1.Strengthening weak transmission towers and enhancing safety 2. TBR to reduce line tripping and enhance availability of lines

C) Miscellaneous : Conversion of AIS into GIS :

SN	Name of S/S (Year of completion)	Detailed Scope of Work	District	Remarks
1	220 kV Dharavi (2020-21)	Replacement of 22 kV Bus. Section III, IV & V by GIS of 38 bays	Mumbai	Replacement of existing 22 kV old AIS by GIS for enhancing reliability and creation of additional bays.
2	110 kV Malad (2020-21)	Replacement of 22 kV Bus. Section I & II by GIS of 28 bays	Mumbai	Replacement of existing 22 kV old AIS by GIS for enhancing reliability.

2021-22

I) New Substations:

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	400 kV Vikhroli (2021-22)	Mumbai	a) 400 KV Kharghar-Vikhroli D/C line with bays at Kharghar – 2 X 21.3 = 42.6 km (Rs. 387 Cr) b) 2 x 500 MVA, 400/220/33 kV power transformers c) 2 x 250 MVA, 220/110/33 kV ICTs d) 23 X 400 kV GIS bays e) 27 X 220 kV GIS bays f) 27 X 33 kV GIS bays g) Construction of 400 kV GIS Bldgs at Ghatkopar and Vikhroli S/S h) LILO of existing 220 kV Trombay-Salsette and 220 kV Trombay-Sahar lines at proposed 220 kV GIS at Vikhroli i) 400 kV cable system between 400 kV switching station at Ghatkopar and 400 kV Receiving station at Vikhroli - 4 X 2 km = 8 km j) Construction of 220 kV GIS Buildings	For strengthening Transmission Network of Mumbai
2	220/110 kV Sewree Switching Station (2021-22)	Mumbai	a) LILO 220 KV Trombay-Carnac 5 & 6 at Sewree S/S -4 X 1 = 4 km b) LILO 220 KV Trombay Backbay at Sewree S/S – 2 X 4 =8 km c) 17 Nos. X 220 kV GIS bays d) 7 Nos. X 110 KV GIS bays e) Construction of GIS Bldg	Operational flexibility and reliability

II) New EHV Lines

A) Link Lines:

Sr. No.	Name of Line (Year of completion)	Length of Line CKT km	District	Remarks
1	220 KV Kalwa - Salsette line # 5 along with bays at both ends (2021-22)	13 km	Mumbai	To meet increased Mumbai demand reliably & to meet N-1 contingency of 220 kV Kalwa- Salsette lines
2	LILO of 400 kV Talegaon-Kalwa Line at Vikhroli (2021-22)	14 km	Mumbai	To import additional power from Maharashtra grid.

B) Second Circuit stringing:

Sr. No.	Name of Line (Year of completion)	Length of Line CKT km	District	Remarks
1	110 kV S/C line from Backbay RS to Carnac RS (2021-22)	5 km	Mumbai	Existing 110 kV cables (Two Circuits) forming South Mumbai Ring do not have sufficient capacity to cater Carnac RS load from Backbay RS during 220 kV Trombay -Carnac-5 & 6 tripping. The installation of this line will bridge the gap and will enhance reliability.

C) Reorientation of existing Lines: NIL

D) Replacement of line conductor / cable:

Sr. No.	Name of Line (Year of completion)	Length of Line CKT km	District	Remarks
1	110 kV Dharavi - Mahalaxmi Cable (2021-22)	8 km	Mumbai	Existing 110 kV oil filled cable is old and have outlived its useful life. It will be replaced by higher capacity 1600 Sq.mm XLPE cable to enhance capacity and reliability.
2	110 kV Parel - Mahalaxmi Cable (2021-22)	4 km	Mumbai	
3	110 kV Carnac Backbay#1 & 2 Cable (2021-22)	(2 X 5 km) 10 km	Mumbai	

III) Addition of Transformation Capacity:

A) Creation of new level in existing substation: NIL

B) Additional ICT in existing substation: NIL

C) Replacement of ICT in existing substation: NIL

D) Additional Transformer: NIL

E) Replacement of Transformer: NIL

IV) Reactor : NIL

V) Capacitor : NIL

VI) Conversion of 110 kV AIS into GIS :

SN	Name of S/S (Year of completion)	Detailed Scope of Work	District/ Approx. Cost	Remarks
1	110 kV Vikhroli (2021-22)	a) 20 X 110 kV GIS Bays b) 26 X 33 kV GIS bays c) Construction of building for 110 kV & 33 kV GIS.	Mumbai	The 110 kV old outdoor switchyard will be converted in to GIS. The vacated space will be utilized for commissioning 250 MVA ICTs of 400 kV Vikhroli Project.

2022-23

I) New Substations:

SR NO	NAME OF S/S (Year of completion)	District	TOTAL SCOPE OF WORK	REMARKS
1	220 kV Parel (2022-23)	Mumbai	a) 220 kV D/C line from Sewree – 2X 4 = 8 km. (1200 sq.mm UG cable) b) 220 kV S/C line from Mahalaxmi (1200 Sq.mm) - 5 km c) 2 X 250 MVA, 220/110/33 kV ICT d) 7 X 220 kV GIS bays. e) 24 X 110 kV GIS bays. f) 31 X 33 kV GIS bays. g) Construction of GIS Building	To meet Load growth requirement of South Mumbai
2	220 kV Vile Parle (W) (2022-23)	Mumbai	a) 220 kV D/C UG cable system from Versova RS to Vile Parle Rs. – 2 X 6 = 12 km b) Procurement of Land at Parle(West) c) Installation of 220 kV GIS d) 2 X 125 MVA, 220/33 kV Power transformers (One in future) e) Installation of 33 kV GIS bays f) Construction of 220/33 kV GIS Building	To meet Load growth requirement of DISCOMs
3	220 kV Goregaon (2022-23)	Mumbai	a) 220 kV S/C line from Tata-Borivali RS to proposed Goregaon RS – 8 km b) 220 kV S/C line from Tata-Sahar to proposed Goregaon – 8 km c) 2 X 125 MVA 220/33 kV Transformers d) 9 Nos. X 220 kV GIS bays e) 30 Nos. X 33 kV GIS bays f) Construction of GIS Building	To meet Load growth requirement of DISCOMs

II) New EHV Lines

A) Link Lines: NIL

B) Second Circuit stringing: NIL

C) Reorientation of existing Lines: NIL

D) Replacement of conductor /cable:

Sr. No.	Name of Line (Year of completion)	Length of Line CKT Km	District	Remarks
1	110 kV Trombay Parel # 3 Cable (2022-23)	4 km	Mumbai	Existing 110 kV oil filled cable is old and have outlived its useful life. It will be replaced by higher capacity 1600 Sq.mm XLPE cable to enhance capacity and reliability.
2	110 kV Trombay Chembur # 1 and 2 (2022-23)	(2 X 4 km) 8 km	Mumbai	
3	110 kV Trombay Carnac # 3 Cable (2022-23)	8 km	Mumbai	

III) Addition of Transformation Capacity:

A) Creation of new level in existing substation: NIL

B) Additional ICT in existing substation:

Sr. No.	Name of Substation (Year of completion)	Description	District	Remarks
1	Carnac R/S (2022-23)	a. 1 x 250 MVA 220/110 / 33 kV ICT b. 7 X 220 kV GIS Bays c. 1 X 110 kV GIS Bay d. LILO of 220 kV Trombay-Salsette-Backbay line- 2 X 1 km = 2 km e. Extension of GIS Hall	Mumbai	ICT is required to improve the capacity and reliability of Carnac RSS and to uprate existing 110 kV feeds. The 220 kV Trombay-Salsette-Backbay line will be made LILO at Carnac RS to provide additional source to Carnac.

C) Replacement of ICT in existing substation: NIL

D) Additional Transformer: Nil

E) Replacement of Transformer: Nil

IV) Conversion of Existing AIS by GIS:

SN	Name of S/S (Year of completion)	Detailed Scope of Work	District	Remarks
1	110 kV Dharavi (2022-23)	a) 41 Nos. X 110 kV GIS bays. b) 50 Nos. x 33 kV GIS Bays c) Construction of GIS building	Mumbai	The existing old 110 kV outdoor switchyard will be converted to indoor GIS for operational flexibility, reliability and Safety.

POWER GRID CORPORATION OF INDIA (ONGOING SCHEMES)

Under Construction / Planned Transmission System being implemented by POWERGRID

1. Western Region System Strengthening –V (Part System)

- 400 kV Vapi – Kala - Kudus D/c-236 ckm (Dec'17)
- LILO of 400 kV Lonikhand /Pune - Kalwa line at Navi Mumbai-16 ckm (Dec'17)
- Establishment of 2x315MVA, 400/220 kV Navi Mumbai (GIS) S/s (Substation is ready)

2. Tr. System of Mundra Ultra Mega Power Project (4000 MW) (Part System)

- Wardha-Aurangabad 400 kV (Quad) D/c with a provision to upgrade to 1200 kV level at a later date - 694 ckm (Feb'18)
- 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end (Feb'18)

3. Solapur STPP(2x660MW) transmission system

- Part A: Solapur STPP – Solapur (PG) 400kV D/c -22 ckm –Commissioned.
- Part B: Solapur STPP – Solapur (PG) 400kV 2nd D/c -22 ckm (Commissioned)
- Augmentation of 400/220kV ICT by 1x500MVA transformer(3rd) at Solapur (PG) – Commissioned

4. Transmission System for IPP generation projects in Chhattisgarh (Part System)

I. Transmission System strengthening in Western part of WR for IPP Generation Projects in Chhattisgarh (DPR-4)

- Aurangabad(PG) – Boisar 400kV D/c (Quad)-654 ckm (Oct'17)
- Wardha – Aurangabad 765kV D/c line – 690 ckm – Commissioned
- Establishment of 2x500MVA, 765/400kV Aurangabad (PG) S/s – Commissioned
- Augmentation of transformation capacity at Boisar by 1x500 MVA - Commissioned

II. System strengthening in North/West part of WR for IPP Projects in Chhattisgarh (Part System) (DPR-5)

- Aurangabad (PG) – Padghe(PG) 765kV D/c-570 ckm (Dec'17)
- Kudus (MSETCL) – Padghe(PG) 400kV D/c (Quad)- 34 ckm (Dec'17)
- Establishment of 765/400kV 2x1500MVA Padghe(PG) S/s [GIS] (Dec'17)

III. System strengthening in Raipur-Wardha corridor for IPP Projects in Chhattisgarh (DPR-6)

- Raipur Pooling Station – Wardha 765kV 2nd D/c-714 ckm —Commissioned

5. Installation of STATCOM in WR (Maharashtra Portion)

- Aurangabad (PG) – +/- 300 MVAR (Jan'18)
- Solapur (PG) - +/-300 MVAR (Jan'18)

6. Transmission System Associated with Mauda-II (2x660MW) generation project

- 400 kV Mauda II – Betul D/c (Quad) - 386 ckm —Commissioned

7. Wardha - Hyderabad 765KV link

- Wardha – Nizamabad 765 kV D/c – 572ckm —Commissioned
- Nizamabad - Hyderabad line 765KV D/C – 486ckm Commissioned
- Nizamabad - Dichpali line 400KV D/C – 9ckm —Commissioned

8. Western Region System Strengthening – 16 (Part System)

- Installation of 2x500MVA, 400/220kV ICTs with associated bays at Parli (PG) switching station along with provision of four nos. of 220 kV bays (July'18) {for LILO of one circuits of Parli - Harngul 220 kV line at Parli (PG) substation; LILO of one circuits of Parli - Osmanabad 220 kV D/C line at Parli (PG) substation}

9. Western Region Strengthening Scheme – 17 (Part System)

- Augmentation of Transformation capacity (4th ICT) at 400/220kV Boisar by 500MVA (Sep'19)

Under Construction / Planned Transmission System being implemented through Tariff Based Competitive Bidding

I. By POWERGRID

10. Transmission System Associated with Gadarwara STPS of NTPC (Part-A)

- Gadarwara STPS – Warora Pooling Station 765 kV D/c line – 640ckm (Nov'17)
- Establishment of 2x1500 MVA, 765/400 Substations at Pooling Station (near Warora) (Nov'17)
- LILO of both circuits of Wardha - Parli (PG) 400 kV D/c quad line at Pooling Station (near Warora) – 180ckm (Nov'17)

11. Transmission System Associated with Gadarwara STPS of NTPC(Part-B)

- Warora Pooling Station – Parli (new) 765 kV D/c line – 640ckm (Jan'18)
- Parli (new) – Solapur 765 kV D/c line – 294ckm (Jan'18)
- Establishment of 2x1500 MVA, 765/400 Substations at Parli (new) (Jan'18)
- Parli (new) – Parli (PG) 400 kV D/c (Quad) line – 40ckm (Jan'18)

II. By Other ISTS Licensees / Yet to be awarded

1. System Strengthening for IPPs in Chhattisgarh (Part-A) & Other generation projects in WR

- LILO of one circuit of Aurangabad – Padghe 765kV D/c line at Pune(GIS) – 100ckm (Mar'19)

2. Additional System Strengthening Scheme for Chhattisgarh IPPs (Part-B)

- Rajnandgaon – Warora 765kV D/c line – 540ckm (Nov'18)

3. Additional inter-Regional AC link for import into Southern Region

- Warora – Warangal 765kV D/c line – 700ckm (2018-19)

4. System Strengthening in WR associated with Khargone TPS (1320MW) (Part System)

- Khandwa Pool– Dhule 765 kV D/C line – 482 ckm (Jul'2019)